


ANNUAL REPORT 2016

JPMorgan Chase & Co.

Financial Highlights

As of or for the year ended December 31, (in millions, except per share, ratio data and headcount)	2016	2015	2014
Reported basis[(a)]			
Total net revenue	$ 95,668	$ 93,543	$ 95,112
Total noninterest expense	55,771	59,014	61,274
Pre-provision profit	39,897	34,529	33,838
Provision for credit losses	5,361	3,827	3,139
Net income	$ 24,733	$ 24,442	$ 21,745
Per common share data			
Net income per share:			
Basic	$ 6.24	$ 6.05	$ 5.33
Diluted	6.19	6.00	5.29
Cash dividends declared	1.88	1.72	1.58
Book value	64.06	60.46	56.98
Tangible book value (TBVPS)[(b)]	51.44	48.13	44.60
Selected ratios			
Return on common equity	10%	11%	10%
Return on tangible common equity (ROTCE)[(b)]	13	13	13
Common equity Tier 1 capital ratio[(c)]	12.2	11.6	10.2
Tier 1 capital ratio[(c)]	14.0	13.3	11.4
Total capital ratio[(c)]	15.2	14.7	12.7
Selected balance sheet data (period-end)			
Loans	$ 894,765	$ 837,299	$ 757,336
Total assets	2,490,972	2,351,698	2,572,274
Deposits	1,375,179	1,279,715	1,363,427
Common stockholders' equity	228,122	221,505	211,664
Total stockholders' equity	254,190	247,573	231,727
Market data			
Closing share price	$ 86.29	$ 66.03	$ 62.58
Market capitalization	307,295	241,899	232,472
Common shares at period-end	3,561.2	3,663.5	3,714.8
Headcount	243,355	234,598	241,359

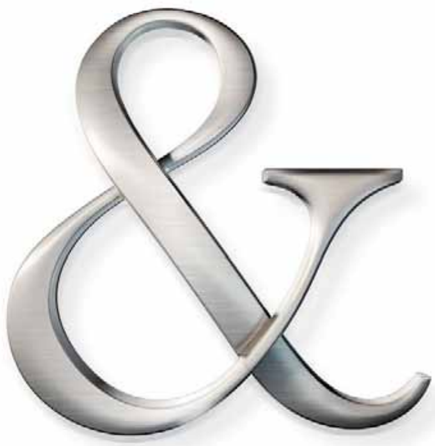
(a) Results are presented in accordance with accounting principles generally accepted in the United States of America, except where otherwise noted.

(b) TBVPS and ROTCE are each non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 48–50.

(c) The ratios presented are calculated under the Basel III Advanced Fully Phased-In Approach, and they are key regulatory capital measures. For further discussion, see "Capital Risk Management" on pages 76-85.

JPMorgan Chase & Co. (NYSE: JPM) is a leading global financial services firm with assets of $2.5 trillion and operations worldwide. The firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing, and asset management. A component of the Dow Jones Industrial Average, JPMorgan Chase & Co. serves millions of consumers in the United States and many of the world's most prominent corporate, institutional and government clients under its J.P. Morgan and Chase brands.

Information about J.P. Morgan's capabilities can be found at jpmorgan.com and about Chase's capabilities at chase.com. Information about JPMorgan Chase & Co. is available at jpmorganchase.com.



communities

clients

customers

employees

veterans

nonprofits

business owners

schools

hospitals

local governments

JPMorgan Chase & Co.

Dear Fellow Shareholders,

Jamie Dimon,
Chairman and
Chief Executive Officer

I begin this letter with a sense of gratitude and pride about JPMorgan Chase that has only grown stronger over the course of the last decade. Ours is an exceptional company with an extraordinary heritage and a promising future.

Throughout a period of profound political and economic change around the world, our company has been steadfast in our dedication to the clients, communities and countries we serve while earning a fair return for our shareholders.

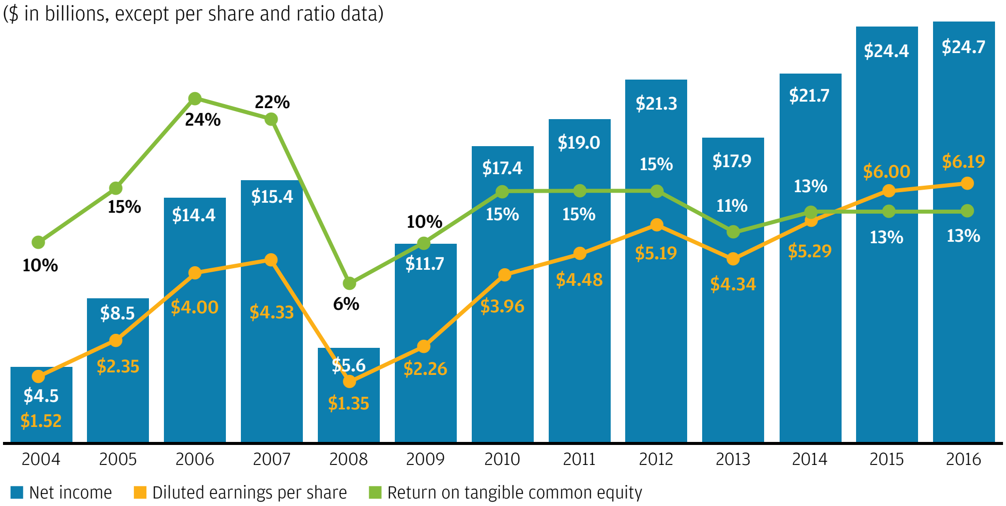
2016 was another breakthrough year for our company. We earned a record $24.7 billion in net income on revenue[1] of $99.1 billion, reflecting strong underlying performance across our businesses. We have delivered record results in six out of the last seven years, and we hope to continue to deliver in the future.

Our stock price is a measure of the progress we have made over the years. This progress is a function of continually making important investments, in good times and not so good times, to build our capabilities — people, systems and products. These

[1] Represents managed revenue

Earnings, Diluted Earnings per Share and Return on Tangible Common Equity 2004–2016

($ in billions, except per share and ratio data)



investments drive the future prospects of our company and position it to grow and prosper for decades. Whether looking back over five years, 10 years or since the Bank One/JPMorgan Chase merger (approximately 12 years ago), our stock has significantly outperformed the Standard & Poor's (S&P) 500 and the S&P Financials Index. And this is during a time of unprecedented challenges for banks – both the Great Recession and

Stock total return analysis

	Bank One	S&P 500	S&P Financials Index
Performance since becoming CEO of Bank One (3/27/2000–12/31/2016)[1]			
Compounded annual gain	11.5%	4.3%	3.1%
Overall gain	524.6%	103.0%	65.9%

	JPMorgan Chase & Co.	S&P 500	S&P Financials Index
Performance since the Bank One and JPMorgan Chase & Co. merger (7/1/2004–12/31/2016)			
Compounded annual gain	9.5%	7.8%	2.3%
Overall gain	211.0%	154.8%	32.3%
Performance for the period ended December 31, 2016			
Compounded annual gain/(loss)			
One year	34.6%	12.0%	22.7%
Five years	24.4%	14.7%	19.4%
Ten years	8.6%	6.9%	(0.4)%

These charts show actual returns of the stock, with dividends included, for heritage shareholders of Bank One and JPMorgan Chase & Co. vs. the Standard & Poor's 500 Index (S&P 500) and the Standard & Poor's Financials Index (S&P Financials Index).

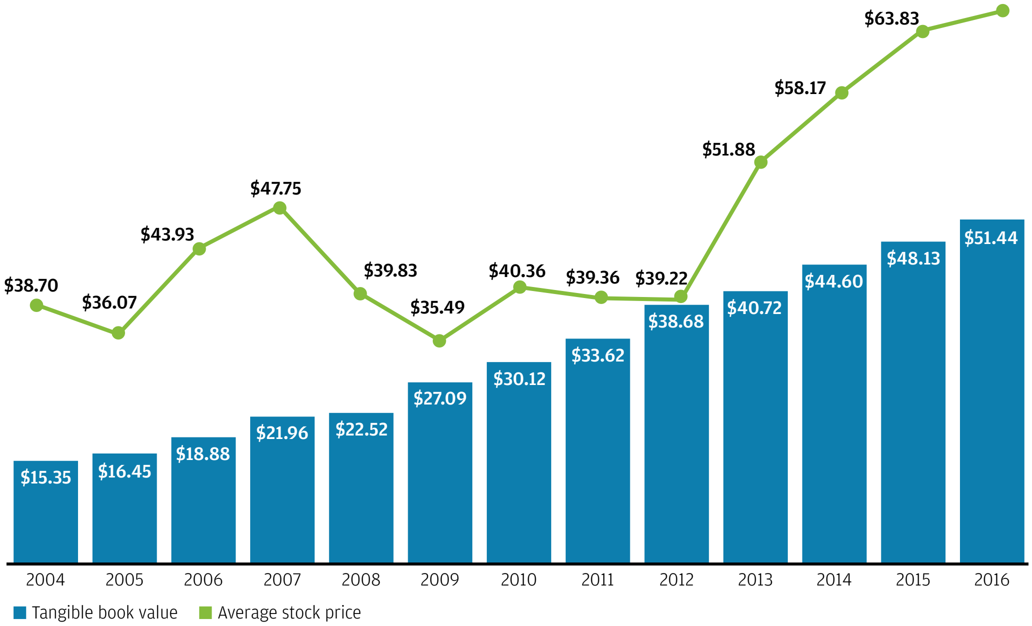
[1] On March 27, 2000, Jamie Dimon was hired as CEO of Bank One.

the extraordinarily difficult legal, regulatory and political environments that followed. We have long contended that these factors explained why bank stock price/earnings ratios were appropriately depressed. And we believe the anticipated reversal of many negatives and the expectation of a more business-friendly environment, coupled with our sustained, strong business results, are among the reasons our stock price has done so well this past year.

As you know, we believe tangible book value per share is a good measure of the value we have created for our shareholders. If we believe our asset and liability values are appropriate — and we do — and if we believe we can continue to deploy this capital at an approximate 15% return on tangible equity, which we do, then our company should ultimately be worth considerably more than tangible book value. If you look at the chart below, you'll see that tangible book value "anchors" the stock price.

In the last five years, we have bought back $25.7 billion in stock. In prior years, I have explained why buying back our stock at tangible book value per share was a no-brainer. While the first and most important use of capital is to invest in growth, buying back stock should also be considered when you are generating excess capital. We do

Tangible Book Value and Average Stock Price per Share
2004–2016



Bank One/JPMorgan Chase & Co. tangible book value per share performance vs. S&P 500

	Bank One (A)	S&P 500 (B)	Relative Results (A) – (B)
Performance since becoming CEO of Bank One (3/27/2000–12/31/2016)[1]			
Compounded annual gain	12.2%	4.3%	7.9%
Overall gain	528.1%	103.0%	425.1%

	JPMorgan Chase & Co. (A)	S&P 500 (B)	Relative Results (A) – (B)
Performance since the Bank One and JPMorgan Chase & Co. merger (7/1/2004–12/31/2016)			
Compounded annual gain	13.2%	7.8%	5.4%
Overall gain	373.6%	154.8%	218.8%

Tangible book value over time captures the company's use of capital, balance sheet and profitability. In this chart, we are looking at heritage Bank One shareholders and JPMorgan Chase & Co. shareholders. The chart shows the increase in tangible book value per share; it is an after-tax number assuming all dividends were retained vs. the Standard & Poor's 500 Index (S&P 500), which is a pre-tax number with dividends reinvested.

[1] On March 27, 2000, Jamie Dimon was hired as CEO of Bank One.

currently have excess capital. Five years ago, we offered the example of our buying back stock at tangible book value and having earnings per share and tangible book value per share substantially higher than they otherwise would have been just four years later. While we prefer buying our stock at tangible book value, we think it makes sense to do so at or around two times tangible book value for reasons similar to those we've expressed in the past. If we buy back a big block of stock this year (using analyst earnings estimates for the next five years), we would expect earnings per share in five years to be 3%–4% higher, and tangible book value would be virtually unchanged.

In this letter, I discuss the issues highlighted on the next page – which describe many of our successes and opportunities, as well as our challenges and responses. Like last year's letter, we have organized much of the content around some of the key questions we have received from shareholders and other interested parties.

I. THE JPMORGAN CHASE FRANCHISE

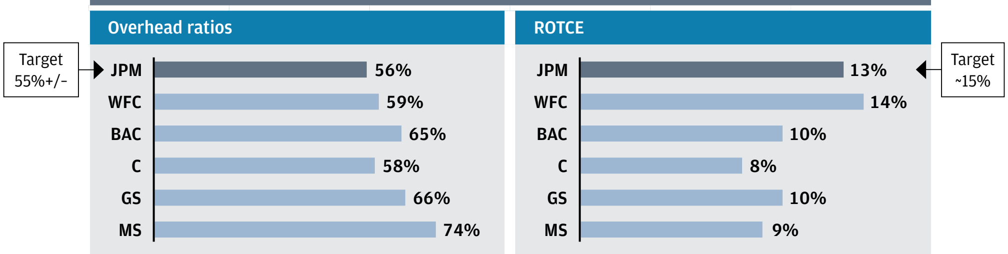
1. Why do we consider our four major business franchises strong and market leading?

The chart below and those on page 8 speak for themselves. Looking closely at the actual numbers, it's clear that every business is among the top performers financially – whether you look at efficiency (overhead ratios) or return on equity (ROE) vs. the best in that business. More important, customer satisfaction is at the center of everything we do. Each business has gained market share – which is possible only when you are improving customer satisfaction and your products and services relative to the competition. And each business continues to innovate, from customer-facing apps, to straight-through processing, to digitized trading services or payment systems. Our business leaders do a great job describing their businesses, and I strongly encourage you to read their letters following this year's Letter to Shareholders. Each will give you a feel for why we are optimistic about our future.

JPMorgan Chase Is in Line with Best-in-Class Peers in Both Efficiency and Returns

	Efficiency			Returns		
	JPM 2016 overhead ratios	Best-in-class peer overhead ratios[1]	JPM target overhead ratios	JPM 2016 ROE[2]	Best-in-class peer ROTCE[3]	JPM target ROTCE[2] (+/-)
Consumer & Community Banking	55%	56% WFC-CB	~50%	18%	14% WFC	20%
Corporate & Investment Bank	54%	54% BAC-GB & BAC-GM	55%+/-	16%	13% BAC-GB & BAC-GM	14%
Commercial Banking	39%	39% PNC	35%	16%	12% FITB	15%
Asset & Wealth Management	70%	65% CS-PB & BLK	70%	24%	24% BAC-GWIM & TROW	25%

JPMorgan Chase compared with peers[4]



[1] Best-in-class overhead ratio represents comparable JPMorgan Chase (JPM) peer segments: Wells Fargo Community Banking (WFC-CB), Bank of America Global Banking and Global Markets (BAC-GB & BAC-GM), PNC Corporate and Institutional Banking (PNC), Credit Suisse Private Banking (CS-PB) and BlackRock (BLK).

[2] JPM 2016 ROE reflects allocation of common equity to each business. JPM target ROTCE reflects the 2017 change in capital allocation methodology from common equity to tangible common equity, resulting in LOB equity being more in line with peers.

[3] Best-in-class ROTCE is based on net income minus preferred stock dividends of comparable JPM peers and peer segments when available: Wells Fargo & Company (WFC), BAC-GB & BAC-GM, Fifth Third Bank (FITB), Bank of America Global Wealth and Investment Management (BAC-GWIM) and T. Rowe Price (TROW).

[4] WFC, Bank of America Corporation (BAC), Citigroup Inc. (C), Goldman Sachs Group, Inc. (GS), Morgan Stanley (MS).

ROTCE = Return on tangible common equity

Client Franchises Built Over the Long Term

		2006	2015	2016
Consumer & Community Banking	Deposits market share[1]	3.6%	7.9%	8.3%
	# of top 50 Chase markets where we are #1 (top 3)	11 (25)	12 (40)	14 (38)
	Average deposits growth rate	8.0%	9.0%	10.0%
	Active mobile customers growth rate	NM	20.0%	16.0%
	Credit card sales market share[2]	15.9%	21.1%	21.5%
	Merchant processing volume[3] ($ in billions)	$661	$949	$1,063
Corporate & Investment Bank	Global Investment Banking fees[4]	#2	#1	#1
	Market share[4]	8.7%	7.9%	8.1%
	Total Markets revenue[5]	#8	#1	#1
	Market share[5]	6.3%	9.7%	11.4%
	FICC[5]	#7	#1	#1
	Market share[5]	7.0%	10.3%	12.0%
	Equities[5]	#8	#3	#2
	Market share[5]	5.0%	8.8%	10.1%
Commercial Banking	# of Metropolitan Statistical Areas with Middle Market banking presence[6]	26	45	47
	Multifamily lending[7]	#28	#1	#1
	Gross Investment Banking revenue ($ in billions)	$0.7	$2.2	$2.3
	% of North America Investment Banking fees	16%	36%	40%
Asset & Wealth Management	Mutual funds with a 4/5 star rating[8]	119	214	220
	Ranking of long-term client asset flows[9]	NA	#4	#2
	Active AUM market share[10]	1.8%	2.6%	2.5%
	North America Private Bank *(Euromoney)*	#1	#1	#1
	Client assets market share[11]	3.0%	4.4%	4.4%

Consumer & Community Banking
- Relationships with ~50% of U.S. households
- Industry leading deposit growth[12]
- #1 U.S. credit card issuer[13]
- #1 U.S. co-brand credit card issuer[14]
- #1 rated mobile banking app[15]
- #1 U.S. credit and debit payments volume[16]
- #2 merchant acquirer[17]

Corporate & Investment Bank
- >80% of Fortune 500 companies do business with us
- #1 in both N.A. and EMEA Investment Banking fees[18]
- #1 in Global Debt, Equity and Equity-related[18]
- #1 in Global Long-Term Debt and Loan Syndications[18]
- #1 in FICC productivity[19]
- Top 3 Custodian globally with AUC of $20.5 trillion[20]
- #1 in USD clearing volumes with 19.0% share in 2016[21]

Commercial Banking
- Unparalleled platform capabilities – competitive advantage
- #1 in perceived customer satisfaction[22]
- Top 3 in overall Middle Market, large Middle Market and Asset Based Lending Bookrunner[23]
- Industry-leading credit performance – 5th straight year of net recoveries or single digit NCO rate

Asset & Wealth Management
- 83% of 10-year long-term mutual fund AUM in top 2 quartiles[24]
- Positive client asset flows every year since 2004
- #2 Global Private Bank and #1 LatAm Private Bank[25]
- Revenue and long-term AUM growth ~80% since 2006
- Doubled WM client assets (1.6x industry rate) since 2006[10]

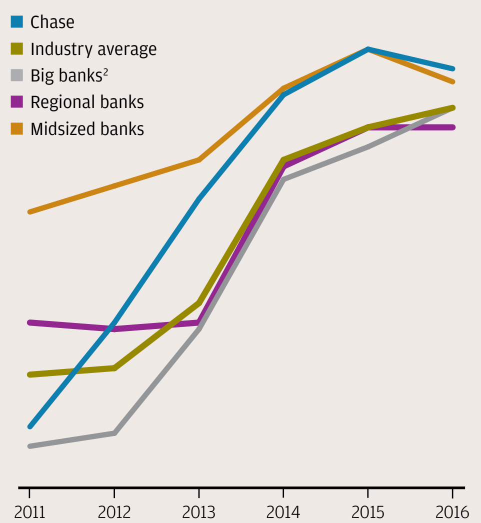
For footnoted information, refer to slide 39 in the 2017 Firm Overview Investor Day presentation, which is available on JPMorgan Chase & Co.'s website (http://investor.shareholder.com/jpmorganchase/presentations.cfm), under the heading Investor Relations, Events & Presentations, JPMorgan Chase 2017 Investor Day, Firm Overview, and on Form 8-K as furnished to the SEC on February 28, 2017, which is available on the SEC's website (www.sec.gov).

NM = Not meaningful

NA = Not available

Increasing Customer Satisfaction

U.S. retail banking satisfaction[1]



[1] Source: J.D. Power U.S. Retail Banking Satisfaction Study

[2] Big banks defined as top six U.S. banks.

Other important metrics

Increasing market share is a sign of increasing customer satisfaction

- Chase grew its Business Banking primary bank market share from ~6% in 2012 to ~9% in 2016
- Chase improved its performance in the J.D. Power Primary Mortgage Origination and Servicer Satisfaction Studies – ranking #5 in originations and #6 in servicing. Chase originations and servicing rankings went up by 2 and 4 spots, respectively, compared to the 2015 rankings
- In Total Markets, J.P. Morgan ranked #1; in Fixed Income, #1, continuously since 2010; and in Equities, #2, having increased its share to 10.1% from 8.8% last year[3]
- *Institutional Investor* magazine surveys large investors every year. In 2016, J.P. Morgan Research team rankings were: #1 for All-America Equity; #1 for All-America Fixed Income; and #1 for All-Europe Fixed Income. With the future focus on emerging markets, J.P. Morgan Research ranked #2 in the survey for Emerging Markets EMEA Research
- Overall client satisfaction for CB clients has increased from 87% to 91% from 2010 to 2016, according to our proprietary client survey
- J.P. Morgan ranks as the #1 private bank in the U.S. for eight consecutive years and #1 in Latin America for four consecutive years[4]
- J.P. Morgan ranks as the Leading Pan-European Fund Management Firm for seven consecutive years[5]

[3] Market share and rank is based on Coalition FY 16 results and reflects J.P. Morgan's share of Coalition's Global Industry Revenue Pool. Total industry pool is based on J.P. Morgan's internal business structure.

[4] Source: *Euromoney*, 2017

[5] Source: Thomson Reuters Extel, 2016

2. Why are we optimistic about our future growth opportunities?

We believe we have substantial opportunities in the decades ahead to drive organic growth in our company. We have confidence in the underlying growth in the U.S. and global economies, which will fuel the growth in our customer base – consumer deposits, assets under management and small to large clients globally. This growth will obviously be faster in emerging markets than in developed markets – and we are well-positioned to serve both. In addition, we believe we can continue to gain share in many markets and, over time, add new, relevant products. This can drive organic growth for years. Capturing this growth is very basic:

- Selectively adding investment bankers and private bankers around the world
- Bringing consumer and commercial banking branches and capabilities to more places in the United States
- Adding wholesale branches overseas and carefully expanding into new countries
- Adding wholesale and Private Bank clients as they grow into our target space

Equally important is using technology and fintech to do a better job serving clients and to grow our businesses – with better products and services. You can read more about our big data, machine learning, payment systems, cybersecurity and electronic trading on pages 47–68 described by our senior executives. But I do want to highlight a few items in the next question that pertain to these topics.

3. What are some technology and fintech initiatives that you're most excited about?

One of the reasons we're performing well as a company is we never stopped investing in technology – this should never change. In 2016, we spent more than $9.5 billion in technology firmwide, of which approximately $3 billion is dedicated toward new initiatives. Of that amount, approximately $600 million is spent on emerging fintech solutions – which include building and improving digital and mobile services and partnering with fintech companies. The reasons we invest so much in technology (whether it's digital, big data or machine learning) are simple: to benefit customers with better, faster and often cheaper products and services, to reduce errors and to make the firm more efficient.

We are developing great new products.

We are currently developing some exciting new products and services, which we will be adding to our suite and rolling out later this year, including:

- End-to-end digital banking – The ability to open an account and complete the majority of transactions on a mobile phone.
- Investment advice and self-directed investing – Online vehicles for both individual retirement and non-retirement accounts, providing easy-to-use (and inexpensive) automated advice, as well as enabling our customers to buy and sell stocks and bonds, etc. (again inexpensively).
- Electronic trading and other online services (e.g., cash management) in our Corporate & Investment Bank and Asset & Wealth Management businesses – Offering our clients a more robust digital platform.

We are investing in data and technology to improve the financial health of low-income households.

Over the last two years, the JPMorgan Chase Institute has helped identify some of the most pressing financial challenges facing American households, such as their difficulty managing income and expense volatility. We are using that data to select and support innovative fintech companies and nonprofits that are designing solutions to address these challenges. One example of these efforts is JPMorgan Chase's Financial Solutions Lab, which, in partnership with the Center for Financial Services Innovation, seeks to facilitate the next generation of fintech products to help consumers manage their daily finances and meet their long-term goals. Highlights of the initiative include:

- To date, the Lab has helped support more than 18 fintech companies working to improve the financial health of more than 1 million Americans. One example is Digit, an automated savings tool that identifies small amounts of money that can be moved into savings based on spending and income. To date, it has helped Americans save more than $350 million.
- Lab winners have raised more than $100 million in follow-on capital.
- In 2017, we launched a new competition seeking innovative fintech solutions to promote the financial health of populations often overlooked, such as people of color, individuals with disabilities and low-income women.

We are successfully collaborating with other companies to deliver fintech solutions.

Whether it is consumer payment systems (Zelle), mortgages (Roostify), auto finance (TrueCar), small business lending (OnDeck Capital) or communications systems (Symphony), we are successfully collaborating with some excellent fintech companies to dramatically improve our digital and other customer offerings. I'd like to highlight just two new exciting areas:

- Developer Services API store – By providing direct interfaces with our applications (fully controlled, of course), we are enabling entrepreneurs, partners, fintech companies and clients to build new products or services dedicated to specific needs.
- Bill payment and business services – While I can't reveal much at the moment, suffice it to say there are some interesting developments coming as we integrate our capabilities with those of other companies.

4. How do we protect customers and their sensitive information while enabling them to share data?

For years, we have been describing the risks – to banks and customers – that arise when customers freely give away their bank passcodes to third-party services, allowing virtually unlimited access to their data. Customers often do not know the liability this may create for them, if their passcode is misused, and, in many cases, they do not realize how their data are being used. For example, access to the data may continue for years after customers have stopped using the third-party services.

We recently completed a new arrangement with Intuit, which we think represents an important step forward. In addition to protecting the bank, the customers and even the third party (in this case, Intuit), it allows customers to share data – how and when they want. Under this arrangement, customers can choose whatever they would like to share and opting to turn these selections on or off as they see fit. The data will be "pushed" to Intuit, eliminating the need for sharing bank passcodes, which protects the bank and our customers and reduces potential liabilities on Intuit's part as well. We are hoping this sets a new standard for data-sharing relationships.

5. What are your biggest geopolitical risks?

Banks have to manage a lot of risks – from credit and trading risks to technological, operational, conduct and cybersecurity risks. But in addition to those, we have exposures around the world, which are subject to normal cyclical and recession risks, as well as to complex geopolitical risks.

There are always geopolitical risks, and you can rest assured we are continuously reviewing, analyzing and stress testing them to ensure that our company can endure them. We always try to make certain that we can handle the worst of all cases – importantly, without disrupting the effective operation of the company and its service to our clients. We think these geopolitical risks currently are in a heightened state – that is, beyond what we might consider normal. There are two specific risks I want to point out:

Brexit and the increasing risk to the European Union (EU).

Regarding Brexit, a key concern is to make sure our company is prepared to support our clients on day one – the first day after the actual Brexit occurs, approximately two years from now. We are confident we will be able to develop and expand the capabilities that our EU subsidiaries and branches will need to serve our clients properly in Europe under EU law. This will require acquiring regulatory approvals, transferring certain technologies and moving some people. On day one, we need to perform all of our critical functions at our standards. For example, underwriting debt and equity, moving money and accepting deposits, and safeguarding the custody assets for all of our European clients, including many sovereigns themselves. We must be prepared to do this assuming a hard exit by the United Kingdom – it would be irresponsible to presume otherwise. While this does not entail moving many people in the next two years, we do suspect that following Brexit, there will be constant pressure by the EU not to "outsource" services to the United Kingdom but to continue to move people and capabilities into EU subsidiaries.

We hope that the advent of Brexit would lead the EU to focus on fixing its issues – immigration, bureaucracy, the ongoing loss of sovereign rights and labor inflexibility – and thereby pulling the EU and the monetary union closer together. Our fear, however, is that it could instead result in political unrest that would force the EU to split apart. The unraveling of the EU and the monetary union ***could*** have devastating economic and political effects. While we are not predicting this will happen, the probabilities have certainly gone up – and we will keep a close eye on the situation in Europe over the next several years.

De-globalization, Mexico and China.

Anti-globalization sentiment is growing in parts of the world today, usually expressing itself in anti-trade and anti-immigration positions. (I'm not going to write about immigration in this letter – we have always supported proper immigration – it is a vital part of the strength of America, and, properly done, it enhances the economy and the vitality of the country.) We do not believe globalization will reverse course – we believe trade has been absolutely critical for growth around the world and has benefited billions of people. While there are some issues with our trade policies that need to be fixed, poorly conceived anti-trade policies could be quite disruptive, particularly with two of our key trading partners: Mexico and China.

The trade deal with Mexico through NAFTA is simpler than the one with China. (In full disclosure, JPMorgan Chase is a major international bank in Mexico, with revenue of more than $400 million, serving Mexican, American and international clients who do business there.) Mexico is a long-standing peaceful neighbor, and it is wholly in our country's interest that Mexico be a prosperous nation. This actually reduces immigration issues (there are now more Mexicans going back to Mexico than coming into the United States). Our trade agreement with Mexico helps ensure that the young democracy in Mexico is not hijacked by populist and anti-American leaders (like Chavez did in Venezuela). While there are some clear, identifiable problems with NAFTA, I believe they will be worked out in a way that is fair and beneficial for both sides. The logic to do so is completely compelling.

China is far more complex. (Again, in full disclosure, we have a major international presence in China, with revenue of approximately $700 million, serving Chinese, American and international clients who do business in that country.) The United States has some serious trade issues with China, which have grown over the years – from cybersecurity and the protection of intellectual property to tariffs, non-tariff trade barriers and non-fulfillment of World Trade Organization obligations. However, there is no inevitable or compelling reason that China and America have to clash – in fact, improving political and economic relationships can be good for both parties. So while the issues here are not easy, I am hopeful they can be resolved in a way that is fair and constructive for the two countries.

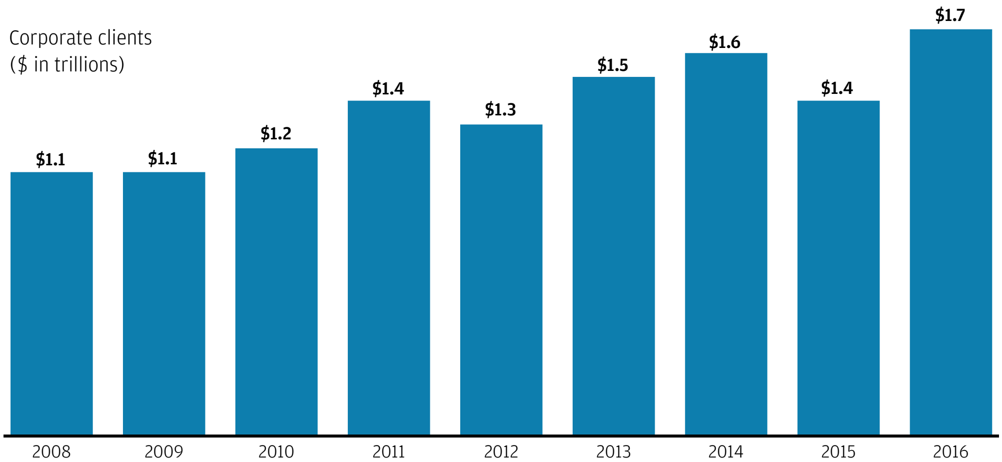
6. Although banks and other large companies remain unpopular with some people, you often say how proud you are of JPMorgan Chase. Why?

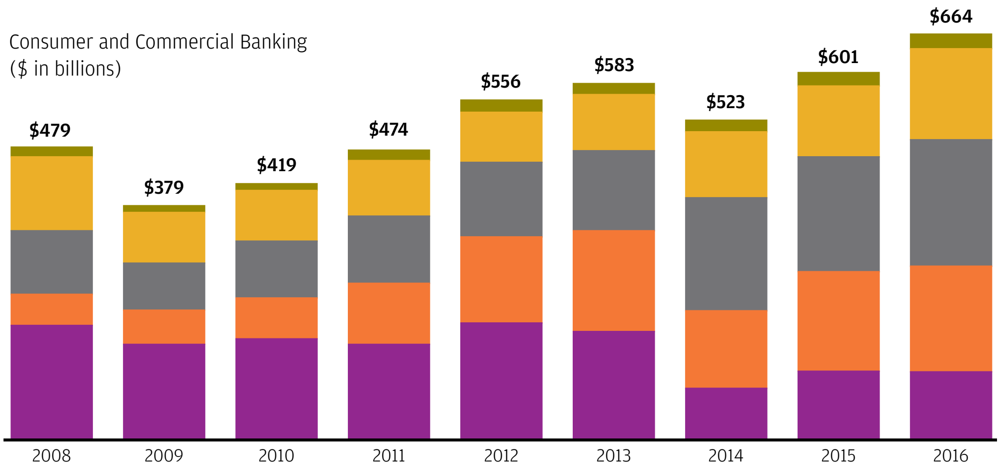
I firmly believe the qualities embedded in JPMorgan Chase today – the knowledge and cohesiveness of our people, our deep client relationships, our technology, our strategic thinking and our global presence – cannot be replicated. While we take nothing for granted, as long as we continue to do our jobs well and continue to drive our company forward, we think we can be a leader for our industry and the communities we serve for decades to come. There are times when I am bursting with pride with what we have accomplished for our clients, communities and countries around the world – let me count (some of) the ways:

We are strong and steadfast and are there for our clients in good times and bad.

In the toughest of times, we maintained a healthy and vibrant company that was able to do its job – we did not need government support and, in fact, we consistently provided credit and capital to our clients and assistance to our government throughout the crisis. I want to remind our shareholders that we continued to lend not at the much higher prevailing market rates at that time but at existing bank rates. These were far below market rates because our clients relied on us – we were their lender of last resort. JPMorgan Chase was and will be a Rock of Gibraltar in the best and worst of times for our clients around the world.

New and Renewed Credit and Capital for Our Clients
at December 31,





	2008	2009	2010	2011	2012	2013	2014	2015	2016
Small business	$ 16	$ 7	$ 11	$ 17	$ 20	$ 18	$ 19	$ 22	$ 24
Card & Auto	121	83	83	91	82	92	108	116	149
Commercial/Middle market	104	77	93	110	122	131	185	188	207
Asset management	51	56	67	100	141	165	127	163	173
Mortgage/Home equity	187	156	165	156	191	177	84	112	111

We have extraordinary capabilities — both our people and our technology.

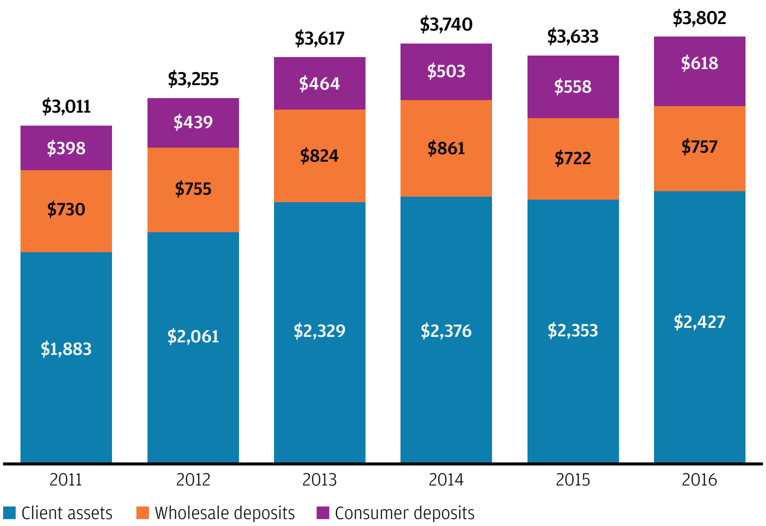
Ultimately, our people are our most important assets – and they are exceptional. Their knowledge, their capabilities and their relationships are what drive everything else, including our technology and our innovation. They partner well with each other around the world, and they are deeply trusted by our clients and within our communities. We all owe them an enormous debt. They are the ones accomplishing all the things you are reading about in this Annual Report.

Our fortress balance sheet and the strength of our people were never more vividly evident than during the darkest hours of the financial crisis. I was in awe of the tremendous effort our people made (thousands of people, seven days a week for months)

Assets Entrusted to Us by Our Clients
at December 31,

($ in billions)

Deposits and client assets[1]



Assets under custody[2]

2011	2012	2013	2014	2015	2016
$16,870	$18,835	$20,485	$20,549	$19,943	$20,520

[1] Represents assets under management, as well as custody, brokerage, administration and deposit accounts.
[2] Represents activities associated with the safekeeping and servicing of assets.

to acquire and assimilate Bear Stearns and Washington Mutual – thereby saving 30,000 jobs and avoiding the devastation of communities that would have happened if those companies had been allowed to fail. Our company went above and beyond the call of duty during the height of the crisis, including lending $87 billion to a bankrupt Lehman to facilitate, as much as possible, an orderly unwind of its assets. In those dark days, we were the only bank willing to commit to lending $4 billion to the state of California, $2 billion to the state of New Jersey and $1 billion to the state of Illinois to keep those states strong. None of these actions had to be taken, and they were made at some risk to JPMorgan Chase. We simply were acting to do our part to try to stop the crisis from getting worse.

We try to be outstanding corporate citizens.

We believe in being great corporate citizens – in how we treat our employees and care for our clients and communities. Let me give some examples to illustrate this point:

- **We compensate our employees fairly and provide extraordinary benefits and training.** We value our employees at JPMorgan Chase, and we are committed to helping them succeed. This past year, we announced that we will increase our minimum wages – mostly for entry-level bank tellers and customer service representatives – to between $12.00 and $16.50 an hour (depending on where these employees live). This will increase wages for approximately 18,000 employees. We believe this pay increase is the right thing to do, and, above all, it enables more people to begin to share in the rewards of our success. Remember, many of these employees soon move on to even higher paying jobs.

We will also continue to invest in employee benefits and training opportunities so that our workers can continue to increase their skills and advance their careers. Our comprehensive benefits package, including healthcare and retirement savings, on average, is valued at $11,000 per year. Our total investment in training and development is approximately $325 million a year. Together, these efforts help our employees support their families, advance their careers and promote economic growth in our communities.

- **We have a diverse workforce.** We have more than 243,000 employees globally with over 167,000 in the United States. Women represent 50% of our employees. Recently, Oliver Wyman, a leading global management consulting firm, issued a report stating that it would be 30 years before women reach 30% Executive Committee representation within global financial services. So you might be surprised to find out that women already represent 30% of my direct reports and approximately 30% of our company's senior leadership globally. They run major businesses – several units on their own would be among Fortune 1000 companies. In addition to having three women on our Operating Committee – who run Asset & Wealth Management, Finance and Legal – some of our other businesses and functions headed by women include Consumer Banking, Credit Card, U.S. Private Bank, U.S. Mergers & Acquisitions, Global Equity Capital Markets, Global Research, Regulatory Affairs, Global Philanthropy, our U.S. branch network, our Controller and firmwide Marketing. I believe we have some of the best women leaders in the corporate world globally. In addition to gender diversity, 48% of our firm's population is ethnically diverse in the United States, and we are in more than 60 countries around the world. Diversity means running a company where people are respected, trusted and given equal opportunity to contribute and raise their ideas and voices.

  But there is one area in particular where we simply have not met the standards JPMorgan Chase has set for itself – and that is in increasing African-American talent at the firm. While we think our effort to attract and retain black talent is as good as at most other companies, it simply is not good enough. Therefore, in 2016, we introduced a new firmwide initiative called ***Advancing Black Leaders***. This initiative is dedicated to helping us better attract and recruit external black talent while retaining and developing the talent within the company. And we are proud of our efforts this past year – we increased the number of black employees at the officer level (through both internal promotions and external new hires), we focused on the pipeline of junior talent, and we increased the number at the senior officer and vice president level. We plan to continue to make progress on this front in the years to come.

- **We are proud of how we are helping veterans.** We want to continue to update you on how JPMorgan Chase has helped position military members, veterans and their families. Our program is centered on facilitating success in their post-service lives primarily through employment and retention. In 2011, JPMorgan Chase and 10 other companies launched the 100,000 Jobs Mission, setting a goal of collectively hiring 100,000 veterans. The initiative now includes more than 200 companies, has collectively hired nearly 400,000 veterans, and is focused on collectively hiring 1 million people. JPMorgan Chase alone has hired more than 11,000 veterans since 2011. We hope you feel as good about this initiative as we do.

- **We have accomplished an extraordinary amount in our Corporate Responsibility efforts.** We take this responsibility very seriously, and, over the last decade, not only have we more than doubled our philanthropic giving from approximately

$100 million to approximately $250 million in 2016, but we have dramatically increased our support with human capital, collaboration, data and management expertise. Our head of Corporate Responsibility talks about our significant measures in more detail in his letter, but I will highlight two initiatives below:

- We provide tremendous support to cities and communities – especially those left behind – and the best example is our work in Detroit. JPMorgan Chase has been doing business in Detroit for more than 80 years, and we watched as this iconic American city was engulfed in economic turmoil after years of decline. Just as Detroit was declaring bankruptcy, our company redoubled its efforts to help and, in 2014, announced our most comprehensive initiative to date – a $100 million investment in Detroit to help accelerate the city's recovery.

  We are making strategic, coordinated investments focused on creating economically inclusive and revitalized neighborhoods, preparing people with the skills needed for today's high-quality jobs and providing small businesses with the capital they need to grow and succeed. This includes our investment in the Strategic Neighborhoods Fund, which brings together community developers and dedicated resources to create and maintain affordable housing and deliver services to targeted communities. We also seeded the city's first nonprofit real estate development firm focused exclusively on creating and preserving affordable housing in Detroit's neighborhoods. In 2015, we helped create the $6.5 million Entrepreneurs of Color Fund with the Kellogg Foundation and Detroit Development Fund to bring critical financing and technical assistance to underserved minority- and community-based small businesses. In its first year, the Fund deployed almost $3 million in capital through more than 30 loans. We are also putting our talented employees to work in Detroit through the Detroit Service Corps. Since 2014, 68 JPMorgan Chase employees from 10 countries dedicated three intensive weeks to 16 Detroit nonprofits, helping them analyze challenges, solve problems and improve their chances for success. Detroit is making incredible progress as a result of the unprecedented spirit of engagement and cooperation among the city's leaders, business community and nonprofit sectors. JPMorgan Chase is proud to be part of Detroit's resurgence, and we believe a thriving Detroit economy will become a shining example of American resilience and ingenuity at work.

- And more broadly, we created solutions for one of our country's biggest challenges – training the world's workforce in the skills needed to compete in today's economy. Through several targeted initiatives, JPMorgan Chase is investing over $325 million in demand-driven workforce development initiatives around the world. Our programs build stronger labor markets that create economic opportunity, focusing on middle-skill jobs – positions that require a high school education, and often specialized training or certifications, but not a college degree. These jobs – surgical technologists, diesel mechanics, help desk technicians and more – offer good wages and the chance to move up the economic ladder. Our goal is to increase the number of workers who have access to career pathways, whether they are adults looking to develop new skills or younger workers starting to prepare for careers during high school and ending with postsecondary degrees or credentials aligned with good-paying, high-demand jobs. We are very proud that we can be a bridge between businesses and job seekers to support an economy that creates opportunity for everyone.

II. REGULATORY REFORM

We had a severe financial crisis followed by needed reform, and our financial system is now stronger and more resilient as a result. During and since the crisis, we've always supported thoughtful, effective regulation, not simply more or less. But it is an understatement to say improvements could be made. The regulatory environment is unnecessarily complex, costly and sometimes confusing. No rational person could think that everything that was done was good, fair, sensible and effective, or coherent and consistent in creating a safer and stronger system. We believe (and many studies show) that poorly conceived and uncoordinated regulations have damaged our economy, inhibiting growth and jobs – and this has hurt the average American. We are not looking to throw out the entirety of Dodd-Frank or other rules (many of which were not specifically prescribed in Dodd-Frank). It is, however, appropriate to open up the rulebook in the light of day and rework the rules and regulations that don't work well or are unnecessary. Rest assured, we will be responsibly and reasonably engaged on this front. We believe changes can and should be made that preserve the safety and soundness of the financial system ***and*** lead to a more healthy and vibrant economy for the benefit of all.

There are some basic principles that should guide responsible regulation:

- Coherence of rules to be coordinated both within and across regulatory agencies
- Global harmonization of regulation to enhance fair trade and competition while helping eliminate any weak links in the global system
- Simplified and proper risk-based capital standards
- Consistent and transparent capital and liquidity rules
- Regular and rigorous regulatory review, including consideration of costs vs. benefits, efficiencies, competitiveness, reduction of redundant costs and assessment of impact on economic growth

Adhering to these principles will maximize safety and soundness, increase competition and improve economic health.

Since the financial crisis, thousands of new rules and regulations have been put into place by multiple regulators in the United States and around the world. An already complex system of financial oversight and supervision has grown even more complex – and this complexity can sometimes create even more risk. Many of these rules and regulations should be examined and possibly modified, but I will focus on the few that are critical in response to some of the questions and topics that follow.

1. Talk about the strength and safety of the financial system and whether Too Big to Fail has been solved.

There is no question that the system is safer and stronger today, and this is mostly due to the following factors:

- Dramatically higher capital for almost all banks (we'll talk later about how much capital is the appropriate amount)
- Far higher liquidity for almost all banks (again, we'll provide more details later in this section)
- More disclosure and transparency – both to investors and regulators
- More coordinated oversight within the United States and abroad
- Far stronger compliance and control systems
- Laws that allow regulators to step in to unwind not only failing banks but investment banks (this did not exist for investment banks prior to the financial crisis)
- The creation of "bail-inable" unsecured debt – this converts debt into equity at the time of failure, immediately recapitalizing the failed bank
- New rules that prohibit derivatives contracts from being voided at bankruptcy – this allows derivatives contracts to stay in place, creating an orderly transition to bankruptcy
- Stress testing that monitors banks' balance sheets and capital ratios under severely adverse scenarios (more on this below)
- Requirements for banks and investment banks to prepare corporate recovery plans in the event of a crisis to prevent bankruptcy (these plans did not exist before the financial crisis)

These changes taken together not only largely eliminate the chance of a major bank failing today but also prevent such failure from having a threatening domino effect on other banks and the economy as a whole. And if a major bank does fail, regulators have the necessary tools to manage it in an orderly way. Moreover, the banking industry itself has an inherent interest in the safety and soundness of the financial system because if there is a failure, ***the entire industry will be liable*** for that cost (more on that below).

Essentially, Too Big to Fail has been solved — taxpayers will not pay if a bank fails.

The American public has the right to demand that if a major bank fails, they, as taxpayers, would not have to pay for it, and the failure wouldn't unduly harm the U.S. economy. In my view, these demands have now both been met.

On the first count, if a bank fails, taxpayers do not pay. Shareholders and debtholders, now due to total loss absorbing capacity (TLAC) rules, are at risk for all losses. To add belts and suspenders, if all that capital is not enough, the next and final line of defense is the industry itself, which is legally liable to pay any excess losses. (Notably, since 2007, JPMorgan Chase alone has contributed $11.7 billion to the industry deposit fund.)

On the second count, a regulatory takeover of a major bank would be orderly because regulators have the tools to manage it in the right way.

It is instructive to look at what would happen if Lehman were to fail in today's regulatory regime. First of all, it is highly unlikely the firm would fail because the new requirements would mean that instead of Lehman's equity capital being $23 billion, which it was in 2007, it would be approximately $45 billion under today's capital rules. In addition, Lehman would have far stronger liquidity and "bail-inable" debt. And finally, the firm would be forced to raise capital much earlier in the process.

If Lehman failed anyway, regulators would now have the legal authority to put the firm in receivership (they did not have that ability back in 2007–2008). The moment that happened, unsecured debt of approximately $120 billion would be immediately converted to equity. Derivatives contracts would not be triggered, and cash would continue to move through the pipes of the financial system. In other words, due to the living wills, Too Big to Fail was solved before any additional rules were put in place. (I'm not going to go into detail on the living wills but will say that while they have some positive elements, they have become unnecessarily complex and costly, and they need to be simplified.)

Last, there is a new push for Chapter 14 bankruptcy for banks, which we at JPMorgan Chase support.

This would provide specialized rules to quickly handle bankruptcy for banks. Whether a failed bank goes through Chapter 14, called "bankruptcy," or Title II, called "resolution" – these are essentially the same thing – we should make the following point perfectly clear to the American people: A failed bank means the bank's board and management are discharged, its equity is worthless, compensation is clawed back to the extent of the law and the bank's name will forever be buried in the Hall of Shame. In addition, we should change the term "resolution" – as it sounds as if we are bailing out a failing bank (which couldn't be further from the truth). Whatever the term is called, it should be made clear that the process is the same as bankruptcy in any other industry. One lesson from the prior crisis is that the American public will not be satisfied without "Old Testament Justice."

But market panic will never disappear entirely, and regulations must be flexible enough to allow banks to act as a bulwark against it rather than forcing financial institutions into a defensive crouch that will only make things worse.

There will be market panic again, and it won't affect just banks – it will affect the entire financial marketplace. Remember, banks were consistent providers of credit at existing prices into the crisis – the market was not. During the crisis, many companies could not raise money in the public markets, many securities did not trade, securities issuances dropped dramatically and many asset prices fell to valuation levels that virtually anticipated a Great Depression. Last time around, banks – in particular (and I say with pride) our bank – stood by their customers to provide capital and liquidity that helped them survive. However, today's capital and liquidity rules have created rigidity that will actually hurt banks' ability to stand against the tide as they did during the Great Recession. This will mean that banks will survive the next market panic with plenty of cushion that could have been – but may not have been – used to help customers, companies and communities.

It is in this environment that regulators need certain authorities to stop the situation from getting worse. One important point: Under both Chapter 14 and Title II, there might be a short-term need for the Federal Deposit Insurance Corporation or the Fed to lend money, in the short run with proper collateral, to a failing or failed institution. This is because panic can cause a run on the bank, and it is far less painful to the economy if that bank's assets are not sold in fire sales. This lending is effectively fully secured, and no loss should ever be incurred. Again, any loss that did occur would be charged back to all the banks. This also gives banks an enormous incentive to be in favor of a properly designed, safe and sound system.

Going back to the principles above, putting safety and soundness first is clearly correct, but regulators also need the ability to take into consideration the costs and impact on our economy in various scenarios.

2. How and why should capital rules be changed?

We need consistent, transparent, simplified and more risk-based capital standards.

A healthy banking system needs consistent and transparent capital and liquidity rules that are based on simplified and proper risk-based standards. This allows banks to use capital intelligently and to properly plan capital levels over the years. Any rules that are capricious or that cause an arbitrary reduction in the value of a bank's capital – and the value of the bank overall – can cause improper or inefficient risk taking. Finally, proper capital rules will allow a bank to do its job: to consistently finance the economy, in good times and, importantly, in bad times.

There are more than 20 different major capital and liquidity requirements – and they often are inconsistent. For example, certain liquidity rules force a bank to hold an increasing amount of cash, essentially deposited at the Fed, but other rules require the bank to hold capital against this risk-free cash. An extraordinary number of calculations need to be made as companies try to manage to avoid inadvertently violating one of the standards – a violation that rarely affects safety and soundness. To protect themselves, banks build enormous buffers – and buffers on top of buffers – or otherwise take unnecessary actions to ensure that they don't step over the line. And finally, if we

Our Fortress Balance Sheet

at December 31,

	2008		2016	
CET1	7.0%[3]	+520 bps	12.2%[4]	16.7% adjusted Basel III Advanced excluding operational risk RWA
TCE/ Total assets[1]	4.0%	+350 bps	7.5%	
Tangible common equity	$84B	+$99B	$183B	
Total assets	$2.2T	+$300B	$2.5T	
RWA	$1.2T[3]	+$300B	$1.5T[4]	
Operational risk RWA	$0	+$400B	$400B	
Liquidity	~$300B	+~$486B	$786B	Reported HQLA is $524 billion
Fed funds purchased and securities loaned or sold under repurchase agreements	$193B	-$27B	$166B	
Long-term debt and preferred stock[2]	$303B	+$18B	$321B	$172 billion eligible for external TLAC

[1] Excludes goodwill and intangible assets.
[2] Includes trust preferred securities.
[3] Reflects Basel I measure; CET1 reflects Tier 1 common.
[4] Reflects Basel III Advanced Fully Phased-in measure.

B = billions
T = trillions
bps = basis points

CET1 = Common equity Tier 1 ratio. CET1 ratios reflect the capital rule the firm was subject to at each reporting period
TCE = Tangible common equity
RWA = Risk-weighted assets
HQLA = High quality liquid assets predominantly includes cash on deposit at central banks and unencumbered U.S. agency mortgage-backed securities, U.S. Treasuries and sovereign bonds
Liquidity = HQLA plus unencumbered marketable securities and trapped liquidity not included in HQLA
TLAC = Total loss absorbing capacity

enter another Great Recession, the need for these buffers ***increases***, which inevitably will force a bank to reduce its lending.

We have a fortress balance sheet — far more than the numbers imply.

The chart on page 20 shows the dramatic improvement in our capital and liquidity numbers since 2008. Remember, we had enough capital and liquidity in 2008 to easily handle the crisis that ensued.

The numbers are even better than they look on the chart for the following reasons:

- In 2008, there was no such thing as operational risk capital (not to say there wasn't operational risk but just that capital was not applied to it). If you measured our capital ratio on the same basis as in 2008 (that is, on an apples to apples basis), we wouldn't have just 12.2% today vs. 7% in 2008 – we would have 16.7% today vs. 7% in 2008.
- Since 2008, the regulatory definition of liquidity has been prescribed. Now, only deposits at a central bank, Treasuries and government-guaranteed mortgage-backed securities (plus a limited amount of sovereign and corporate bonds) count as liquidity. Many securities are not allowed to count as liquidity today – on the theory that they can sustain losses and occasionally become illiquid. While maybe not all 100% of the current value of these securities should apply toward liquidity requirements, they should count for something. If you did combine all of these categories as liquidity, our liquidity at JPMorgan Chase would have gone from $300 billion in 2008 to $786 billion today. And remember, our deposits – theoretically subject to "run on the bank" risk – total $1.4 trillion. Even in the Great Recession, the worst case for a bank was only a 30% loss of its deposits.
- Finally, when you include long-term debt and preferred stock as loss absorbing capital, our total capital[2] is approximately $500 billion vs. true risk-weighted assets of $1.1 trillion.[3] Essentially, since 2008, our total capital has gone from $387 billion to $500 billion, while actual risk-weighted assets have declined to $1.1 trillion.

In addition to our fortress balance sheet, we are well-diversified, and we have healthy margins and strong controls. These are all factors that dramatically improve safety and soundness, but they are not included in any measures. As you will see below, we can handle almost any stress.

We believe in stress testing, but it could be improved and simplified.

As you know, the Fed puts our company through one "severely adverse" stress test annually, which determines how we can use our capital, pay dividends, buy back stock and expand. We are great believers in stress testing but would like to make the following points:

- Our shareholders should know that we don't rely on one stress test a year – we conduct more than 200 each week across all of our riskiest exposures. We meet weekly; we analyze each exposure in multiple ways; we are extremely risk conscious.
- The Federal Reserve's Comprehensive Capital Analysis and Review (CCAR) stress test estimates what our losses would be through a severely adverse event lasting over nine quarters, which approximates the severity and time of the Great Recession; e.g., high unemployment, counterparty failures, etc. The Fed estimates that in such a scenario, we would lose $31 billion over the ensuing nine quarters, which is easily manageable by JPMorgan Chase's capital base. My own view is that we would make money in almost every quarter in that type of environment, and this is supported by our having earned approximately $30 billion pre-tax over the course of the nine quarters during the real financial crisis.

[2] Tangible common equity, long-term debt and preferred stock.

[3] RWA less operational risk RWA.

We don't completely understand the Fed's assumptions and models – the Fed does not share them with us (we hope there will be more transparency and clarity in the future). But we do understand that the Fed's stress test shows results far worse than our own test because the Fed's stress test is not a forecast of what you actually think will happen. Instead, it appropriately makes additional assumptions about a company's likelihood to fail – that its trading losses will be far worse than expected, etc. The Fed wants to make sure the bank has enough capital if just about everything goes wrong.

Finally, while we firmly believe banks should have a proper assessment of their qualitative abilities, this should not be part of a once-a-year stress test. Instead, it should be part of the Fed's regular exam process. The Fed and the banks should work together to continuously improve the quality of their processes while creating a consistent, safe and economy-growing use of capital.

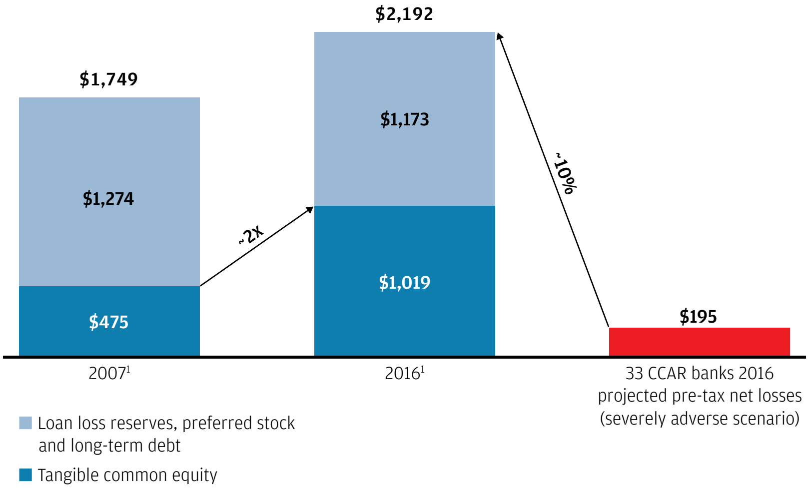
It is clear that the banks have too much capital.

Here is another critical point: The Fed's stress test of the 33 major banks estimates what each bank would lose assuming it were the worst bank in the crisis, which, of course, will not be true in the real world. But even if that happened, the chart below shows that if you combine all the banks' extreme losses, the total losses add up to less than 10% of the banks' combined capital. This definitively proves that there is excess capital in the system.

And more of that capital can be safely used to finance the economy.

Proper calibration of capital is critical to ensure not only that the system is safe and sound but that banks can use their capital to finance the economy. And we think it's clear that banks can use more of their capital to finance the economy without sacrificing safety and soundness. Had they been less afraid of potential CCAR stress losses, banks probably would have been more aggressive in making some small business loans, lower rated middle market loans and near-prime mortgages.

Loss Absorbing Resources of U.S. SIFI Banks Combined
($ in billions)



[1] Includes 2013's 18 participating CCAR banks as well as Bear Stearns, Countrywide, Merrill Lynch, National City, Wachovia and Washington Mutual.
SIFI = Systemically Important Financial Institution
CCAR = Comprehensive Capital Analysis and Review

Source: SNL Financial; Federal Reserve Bank

The global systemically important bank (GSIB) and supplementary leverage ratio (SLR) rules need to be modified.

The GSIB capital surcharge forces large banks to add even more capital, based on some very complex calculations that are highly flawed and not risk based. In fact, the rules often penalize fairly risk-free activity, such as deposits held at the Fed and short-term secured financing. Likewise, the SLR rules force capital to be held on deposit at the Fed in Treasury securities and in other liquid securities. Neither calculation gives credit for operating margins, diversification or annuity streams of business. These calculations should, at a minimum, be significantly modified and balanced to promote lending and other policy goals, including maintaining deep and liquid capital markets, clearing derivatives and directing more private capital in the mortgage market.

Operational risk capital should be significantly modified, if not eliminated.

No one could credibly argue that there is no such thing as operational risk, separate and distinct from credit and market risk. All businesses have operational risk (trucks crash, computers fail, lawsuits happen, etc.), but almost all businesses successfully manage it through their operating earnings and general resources. Basel standards required banks to hold capital for operational risk, and the United States "gold plated" this calculation. Banks in the United States in total now hold approximately $200 billion in operational risk capital. For us, we hold excess operational risk capital which is not being utilized to support our economy. It was an unnecessarily large add-on. If you are going to have operational risk capital, it should be forward looking, fairly calculated, coordinated with other capital rules and consistent with reality. (Currently, if you exit a business that created operational risk capital, you are still, most likely, required to hold the operational risk capital.)

Finally, America should eliminate its "gold plating" of international standards.

American regulators took the new Basel standards across a wide variety of calculations and asked for more. If JPMorgan Chase could use the same international standards as other international banks, it would free up a material amount of capital. The removal of the GSIB surcharge "gold plating" alone would free up $15 billion of equity capital – an amount that could support almost $190 billion of loans. In addition, America gold plated operational risk capital, liquidity rules, SLR rules and TLAC rules. Later in this letter, we will discuss international standards.

Properly done and improved, modifying many of these regulatory standards could help finance the growth of the American economy without damaging the safety and soundness of the system.

3. How do certain regulatory policies impact money markets?

Different from most banks, money center banks help large institutions – including governments, investors and large money market funds – move short-term funds around the system to where those funds are needed most. The recipients of these funds include financial institutions (including non-money center banks) and corporations that can have large daily needs to invest or borrow. The products that money center banks offer large institutions are predominantly deposits, securities, money market funds and short-term overnight investments called repurchase agreements. These involve enormous flows of funds, which money center banks handle easily, carefully and securely. They are generally match-funded[4], almost no credit risk is taken, and most lending is done wholly and properly secured by Treasuries or government-guaranteed securities. These transactions represent a large part of JPMorgan Chase's balance sheet. Because of new rules, capital in many cases must be held on these short-term, virtually riskless activities, and we believe this has caused distortions in the marketplace. For example:

[4]Match-funding ensures that the risk characteristics – e.g., interest rate, maturity – of the asset (e.g., loan) are offset by the liability (e.g., deposit) funding it.

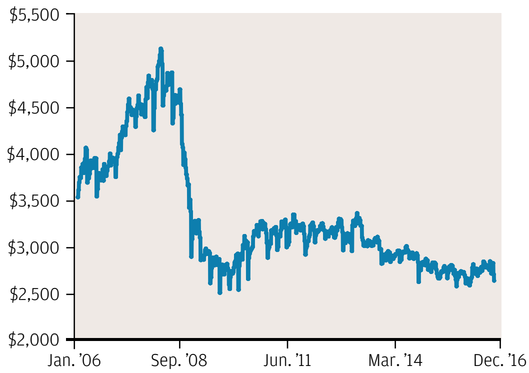
- Swap spreads, for the first time in history, turned negative, which means that corporations need to pay a lot more to hedge their interest rate exposure.
- Reduction in broker-dealer inventories has impacted liquidity.
- Many banks reject certain types of large deposits from some of their large institutional clients. In a peculiar twist of fate – and something difficult for our clients to understand – through 2016, JPMorgan Chase turned away 3,200 large clients and $200 billion of their deposits even though we could have taken them without incurring any risk whatsoever (we simply would have deposited the $200 billion at the central bank).

The charts below shows some of the reduction in banks' market-making abilities.

We need to work closely with regulators to assess the impact of the new rules on specific markets, the cost and volatility of liquidity, and the potential cost of credit. We should be able to make some modest changes that in no way impact safety and soundness but improve markets.

Dealer Positions across Treasuries, Agencies, MBS[1] and Corporates 2006–2016
($ in billions)

Total Repurchase Agreements Outstanding 2006–2016
($ in billions)



[1] Mortgage-backed securities (MBS)

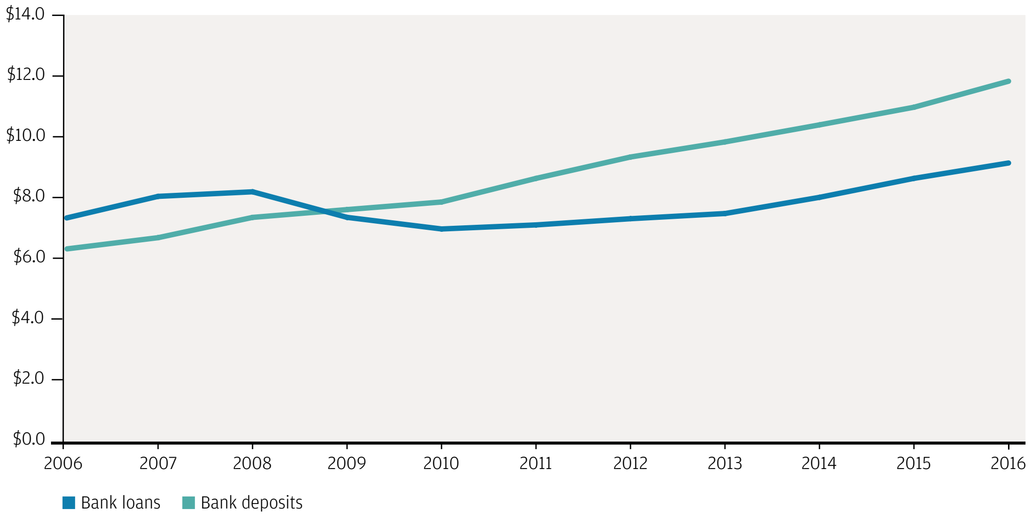
Source: Haver; Federal Reserve Bank of New York

4. How has regulation affected monetary policy, the flow of bank credit and the growth of the economy?

It is extremely important that we analyze how new capital and liquidity rules affect the creation of credit; i.e., lending. We have yet to see thorough, thoughtful analysis on this subject by economists – because in this case, it is very hard to calculate what might have been counterfactual. However, it seems clear that if banks had been able to use more of their capital and liquidity, they would have been more aggressive in terms of expanding: Think of additional bankers, bank branches and geographies, which likely would have led to additional lending. (On the following pages, we make it clear that this would have been the case in mortgage lending.)

I would like to focus on how liquidity policies may have impacted the effectiveness of monetary policy and lending. The chart on page 25 shows bank loans vs. bank deposits from 2006 to 2016. During the last several decades, deposits and loans were mostly balanced. You can see that stopped being true after the start of the Great Recession. Today, loans are approximately $2 trillion less than deposits.

Bank Loans and Bank Deposits
2006–2016
($ in trillions)



Source: Haver; Federal Reserve Bank

Many factors may influence this scenario, but there are two arguments at the bookends about why this happened:

- There was simply not enough loan demand due to a slow-growing economy.
- The new liquidity rules require banks to hold approximately $2 trillion at the Federal Reserve, whether or not there is loan demand.

It is evident that banks reduced certain types of lending legitimately – think of some of the inappropriate subprime mortgage lending – but banks cut back on other types of lending as well because of the new rules; for example, small business lending due to CCAR and cross-border lending because of GSIB. The ensuing discussion shows how other regulatory rules dramatically decreased mortgage lending, again slowing down the economy.

It is clear that the transmission of monetary policy is different today from what it was in the past because of new capital and liquidity rules. What is not clear is how much these rules reduced lending. Again, working together, we should be able to figure it out and make appropriate improvements that enhance economic growth without damaging the safety of the system.

5. How can we reform mortgage markets to give qualified borrowers access to the credit they need?

Much of what we consider good in America – a good job, stability and community involvement – is represented in the achievement of homeownership. Owning a home is still the embodiment of the American Dream, and it is commonly the most important asset that most families have.

So it is no surprise the financial crisis, which was caused in part by poor mortgage lending practices and which caused so much pain for American families and businesses, led to new regulations and enhanced supervision. We needed to create a safer and better functioning mortgage industry. However, our housing sector has been unusually slow to recover, and that may be partly due to restrictions in mortgage credit.

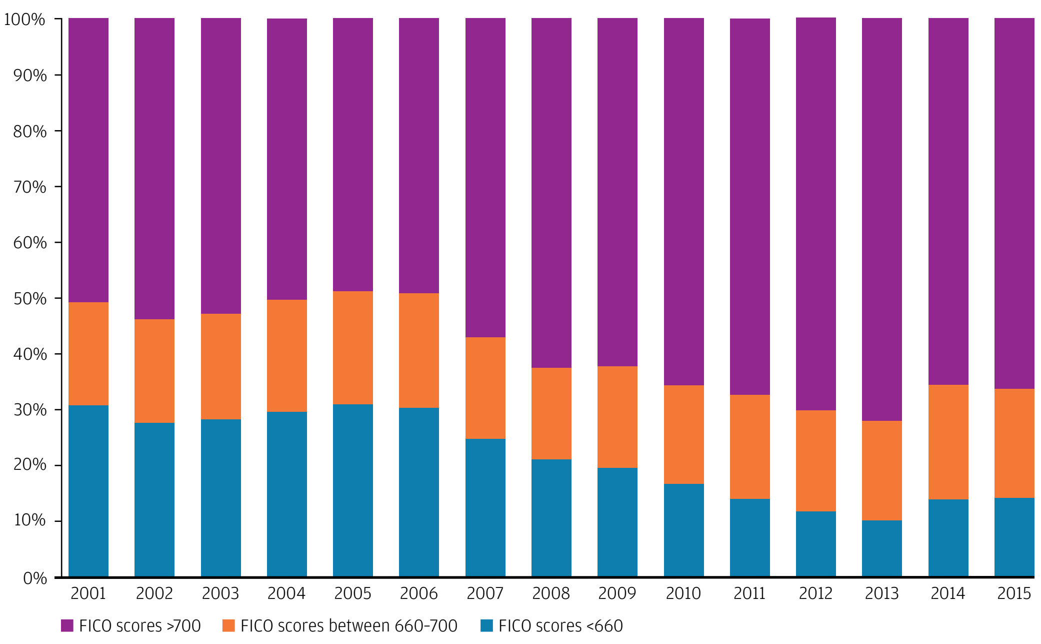
Seven major federal regulators and a long list of state and local regulators have overlapping jurisdiction on mortgage laws and wrote a plethora of new rules and regulations appropriately focused on educating and protecting customers. While some of the rules are beneficial, many were hastily developed and layered upon existing rules without coordination or calibration as to the potential effects.

The result is a complex, highly risky and unpredictable operating environment that exposes lenders and servicers to disproportionate legal liability and materially increases operational risks and costs. These actions resulted in:

- Mortgages that cost the consumer more
- A tightening credit box; i.e., mortgage lenders are less likely to extend credit to borrowers without a strong credit history
- An inhibition of the return of private capital to the housing industry
- The crowding out of resources to improve technology and the customer experience

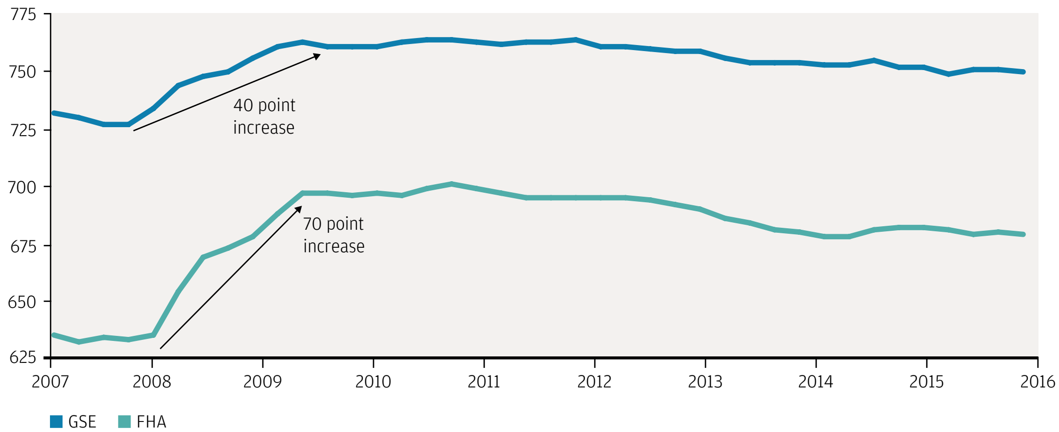
The chart below and the top chart on page 27 show the decline in lending to individuals with lower credit scores. The bottom chart on page 27 shows what is likely a related decline in the sales of new but lower priced homes.

Share of Borrowers with Strong Credit Has Increased Dramatically



Source: Urban Institute Housing Finance Policy Center

Average FICO of Newly Originated 30-Year Purchase Loans, for the GSEs and FHA

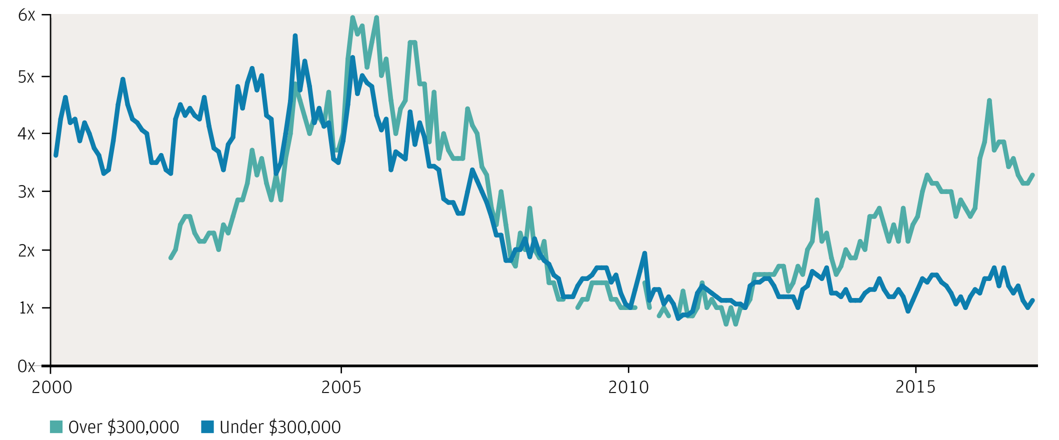


GSE = Government-sponsored enterprise
FHA = Federal Housing Administration

Source: Freddie Mac, The Federal Housing Administration

Comparison of New Home Sales by Price Range

Benchmark (1x = January 2010 sales levels)



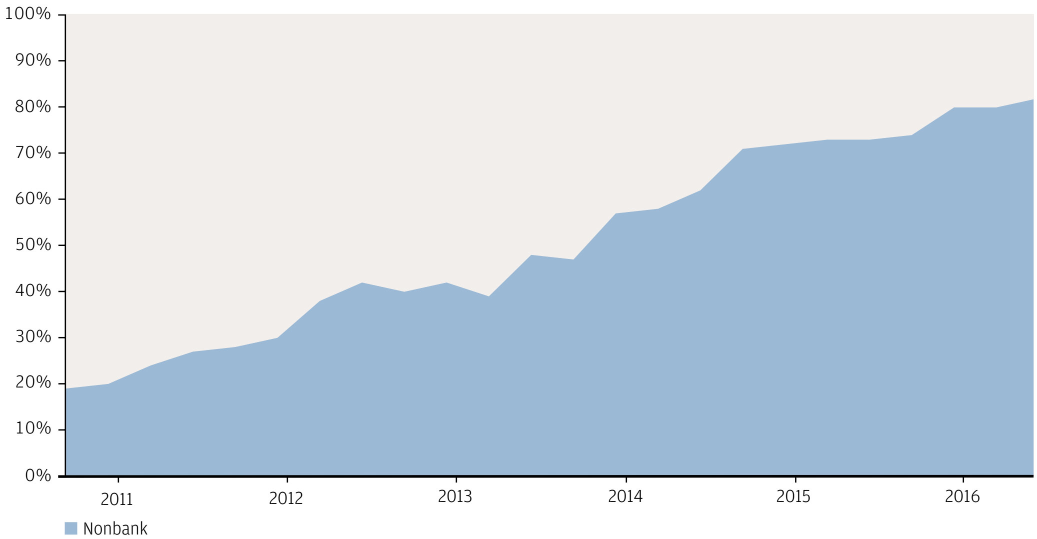
Source: Haver; U.S. Census Bureau

There are significant opportunities to make simple changes that can have a dramatic impact on improving the current state of the home lending industry – this will make access to good and affordable mortgages much more achievable for far more Americans. And it's noteworthy that those who lost access to mortgage credit are the very ones who so many people profess to want to help – e.g., lower income buyers, first-time homebuyers, the self-employed and individuals with prior defaults who deserve another chance.

Federal Housing Administration (FHA) reform can bring banks back and expand access to credit.

The FHA plays a significant role in providing credit for first-time, low- to moderate-income and minority homebuyers. However, aggressive use of the False Claims Act (FCA) (a Civil War act passed to protect the government from intentional fraud) and overly complex regulations have made FHA lending risky and cost prohibitive for many banks. In fact, FCA settlements wiped out a decade of FHA profitability, and subsequent losses

Nonbank Share of New 30-Year FHA Originations



Source: Ginnie Mae

have kept returns on capital solidly below our target. This has led us to scale back our participation in the FHA lending program in favor of less burdensome lending programs that serve the same consumer base – and we are not alone. The chart above shows that nonbanks have gone from 20% to 80% of FHA originations.

A first step to increasing participation in the FHA program could be the communication of support for only using the FCA, as originally intended, to penalize intentional fraud rather than immaterial or unintentional errors. Other changes that would help would be:

- Improve and fully implement the Housing and Urban Development's (HUD) proposed defect taxonomy, clarifying liability for fraudulent activity.
- Revise certification requirements to make them more commercially reasonable.
- Simplify loss mitigation by allowing streamlined programs and aligning with industry standards.
- Eliminate costly, unnecessary and outdated requirements that make the cost of servicing an FHA loan significantly more expensive than a conventional loan.

Mortgage servicing is too complex: National servicing standards would help.

Mortgage servicing is a particularly complex business in which the cumulative impact of regulations has dramatically increased operational and compliance risk and costs (remember that costs are usually passed on to the customer). Mortgage servicing starts immediately after loan origination (loan origination also has become significantly more expensive and complex as a result of regulatory changes) and involves a continuing and dynamic relationship among a servicer, customer and investor or guarantor, such as Fannie Mae, Freddie Mac or FHA, to name a few.

New mortgage rules and regulations total more than 14,000 pages and stand about six feet tall. In servicing alone, there are thousands of pages of federal and state servicing rules now – clearly driving up complexity and cost. The Mortgage Bankers Association estimated the fully loaded annual cost of industry servicing, as of 2015, to be $181 for a performing mortgage and $2,386 for a mortgage in default. The cost of servicing a defaulted loan is so high that many servicers avoid underwriting loans that have even a modest probability of default. This is another reason why mortgage companies avoid underwriting certain types of mortgages today than they would have underwritten in the past.

The most promising opportunity in mortgage servicing is to adopt uniform national servicing standards across guarantors, federal and state regulators, and investors. Importantly, there is no need for legislation to implement the necessary coordination to get this done. In particular, the U.S. Treasury is well-positioned to lead key players in the mortgage industry (the Consumer Financial Protection Bureau, Fannie Mae, Freddie Mac, the Federal Housing Finance Agency, HUD, the FHA, the Veterans Administration, Ginnie Mae and the U.S. Department of Agriculture) to establish national service standards that would simplify mortgage origination and servicing. Treasury played a similarly pivotal leadership role during the crisis when it helped develop the various mortgage assistance initiatives, such as the loan modification and streamlined refinance programs that allowed many Americans to stay in their homes and communities.

Private capital needs to return in order to make the market less taxpayer dependent — we need to complete the securitization standards.

Private capital in the mortgage industry, particularly in the form of securitizations, dried up as a result of the financial crisis. Eight years later, we still have not opened up a healthy securitization market because of our inability to finalize the rules. Not only does this reduce the share of private capital in the U.S. housing sector (an action that would significantly reduce taxpayer exposure), it also significantly increases the cost to the customer. Taking a few actions would fix this, including:

- Rationalize capital requirements on securitizations to effectively transfer risk to the market while leaving "skin in the game" with the originator.
- Reduce the complexity of data delivery requirements.
- Clarify and define materiality standards associated with compliance with laws and regulations, as well as underwriting standards, to allow for reasonable protections from litigation and to enable standardized due diligence practices.

If we do this right, we believe the mortgage market could add more than $300 billion a year in new purchased loans.

If we take the actions mentioned above, we believe that the cost to a customer would be 20 basis points lower and that mortgage underwriters would be willing to take more – but appropriate – risk on loans (again, this would be for first-time, young and lower income buyers, those with prior delinquencies but who are now in good financial standing and those who are self-employed).

Taken in total, we believe the issues identified above have reduced mortgage lending by more than $300 billion purchased mortgages annually (our analysis deliberately excludes underwriting the subprime and Alt-A mortgages that caused so many problems in the Great Recession). Had we been able to fix these issues five years ago (i.e., three years after the crisis), our analysis shows that, conservatively, more than $1 trillion in mortgage loans might have been made.

If this is true, it may explain why our housing sector has been unusually slow to recover: $1 trillion of new mortgage loans is approximately 3 million loans. Of these, typically more than 20% would go to purchase new homes that would need to be built. By any estimate, this could have had a significant impact on the growth of jobs and gross domestic product (GDP). ***Our economists think that $1 trillion of loans could have increased GDP, in each of those five years, by 0.5%.*** In the next section, we will talk about how this is just one of the many things we did to damage our nation's economy.

6. How can we reduce complexity and create a more coherent regulatory system?

We created a massively complex system in which multiple regulators have overlapping responsibilities on virtually every issue, including rulemaking, examination, auditing and enforcement. This is extremely taxing, complex and overly burdensome for banks, customers of banks and regulators.

Dodd-Frank appropriately established the Financial Services Oversight Committee (FSOC) and assigned to it the responsibility of general oversight across the entire financial system. Unfortunately, the FSOC was not given the ability to adjudicate issues or assign responsibility. Therefore, the FSOC is unable to fully resolve some of the problems that we have detailed in this letter. Finally, another flaw is that some of the laws were written in a way that left them open to broad interpretation and novel enforcement.

There is too much complexity in the system – it could be fixed, and that would make the system stronger.

Nearly everyone agrees there is too much complexity in the current construct of the financial system. A few examples will suffice:

- There are multiple calculations of capital, living wills, the Volcker Rule, etc.
- There are multiple regulators involved independently in rulemaking – just two examples: Seven regulators are involved in setting mortgage regulations, and five regulators oversee the Volcker Rule. This leads to slow rulemaking (e.g., as noted above, we still have not finished the mortgage rules eight years after the crisis), excessive reporting and varied interpretations on what the actual rules are.
- Each agency makes separate audit and reporting demands and can independently take enforcement action on the same subject.

This is clearly a dysfunctional structure. The fix is simple – though getting it done may not be:

- The system should be simplified. There should be one primary regulator on any issue, and we should always strive to make things as simple as possible.
- The primary regulator should establish the rules, the reporting requirements, the audit plans and the enforcement action. Other regulators should get involved only if they believe the primary person did a particularly poor job.
- Everything in the regulatory landscape should be reviewed in the context of safety and soundness, cost-benefit analysis and economic growth.

The FSOC is a good idea but needs to be modified to be more effective.

It makes sense for regulators to be continuously reviewing the entire financial system in an effort to make it as safe and sound as possible (think of this as a well-functioning risk committee of a major bank). But the FSOC should be given some authority to assign responsibility, adjudicate disagreements, set deadlines and force the resolution of critical issues. The FSOC could also enforce due consideration of regulations' costs vs. benefits and the impact on economic growth.

We have great sympathy for, and agree with, the complaints of the community banks. They are struggling to deal with the complexity and cost of meeting these requirements – and we agree these smaller banks should be relieved of many of the requirements.

Enhancing the functionality of the FSOC and providing regulatory relief where appropriate should not be a political issue. The administration is currently conducting a review of the rules and regulations, which are burdensome and duplicative and which may impede economic growth. That process should be as de-politicized as possible. Everyone stands to gain when growth is enabled in a safe and sound manner.

7. How can we harmonize regulations across the globe?

Currently, American regulators have been pushing the Basel Committee – the international forum that is supposed to set international financial regulatory guidelines – to meet the even higher American standards around capital requirements, derivatives rules, risk-weight calculations, stress testing and other requirements. Many other countries around the world are telling Basel that it has gone too far and that it's time to let the banks focus on healthy lending and growth of the economy. Following are a few principles that we think should guide global regulations and international coordination to increase safety and soundness and foster global growth:

- International regulations should be coherent and generally harmonized around the world – but they don't need to be exactly the same.
- We should recognize where there are legitimate reasons to do something different. For example, certain types of loans legitimately could draw different risk weighting in various countries based on historical performance, collateral and bankruptcy laws or even culture.
- Cross-border financial rules need to be part of trade negotiations like any other product or service. We know we will be increasingly competing with Chinese banks, and, eventually, we need the U.S. government to make that part of our trade agreement.
- We can acknowledge that the state of affairs in different countries, including in their banks and their economies, may differ and that these differences might warrant idiosyncratic regulatory responses. For example, European banks for eight years have consistently been put in the position of having to raise more and more capital and liquidity or having to reduce their lending capacity. While their capital standards may have been low compared with American standards (particularly in how they calculate risk-weighted assets), this deleveraging has to have hurt the growth of European economies and opportunities for their people. These banks started from a different position (which had been sanctioned by both their regulators and governments years ago), and we agree that these banks should be allowed to do their job. Most of these banks have plenty of total capital. While it might be true that one day they should have more, the moral imperative now is to help their economies grow and to help the people of those countries.

We are completely convinced that if we can rationally change and coordinate many of these rules, banks can do ***even more*** to help the economy thrive.

Before we address some of the critical issues confronting our country, it would be good to count our blessings. Let's start with a serious assessment of our strengths.

1. The United States of America is truly an exceptional country.

America today is probably stronger than ever before. For example:

- The United States has the world's strongest military, and this will be the case for decades. We are fortunate to be at peace with our neighbors and to have the protection of the Atlantic and Pacific oceans.
- As a nation, we have essentially all the food, water and energy we need.
- The United States has among the world's best universities and hospitals.
- The United States has a generally reliable rule of law and low corruption.
- The government of the United States is the world's longest surviving democracy, which has been steadfast, resilient and enduring through some very difficult times.
- The people of the United States have a great work ethic and can-do attitude.
- Americans are among the most entrepreneurial and innovative people in the world – from those who work on the factory floors to geniuses like the late Steve Jobs. Improving "things" and increasing productivity are American pastimes. And America still fosters an entrepreneurial culture, which allows risk taking – and acknowledges that it can result in success or failure.
- The United States is home to many of the best, most vibrant businesses on the planet – from small and midsized companies to large, global multinationals.
- The United States has the widest, deepest, most transparent and best financial markets in the world. And I'm not talking about just Wall Street and banks – I include the whole mosaic: venture capital, private equity, asset managers, individual and corporate investors, and public and private capital markets. Our financial markets have been an essential part of the great American business machine.

Very few countries, if any, are as blessed as we are.

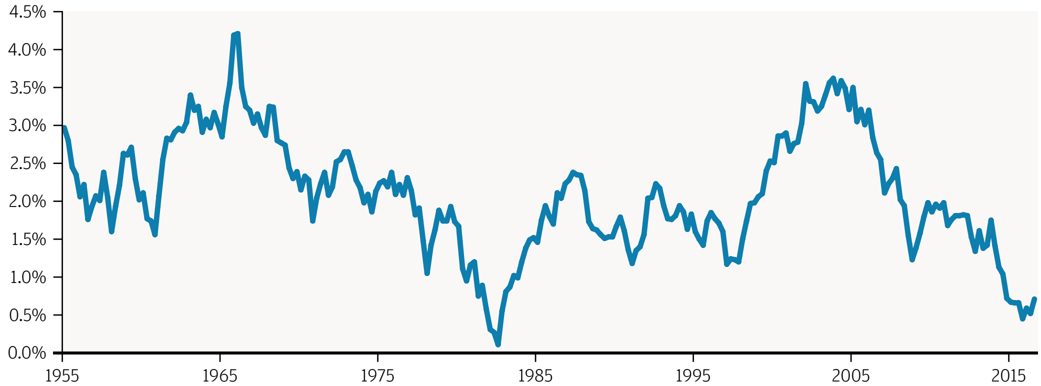
2. But it is clear that something is wrong – and it's holding us back.

Our economy has been growing much more slowly in the last decade or two than in the 50 years before then. From 1948 to 2000, real per capita GDP grew 2.3%; from 2000 to 2016, it grew 1%. Had it grown at 2.3% instead of 1% in those 17 years, our GDP per capita would be 24%, or more than $12,500 per person higher than it is. U.S. productivity growth tells much the same story, as shown in the chart on page 33.

Our nation's lower growth has been accompanied by – and may be one of the reasons why – real median household incomes in 2015 were actually 2.5% lower than they were in 1999. In addition, the percentage of middle class households has actually shrunk over time. In 1971, 61% of households were considered middle class, but that percentage was only 50% in 2015. And for those in the bottom 20% of earners – mainly lower skilled workers – the story may be even

U.S. Productivity Growth

5-year % change, annualized



Source: Haver; Bureau of Labor Statistics

worse. For this group, real incomes declined by more than 8% between 1999 and 2015. In 1984, 60% of families could afford a modestly priced home. By 2009, that figure fell to about 50%. This drop occurred even though the percentage of U.S. citizens with a high school degree or higher increased from 30% to 50% from 1980 to 2013. Low-skilled labor just doesn't earn what it used to, which understandably is a source of real frustration for a very meaningful group of people. The income gap between lower skilled and skilled workers has been growing and may be the inevitable consequence of an increasingly sophisticated economy.

Regarding reduced social mobility, researchers have found that the likelihood of workers moving to the top-earning decile from starting positions in the middle of the earnings distribution has declined by approximately 20% since the early 1980s.

Many economists believe we are now permanently relegated to slower growth and lower productivity (they say that secular stagnation is the new normal), but I strongly disagree.

We will describe in the rest of this section many factors that are rarely considered in economic models although they can have an enormous effect on growth and productivity. Making this list was an upsetting exercise, especially since many of our problems have been self-inflicted. That said, it was also a good reminder of how much of this is in our control and how critical it is that we focus on all the levers that could be pulled to help the U.S. economy. We must do this because it will help ***all*** Americans.

Many other, often non-economic, factors impact growth and productivity.

Following is a list of some non-economic items that must have had a significant impact on America's growth:

- Over the last 16 years, we have spent trillions of dollars on wars when we could have been investing that money productively. (I'm not saying that money didn't need to be spent; but every dollar spent on battle is a dollar that can't be put to use elsewhere.)
- Since 2010, when the government took over student lending, direct government lending to students has gone from approximately $200 billion to more than $900 billion – creating dramatically increased student defaults and a population that is rightfully angry about how much money they owe, particularly since it reduces their ability to get other credit.

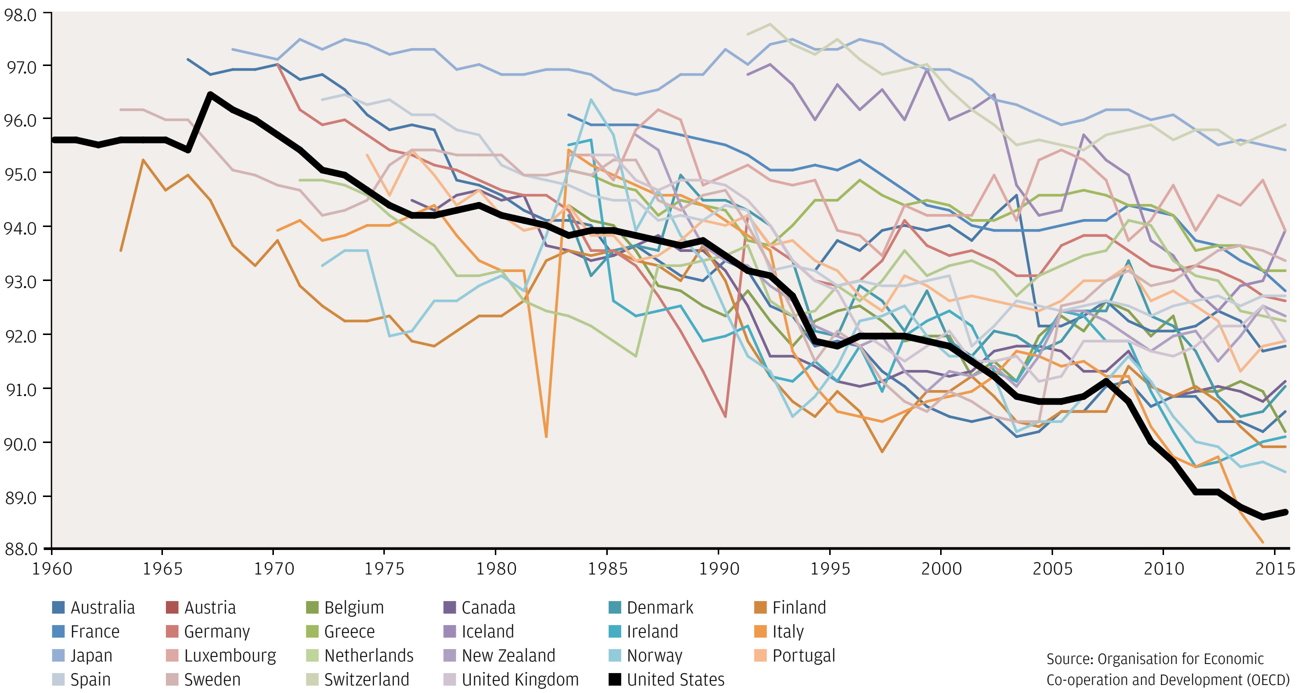
- Our nation's healthcare costs are essentially twice as much per person vs. most other developed nations.
- It is alarming that approximately 40% (this is an astounding 300,000 students each year) of those who receive advanced degrees in science, technology, engineering and math at American universities are foreign nationals with no legal way of staying here even when many would choose to do so. We are forcing great talent overseas by not allowing these young people to build their dreams here.
- Felony convictions for even minor offenses have led, in part, to 20 million American citizens having a criminal record – and this means they often have a hard time getting a job. (There are six times more felons in the United States than in Canada.)
- The inability to reform mortgage markets has dramatically reduced mortgage availability. We estimate that mortgages alone would have been more than $1 trillion higher had we had healthier mortgage markets. Greater mortgage access would have led to more homebuilding and additional jobs and investments, which also would have driven additional growth.

Any one of these non-economic factors is fairly material in damaging America's effort to achieve healthy growth. Let's dig a little bit deeper into six additional unsettling issues that have also limited our growth rate.

Labor force participation is too low.

Labor force participation in the United States has gone from 66% to 63% between 2008 and today. Some of the reasons for this decline are understandable and aren't too worrisome – for example, an aging population. But if you examine the data more closely and focus just on labor force participation for one key segment; i.e., men ages 25-54, you'll see that we have a serious problem. The chart below shows that in America, the participation rate for that cohort has gone from 96% in 1968 to a little over 88% today. This is way below labor force participation in almost every other developed nation.

Labor Force Participation Rates for Men Ages 25–54: U.S. vs. 22 Original OECD Member States, 1960–2015



Source: Organisation for Economic Co-operation and Development (OECD)

If the work participation rate for this group went back to just 93% – the current average for the other developed nations – approximately 10 million more people would be working in the United States. Some other highly disturbing facts include: Fifty-seven percent of these non-working males are on disability, and fully 71% of today's youth (ages 17–24) are ineligible for the military due to a lack of proper education (basic reading or writing skills) or health issues (often obesity or diabetes).

Education is leaving too many behind.

Many high schools and vocational schools do not provide the education our students need – the goal should be to graduate and get a decent job. We should be ringing the national alarm bell that inner city schools are failing our children – often minorities and children from lower income households. In many inner city schools, ***fewer than 60%*** of students graduate, and many of those who do graduate are not prepared for employment. We are creating generations of citizens who will never have a chance in this land of dreams and opportunity. Unfortunately, it's self-perpetuating, and we all pay the price. The subpar academic outcomes of America's minority and low-income children resulted in yearly GDP losses of trillions of dollars, according to McKinsey & Company.

Infrastructure needs planning and investment.

In the early 1960s, America was considered by most to have the best infrastructure (highways, ports, water supply, electrical grid, airports, tunnels, etc.). The World Economic Forum now ranks the United States #27 on its Basic Requirements index, reflecting infrastructure along with other criteria, among 138 countries. On infrastructure, the United States is behind most major developed countries, including the United Kingdom, France and Korea. The American Society of Civil Engineers releases a report every four years examining current infrastructure conditions and needs – the 2017 report card gave us a grade of D+. Another interesting and distressing fact: The United States has not built a major airport in more than 20 years. China, on the other hand, has built 75 new civilian airports in the last 10 years alone.

Our corporate tax system is driving capital and brains overseas.

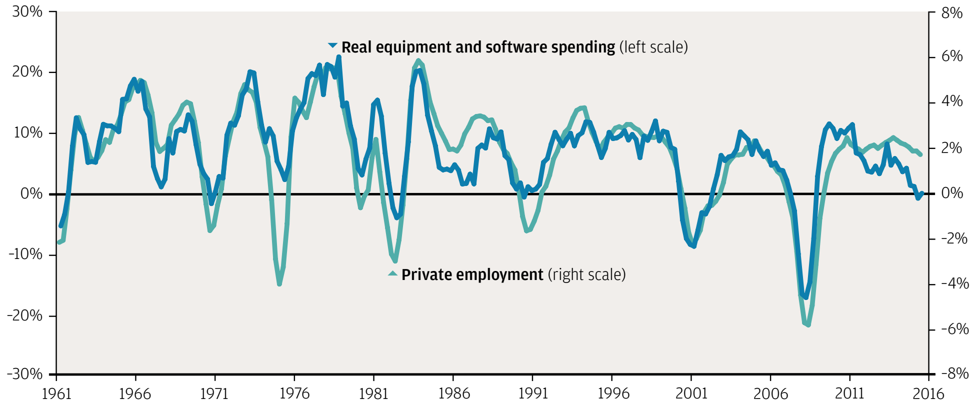
America now has the highest corporate tax rates among developed nations. Most other developed nations have reduced their tax rates substantially over the past 10 years (and this is true whether looking at statutory or effective tax rates). This is causing considerable damage. American corporations are generally better off investing their capital overseas, where they can earn a higher return because of lower taxes. In addition, foreign companies are advantaged when they buy American companies – often they are able to reduce the overall tax rate of the combined company. Because of this, American companies have been making substantial investments in human capital, as well as in plants, facilities, research and development (R&D) and acquisitions overseas. Also, American corporations hold more than $2 trillion in cash abroad to avoid the additional taxes. The only question is how much damage will be done before we fix this.

Reducing corporate taxes would incent business investment and job creation. The charts on page 36 show the following:

- That job growth is highly correlated to business investment (this also makes intuitive sense).
- That fixed investments by businesses and capital formation have gone down substantially and are far below what we would consider normal.

Jobs Growth Clearly Linked to Business Investment

Year-over-year % change

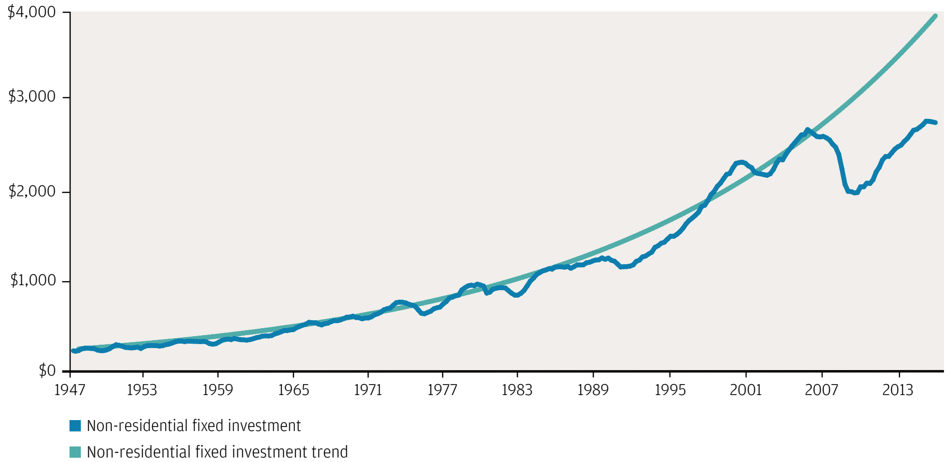


Source: Bureau of Economic Analysis; Bureau of Labor Statistics

Business Fixed Investment below Trend

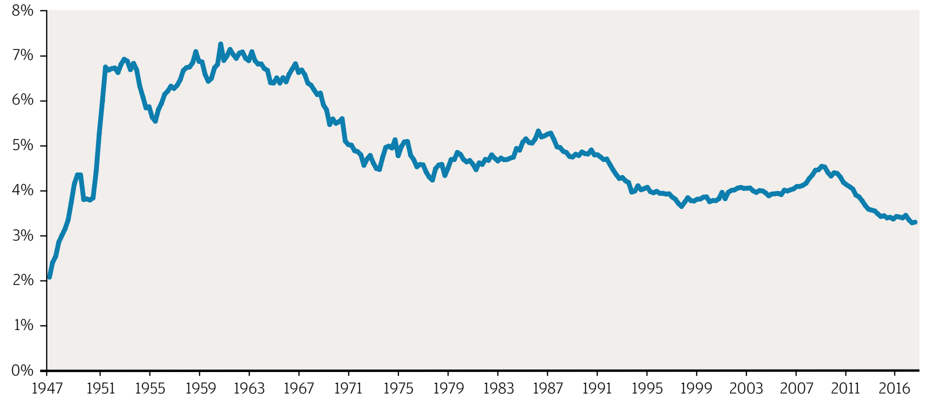
Quarterly data from 1947 to 3rd quarter 2016

($ in billions)



Source: Haver; Bureau of Economic Analysis

U.S. Public Gross Fixed Capital Formation as % of GDP



Source: Haver; Bureau of Economic Analysis

And counterintuitively, reducing corporate taxes would also ***improve*** wages. One of the unintended consequences of high corporate taxes is that they actually depress wages in the United States. A 2007 Treasury Department review finds that labor "may bear a substantial portion of the burden from the corporate income tax." A study by Kevin Hassett from the American Enterprise Institute finds that each $1 increase in U.S. corporate income tax collections leads to a $2 decrease in wages in the short run and a $4 decrease in aggregate wages in the long run. And analysis of the U.S. corporate income tax by the Congressional Budget Office finds that labor bears more than 70% of the burden of the corporate income tax, with the remaining 30% borne by domestic savers through a reduced return on their savings. We must fix this for the benefit of American competitiveness and all Americans.

Excessive regulations reduce growth and business formation.

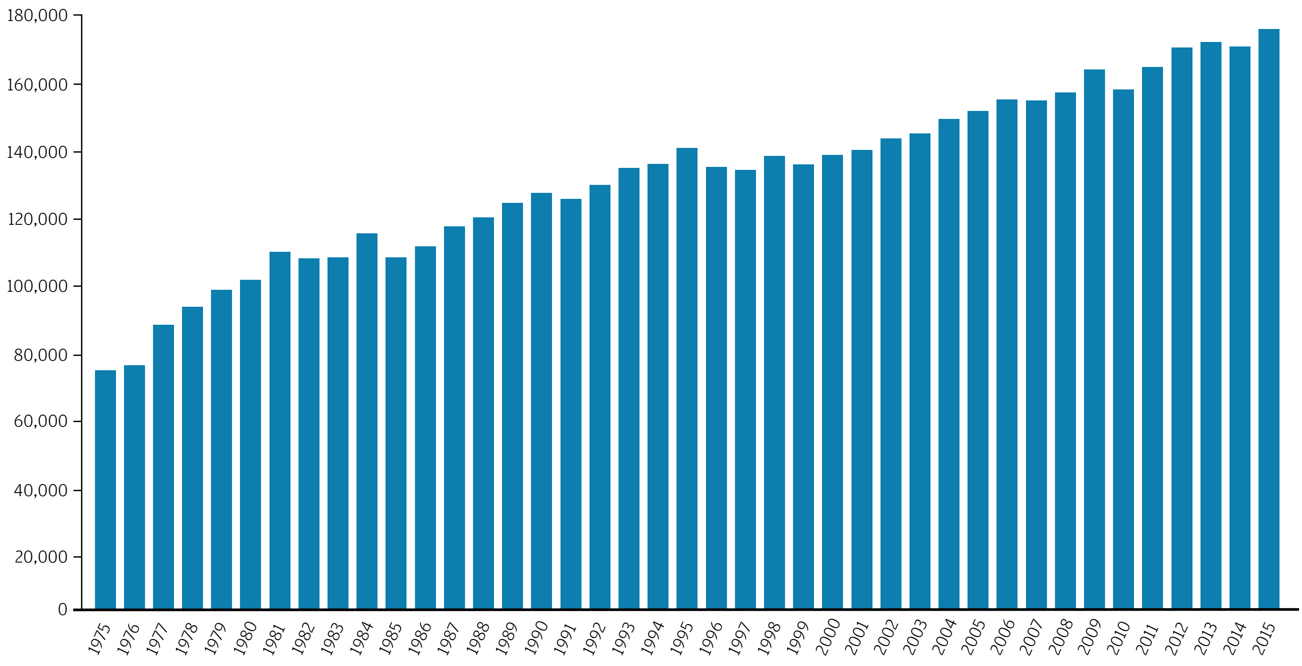
Everyone agrees we should have proper regulation – and, of course, good regulations have many positive effects. But anyone in business understands the damaging effects of overcomplicated and inefficient regulations. There are many ways to look at regulations, and the chart below and the two on page 38 provide some insight. The one below shows the total pages of federal regulations, which is a simple way to illustrate additional reporting and compliance requirements. The second records how we compare with the rest of the world on the ease of starting a new business – we used to be among the best, and now we are not. The bottom chart on page 38 shows that small businesses now report that one of their largest problems is regulations.

By some estimates, approximately $2 trillion is spent on regulations annually (which is approximately $15,000 per U.S. household annually).[5] And even if this number is exag-

[5] Crews, Clyde Wayne, Jr. (2016). *Ten Thousand Commandments – An Annual Snapshot of the Federal Regulatory State*.

Code of Federal Regulation 1975–2015

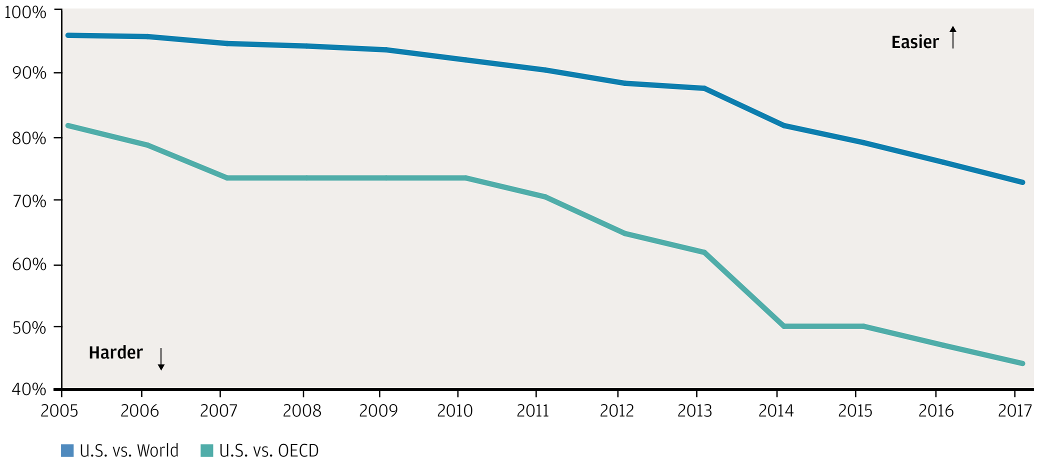
Number of pages



Source: The National Archives

"Ease of Starting a New Business": In the U.S., Getting Less Easy

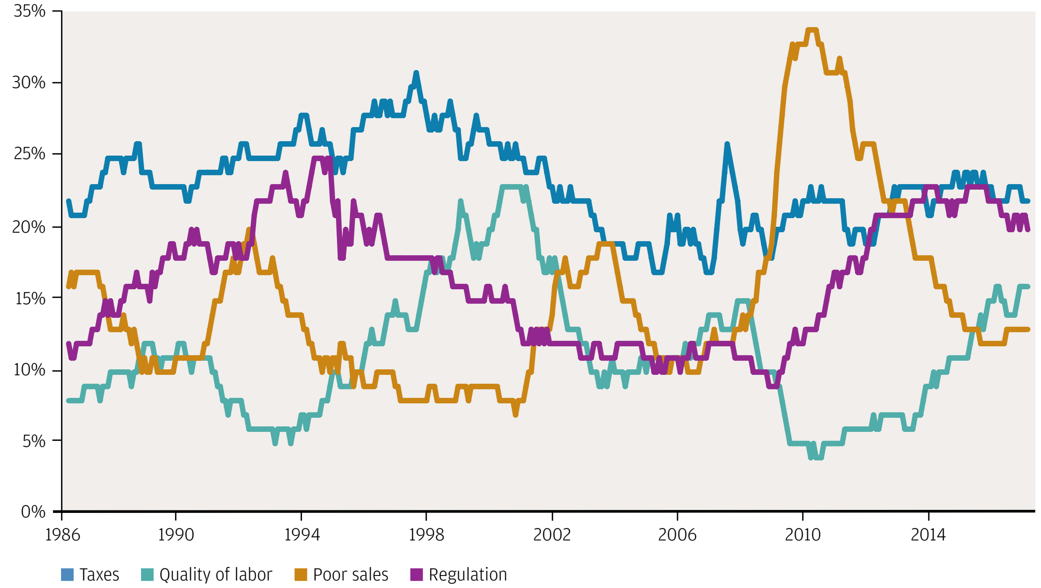
U.S. percentile rank relative to world and OECD



Source: World Bank Doing Business; J.P. Morgan Asset Management, October 2016. N = 189

What's the Largest Problem Facing Small Businesses?

% of respondents, 6-month average



Source: Haver; National Federation of Independent Business

gerated, it highlights a disturbing problem. Particularly troubling is that this may be one of the reasons why small business creation has slowed alarmingly in recent years. According to the U.S. Chamber of Commerce, the rising burdens of federal regulations alone may be a main reason for a falling pace in new business formation. In 1980, Americans were creating some 450,000 new companies a year. In 2013, they formed 400,000 new businesses despite a 40% increase in population from 1980 to 2013. Our three-decade slump in company formation fell to its lowest point with the onset of the Great Recession; even with more businesses being established today, America's startup activity remains below pre-recession levels.

While some regulations quite clearly create a common good (e.g., clean air and water), it is clear that excessive regulation does not help productivity, growth of the economy or job creation. And even regulations that once may have made sense may no longer be fit for the purpose. I am not going to outline specific recommendations about non-financial regulatory reform here, other than to say that we should have a permanent and systematic review of the costs and benefits of regulations, including their intended vs. unintended consequences.

The lack of economic growth and opportunity has led to deep and understandable frustration among so many Americans.

Low job growth, a lack of opportunity for many, declining wages, students and low-wage workers being left behind, economic and job uncertainty, high healthcare costs and growing income inequality all have created deep frustration. It is understandable why so many are angry at the leaders of America's institutions, including businesses, schools and governments – they are right to expect us to do a better job. Collectively, we are the ones responsible. Additionally, this can understandably lead to disenchantment with trade, globalization and even our free enterprise system, which for so many people seems not to have worked.

Our problems are significant, and they are not the singular purview of either political party. We need coherent, consistent, comprehensive and coordinated policies that help fix these problems. The solutions are not binary – they are not either/or, and they are not about Democrats or Republicans. They are about facts, analysis, ideas and best practices (including what we can learn from others around the world).

3. How can we start investing in our people to help them be more productive and share in the opportunities and rewards of our economy?

We need to work together to improve work skills.

I cannot in this letter tackle the complex set of issues confronting our inner city schools, but I do know that if we don't ***acknowledge*** these problems, we will never fix them. Whether they graduate from high school, vocational or training school or go on to college, our students can and should be adequately prepared for good, decent-paying jobs. And whether a student graduates from high school, vocational school or training school, the graduate should have a sense of pride and accomplishment – and meaningful employment opportunities, without forgoing the chance to go to college later on. Career and technical education specifically can give young people the skills they need for decent-paying roles in hundreds of fields, including aviation, robotics, medical science, welding, accounting and coding – all jobs that are in demand today.

In New York City, not far from where I grew up in Jackson Heights, Queens, there's a school called Aviation High School. Students travel from all over the city to go to the school (with a 97% student attendance rate), where they are trained in many facets of aviation, from how to maintain an aircraft to the details of the plane's electronics, hydraulics and electrical systems. And when the students graduate (93% graduated in the normal four years), they get a job, often earning an annual starting salary of approximately $60,000. It's a great example of what we should be promoting in our educational system.

Businesses must be involved in this process. They need to partner with schools to let them know what skills are needed, help develop the appropriate curricula, help train teachers and be prepared to hire the students. In addition, this has to be done locally because that is where the actual jobs are. Germany does this well. Germany has one of the strongest education and training systems in the world, with about 1.5 million young people every year participating in apprenticeship programs that are paid opportunities to gain in-demand skills along with an education. The vocational schools and apprenticeship programs work directly with local businesses to ensure the students are connected to available jobs upon graduation. As a result of this market-driven vocational training, Germany's youth unemployment rate is also one of the lowest in the world. There is nothing wrong with learning from other countries.

Proper skills training also can be used to continuously re-educate American workers. Many people are afraid that automation is taking away jobs. Let's be clear. Technology is the best thing that ever happened to mankind, and it is the reason the world is getting progressively better. But we should acknowledge that though technology helps everyone generally, it does cause some job loss, dislocation and disruption in specific areas. Retraining is the best way to help those disrupted by advancements in technology.

We need to help lower skilled workers earn a living wage while helping small businesses. Business should support an expanded EITC.

There is a tax credit in the United States called the Earned Income Tax Credit (EITC), which supplements low-paid workers' incomes. For example, a single mother with two children earning $9 an hour (approximately $20,000 a year) could get a tax credit of more than $5,000 at the end of the year. A single man without children could get a tax credit under this program of only about $500. This program has flaws (which we believe could be fixed), but it has lifted an estimated 9 million people above the poverty line. (The federal poverty guideline is determined by household size. For a four-person household, the poverty level is $24,600 or approximately $11 an hour.) Last year, the EITC program cost the United States about $67 billion, and there were 27 million individuals who received the credit.

Approximately 20.6 million American workers earn between $7.25 an hour (the prevailing federal minimum wage) and $10.10 an hour. Approximately 42% of American workers make less than $15 an hour. I believe we should dramatically expand the EITC to help more low-paid individuals, with and without children, earn a living wage. I have no doubt that this will entice more workers back into the workforce. Jobs bring dignity. That first job is often the first rung on the ladder. And studies show that once people start working, they continue working. In addition, living wages lead to less crime, more household formation and, it is hoped, better social outcomes, including more marriages and children and better health and overall well-being.

It is important to note that large companies generally pay well above the minimum wage and provide health insurance and retirement benefits to all their employees. They also extensively train their employees and help them move along in their careers. While this would help small businesses far more than big businesses, large companies should support the expansion of this program because it would foster growth and be great for lower paid American workers.

4. What should our country be doing to invest in its infrastructure? How does the lack of a plan and investment hurt our economy?

Infrastructure in America is a very broad and complex subject. However, we do have a few suggestions on how to make it better.

Similar to companies planning for capacity needs, it is quite clear that cities, states and the federal government can also plan around their somewhat predictable needs for maintenance, new roads and bridges, increasing electrical requirements and other necessities to serve a growing population. Infrastructure should not be a stop-start process but an ongoing endeavor whereby intelligent investments are made continuously. And the plan could also be sped up if necessary to help a weakening economy.

Infrastructure, which could have a life of five to 50 years, should not be expensed as a government debt but should be accounted for as an investment that could be financed separately. Borrowing money for consumption is completely different from borrowing for something that has value for a long period of time.

It's important to streamline the approval process, and approvals should run simultaneously and not sequentially.

Last, we need to assure that we have good infrastructure and not bridges to nowhere. Good infrastructure serving real needs is not only conducive to jobs in the short run but to growth in the long run. Projects should be specifically identified, with budgets and calendars and with responsible parties named.

5. How should the U.S. legal and regulatory systems be reformed to incentivize investment and job creation?

There are many reasons to be proud of our system of government. The U.S. Constitution is the bedrock of the greatest democracy in the world. The checks and balances put in place by the framers are still powerful limits on each branch's powers. And this year, we witnessed one of the hallmarks of our great nation – the peaceful transition of power following a democratic election.

Our legal system, including our nation's commitment to the rule of law, has long been a particular source of strength for our economy. When people, communities and companies are confident in the stability and fairness of a country's legal system, they want to do business in that country and invest there (and come from overseas to do so). Knowing that you will have access to courts for a fair and timely hearing on matters and that there are checks against abuses of power is important. As the discussion about areas for potential reform continues, it is critical that these long-term U.S. advantages are kept in mind and preserved.

In regulation, for example, I worry that the distribution of power has shifted. Congress, through the Administrative Procedures Act (APA), set out how regulators should publish draft rules. The APA allows for comments on draft rules, including comments on how a proposed rule will impact lending, jobs and the economy. Today, however, agencies often regulate through supervisory guidance that isn't subject to the same commentary or checks. The function of interpretive guidance is to clarify or explain existing law and should not be used to impose new, substantive requirements. Now is a good time to discuss how to reset this balance.

There also is an opportunity to have a similar conversation around enforcement and litigation. On the civil side, we should look closely at whether statutory damages provisions work as intended. I read recently about a settlement under the Fair and Accurate Credit Transactions Act in which plaintiffs received in excess of $30 million from a business that printed credit card receipts with the customer's card expiration date. Is that fair and proportionate – or is the result driven by a statutory damages framework that should be reconsidered?

And simply because the company agreed to the settlement does not mean it was the right result. Here is the fact: The current dynamics make it very hard for companies to get their day in court – as the consequences of a loss at trial can be disproportionately severe. This is particularly true in a government-initiated case. The collateral consequences of standing up to a regulator or losing at trial can be disproportionately negative when compared with the underlying issue or proposed settlement, and it can lead to the decision not to fight at all, no matter what the merits of the case may be. The Institute for Legal Reform, for the Chamber of Commerce has framed this issue as follows:

"The so-called 'trial penalty' has virtually annihilated the constitutional right to a trial. What are the consequences of a system in which the government is only rarely required to prove its case? What are the implications of this on businesses, both large and small? Ultimately, what are the long-term prospects for entrepreneurship in an environment where even the most minor, unintentional misstep may result in criminal investigation, prosecution and loss of liberty?"

When you combine this with the fact that businesses have no "penalty-free" way to challenge a new interpretation of the law, the net-net result is a system that fosters legislation by enforcement actions and settlements. Said differently, rather than Congress expanding a law or a court testing a novel interpretation, regulators and prosecutors make those decisions and companies acquiesce.

The impact of these issues is further exacerbated by a system that allows for "multiple jeopardy," where federal, state, prudential and foreign agencies can "pile on" to any matter, each seeking its own penalty without any mechanism to ensure that the multiple punishments are proportionate and fair. It would be like getting pulled over by a local police officer and getting fined by your local town, then by your county, then by your state, then by the federal government and then having the U.N. weigh in since the car was made overseas.

To be clear, we need regulators focused on the safety and soundness of all institutions. We need enforcement bodies focused on compliance with the law. But we also need to preserve the system of checks and balances – when you cannot get your day in court on some really important issues, we all suffer.

We need to improve and reform our legal system because it is having a chilling impact on business formation, risk taking and entrepreneurship.

6. What price are we paying for the lack of understanding about business and free enterprise?

The United States needs to ensure that we maintain a healthy and vibrant economy. This is what fuels job creation, raises the standard of living for those who are hurting, and positions us to invest in education, technology and infrastructure in a programmatic and sustainable way to build a better and safer future for our country and its people. America's military will be the best in the world ***only*** as long as we have the best economy in the world.

Business plays a critical role as an engine of economic growth, particularly our largest, globally competitive American businesses. As an example, the thousand largest companies in America (out of approximately 29 million) employ nearly 30 million people in the United States, and almost all of their employees get full medical and retirement benefits and extensive training. In addition, these companies account for more than 30% of the roughly $2.3 trillion spent annually on capital expenditures. Capital expenditures and R&D spending drive productivity and innovation, which ultimately drive job creation across the entire economy.

To support this, we need a pro-growth policy environment from the government that provides a degree of certainty around long-standing issues that have proved frustratingly elusive to solve. The most pressing areas in which government, business and other stakeholders can find common ground should include tax reform, infrastructure investment, education reform, more favorable trade agreements and a sensible immigration policy, among others.

When you read that small businesses and big businesses are pitted against each other or are not good for each other, don't believe it.

Why are America's public equity markets so important?
How do we sustain them and strengthen corporate governance?

For more than two centuries, the American free enterprise system has led to enormous prosperity for our country: the creation of jobs, increases in wages and savings, and the emergence and growth of dynamic companies. Because well-managed and well-governed businesses are the engines of our economy, good corporate governance must be more than just a catchphrase or fad. It's an imperative – especially when it comes to our publicly owned companies.

The chart on the right should be a cause for concern. It notes that the number of public companies in the United States has declined 45% since 1996.

There may very well be some logical and good explanations for why this is so; e.g., companies can get capital more easily in the private markets, and the private markets can be more efficient than they used to be.

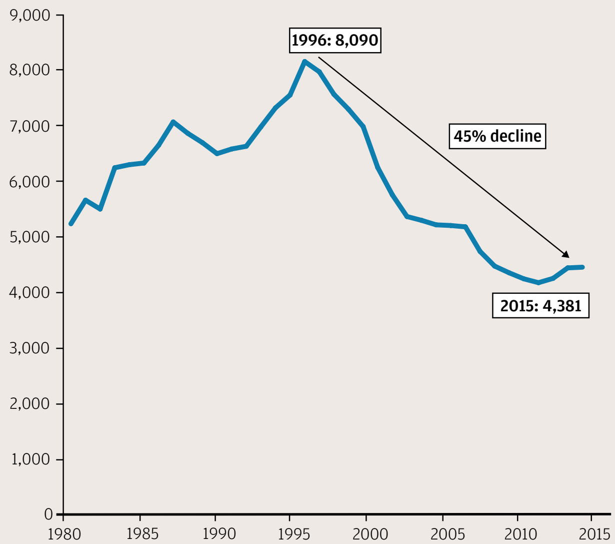
I suspect there are other less-constructive reasons, which could be greatly expanded upon, but I will merely list them below:

- Excessive litigation, including shareholder class action lawsuits
- Excessive and expensive reporting requirements
- Self-serving shareholder activity and proposals not intended to benefit the company
- Shareholder meetings that are hijacked by special interest groups and become a complete farce
- Too much short-termism; i.e., quarterly earnings, at the expense of making good, long-term investments
- Constant and frequent negative media scrutiny – some deserved and some not
- Boards spending more and more time on check-the-box legal and regulatory demands as opposed to the most important role of boards – management, strategy, major risks, etc.

Many private equity companies often stress that it is better to be owned by them because they operate with commonsense corporate governance; i.e., less check-the-box corporate governance – whether addressing board membership, how a board spends its time, management compensation or long-term results vs. just quarterly earnings. The following page exhibits a letter drafted by a diverse group of financial leaders that outlines recommendations for commonsense corporate governance principles that would foster the health of our public companies.

It is hard to estimate the cause and effect of all these factors, but they are reasons for concern. America's public markets have been a key to America's success, and I suspect that years from now, we may regret the damage we have done to them.

Public Companies Disappearing



Source: World Bank; World Federation of Exchanges database

COMMONSENSE CORPORATE GOVERNANCE PRINCIPLES

The health of America's public corporations and financial markets — and public trust in both — is critical to economic growth and a better financial future for American workers, retirees and investors.

Millions of American families depend on these companies for work — our nearly 5,000 public companies account for a third of the nation's private sector jobs. And these same families and millions more also rely on public companies to help improve their financial future — they are heavily invested in these companies through mutual funds, 401(k) and pension plans, college savings plans and other accounts to buy a home, send their children to college and save for retirement.

Our future depends on these companies being managed effectively for long-term prosperity, which is why the governance of American companies is so important to every American. Corporate governance in recent years has often been an area of intense debate among investors, corporate leaders and other stakeholders. Yet, too often, that debate has generated more heat than light.

We represent some of America's largest corporations, as well as investment managers, that, as fiduciaries, represent millions of individual savers and pension beneficiaries. We include corporate CEOs, the head of the Canadian public pension fund and an activist investor, and the heads of a number of institutional investors who manage money on behalf of a broad range of Americans.

This diverse group certainly holds varied opinions on corporate governance. But we share the view that constructive dialogue requires finding common ground — a starting point to foster the economic growth that benefits shareholders, employees and the economy as a whole. To that end, we have worked to find commonsense principles. We offer these principles, which can be found at www.governanceprinciples.org, in the hope that they will promote further conversation on corporate governance. These principles include the following, among others:

- Truly independent corporate boards are vital to effective governance, so no board should be beholden to the CEO or management. Every board should meet regularly without the CEO present, and every board should have active and direct engagement with executives below the CEO level;
- Diverse boards make better decisions, so every board should have members with complementary and diverse skills, backgrounds and experiences. It's also important to balance wisdom and judgment that accompany experience and tenure with the need for fresh thinking and perspectives of new board members;
- Every board needs a strong leader who is independent of management. The board's independent directors usually are in the best position to evaluate whether the roles of chairman and CEO should be separate or combined; and if the board decides on a combined role, it is essential that the board have a strong lead independent director with clearly defined authorities and responsibilities;
- Our financial markets have become too obsessed with quarterly earnings forecasts. Companies should not feel obligated to provide earnings guidance — and should do so only if they believe that providing such guidance is beneficial to shareholders;
- A common accounting standard is critical for corporate transparency, so while companies may use non-Generally Accepted Accounting Principles ("GAAP") to explain and clarify their results, they never should do so in such a way as to obscure GAAP-reported results; and in particular, since stock- or options-based compensation is plainly a cost of doing business, it always should be reflected in non-GAAP measurements of earnings; and
- Effective governance requires constructive engagement between a company and its shareholders. So the company's institutional investors making decisions on proxy issues important to long-term value creation should have access to the company, its management and, in some circumstances, the board; similarly, a company, its management and board should have access to institutional investors' ultimate decision makers on those issues.

These recommendations are not meant to be absolute. We know that there is significant variation among our public companies and that their approach to corporate governance will inevitably (and appropriately) reflect those differences. But we do hope our effort will be the beginning of a continuing dialogue that will benefit millions of Americans by promoting trust in our nation's public companies.

We encourage others to join in that dialogue. Our country, our economy and the future of our citizens depend on getting corporate governance right.

Tim Armour
Capital Group

Mary Barra
General Motors Company

Warren Buffett
Berkshire Hathaway Inc.

Jamie Dimon
JPMorgan Chase

Mary Erdoes
J.P. Morgan Asset Management

Larry Fink
BlackRock

Jeff Immelt
GE

Mark Machin
CPP Investment Board

Lowell McAdam
Verizon

Bill McNabb
Vanguard

Ronald O'Hanley
State Street Global Advisors

Brian Rogers
T. Rowe Price

Jeff Ubben
ValueAct Capital

www.governanceprinciples.org

Small businesses and large businesses are symbiotic – they are substantial customers of each other, and they help drive each other's growth – and are integral to our large business ecosystem. At JPMorgan Chase, for example, we support more than 4 million small business clients, 15,000 middle market companies, and approximately 7,000 corporations and investor clients. We also rely on services from nearly 30,000 vendors, many of which are small and midsized companies. Business, taken as a whole, is the source of almost all job creation.

Approximately 150 million people work in the United States; 130 million work in private enterprise. We hold in high regard the 20 million people who work in government – teachers, policemen, firemen and others. But we could not pay for those jobs if the other 130 million were not actively producing the GDP of America.

Something has gone awry in the public's understanding of business and free enterprise. Whether it is the current environment or the deficiency of education in general, the lack of understanding around free enterprise is astounding. When businesses or individuals in business do something wrong (problems that all institutions have, including schools, churches, governments, small businesses, etc.), they should be appropriately punished – but not demonized. We need trust and confidence in our institutions – confidence is the "secret sauce" that, without spending any money, helps the economy grow. A strong and vibrant private sector (including big companies) is good for the average American. Entrepreneurship and free enterprise, with strong ethics and high standards, are worth rooting for, not attacking.

7. Strong collaboration is needed between business and government.

We all can agree that a general dissatisfaction with the lack of true collaboration and willingness to address our most pressing policy issues has contributed to the existing divisive and polarized environment. Certainly there is plenty of blame to go around on this front. However, rather than looking back, it is now more important than ever for the business community and government to come together and collaborate to find meaningful solutions and develop thoughtful policies that create economic growth and opportunity for all. This cannot be done by government alone or by business alone. We all must work together in ways that put aside our "business-as-usual" approaches. The lack of economic opportunity is a moral and economic crisis that affects everyone. There are too many people who are not getting a fair chance to get ahead and move up the economic ladder. This runs contrary to the fundamental idea that America is a country where everyone has an opportunity to improve their lives and that future generations of Americans know they can be just as successful as those who came before them.

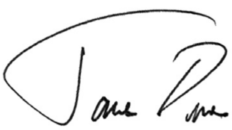
By working together and applying some good old American can-do ingenuity, there is nothing that we can't accomplish. By working together, the business community, government and the nonprofit sector can ensure and maintain a healthy and vibrant economy today and into the future, creating jobs, fostering economic mobility and maintaining sustainable economic growth. Ultimately, this translates to an improved quality of life and greater financial security for those who are struggling to make ends meet. It also would be a significant step in restoring public faith in two of our greatest democratic institutions – U.S. business and government – and would allow us to move forward toward a prosperous future for all Americans.

IN CLOSING

We know we have to earn the trust and respect of our shareholders, employees, customers and the communities we serve every single day. You can rest assured that we are devoted to doing this.

I want to thank our management team. If you could see them in action like I do, you would know that they have remarkable capabilities, character, culture, experience and wisdom.

In closing, I can't emphasize enough how honored I am to work at this company and with its people. What they have accomplished during these turbulent times has been extraordinary. On behalf of JPMorgan Chase and its management, I want to express my deepest gratitude to our people – I am proud to be their partner.



Jamie Dimon
Chairman and Chief Executive Officer

April 4, 2017

Redefining the Financial Services Industry

Matt Zames

As the firm's Chief Operating Officer, I manage a diverse group of critical firmwide operations and functions, as well as certain markets-intensive activities that are integral to our success. These include Global Technology, the Intelligent Solutions group (which drives innovation across the firm by leveraging big data and advanced analytics such as machine learning), Treasury and the Chief Investment Office, Mortgage Banking Capital Markets, Oversight & Control, Regulatory Affairs and the Chief Administrative Office, which includes Real Estate, Procurement, Military & Veteran Affairs, Compliance Operations and Strategy & Process Improvement, among others.

The Chief Operating Office (COO) has a broad and deep mandate, but this year, I want to highlight (i) our investment in technology; (ii) our approach to managing a $2.5 trillion balance sheet; and (iii) our ongoing commitment to a best-in-class culture.

Technology continues to fuel everything we do

Technology is at the core of what we do. Advances in technology make us faster and safer and drive a more engaging customer experience, differentiating our businesses today and for the future. The pace of technology change is always increasing, and we challenge ourselves to think, innovate and deliver like a technology company.

Our more than $9.5 billion technology budget demonstrates our significant, ongoing commitment to technology investment. The scale and diversity of our businesses enable us to invest wherever we see opportunity or competitive advantage to do so effectively. We will continue to grow the share of our technology budget allocated to new investment and innovation by optimizing our existing technology environment. We will also maintain a relentless focus and significant spend on cybersecurity, protecting the firm and enabling the secure introduction of new capabilities.

Optimize to innovate

2016 was a year of mobilizing a portfolio of optimization programs that increased the pace and quality of technology delivery while decreasing cost. Improving software development productivity and adopting cloud infrastructure are core elements of that strategy. We continued to improve developer productivity by enabling an agile technology workforce and automating the software development life cycle. We are also defining design standards to provide a common technical framework for development of applications of a particular type, for example, big data analytics. This will significantly reduce rework and duplication in the software development life cycle where, previously, application developers have had to create their own one-off frameworks. We anticipate that these steps ultimately will lead to a 20% efficiency gain in the development process.

Historically, we have followed a traditional "waterfall" approach to software development, with separate teams and processes for development, testing and operations. The agile approach, by contrast, is characterized by multifunctional and collaborative teams and allows frequent readjustment to project plans in response to changing requirements. Adopting this approach vastly improves software quality through its iterative nature and accelerates our ability to deliver incremental value. To put that into perspective, we are moving from software release cycles measured in quarters to cycles measured in days.

We have also made great progress toward fully automating development life cycle processes and standardizing developer toolkits. In 2016, automated code scanning and deployment tools resulted in savings of nearly 120,000 developer hours –

and, over the next few years, we expect to be able to deliver more than 90% of our software through end-to-end automation.

Attracting, retaining and developing top technology talent is paramount, and we cast a net far and wide to find the best and the brightest. In 2016, 32% of our senior hires in technology came from non-financial services firms. We had a 10:1 applicant-to-position ratio for our Technology Analyst Program, which targets graduates of global universities that have strong technology programs. Our employee training programs cover new skill sets, such as cloud and agile development. We also reinforce a strong innovation culture and atmosphere to spark new solutions through open source projects and "hackathons" in which technologists collaboratively code to solve business problems. In 2016, we hosted a firmwide global hackathon across 20 cities with over 2,500 developer participants. This led to 400 new product ideas, of which 130 were potential opportunities for patents.

We continued to pursue a hybrid cloud strategy – leveraging a next-generation internal, private cloud, as well as external, public cloud services – to further enable our developers through on-demand availability, pay-for-use and elastic scalability. In 2016, we launched a new private cloud platform called Gaia, designed to provide developers with rapid agility – so that they spend more time developing and less time provisioning infrastructure and application services. Over 5,000 developers already have begun to use Gaia. By the end of 2017, we expect to more than double the number of applications hosted on the platform.

Over the last year, we established a new Cloud Services function within Global Technology to accelerate our hybrid cloud strategy, which includes running our first applications in the public cloud in 2017. Working collaboratively with public cloud providers, we have made significant progress developing a set of solutions that meets our rigorous risk and security standards. The public cloud reduces our peak infrastructure requirements by providing compute services during temporary fluctuations in demand. The public cloud also helps reduce long-term storage costs and accelerates developer access to new cloud services.

In 2016, we invested in a new global data center strategy to consolidate our existing facilities into fewer, larger, more modular sites. In early 2017, we opened our first new state-of-the-art data center, which is the strategic model for all future builds globally. The new data centers will house our next-generation optimized infrastructure, enabling significant cost benefits. For example, hardware commoditization already has reduced our server costs by 25%. We also have introduced innovative storage offerings, decreasing the price of our lowest tier storage by 75%. We are driving additional efficiency by reducing waste and becoming smarter around technology consumption – for example, reducing over-provisioned storage and automating manual operational tasks.

Our applications are also changing. We are designing and developing applications to take full advantage of the cloud's benefits. In addition, there is growing internal and external demand for simple, self-service interfaces to our data and applications. To meet this demand, we are leveraging application programming interfaces (API) and launched an internal API store to provide access to a marketplace of secure application services to developers throughout the firm. The old world of developing and writing unique code is rapidly being replaced by reusable component pieces ("microservices") that can communicate seamlessly, dramatically reducing integration development time and driving developer efficiency. We also are expanding the APIs we offer externally to enable direct client integration and secure solutions by third-party developers – for example, the partnership with Intuit that we recently announced. By the end of 2017, we estimate our applications will generate more than 100 million internal and external API calls each day.

Advancing innovation and partnerships

As a firm, innovation is our top strategic priority. We take pride in our ability to differentiate ourselves through the development of new solutions and the adoption of emerging technology at scale.

Demand for digital-centric experiences is transforming our businesses faster than ever. Most of our digital solutions will continue to be built in-house due to competitive and strategic importance. However, we have realized the complementary benefit of partnering with fintech companies to enhance select digital products and services. As a result, our strategy is a combination of build, buy and partner in order to continue delivering the best digital products and services at scale.

We have formalized a firmwide fintech strategy and ecosystem engagement model to identify and leverage partner relationships across all of our business areas. In their letters, each of our CEOs highlights examples of how technological innovation is delivering value to their business.

Our relationships with the external technology ecosystem helped drive value across our technology focus areas, including next-generation data and analytics platforms, such as Hadoop and Spark. To maximize the impact of these new data platforms, we have doubled our big data infrastructure consistently year-over-year. We now can access and analyze data in ways that we could not have done before. For example, last year, we re-engineered our Market Risk platform, one of the largest in-memory risk analytics platforms in the world. The platform now manages over 1 billion risk sensitivities and provides visibility 17 times faster than the prior system while delivering a more granular and holistic view of the firm's risk exposure.

Within our global payments strategy, we have developed a new payments platform based on similar cutting-edge technologies. It will replace nine monolithic platforms and enhance client value through real-time cross-border payment execution and end-to-end payment status transparency. In addition, the platform will enable us to bring new products to market more quickly and offer a more configurable, flexible client experience through reusable APIs and microservices for event processing.

As we look forward, two emerging areas of innovation – robotics and machine learning – offer promising opportunities to drive new value through automation and insight.

Robotics

Robotic process automation is software that automates routine, repetitive activity that otherwise would be performed manually. Virtual "bots" are available 24/7 to efficiently execute simple processes without the risk of human error. In 2016, we established an internal center of excellence to drive best practices around a growing pipeline of robotic process automation, including systems access administration, for which we expect to automate 1.7 million requests in 2017. We have line of sight into more than $30 million run rate saves from robotic process automation in 2017, a savings that, coupled with other optimization efforts, will continue to increase substantially in the years to come. This technology has the opportunity to deliver immediate benefit in several areas across the firm, helping us to position our workforce around higher value tasks and functions.

Machine learning

Machine learning offers another exciting opportunity to drive new capabilities for the firm and our customers and clients. Machine learning technology provides insights about data without needing to pre-program algorithms. Machine learning technology actively learns from data with the goal of predicting outcomes. The more these learning algorithms are engaged, the more effective they become at identifying patterns and relationships. In 2016, we established a center of excellence within Intelligent Solutions to explore and implement a growing number of use cases for machine learning applications across the firm.

As an example, we recently introduced COiN, a contract intelligence platform that uses unsupervised machine learning to analyze legal documents and to extract important data points and clauses. In an initial implementation of this technology, we can extract 150 relevant attributes from 12,000 annual commercial credit agreements in seconds compared with as many as 360,000 hours per year under manual review. This capability has far-reaching implications considering that approximately 80% of loan servicing errors today are due to contract interpretation errors.

We also use machine learning to drive predictive recommendations for Investment Banking. Last year, we introduced the Emerging Opportunities Engine, which helps identify clients best positioned for follow-on equity offerings through automated analysis of current financial positions, market conditions and historical data. Given the initial success of the Emerging Opportunities Engine in Equity Capital Markets, we are expanding it to other areas, like Debt Capital Markets, similarly basing predictions on client financial data, issuance history and market activity.

We are initiating pilots for a broad range of machine learning use cases – from detecting anomalies for fraud and cybersecurity, to generating targeted trading strategies to share with clients, to optimizing our client-servicing channels. We are only at the very beginning of tapping the potential capabilities of machine learning and its benefits to our business.

We also are excited about the prospects of cognitive automation, which combines both robotics and machine learning technologies to mimic human judgment. Cognitive automation has the potential to automate more complex, human-like processes, such as perceiving, hypothesizing and reasoning. In 2016, we successfully piloted a virtual assistant technology to respond to employee technology service desk requests through a natural language interface. We are rolling out this technology in 2017 to help us initially triage over 120,000 service tickets, with plans to expand the capability to address even more of the 1.7 million annual employee requests.

Securing a changing landscape

Our cybersecurity strategy is focused on securely enabling new technology and business initiatives while maintaining a relentless focus on protecting the firm from cybersecurity threats. Our defensive philosophy follows a "kill chain" approach – layers of controls aligned to the multiple stages of the cyber threat life cycle (from early warning, to inbound/outbound prevention and detection, to response and recovery). We have aligned our security technology and processes to this life cycle, with a focus on a "shift left" approach – increasing our effectiveness in detecting and preventing malicious activity at the earliest points in the life cycle.

The firm continues to make significant investments in cybersecurity to enhance these defensive controls and our resilience to threats. For example, we have deployed web browser isolation technology to reduce the risk of employee compromise through phishing. Investments in security analytics, data science and automation technology will enable analysts within our Security Operations Centers to efficiently detect and respond to anomalous activity. We have adopted and continue to evolve leading-edge technology to prevent client fraud across lines of business, including risk-decisioning engines that help distinguish between good and bad activity in real time.

Through robust employee awareness and readiness programs, we continue to reinforce the idea that cybersecurity is everyone's job. We also educate our customers and clients on how to protect their assets and business from cyber threats. We broadly distribute awareness communications and conduct both in-person and web-based training in which more than 7,000 clients in Asset & Wealth Management, more than 3,000 Commercial Banking clients and over 1,900 Corporate & Investment Bank clients participated in 2016 alone. As one of the largest global financial institutions, we embrace our cybersecurity leadership responsibility to the industry. In 2016, we led the creation of the Financial Systemic Analysis & Resilience Center (FSARC) in partnership with seven of our peer banks and the U.S. government. FSARC's mission is to proactively identify, analyze, assess and coordinate activities to mitigate systemic risk to the U.S. financial system from cybersecurity threats through focused operations and enhanced collaboration.

Increasingly, our customers and clients view our cyber posture, like our fortress balance sheet, as a source of strength. We will continue to work tirelessly to identify opportunities in which the firm can leverage our cybersecurity expertise to strengthen our controls, protect our client relationships and improve the posture of the broader industry.

Liquidity and interest rate risk

The firm's Treasury and Chief Investment Office are integral to delivering on our strategic objectives, playing a primary role in overseeing our $2.5 trillion balance sheet and providing both governance and risk management expertise around interest rate and liquidity risk. We meet our objectives through our nearly $300 billion high-quality investment securities portfolio, as well as the $300+ billion of funding and liquidity sources directed by Treasury.

Most notable in 2016 was our work related to liquidity and funding in response to U.S. regulator feedback on our 2015 Resolution Plan. We introduced a comprehensive new liquidity framework to estimate available resources and liquidity needs during a resolution event – and, as part of this work, rolled out two enhanced liquidity models across our material legal entities. We further strengthened the firm's liquidity position, raising more than $50 billion of liquidity to meet the requirements of the new framework. While deposit growth in excess of loan growth drove some of this improvement, the liquidity benefit came mainly from a reduction in non-high quality liquid assets in our investment securities portfolio and an increase in Treasury-originated short- and long-term secured funding.

Our focus on optimizing the firm's balance sheet continued with rigor through 2016. We extended our optimization framework to analyze the maturity structure of our long-term debt, and we introduced the industry's first total loss absorbing capacity (TLAC) efficient callable debt structure, resulting in a larger proportion of our outstanding long-term debt being TLAC eligible. More broadly, our optimization framework helped to inform our new multi-factor equity allocation approach to better align incentives with the broader set of constraints we face. Our firmwide Asset Strategy group together with our Deposit Strategy group provide strategic cross-business focus on our deposit, lending and investment activities. These forums have and will continue to evolve our analytical frameworks and monitoring capabilities, as well as continually assess market opportunities and associated resources and risks.

2016 also saw a move higher in U.S. dollar interest rates and featured a second rate hike by the Fed in December. During the second half of 2016, three-month LIBOR increased 35 basis points to 1%, while 10-year Treasury yields increased nearly 100 basis points to 2.43%. Staying true to our disciplined risk management framework, we opportunistically added duration through our investment securities portfolio as long-end rates rose.

Market expectations have shifted as well. At the end of the second quarter of 2016, the market was expecting the Fed's interest rate on reserves to remain below 1% through the end of 2019. With recent and anticipated Fed interest rate hikes, industry expectations are now for the rate on reserves to reach 2% during 2019. And, as indicated by our $2.4 billion of "earnings-at-risk," our firm benefits greatly when rates rise, particularly short rates, which allow us to capture the full value of our significant deposit franchise.

We continue to build on the great work started in 2015 on our intraday liquidity program, with technology at the core of our advancements. We are able to monitor, in real time, the liquidity impact of over $6 trillion of transactions daily and the credit exposure across tens of thousands of intraday credit facilities, consuming up to 5,500 updates per second. This year, we introduced big data analytics, which has substantially improved our predictive capabilities around intraday drivers. We store 90 million data points covering in excess of 18 months of daily history, adding over 500,000 data points per day. We are now realizing the benefits of harnessing this vast amount of data, informing decisions internally and improving the quality of our dialogue with clients. Additionally, we are leveraging technology to further optimize approximately $1 trillion of collateral the firm has received, as well as the firm's own collateral, to provide a more integrated and dynamic operating model for collateral firmwide.

A culture of accountability

Having fortress controls remains a critical priority, but controls alone are not sufficient without the right culture. The COO will continue its leadership to reinforce our Business Principles and cultural values throughout the firm and maintain an appropriate governance framework to effectively manage our approach to conduct risk. Confirming we are getting it right requires a comprehensive set of metrics, and, over the past year, we have introduced a series of conduct measures to do just that.

Culture and Conduct Risk was reaffirmed as a strategic priority at our Operating Committee annual strategy off-site meeting in July. We recently appointed a Chief Culture and Conduct Officer for the firm to reinforce ownership of conduct risk and a consistent firmwide approach in the first line of defense. We also established a separate risk stripe for Conduct Risk so that we have disciplined and consistent oversight and a clear conduct risk management framework.

We use increasingly sophisticated detective controls to help us identify broad, as well as individual, trends in employee conduct. For example, we now have in production a Front Office Supervisory monthly report across our markets businesses globally. This tool consolidates key sales and trading metrics, such as number of canceled and amended trades and credit and market risk limit breaches, with compliance metrics, such as an employee's compliance with mandatory training and consecutive leave requirements, to give supervisors a view of their employees' behavior. We also surveil certain electronic communications and trades to identify potential misconduct, and we have implemented controls designed to prevent and detect abuses related to collusion, market misconduct or manipulation and corruption, among others.

We continue to develop our Culture and Conduct Risk Dashboard, which is reviewed with our Board of Directors and senior management. The Dashboard is a qualitative and quantitative assessment that includes key metrics and commentary related to how well-controlled we are and how well we manage risk, compliance results for our businesses and employees, Code of Conduct matters, employee survey results, and customer and client feedback/complaints for each of our businesses.

In 2017, we will continue to connect key programs, metrics and policies across the firm to identify additional opportunities – and our Board of Directors will continue to hold us accountable for this important work. Our approach is iterative, driven by our commitment to our firmwide values and ongoing communication of our standards to our employees. We engage in ongoing dialogue with our regulators, industry peers and other experts to identify and adopt best practices.

Looking ahead

I have never been more excited about the opportunities ahead. Our focus on innovation and aggressive optimization to meet new challenges will continue to result in dynamic changes to our operating model as we best position our businesses for the future. In so doing, we will maintain a relentless commitment to the highest standards of conduct and safety and soundness to protect the integrity and security of the markets in which we operate and the assets of our customers and clients.

Matt Zames
Chief Operating Officer

Consumer & Community Banking

Gordon Smith

2016 financial results

2016 was another strong year for Consumer & Community Banking (CCB). All our businesses performed well and delivered very strong results. We gained market share in each of our six business units. For the full year, we achieved a return on equity of 18% on net income of $9.7 billion and revenue of $44.9 billion.

We made meaningful progress on our 2016 priorities – a strategy we have been following consistently since we unified our Consumer businesses in 2012 under CCB:

- Deepen relationships with our customers and simplify and improve the customer experience
- Lead payments innovation by delivering solutions that address merchant and consumer needs
- Increase digital engagement by delivering differentiated experiences
- Protect the firm and its clients/customers, investors and employees from cyberattacks, as well as protect the privacy of their data and transactions
- Continue our unwavering commitment to build and maintain an effective and efficient control environment
- Execute structural expense management strategies while continuing to invest for the future
- Attract, train, develop and retain the best talent and strengthen our diversity

Simply put, our commitment to customers is at the heart of everything we do. It's what drives our work and our strong results. We know that happy customers will do more business with us and stick with us throughout their lives. For us, our goal is not only to acquire customers – it's to acquire customers who view Chase as their primary bank or credit card. We want to be our customers' first call when they are seeking financial advice.

Today, we have a relationship with almost half of all households in the U.S. We grew our customer base in 2016 by 4% to 60 million U.S. households. We are the primary bank for more than 70% of our consumer households and nearly 50% of our small businesses. Our household attrition is at record lows. And according to our 2016 Brand Health Survey, the Chase brand is at the strongest levels we have seen, ranking #1 in key categories, including consideration, which measures if survey participants would consider doing business with Chase and have a positive perception of Chase.

While we are extremely pleased with where we are, we know we have plenty of work to do. There is tremendous opportunity literally on our own doorstep. More than 80% of Chase households with a mortgage got it somewhere else. Only one-third of our customers are engaged with more than one product across Chase. And only 10% of our small business customers who have a Chase banker use us for business banking, credit card and merchant services, while 43% of small businesses need all three. We can continue to grow simply by serving our existing customers exceptionally well and earning their trust to do more business with us.

Building a strong business for the future

We have been fortunate to be in an extended, historically benign credit environment. Despite that, we have not forgotten the painful lessons of 2008 and have maintained an extremely disciplined approach to credit throughout the cycle.

In Mortgage Banking, we've increased our loan balances while improving the quality of our servicing portfolio. Today, our delinquency rate is approaching its lowest level in

2016 Performance Highlights

Key business drivers			
$ in billions, except ratios and where otherwise noted		2016	YoY∆
Consumer & Community Banking	Households[1] (millions)	60.0	4%
	Active mobile customers (millions)	26.5	**16%**
Consumer Banking	Average deposits	$461	**11%**
	Client investment assets (end of period)	$235	7%
Business Banking	Average deposits	$110	**9%**
	Average loans[2]	$22	7%
	Loan originations	$7	8%
	Net charge-off rate	0.61%	(5) bps
Mortgage Banking	Total mortgage origination volume	$104	(3)%
	Foreclosure units (thousands, end of period)	47	**(36)%**
	Average loans	$232	**14%**
	Net charge-off rate[3]	0.10%	(8) bps
Credit Card	New accounts opened[4] (millions)	10.4	**20%**
	Sales volume[4]	$545	**10%**
	Average loans	$131	4%
	Net charge-off rate	2.63%	12 bps
Commerce Solutions	Merchant processing volume	$1,063	**12%**
Auto Finance	Loan and lease originations	$35	9%
	Average loan and leased assets	$75	**16%**
	Net charge-off rate	0.45%	7 bps

[1] Reflects data as of November 2016
[2] Includes predominantly Business Banking loans as well as deposit overdrafts
[3] Excludes the impact of purchased credit-impaired loans
[4] Excludes Commercial Card

YoY = year-over-year bps = basis points

a decade, and our foreclosure inventory is down 85% since 2012. That's important because a nonperforming loan is 25 to 30 times more expensive for us to service than one that is performing. We are continuing to evolve Mortgage Banking into a less volatile and more profitable business. In our Card business, we have been very consistent in terms of our modest exposure to the less than 660 FICO segment. And when you look at the mid-prime space, characterized as FICO scores between 640 and 720, we have the lowest share among the players in the industry. Our credit card losses remain at very low levels.

Along with credit discipline, we remain fiercely devoted to expense discipline. We reversed a trend of rising expenses with relatively flat revenue. Since 2014, we achieved $2.4 billion in structural expense reductions and improved our overhead ratio from 58% in 2014 to 55% in 2016. Importantly, during that same time period, we continued to prudently invest in our core businesses to deliver value for the long term. In particular, we've invested heavily in technology and marketing associated with new product launches, digital and payments innovation, and cybersecurity. Our investments have also improved our control environment, leading to more automated processes and better customer and employee experiences. Expense discipline is part of how we do business every day, and the work to reduce our structural expenses will continue.

Payments innovation

Payments are at the very core of what our business does for customers. We are one of the few companies that can deliver the full payment chain from merchant to consumer. The payments industry is one that is evolving rapidly with innovation and new entrants. Our strategy has been consistent:

- Build our own proprietary wallet with Chase Pay℠
- Be top of wallet in other wallets, whether that is Apple Pay™, Android Pay™, Samsung Pay™, or other embedded payment systems such as Amazon or Uber
- Have the best person-to-person (P2P) payments experience anywhere
- Create card products that our customers love, with rich reward offerings to make them top of the physical and digital wallet

The future here is still unknown as customers adopt new capabilities. But we know payments are core to what we do, and we are investing across multiple fronts to create the best payments experience for our consumer and merchant customers as technology evolves. In 2016, we achieved some key milestones in payments:

Commerce Solutions – Our Chase Commerce Solutions business has earned double-digit growth since 2012 and in 2016 surpassed a staggering *$1 trillion* in processing volume.

Chase Pay – We introduced Chase Pay, our payment solution that provides benefits to both customers and merchants. Chase Pay has unique features other payment methods don't and has the Chase brand and security behind it. Several large retailers, including WalMart, Starbucks and Best Buy, have partnered with us to offer Chase Pay to their customers. It's early, but we're already seeing promising results and expect 2017 to show continued strong momentum.

Person-to-person payments – Chase QuickPay℠ has been an industry leader with 94 million transactions in 2016. The number of households using QuickPay has gone up 30% in just the past year. As strong as it is, we took an important step to make it even better. We worked with 20+ other financial institutions on a solution called Zelle that speeds up P2P real-time payments between banks.

Sapphire Reserve℠ – This past year, our team noticed an important insight from our customers: People are traveling differently. They want to feel more like locals than tourists, and the shared economy has revolutionized the travel industry. When choosing a credit card, customers want a card that rewards them more for doing what they love to do and helps them discover the future of travel. We created Sapphire Reserve with one of the strongest point programs in the industry. And while we knew we had designed a superb card, frankly, even we were surprised by the sensation it became. We exceeded our annual target of customers in less than two weeks.

Sapphire Reserve has introduced Chase to an exciting and passionate customer base with average FICO scores above 785 and an average deposit and investment wallet of over $800,000. Even more exciting, the majority of our new Sapphire Reserve customers are millennials. That is significant because millennials make up the majority of our new deposit accounts today, and their wealth is expected to grow at the fastest rate of all generations over the next 15 years. Since we are more than a credit card company and given our new customers' strong satisfaction and engagement with their Sapphire Reserve cards, we are confident they will also choose Chase to do more of their banking, investments and loans.

New card launches – While receiving less hype than Sapphire Reserve, we've also introduced several other popular cards. Chase Freedom Unlimited℠ simplified our cash-back proposition by offering customers 1.5% cash back on everything they buy. And not to be outdone, Ink Business Preferred℠ and our Amazon Prime℠ card also earned a very strong customer reception. Together, these cards have contributed to our momentum. In 2016, we saw new accounts up 20%, card sales volume up 10% and outstandings up 8%.

Digital

We think we can confidently say that Chase is the digital leader in the industry. We have the #1 rated mobile banking app, #1 ATM network and #1 most visited banking portal in the U.S. This is important because, increasingly, digital is a critical driver in why customers choose to do business with Chase. Banking no longer is a sometimes activity – customers engage with us every day. More than 26 million customers are active on our mobile app today. Digital also drives tremendous loyalty. Households that use our digital channels have credit and debit spend levels over 90% higher than those that don't. Customers who are digitally engaged have higher satisfaction and retention rates, spend more and have far lower transaction costs.

Advancing our digital and technology capabilities is job #1, but we are also paying close attention to the emerging technologies in our industry. Many new fintech companies are mastering ways to simplify the customer experience. Those we meet with have huge respect for the Chase brand, and they envy our scale and distribution. In cases where we think their solutions will improve the customer experience quickly, we partner with them. A few of those 2016 partnerships have worked out very well:

- **Chase Business Quick Capital®** – A partnership with OnDeck to provide fast funding to small businesses using Chase underwriting standards
- **Chase Digital Mortgage℠** – A partnership with Roostify that helps our customers manage the mortgage process online or on mobile
- **Chase Auto Direct℠** – A partnership with TrueCar that allows customers to shop for and finance the specific car they want online and simply pick it up at the dealership

We continue to study and meet with new players to evaluate which partnerships could benefit our customers.

Chase in the community

Chase's 5,258 branches are the face of our firm to local communities. Roughly two-thirds of our customers visit a Chase branch four times a quarter on average. Our branches are located in the fastest growing markets in the country, and we are outpacing our competitors wherever we compete.

If you visit our branches regularly, you will see how they have changed. There are fewer teller lines and more options for customers who choose to self-serve. There are more private spaces and conference rooms for customers to meet with a banker and privately discuss transactions. And the branches just look better. Most branches are refreshed roughly every six to seven years to update the technology and brand experience.

We know one thing that will drive a customer crazy is a long teller line. Since 2014, we've reduced total teller transactions by ~130 million and increased self-service/digital transactions by ~180 million. That's great progress, but we still can do more. In 2016, 70% of our 400 million teller transactions could have been performed through a self-service channel. We continue to work with our customers to help them understand how to complete transactions on their own if they so choose.

And as transaction volumes come down, we will rationalize our branch footprint. We have been opening branches in higher growth areas and consolidating those with less foot traffic. As a result, we reduced our net branches by about 150 in the past year. However, by being smart about where we open branches, even in markets where we consolidated, we still grew share.

Our branches also are advice centers for many of our 4 million small businesses. There are few things more gratifying than watching a small business owner turn an idea into a sale and then sales into a business. Since 2012, our share of business customers who use Chase as their primary bank grew from 6% to 9%. We improved our Net Promoter Score by 38%. And since 2014, average deposits are up by 21% and loans by 13%.

At Chase, we take very seriously the role our business plays in helping customers make the most of their money. Our goal is to offer products, advice and tools to help them make the best choices. It's such a privilege to be in the business of banking and payments. We are honored to be part of our customers' lives in a way that few businesses are.

On behalf of the more than 130,000 employees in Consumer & Community Banking, thank you for your investment in us.

Gordon Smith
CEO, Consumer & Community Banking

2016 HIGHLIGHTS AND ACCOMPLISHMENTS

- Consumer relationship with almost half of U.S. households
- #1 in primary bank relationships within our Chase footprint
- Consumer deposit volume has grown at more than twice the industry average since 2012
- #1 most visited banking portal in the U.S. — chase.com
- #1 rated mobile banking app
- #1 ATM network in the U.S.
- #1 credit card issuer in the U.S.
- #1 U.S. co-brand credit card issuer
- #1 in total U.S. credit and debit payments volume
- #2 merchant acquirer
- #2 mortgage originator and servicer
- #3 bank auto lender

2016 West Coast Bus Tour

Every summer, we go out on the road to meet with our employees and ask for their feedback. They tell us what they are hearing from our customers and give us ideas on how we can make our Chase customer experience even better. We've made many customer improvements as a result of our bus tours, and we have a lot of fun along the way.

Corporate & Investment Bank

Daniel Pinto

During a year of significant volatility, the Corporate & Investment Bank (CIB) consistently delivered for its clients. Throughout 2016, we increased or maintained our leading positions by avoiding complacency, reinforcing our culture of meeting the highest standards and attracting the best talent in the industry.

By adhering to those principles, the CIB achieved impressive results in 2016. Record earnings of $10.8 billion were up 34% compared with 2015, and our $35.2 billion in total revenue reflects a gain of 5% over the previous year. That performance produced a superior return on equity (ROE) of 16% on a capital base of $64 billion.

Providing clients with capital and liquidity during volatile market conditions has become even more essential in recent years. As some competitors retrenched and signs of decreasing liquidity emerged, we remained supportive and accessible. Our global scale, complete product set and the strength of our balance sheet, underpinned by our sound risk management practices, enabled us to consistently serve clients, a factor in driving wallet share increases across our already top-ranked businesses.

We don't take our leadership for granted, though. Despite our leading franchises, we continue to look beneath the surface of our businesses, ask the critical questions and make improvements where necessary. We are committed to staying ahead of the curve and embracing the technological changes affecting our industry in the face of competitors, both new and traditional.

By investing in scalable platforms and innovative trading tools and improving the overall experience, we are serving clients better, faster and more efficiently than ever before. More important, while we drove annual expenses down to $19 billion by staying disciplined, we still kept investing for the future. The market share gains we experienced in 2016 were supported by the CIB's profitability and our willingness to make strategic investments in innovation that will bolster our growth for years to come.

The past year demonstrated once again that there will always be unpredictable global events. One unknown is the ultimate outcome of negotiations between the U.K. and the EU. We are fortunate to have options in terms of locations and legal entities that will allow us to serve clients seamlessly during the transition. We will need to make adjustments, but our commitment to clients in the U.K. and the EU is as strong as ever.

By continually improving, adapting and being prepared, we are better able to respond. That's what our clients have come to expect, and we know that their success is the foundation for ours.

Strengthening investment banking leadership

Investment banking has always been about deep, long-standing relationships and solutions. Clients want consistent coverage, good ideas and global capabilities. We have an exceptional Investment Banking franchise that consistently ranks #1 globally. That success continued in 2016 with an 8.1% share of the global fee wallet.

We take immense pride in our people and the talent at J.P. Morgan, and our #1 standing is mainly due to the fact that we have the industry's best bankers. Still, there are sectors and geographies in which we can always improve. Since 2014, we have hired approximately 60 investment bankers, about 40 of whom were managing directors, who brought experience and relationships that will help bring J.P. Morgan's full suite of solutions to even more clients.

Our bankers represent a franchise that has a full range of global capabilities. Our Debt Capital Markets team retained its hold at the top of the global debt league tables. Its expertise and the firm's ability to deliver capital in scale for complex financings set us apart.

One standout deal of the year was evident in J.P. Morgan's role as the lead financial advisor to Dell Inc. and Silver Lake Partners on Dell's $67 billion acquisition of EMC Corporation, the largest technology transaction in history. In addition, J.P. Morgan served as global financing coordinator on Dell's $49.5 billion of committed financing associated with this transaction.

We also remain a leading source of debt capital for U.S. nonprofit and governmental entities, specifically states, municipalities, hospitals and universities. Last year, J.P. Morgan raised $90 billion of credit and capital for these important clients.

In 2016, we also were the top equity underwriter. Despite a difficult environment for initial public offerings (IPO) and a significantly smaller industry wallet, J.P. Morgan was the only global bank to gain share last year. Our bankers led 343 deals, more than any other bank. J.P. Morgan was a global coordinator and sponsor on the Postal Savings Bank of China's $7.6 billion IPO, the largest equity deal of the year and the largest IPO since the 2014 deal for Alibaba, in which J.P. Morgan acted as global coordinator. That 2016 deal underscored once again our ability to execute large transactions around the world by connecting regional issuers with global investors.

In order to grow, clients have often searched for merger and acquisition (M&A) opportunities to transform their companies. They look to trusted advisors who understand their companies and sectors and can provide the strategic insights to help them expand.

Our global team of M&A bankers works together to coordinate quickly and often, enabling J.P. Morgan to identify timely trends and opportunities across industries and borders. After record M&A volume in 2015, overall activity was down in 2016, but J.P. Morgan advised on more deals than any other bank and ranked #2 in wallet share globally. The firm's North America M&A wallet share grew by 60 basis points since the end of 2015.

Having top franchises across M&A, debt and equity gives us real-time, global market insights. Windows of opportunity in both M&A and capital markets can open and close quickly. Having expertise across product areas allows us to be timely and provide our clients with the best solutions to further their growth strategies. That's how we build trust.

Our Investment Banking franchise also enjoys a strong partnership with Commercial Banking (CB) that sets us apart from all other competitors. Its Commercial and Industrial franchise is a leading bank to nearly 18,000 clients. As those businesses grow and flourish, many need capital and advisory services from the Corporate & Investment Bank.

In 2016, the CIB led more than 800 capital markets transactions for CB clients and generated a record $2.3 billion of gross investment banking revenue. Despite that already impressive pipeline of shared client business, we think the potential magnitude over time could reach $3 billion.

Another developing partnership for the CIB is the potential to work with J.P. Morgan Asset & Wealth Management and its client base of family offices. We think there is more opportunity to offer these large investors participation in CIB transactions relevant to their investment goals.

Investments and scale in the global markets

We believe that having global scale, a complete platform and operational excellence are essential to having a best-in-class, profitable franchise. In 2016, our Markets business (Fixed Income and Equities) finished the year with a combined $21.0 billion in revenue, a year-over-year increase of 15%.

We have always believed that providing clients with a global and diverse Markets business leads to a higher and more resilient ROE. In 2016, each one of our major Fixed Income businesses produced a ROE above the cost of capital. More important, the marginal contribution that each business provides to the larger Fixed Income franchise is much greater. The costs to run our Markets business are mostly fixed so operating leverage gives us upside when market growth occurs, which is what we saw last year. Even Commodities, which didn't meet its cost of capital in 2015, in part because of ongoing simplification efforts, produced a good return in 2016.

Since 2010, the Fixed Income industry revenue pool has contracted from $157 billion to $114 billion. However, because of our scale, continuous investments and risk discipline, we were able to increase our market share over the seven-year period from 8.6% to 12.0%.

Our Equities and Prime Services businesses, major areas of focus for us, also gained share during that seven-year period. Our market share increased from 6.9% to 10.1%, and we are now ranked #2, even as the global wallet declined by $6 billion during that stretch. We had record revenue and balances in prime brokerage last year. It's an area where we committed to invest in order to complete our platform, and the progress is evident across all segments. In fact, since 2014, we have grown synthetic revenue by 48% and cash revenue by 12% within our prime brokerage business, bringing the two segments more into balance. Our leading equity derivatives franchise grew revenue by 26% even while the industry revenue pool shrunk by 5%.

We've also made great strides in cash equities. No doubt about it, we were late to the game when it came to investing in low-touch, electronic trading about a decade ago. But by taking advantage of our profitability and committing ourselves to significant, ongoing technology investments, we now are a leading equities franchise and are driving the changes of tomorrow. Between 2014 and 2016, the overall cash equities industry revenue pool fell by 18%, yet our revenue decreased by only 4%, helped by a 31% jump in low-touch revenue. The technology investments we made helped preserve our share in a declining market and positioned us for growth as we continue to onboard clients faster and build best-in-class electronic trading tools.

We are proud to be a perennial leader in Fixed Income and pleased with the progress we've made in Equities, but there is still more to do. Across the Markets businesses, we track 31 sub-product and geographic categories. In 2012, we held a top three leadership position in 61% of those categories. In 2016, we improved our standing by having a top three leadership position in 77% of those same categories. The bulk of those leadership improvements came from investments we made in Asia, where we have completed or enhanced some pieces of our global platform.

We feel very good about our Markets business. Global scale and a complete platform have never been more critical. We have many competitive advantages in Markets, but it is essential we continue to invest and proactively think about disruption on our own terms.

Adapting to the new market structure

Technology is rapidly reshaping the Markets landscape, positively altering how our clients trade and how we communicate with them. As the technology advances, we have the resources and the will to embrace behavioral shifts and build offerings around them. We fundamentally believe that clients should have the ability to choose how they want to trade with us rather than be constrained by the technologies we, or they, happen to have. Our Markets Execution group is dedicated to making sure clients can seamlessly and confidently engage with us anytime, anywhere, now and in the future.

Whether it was the U.K.'s referendum to exit the EU, the results of the U.S. presidential election or the uncertainty of China's growth rate, the CIB's technology, our scale and operational excellence enabled clients to trade through turbulent markets. In the case of the U.K. referendum, as results were tallied, J.P. Morgan smoothly handled record volume in currency trading, at one point processing 1,000 tickets per second as investors scrambled and adjusted their positions around the world.

While impressive, years of technology investments and proper risk discipline prepared us for an event such as the U.K. referendum. Our profitable Markets business, which generated an overall ROE of 17% last year, enables us to invest in innovation and the client experience. Eighty-three percent of notional FX trading is now done electronically. We have seen a $100 million trade done on a mobile phone, and on peak days in 2016, $200 billion in FX was traded through our electronic channels, including our own J.P. Morgan Markets platform, which provides a range of services from research to pre- and post-trade reporting.

The electronic evolution is advancing, and the investments we've made, and will continue to make, already are proving their merit to our clients.

Transforming transaction banking

Our commitment to technological advancement also has helped us make significant progress in Treasury Services (TS) and Custody & Fund Services (CFS). As businesses that provide vital services to clients, both have benefited from the extensive resources we've allocated to them.

To give a sense of the scale and importance of these two franchises, we hold and protect more than $20 trillion in assets under custody and securely process $5 trillion in payments every day.

Global companies know how vital these functions are in terms of safeguarding their financial operations and enabling their businesses to run smoothly.

Clients of both Treasury Services and Custody & Fund Services increasingly demand real-time access to their balances, intraday liquidity and ever faster processing capabilities. They are turning to us to deliver innovative products, alert them to fraudulent transactions, and track their finances across multiple currencies and countries. The goal is to give clients real-time information on their complex, global portfolios with easy-to-use, seamless technology.

Clients look to these critical services to be faster and more accessible than ever before, which is why we have invested so heavily in these businesses.

There's more to do, but our efforts haven't gone unnoticed. Greenwich Associates recently named

J.P. Morgan's ACCESS Online℠ the top-ranking cash management portal globally, as well as in North America.

Our commitment to technology and delivery of innovative solutions were also important factors behind BlackRock's decision to award us a CFS mandate with $1.3 trillion in assets under management last year, the biggest custody transaction in history. Clients are rewarding us with new and incremental business; the bank has increased business with existing custody clients by 10% in 2016, and the forward pipeline is strong. Overall, the bank serves about 2,500 custody clients in more than 100 markets. The faith that clients have in our capabilities is a validation of our investments and reflects our ability to collaborate across areas, such as Sales, Products, Technology and Operations.

By 2017, TS is expected to increase its technology budget by 12% vs. 2014 with investments that include automating and streamlining the account opening process, digitizing document exchanges and expanding virtual branches. We're also continually investing in cybersecurity capabilities to guard against fraud, malevolent attacks on our operations and other intrusions. We believe that by 2017, these improvements will help reduce operating expenses by 13% vs. 2014, while client operating balances jumped by 15% in just the last two years.

Similarly, Custody & Fund Services will increase its technology budget by 30% vs. 2014 while driving down operating expenses by 12%. Using technology-driven solutions, CFS is enhancing its stability and enabling the business to grow in a more scalable way.

After a few years of tightening controls and upgrading systems, we are now winning more business and attracting talented bankers and technologists who are excited about our willingness to invest in and build new technologies.

Building for the future

We view last year as a transitional period in the financial markets. If the global economy continues improving, that should have a positive impact on client activity and gross domestic product (GDP) growth in the U.S. and in many of the developed and emerging market economies. Estimates are that emerging markets ultimately will account for 70% of future GDP growth compared with its present share of worldwide GDP of 40%. If and when that shift occurs, J.P. Morgan will be prepared to serve the next generation of multinationals and to foster their development through the financing capabilities that we are uniquely able to offer.

We will continue to build new products and make it easier for clients to work with us, from onboarding to day-to-day trading and through the simplification of our processes. We have great assets, and no other bank is better positioned to deliver them to the global corporations of today or the ones sure to come into being in the next decades. But whether they're long-established multinationals or startups looking to gain their own foothold in the global markets, we will never forget that they are at the center of what we do.

Daniel Pinto
CEO, Corporate & Investment Bank

2016 HIGHLIGHTS AND ACCOMPLISHMENTS

- The CIB had record earnings of $10.8 billion on $35.2 billion of revenue, producing an ROE of 16% on a capital base of $64 billion.
- We retained our #1 ranking in global Investment Banking fees with an 8.1% market share, according to Dealogic.
- The CIB had $19 billion of expenses, down $2.8 billion since 2014.
- The CIB continued investing to embrace technology in order to offer clients a broader array of trading platforms in which to transact with J.P. Morgan.
- The CIB's leadership and role as a trusted partner to our clients helped drive the firm's total merger and acquisition share to 8.6%, up from 6.4% in 2012, a gain of more than 200 basis points.
- In our Markets business, despite a significantly smaller industry revenue pool compared with 2010, the CIB's Fixed Income market share rose to 12.0% in 2016, up from 8.6% during the same time frame.
- The Treasury Services business supports approximately 80% of the global Fortune 500, including the world's top 25 banks, and handles $5 trillion in payments per day.
- Custody & Fund Services has more than $20 trillion in assets under custody; during the past year, it increased business with existing clients by 10%.

Commercial Banking

Doug Petno

Across our company, our clients are at the center of everything we do. In 2016, this meant supporting our energy clients as they weathered one of the worst sector downturns in 30 years. With oil prices down almost 75%, the industry has felt tremendous stress. During this time, we stood by our clients and have provided meaningful advice and much-needed capital. As many banks stepped away, we continued to demonstrate leadership in the industry, adding over 30 clients to our energy portfolio and extending more than $1 billion in new loan commitments last year.

It was our disciplined client selection and deep sector expertise that gave us the confidence and resolve to provide unwavering support during this significant downturn. I'm incredibly proud of our entire energy team for their relentless focus, leadership and hard work. We believe it is this enduring client commitment and our long-term view that set us apart in the industry.

2016 was a terrific year for Commercial Banking (CB) in so many ways, and our performance highlighted the strength and potential of our franchise. I'm excited to share our 2016 results, the investments we are making and our expectations for the future.

2016 performance

For the year, Commercial Banking delivered strong financial results, with record revenue of $7.5 billion, $2.7 billion of net income and a return on equity of 16%. Notably, we absorbed incrementally higher capital and substantial investments in our platform and capabilities while maintaining strong returns and operating efficiency in the business.

Our partnership with the Corporate & Investment Bank (CIB) continues to thrive and is a key differentiator for our business. Being able to provide strategic insights and leading capital markets and advisory capabilities distinguishes us from every other commercial bank. In 2016, we delivered record gross investment banking revenue of $2.3 billion, up 5% from the prior year. This outstanding partnership accounted for 40% of the firm's North American investment banking fees, and we believe there is tremendous opportunity to grow.

Loan growth across our business was also outstanding, ending the year with record loan balances of $189 billion, up $21 billion from the prior year. Loans in our Commercial & Industrial franchise reached a new record, up 9% from the prior year, and loans in our Commercial Real Estate businesses completed another fantastic year, with record originations of $37 billion.

Staying true to our proven underwriting standards, we have remained highly selective in growing our loan portfolio. Despite pressures in the energy and commodities sectors, 2016 marked the fifth straight year of net charge-offs of less than 10 basis points. As we begin 2017, credit fundamentals across CB are quite strong, but we remain disciplined and focused. We are monitoring all new activity carefully and know that this will serve us well over time.

What's not in our financial results also tells a great story. We have made significant investments to build a fortress risk and compliance framework for our business. Moreover, we have executed a significant portion of our regulatory and control priorities and are committed to set the standard in the industry. This progress has allowed us to focus on improving our processes to deliver a better client experience. It is an ongoing priority, and we will continue to invest in safeguarding our clients and our business.

Investing in our franchise to better serve our clients

As strong as our business is, we are certainly not standing still. We are executing a multi-year transformation across CB, with a clear focus on bringing greater value to our clients.

Last year, we invested more than we ever have on technology, data and our key product capabilities. Looking forward, we will direct even more resources in 2017 to enhance our wholesale payments platforms, build upon our market-leading digital capabilities, use data to better manage risks, and drive improvements across critical processes like credit delivery and client onboarding. This is an effort with no finish line – through continuous innovation, we will seek better ways to serve our clients and extend our competitive advantages.

Improving the client experience through enhanced digital delivery

Given the rapidly increasing consumer and wholesale client expectations, we are focused on leading the industry in our digital and mobile capabilities. Our mission is to deliver greater speed, convenience, simplification, transparency and mobile access. We are working hand in hand with our partners in Consumer & Community Banking (CCB) and CIB to leverage their experience and technology investment in this area.

In 2016, we joined CCB to launch a new digital platform that is specifically tailored to meet the needs of small and midsized companies. It works across desktops, tablets and mobile devices to provide an integrated experience across all of our products and services. We are excited that this new platform will help us bring innovative functionality to our clients.

Expanding our footprint to reach more clients

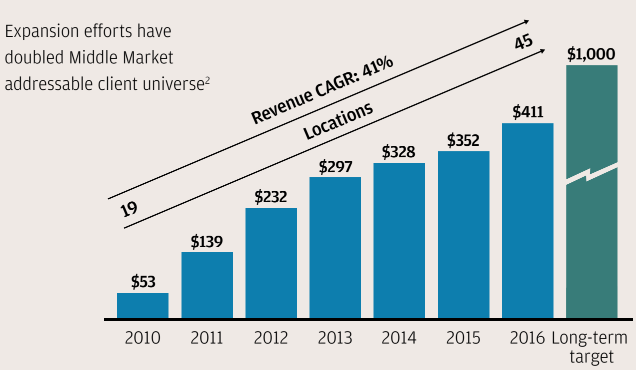
Expanding our client base and building deeper client relationships remain top priorities for CB. During 2016, we made significant progress in executing our long-term growth strategy – opening offices in eight new markets and hiring over 100 bankers across our business. These long-term investments are bringing us much closer to our clients. We made 20,000 more client calls last year than we did in 2015, and this focus will continue to drive opportunity for us in the coming years.

Our Middle Market business in California is a great example of the progress we've made so far and the tremendous potential we see in our expansion markets. It's an extremely exciting market for us as it represents the sixth largest global economy. Our team entered California following the Washington Mutual acquisition in 2008, and we now have 13 offices across the state. We are delighted with our progress as we have added more than 450 clients, and we are growing with discipline, maintaining fantastic credit performance with essentially zero net charge-offs.

Since 2010, our Middle Market team has opened 45 offices in major markets, including Los Angeles, San

Total Expansion Market Revenue[1]

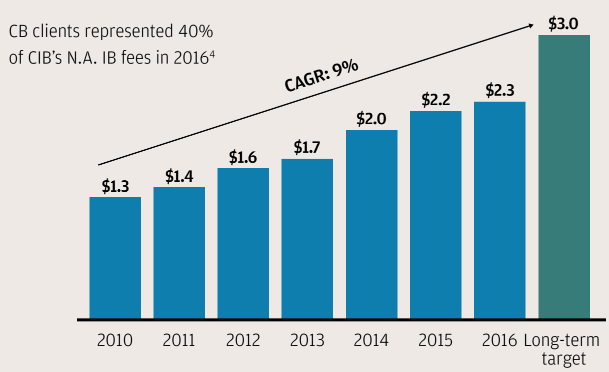
$ in millions



	2010	2011	2012	2013	2014	2015	2016	2010-2016 CAGR
Clients (#)	820	1,100	1,360	1,470	1,670	1,970	2,220	18%
Loans EOP ($B)	$1.6	$4.4	$6.8	$8.2	$8.8	$10.7	$12.6	41%
Deposits ($B)	$1.3	$3.0	$4.7	$6.0	$7.8	$8.2	$8.2	36%

Commercial Banking Gross Investment Banking Revenue[3]

$ in billions



[1] Prior years' financials have been revised to conform to current presentation
[2] Analysis based on Dun & Bradstreet data for companies headquartered in Metropolitan Statistical Areas with revenue between $20 million and $500 million; excludes high-risk industries and industries not aligned to Middle Market
[3] Represents total firm revenue from investment banking products provided to CB clients
[4] Does not include fees from Fixed Income and Equity Markets products, which are included in Commercial Banking gross investment banking revenue
CAGR = Compound annual growth rate EOP = End of period N.A. IB = North America Investment Banking

Francisco, Boston, Miami and Washington, D.C. We are in 48 of the top 50 markets in the U.S., and by the end of 2017, we will be in all 50. Through these efforts, we have organically built a nice-sized bank with over 2,200 clients, $13 billion of loans and $8 billion of deposits. Our Middle Market expansion strategy is a significant growth opportunity – one in which we believe will reach $1 billion in revenue over time.

Our opportunity

As we look forward, our strategic priorities are clear. We are going to continue to drive innovation and strengthen our business processes to improve the client experience, operate with fortress principles and have the best team in all of our markets to serve our clients. We remain committed to growing with discipline and will continue to take a long-term view with our business and our clients, investing for their success and ours.

With these priorities guiding us, I'm excited by the future and the potential of our business. We see enormous opportunity across our franchise as the investments we have made over the last several years have set a solid foundation. Expanding our footprint and adding new bankers puts us in front of a tremendous number of potential clients. Moreover, the enhancements we are making in our platform and capabilities give us confidence in our ability to compete and add differential value to our clients.

Our success depends completely on our people. They are knowledgeable, dedicated and deeply embedded in the communities they serve. I'm excited by the enthusiasm they show every day and am proud to work with such an incredible team. As always, we are optimistic about the U.S. economy and our clients' role in driving growth and opportunity for CB. If we stay true to our proven strategy, we believe this team will continue to deliver strong results for our shareholders.

Douglas Petno
CEO, Commercial Banking

2016 HIGHLIGHTS AND ACCOMPLISHMENTS

Performance highlights

- Delivered record revenue of $7.5 billion
- Grew end-of-period loans 13%; 26 consecutive quarters of loan growth
- Generated return on equity of 16% on $16 billion of allocated capital
- Continued superior credit quality – net charge-off ratio of 0.09%

Leadership positions

- #1 U.S. multifamily lender[1]
- #1 in Perceived Customer Satisfaction, *CFO* magazine's Commercial Banking Survey, 2016
- Top 3 in Overall Middle Market, Large Middle Market and Asset Based Lending Bookrunner[2]
- Winner of Greenwich Associates' Best Brand Awards in Middle Market Banking – overall, loans or lines of credit, cash management, trade finance and investment banking, 2016
- Recognized in 2016 by Greenwich Associates as #1 cash management overall satisfaction and #1 cash management market penetration in the $20 million-$500 million footprint

Business segment highlights

- Middle Market Banking – Added more than 700 new clients
- Corporate Client Banking – Record gross investment banking revenue[3]
- Commercial Term Lending – Record originations of more than $20 billion
- Real Estate Banking – Completed its best year ever with record originations over $10 billion
- Community Development Banking – Originated over $1 billion in new construction commitments, financing more than 10,000 units of affordable housing in 90+ cities

Firmwide contribution

- Commercial Banking clients accounted for 40% of total North American investment banking fees[4]
- Over $130 billion in assets under management from Commercial Banking clients, generating more than $460 million in Investment Management revenue
- $475 million in Card Services revenue[3]
- $2.8 billion in Treasury Services revenue

Progress in key growth areas

- Middle Market expansion – Record revenue of $411 million; 24% CAGR since 2011
- Investment banking – Record gross revenue of $2.3 billion; 10% CAGR since 2011
- International Banking – Revenue[5] of $285 million; 8% CAGR since 2011

[1] SNL Financial based on Federal Deposit Insurance Corporation data as of 12/31/16
[2] Thomson Reuters as of year-end 2016
[3] Investment banking and Card Services revenue represents gross revenue generated by CB clients
[4] Calculated based on gross domestic investment banking revenue for syndicated and leveraged finance, M&A, equity underwriting and bond underwriting
[5] Overseas revenue from U.S. multinational clients

CAGR = Compound annual growth rate

Asset & Wealth Management

Mary Callahan Erdoes

The major geopolitical events of 2016, namely the U.S. presidential election and Brexit, surprised many as the outcome of these two major votes had been deemed improbable. As such, market reactions were volatile and unsettling to many.

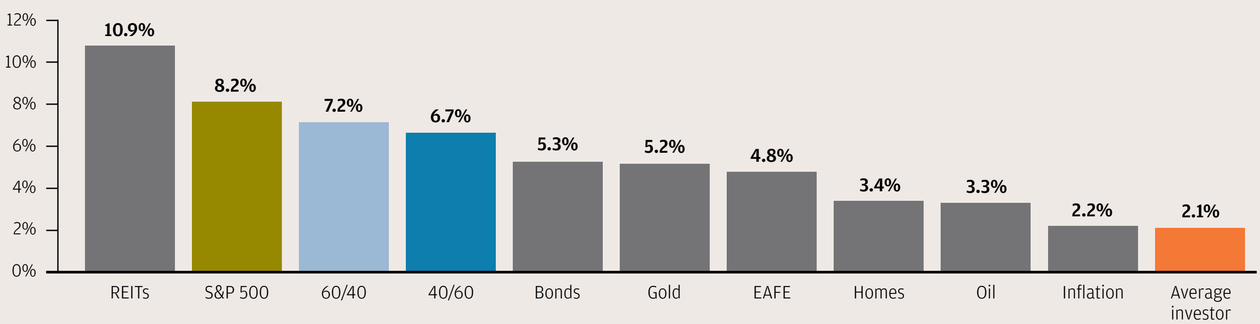
The emotional response to such events often makes it difficult to objectively reassess and position portfolios. For 180 years – through countless political challenges and conflicts – J.P. Morgan Asset & Wealth Management (AWM) has brought its fiduciary mindset to help clients navigate portfolios. Over these many decades, we have institutionalized our insights and passed on the cumulative wisdom and knowledge of those before us to incoming generations.

Perhaps the two most important investment lessons passed on through these centuries are around long-term focus and diversification. Diversification across and within asset classes helps clients avoid overexposure to a particular region or asset class, protecting their portfolios from significant drawdowns and enabling them to be nimble and take advantage of market opportunities when they arise. When investors make emotional decisions related to current events, the benefits of long-term investing and properly diversified portfolios can be eroded.

Instead of focusing on proper long-term, diversified investment portfolios, today's debate is centered more on how to invest. Questions relating to "active vs. passive" investing and "humans vs. computers" have taken over the headlines.

We believe proper portfolio construction should include both active and passive strategies, depending on a client's time horizon and risk profile. We also believe advisors and technology need to work together. Clients want to choose how, when and from where they interact with us – whether it's through online platforms, on the phone or face to face. The person-to-person interaction becomes even more important as our clients' lives grow more complex and they require more comprehensive advice.

20-Year Annualized Returns by Asset Class (1996–2015)



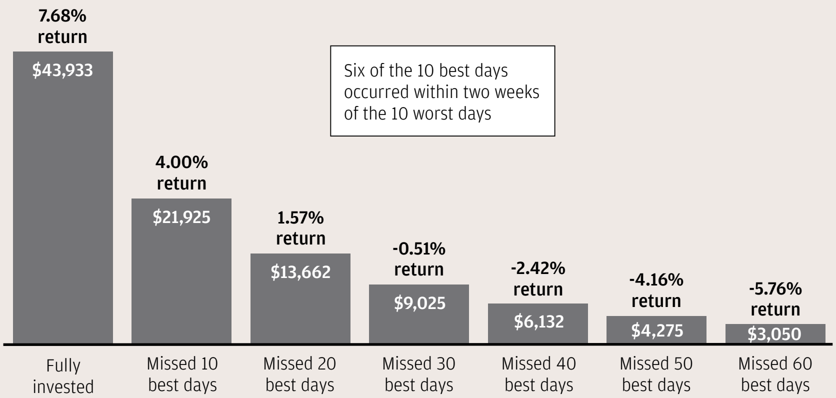
Source: J.P. Morgan Asset Management; Dalbar Inc.

Indexes used are as follows: REITs: NAREIT Equity REIT Index; EAFE: MSCI EAFE; Oil: WTI Index; Bonds: Barclays U.S. Aggregate Index; Homes: median sale price of existing single-family homes; Gold: USD/troy oz; Inflation: CPI; 60/40: A balanced portfolio with 60% invested in S&P 500 Index and 40% invested in high-quality U.S. fixed income, represented by the Barclays U.S. Aggregate Index. The portfolio is rebalanced annually. Average asset allocation investor return is based on an analysis by Dalbar Inc., which utilizes the net of aggregate mutual fund sales, redemptions and exchanges each month as a measure of investor behavior. Returns are annualized (and total return where applicable) and represent the 20-year period ending 12/31/15 to match Dalbar's most recent analysis.

Source: "Guide to the Markets" — U.S. data are as of December 31, 2016

Returns of S&P 500

Performance of a $10,000 investment between January 2, 1997 and December 31, 2016



Source: Prepared by J.P. Morgan Asset Management using data from Morningstar Direct. Returns based on the S&P 500 Total Return Index. For illustrative purposes only. Past performance is not indicative of future returns

As stewards of our clients' wealth, our mission at J.P. Morgan is to help clients of all types get, and stay, properly invested. Our clients span the entire spectrum – from retail investors working with our Chase branch network, to wealthy individuals or families working with our Private Bank, to sophisticated institutional investors working with our Asset Management business.

We have direct relationships with 60% of the world's largest pension funds, sovereign wealth funds and central banks and 50% of the world's wealthiest individuals and families. We also deliver our insights and advice to more than 1 million U.S. families through Chase Wealth Management.

These clients can choose to work with any firm they wish. They turn to J.P. Morgan because they know we will be there for them when they need us most and that we will always put their interests first.

World-class investment performance

While trust is the primary reason clients choose J.P. Morgan, our superior investment performance is also critically important to the compounding of clients' wealth. In 2016, 83% of our 10-year, long-term mutual fund assets under management (AUM) ranked in the top two quartiles.

Our market-leading performance spans asset classes – 90% of assets for multi-asset solutions and alternatives, 84% for equity and 77% for fixed income ranked in the top two quartiles over the 10-year period. This outstanding track record has resulted in 140 of our equity strategies and 41 of our fixed income strategies receiving a four- or five-star ranking from Morningstar.

This consistent performance also has led to clients entrusting J.P. Morgan with more of their assets. Over the past five years, we ranked #2 in total inflows among our large public peers, with an average of $82 billion annually and $408 billion cumulatively.

A diverse and balanced business mix driving strong financial performance

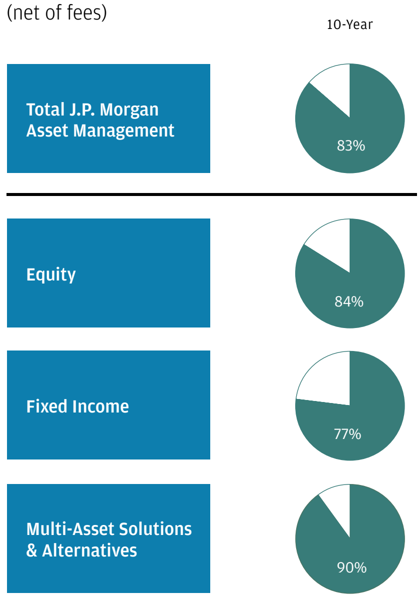
Much like the portfolios we manage, our business is diversified across asset classes, regions and client types. That diversity, coupled with our proven track record, has led to strong financial performance for AWM.

In 2016, we delivered $12 billion in revenue and record pre-tax income of $3.5 billion. We also reached a record $2.5 trillion in total client assets. These numbers have consistently grown over the past five years, with a 5% compound annual growth rate (CAGR) for revenue and client assets and a 7% rate for pre-tax income.

In addition, clients are increasingly using us for their primary banking services. Wealth Management deposits grew to $290 billion in 2016 and recorded an impressive 19% CAGR over the past decade. In credit, our $121 billion in loan balances, including mortgages, represent a 15% CAGR over the past 10 years. Our focus on strong risk management has helped us do that while maintaining charge-off rates that are among the lowest in the industry.

% of 2016 J.P. Morgan Asset Management AUM Over Peer Median[1]

(net of fees)



[1] For footnoted information, refer to slide 17 in the 2017 Asset & Wealth Management Investor Day presentation, which is available on JPMorgan Chase & Co.'s website at jpmorganchase.com/corporate/investor-relations/event-calendar.htm, under the heading JPMorgan Chase 2017 Investor Day, Asset & Wealth Management, and on Form 8-K as furnished to the SEC on February 28, 2017, which is available on the SEC's website at www.sec.gov

Never stop investing in people and technology

We work hard to make J.P. Morgan a place where our people can have long and successful careers. We have a history of investing in our people at every level, from the thousands of training sessions and leadership development courses to our continuous work on talent mobility.

Over the past five years, we've increased our front-office spend by 14% to ensure we have the right people with the right skills in the right roles. As a result of this commitment to developing our talent, we proudly maintained a top talent retention rate of over 95%.

One of the best ways we can invest in our people is by also investing in our technology. Our emphasis is on having a technology platform that allows us to automate and improve processes while, at the same time, helps our advisors to serve clients more quickly and efficiently, as well as focus on the value-added client work.

We have successfully reduced our legacy technology footprint and error rates and significantly increased our spend on forward-looking initiatives. These efforts include building out an enhanced digital wealth management platform that will launch later this year and introducing new client management systems for our advisors.

Asset & Wealth Management — difficult to replicate

One of the keys to our success has been our ability to bring to the table a unique combination of a two-century heritage and a focus on continuous investment, innovation and improvement. That means clients can have confidence that we will be there for them over the long term and also know that we have the foresight to adapt and innovate to help them through whatever the future brings.

The long-term focus of this business is part of what makes AWM so difficult to replicate. A franchise with a 10-year investment performance track record, a 50-year relationship with a state pension fund and a 100-year relationship with a multi-generational family cannot be built overnight. The culture of our firm – both what we do and how we do it – is equally special and one of our greatest competitive advantages.

When you combine our AWM capabilities with the world's leading investment, consumer and commercial banks, our story is even more powerful and enables us to bring the best the firm has to offer to help solve our clients' most important issues.

I am so proud to be part of this great firm and our AWM business. Our commitment to you, our shareholders, is that we will continue to do first-class business in a first-class way so that we can create even more value for you and for our clients.

Mary

Mary Callahan Erdoes
CEO, Asset & Wealth Management

2016 HIGHLIGHTS AND ACCOMPLISHMENTS

Business highlights

- Fiduciary mindset ingrained since mid-1800s
- Positive client asset flows every year since 2004
- Revenue of $12 billion
- Record $2.5 trillion in client assets
- Record pre-tax income of $3.5 billion
- Record average loan balances of $113 billion
- Record average mortgage balances of $29 billion
- Retention rate of over 95% for top senior portfolio management talent

Leadership positions

- #1 Global Asset Management (*Euromoney*, February 2017)
- #1 Institutional Money Market Fund Manager Worldwide (iMoneyNet, December 2016)
- #1 Private Bank Overall in North America (*Euromoney*, February 2017)
- #1 Private Bank Overall in Latin America (*Euromoney*, February 2017)
- Best Asset Management Company for Asia (*The Asset*, May 2016)
- Best Infrastructure Manager of the Year (*Institutional Investor*, May 2016)
- Top Pan-European Fund Management Firm (Thomson Reuters Extel, June 2016)
- Best Large-Cap Core Equity Manager of the Year (*Institutional Investor*, May 2016)
- #3 Hedge Fund Manager (*Absolute Return*, September 2016)

Corporate Responsibility

Peter Scher

At JPMorgan Chase, we understand that the success of our firm is directly linked to the success of our communities. For us, corporate responsibility is a strategic imperative. By giving more people the opportunity to share in the rewards of a growing economy, we help build the foundation for more prosperous communities – and, in the process, help secure our firm's long-term future.

The importance of corporate responsibility is reflected in its integration throughout our operations. Our long-term initiatives and programs – backed by significant human and financial capital and informed by our firm's expertise – are among the most externally visible indicators of the seriousness of our intent. So, too, are the ways in which we actively leverage our core business in service to our communities, deploying the capital and the credit that fuel economic growth.

Bolstering these investments is the tremendous dedication of our people to serve our communities, including the hundreds of employees who applied to the JPMorgan Chase Service Corps, our highly selective program that embeds top-performing employees with many of our nonprofit partners. That so many of our people eagerly throw their hats in the ring to leave their jobs, families and, in some cases, their countries for three weeks to lend their skills to our communities speaks volumes about who we are as a firm.

Underpinning this ethos is a conviction that firms like ours have not only a responsibility and a vested interest in helping solve the challenges facing our communities but also a vital contribution to make. The private sector's capabilities, ingenuity and assets have time and again demonstrated their capacity to drive transformative change.

JPMorgan Chase has answered this call by reimagining our approach to corporate responsibility. Based on our experience around the world, we have developed and refined a model that is informed by data and based on evidence about what's most effective at driving inclusive growth. Our conclusion: Arm people with the skills needed for today's high-quality jobs; provide small businesses – particularly minority-owned and community-based ones – with capital and resources; invest in community development that revitalizes not only urban cores but also surrounding neighborhoods; and give households the tools and resources to manage their financial health. Taken together, these are four fundamental pillars of opportunity – and the focus of our efforts.

Our model also reflects what we have learned are the essential ingredients for creating lasting impact. Critically, it must include a deliberate focus on strengthening the underlying organizations and systems that are needed to empower communities to deliver on – and sustain – change. Equally, it depends on forging meaningful partnerships across the public, private and nonprofit sectors – and then actively leveraging our unique capabilities.

Of course, every company has different assets and experiences to contribute – from Google's initiatives that harness its employees' passion for technology to give back to their communities to IBM's pioneering skilled volunteerism program that demonstrates what can be achieved when firms lend their people's expertise. Regardless of what we bring to the table, all of us can – and must – embrace the obligation to be a positive force for progress and opportunity in our communities.

Peter Scher
Head of Corporate Responsibility
and Chairman of the
Greater Washington Region

A MODEL FOR IMPACT

Driving inclusive growth

More people must have access to opportunity and the chance to move up the economic ladder, particularly in the world's cities, where the benefits of revitalization are not reaching everyone. To achieve this mission, we have reimagined our approach to corporate responsibility. We are leveraging our firm's data, global scale, talent and resources to invest in key drivers of inclusive growth: financial health, jobs and skills, neighborhood revitalization and small business expansion.

We continually test, learn and iterate in order to create more widely shared prosperity and to strengthen the underlying systems needed to deliver sustainable change.

A MODEL IN ACTION

Jobs and skills

Helping people get the skills they need to compete in today's labor market is critical for expanding access to opportunity and promoting economic mobility. Yet even as the global economy improves, people around the world are being left behind.

To help address this challenge, JPMorgan Chase is investing $325 million over five years to provide adults and young people around the world with critical support, education and training to build in-demand skills while providing employers with the workforce they need to grow and compete in today's economy. As part of these efforts, JPMorgan Chase launched New Skills for Youth in 2016, a $75 million global initiative to expand high-quality, career-focused education programs that lead to well-paying jobs and long-term careers.

New Skills for Youth is expanding opportunity for young people through two approaches: a multimillion dollar competition, in collaboration with the Council of Chief State School Officers, which seeks to incentivize U.S. states to grow and strengthen their career and technical education systems; and, through global innovation sites, the development of career-focused education programs in cities and school districts around the world.

Communities engaged in 2016:

- Forty-three states and the District of Columbia submitted proposals to participate in the first phase of the competitive program. Of these 44 submissions, we selected 24 states and the District of Columbia and then committed a total of $2.5 million to help them plan and implement long-term career-readiness programs. These states represent half of all K-12 enrollments in the U.S.
- In the second phase of the program in January 2017, we selected 10 states and committed a total of $20 million to help them execute the career-readiness plans they developed during phase one of the initiative. Through ongoing engagement by JPMorgan Chase, these 10 states will have the opportunity to collaborate and learn from each other, receive targeted technical assistance to address their specific challenges, and access lessons, best practices and other research drawn from the initiative.
- Additionally, we have committed a total of $10.5 million to Denver, Detroit and New Orleans to develop and expand innovative apprenticeship models and career-focused programs that equip high school students with the skills and education they need to pursue well-paying, long-term careers.

Neighborhood revitalization

Our community development efforts focus on creating vibrant communities and neighborhoods that offer residents access to opportunity through partnerships, innovative financing and data to address the key drivers of inequality.

Launched in 2016, PRO Neighborhoods, our $125 million, five-year initiative, seeks to identify and support solutions for creating economic opportunity in disadvantaged neighborhoods around the country. PRO Neighborhoods promotes collaboration across sectors and community-based innovators to ensure that economic growth does not stop at commercial corridors but extends into a city's neighborhoods.

This initiative focuses on three key areas: convening and supporting Community Development Financial Institution (CDFI) collaboratives to work together to address specific community development challenges; providing seed capital that enables partners to develop and preserve affordable housing; and funding research on land use, housing trends and shifting demographics to identify data-driven neighborhood solutions.

In October 2016, JPMorgan Chase announced $20 million for five community development organizations working to create economic opportunity in five U.S. cities: Atlanta, Chicago, Detroit, Miami and New York.

Small business expansion

Small businesses are vital engines of job growth and economic stability in the neighborhoods they serve.

They also have the potential to play a major role in lowering unemployment rates in distressed neighborhoods. Yet many low- and moderate-income small businesses lack access to vital resources needed for success.

Through our efforts in Detroit, we have learned that supporting underserved entrepreneurs is essential to the city's transformation. These insights led us to refine and sharpen our focus on helping underserved entrepreneurs connect with capital to drive sustainable, widespread and inclusive growth.

In October 2016, JPMorgan Chase more than doubled the size of the global Small Business Forward program, committing $75 million over the next three years to connect underserved small businesses with capital, targeted technical assistance and support networks to help them grow faster, create jobs and strengthen local economies.

As part of these efforts, JPMorgan Chase partnered with LiftFund and committed $4.6 million to support the launch of LiftUP, a new web-based small business lending program to increase access to capital for underserved minority- and women-owned small businesses in the southern U.S. LiftUP will provide small businesses faster access to affordable small business loans, reducing lending approval time from an average of five weeks to four days.

Additionally, JPMorgan Chase partnered with the Association for Enterprise Opportunity and committed $1.9 million to support the advancement of a new technology-enabled platform that will serve as an industry utility connecting small businesses with CDFI lenders when the owners are unable to qualify for traditional loans.

Data and analysis

Almost two years ago, we established the JPMorgan Chase Institute: a global economic think tank dedicated to delivering data-rich analyses for the public good. The Institute utilizes our proprietary data, augmented by firmwide expertise and market access, to provide insights on the global economy and offer innovative analyses to advance economic prosperity.

In 2016, the Institute uncovered fresh insights on:

- Household income volatility, particularly in the wake of extraordinary payments;
- The impact of the online platform economy as a way for consumers to manage this volatility and the slowing participation growth within the online platform economy;
- Consumers' response to the sustained drop in the price of fuel;
- Small business cash flow and cash reserves ("cash buffer days") they have on hand to weather financial volatility;
- The economic impact of Daylight Savings Time;
- The role of unemployment insurance and the financial decisions households make after receiving it;
- Nearly a full year of the Local Consumer Commerce Index, measuring consumer spending growth in 15 U.S. cities and in aggregate.

2016 HIGHLIGHTS AND ACCOMPLISHMENTS

JPMorgan Chase received *Euromoney*'s 2016 **World's Best Bank for Corporate Social Responsibility** award for our commitment and innovative approach to addressing economic opportunity around the world.

- JPMorgan Chase's $100 million commitment to Detroit announced in 2014, half of which we are investing in two CDFIs – to fund and catalyze further investment in housing, commercial and manufacturing – has supported more than $270 million in such projects, created or preserved over 800 units of housing and created nearly 800 jobs.
- Announced nine financial services innovators as winners of the second competition of the Financial Solutions Lab aimed at identifying solutions that help consumers prepare for, and weather, financial shocks. Each winner received $250,000 in capital to enhance and scale the availability of their products and services. More than 70 of our employees leveraged their expertise and networks to help the Lab winners improve their products and increase their reach. To date, the Financial Solutions Lab has supported 18 fintech companies offering innovative financial products to help more than 1 million Americans improve their financial health.
- Engaged over 1,800 young people in summer jobs and other work-related experiences in 21 cities across the U.S.
- Underwrote more than $5 billion in green, social and sustainability themed bonds and facilitated over $1.9 billion of capital for renewable energy projects in the U.S.
- Committed to strengthening apprenticeship systems around the world through a $9 million investment by supporting the development of innovative apprenticeship models in high-growth fields; expanding existing high-quality programs to serve young people from disadvantaged backgrounds; and bolstering the case for private investment in apprenticeship through first-of-its-kind research measuring the employer return on investment for apprenticeship programs.
- The talent and expertise of our people are key components of our model for impact and are central to all of our efforts. In 2016, 50,000 of our employees volunteered more than 325,000 hours of their time. And through the JPMorgan Chase Service Corps, 64 employees applied their skills and expertise to help our nonprofit partners expand their capacity, contributing more than 9,600 hours with an approximate market value of $1.4 million.

Financial:

Note:

The following pages from JPMorgan Chase & Co.'s 2016 Form 10-K are not included herein: 1-32, 286-298

FIVE-YEAR SUMMARY OF CONSOLIDATED FINANCIAL HIGHLIGHTS

(unaudited) As of or for the year ended December 31, (in millions, except per share, ratio, headcount data and where otherwise noted)		2016		2015		2014		2013		2012
Selected income statement data										
Total net revenue	$	**95,668**	$	93,543	$	95,112	$	97,367	$	97,680
Total noninterest expense		**55,771**		59,014		61,274		70,467		64,729
Pre-provision profit		**39,897**		34,529		33,838		26,900		32,951
Provision for credit losses		**5,361**		3,827		3,139		225		3,385
Income before income tax expense		**34,536**		30,702		30,699		26,675		29,566
Income tax expense		**9,803**		6,260		8,954		8,789		8,307
Net income	$	**24,733**	$	24,442	$	21,745	$	17,886	$	21,259
Earnings per share data										
Net income: Basic	$	**6.24**	$	6.05	$	5.33	$	4.38	$	5.21
Diluted		**6.19**		6.00		5.29		4.34		5.19
Average shares: Basic		**3,618.5**		3,700.4		3,763.5		3,782.4		3,809.4
Diluted		**3,649.8**		3,732.8		3,797.5		3,814.9		3,822.2
Market and per common share data										
Market capitalization	$	**307,295**	$	241,899	$	232,472	$	219,657	$	167,260
Common shares at period-end		**3,561.2**		3,663.5		3,714.8		3,756.1		3,804.0
Share price:(a)										
High	$	**87.39**	$	70.61	$	63.49	$	58.55	$	46.49
Low		**52.50**		50.07		52.97		44.20		30.83
Close		**86.29**		66.03		62.58		58.48		43.97
Book value per share		**64.06**		60.46		56.98		53.17		51.19
Tangible book value per share ("TBVPS")(b)		**51.44**		48.13		44.60		40.72		38.68
Cash dividends declared per share		**1.88**		1.72		1.58		1.44		1.20
Selected ratios and metrics										
Return on common equity ("ROE")		**10%**		11%		10%		9%		11%
Return on tangible common equity ("ROTCE")(b)		**13**		13		13		11		15
Return on assets ("ROA")		**1.00**		0.99		0.89		0.75		0.94
Overhead ratio		**58**		63		64		72		66
Loans-to-deposits ratio		**65**		65		56		57		61
High quality liquid assets ("HQLA") (in billions)(c)	$	**524**	$	496	$	600	$	522	$	341
Common equity tier 1 ("CET1") capital ratio(d)		**12.4%**		11.8%		10.2%		10.7%		11.0%
Tier 1 capital ratio(d)		**14.1**		13.5		11.6		11.9		12.6
Total capital ratio(d)		**15.5**		15.1		13.1		14.3		15.2
Tier 1 leverage ratio(d)		**8.4**		8.5		7.6		7.1		7.1
Selected balance sheet data (period-end)										
Trading assets	$	**372,130**	$	343,839	$	398,988	$	374,664	$	450,028
Securities		**289,059**		290,827		348,004		354,003		371,152
Loans		**894,765**		837,299		757,336		738,418		733,796
Core Loans		**806,152**		732,093		628,785		583,751		555,351
Average core loans		**769,385**		670,757		596,823		563,809		534,615
Total assets		**2,490,972**		2,351,698		2,572,274		2,414,879		2,358,323
Deposits		**1,375,179**		1,279,715		1,363,427		1,287,765		1,193,593
Long-term debt(e)		**295,245**		288,651		276,379		267,446		248,521
Common stockholders' equity		**228,122**		221,505		211,664		199,699		194,727
Total stockholders' equity		**254,190**		247,573		231,727		210,857		203,785
Headcount		**243,355**		234,598		241,359		251,196		258,753
Credit quality metrics										
Allowance for credit losses	$	**14,854**	$	14,341	$	14,807	$	16,969	$	22,604
Allowance for loan losses to total retained loans		**1.55%**		1.63%		1.90%		2.25%		3.02%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans(f)		**1.34**		1.37		1.55		1.80		2.43
Nonperforming assets	$	**7,535**	$	7,034	$	7,967	$	9,706	$	11,906
Net charge-offs		**4,692**		4,086		4,759		5,802		9,063
Net charge-off rate		**0.54%**		0.52%		0.65%		0.81%		1.26%

Note: Effective January 1, 2016, the Firm adopted new accounting guidance related to (1) the recognition and measurement of debit valuation adjustments ("DVA") on financial liabilities where the fair value option has been elected, and (2) the accounting for employee stock-based incentive payments. For additional information, see Accounting and Reporting Developments on pages 135–137 and Notes 3, 4 and 25.

(a) Share prices are from the New York Stock Exchange.
(b) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 48–50.
(c) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio under the final U.S. rule ("U.S. LCR") for December 31, 2016 and 2015, and the Firm's estimated amount for December 31, 2014 prior to the effective date of the final rule, and under the Basel III liquidity coverage ratio ("Basel III LCR") for prior periods. For additional information, see HQLA on page 111.
(d) Ratios presented are calculated under the Basel III Transitional rules, which became effective on January 1, 2014, and for the capital ratios, represent the Collins Floor. Prior to 2014, the ratios were calculated under the Basel I rules. See Capital Risk Management on pages 76–85 for additional information on Basel III.
(e) Included unsecured long-term debt of $212.6 billion, $211.8 billion, $207.0 billion, $198.9 billion and $200.1 billion respectively, as of December 31, of each year presented.
(f) Excluded the impact of residential real estate purchased credit-impaired ("PCI") loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50. For further discussion, see Allowance for credit losses on pages 105–107.

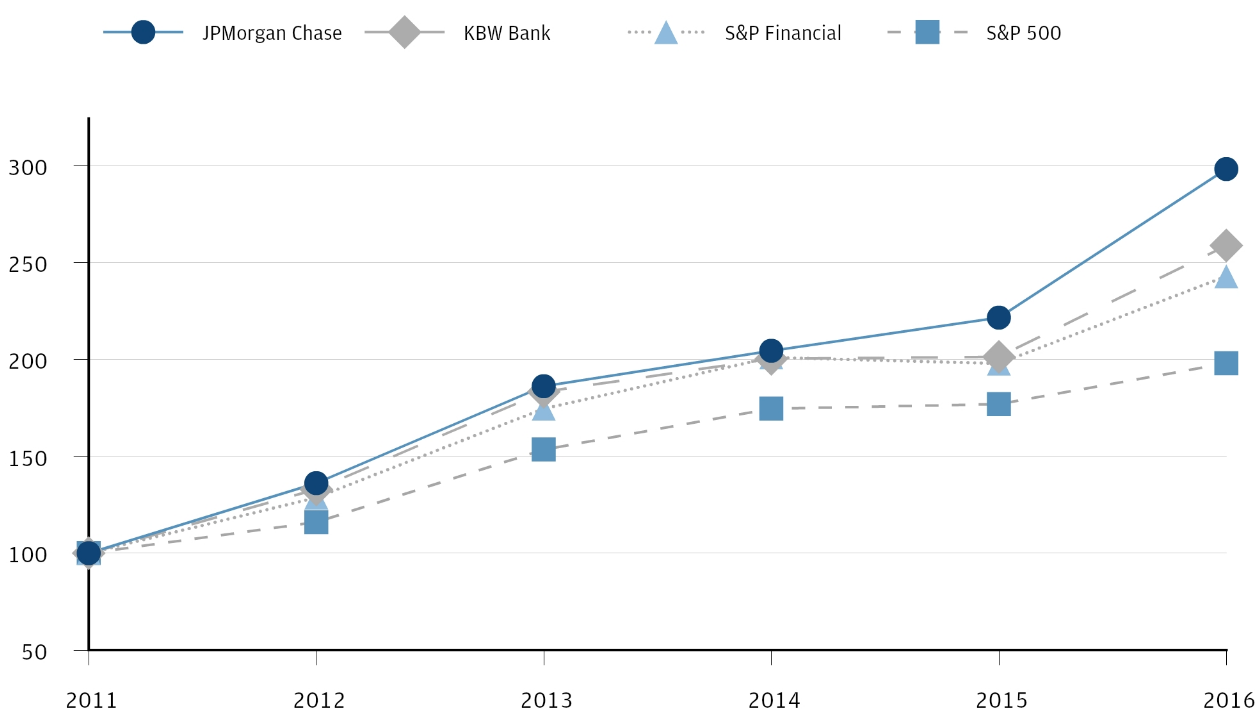
FIVE-YEAR STOCK PERFORMANCE

The following table and graph compare the five-year cumulative total return for JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm") common stock with the cumulative return of the S&P 500 Index, the KBW Bank Index and the S&P Financial Index. The S&P 500 Index is a commonly referenced United States of America ("U.S.") equity benchmark consisting of leading companies from different economic sectors. The KBW Bank Index seeks to reflect the performance of banks and thrifts that are publicly traded in the U.S. and is composed of leading national money center and regional banks and thrifts. The S&P Financial Index is an index of financial companies, all of which are components of the S&P 500. The Firm is a component of all three industry indices.

The following table and graph assume simultaneous investments of $100 on December 31, 2011, in JPMorgan Chase common stock and in each of the above indices. The comparison assumes that all dividends are reinvested.

December 31, (in dollars)	2011	2012	2013	2014	2015	**2016**
JPMorgan Chase	$ 100.00	$ 136.18	$ 186.17	$ 204.57	$ 221.68	**$ 298.31**
KBW Bank Index	100.00	133.03	183.26	200.42	201.40	**258.82**
S&P Financial Index	100.00	128.75	174.57	201.06	197.92	**242.94**
S&P 500 Index	100.00	115.99	153.55	174.55	176.95	**198.10**

December 31,
(in dollars)



This section of JPMorgan Chase's Annual Report for the year ended December 31, 2016 ("Annual Report"), provides Management's discussion and analysis of the financial condition and results of operations ("MD&A") of JPMorgan Chase. See the Glossary of Terms and Acronyms on pages 279-285 for definitions of terms used throughout this Annual Report. The MD&A included in this Annual Report contains statements that are forward-looking within the meaning of the Private Securities Litigation Reform Act of 1995. Such statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm's actual results to differ materially from those set forth in such forward-looking statements. Certain of such risks and uncertainties are described herein (see Forward-looking Statements on page 138) and in JPMorgan Chase's Annual Report on Form 10-K for the year ended December 31, 2016 ("2016 Form 10-K"), in Part I, Item 1A: Risk factors; reference is hereby made to both.

INTRODUCTION

JPMorgan Chase & Co., a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the United States of America ("U.S."), with operations worldwide; the Firm had $2.5 trillion in assets and $254.2 billion in stockholders' equity as of December 31, 2016. The Firm is a leader in investment banking, financial services for consumers and small businesses, commercial banking, financial transaction processing and asset management. Under the J.P. Morgan and Chase brands, the Firm serves millions of customers in the U.S. and many of the world's most prominent corporate, institutional and government clients.

JPMorgan Chase's principal bank subsidiaries are JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), a national banking association with U.S. branches in 23 states, and Chase Bank USA, National Association ("Chase Bank USA, N.A."), a national banking association that is the Firm's credit card-issuing bank. JPMorgan Chase's principal nonbank subsidiary is J.P. Morgan Securities LLC ("JPMorgan Securities"), the Firm's U.S. investment banking firm. The bank and nonbank subsidiaries of JPMorgan Chase operate nationally as well as through overseas branches and subsidiaries, representative offices and subsidiary foreign banks. One of the Firm's principal operating subsidiaries in the U.K. is J.P. Morgan Securities plc, a subsidiary of JPMorgan Chase Bank, N.A.

For management reporting purposes, the Firm's activities are organized into four major reportable business segments, as well as a Corporate segment. The Firm's consumer business is the Consumer & Community Banking ("CCB") segment. The Firm's wholesale business segments are Corporate & Investment Bank ("CIB"), Commercial Banking ("CB"), and Asset & Wealth Management ("AWM") (formerly Asset Management or "AM"). For a description of the Firm's business segments, and the products and services they provide to their respective client bases, refer to Business Segment Results on pages 51–70, and Note 33.

This executive overview of the MD&A highlights selected information and may not contain all of the information that is important to readers of this Annual Report. For a complete description of the trends and uncertainties, as well as the risks and critical accounting estimates affecting the Firm and its various lines of business, this Annual Report should be read in its entirety.

Financial performance of JPMorgan Chase

Year ended December 31, (in millions, except per share data and ratios)	2016	2015	Change
Selected income statement data			
Total net revenue	**$ 95,668**	$ 93,543	2%
Total noninterest expense	**55,771**	59,014	(5)
Pre-provision profit	**39,897**	34,529	16
Provision for credit losses	**5,361**	3,827	40
Net income	**24,733**	24,442	1
Diluted earnings per share	**6.19**	6.00	3
Selected ratios and metrics			
Return on common equity	**10%**	11%	
Return on tangible common equity	**13**	13	
Book value per share	**$ 64.06**	$ 60.46	6
Tangible book value per share	**51.44**	48.13	7
Capital ratios[(a)]			
CET1	**12.4%**	11.8%	
Tier 1 capital	**14.1**	13.5	
Total capital	**15.5**	15.1	

(a) Ratios presented are calculated under the Basel III Transitional rules and represent the Collins Floor. See Capital Risk Management on pages 76–85 for additional information on Basel III.

Summary of 2016 results

JPMorgan Chase reported strong results for full year 2016 with net income of $24.7 billion, or $6.19 per share, on net revenue of $95.7 billion. The Firm reported ROE of 10% and ROTCE of 13%.

Net income increased 1% compared with the prior year driven by lower noninterest expense and higher net revenue, predominantly offset by higher income tax expense and provision for credit losses.

Total net revenue increased by 2% primarily reflecting higher net interest income across all the Firm's business segments and higher Markets noninterest revenue in CIB, partially offset by lower card income in CCB and lower asset management fees in AWM.

Noninterest expense was $55.8 billion, down 5% compared with the prior year, driven by lower legal expense.

The provision for credit losses was $5.4 billion, an increase of $1.5 billion, reflecting an increase in the total consumer provision related to additions in the allowance for loan losses and higher net charge-offs in the credit card portfolio, and a lower benefit in the residential real estate portfolio driven by a lower reduction in the allowance for loan losses compared with the prior year. The wholesale provision had a modest increase, largely driven by the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios.

The total allowance for credit losses was $14.9 billion at December 31, 2016, and the Firm had a loan loss coverage ratio, excluding the PCI portfolio, of 1.34%, compared with 1.37% in the prior year. The Firm's nonperforming assets totaled $7.5 billion, an increase from the prior-year level of $7.0 billion.

Firmwide average core loans increased 15% compared with the prior year.

Within CCB, average core loans increased 20% from the prior year. CCB had record growth in average deposits, with a 10% increase from the prior year. Credit card sales volume increased 10%, and merchant processing volume increased 12%, from the prior year. CCB had nearly 27 million active mobile customers at year-end 2016, an increase of 16% from the prior year.

CIB maintained its #1 ranking for Global Investment Banking fees with a 8.1% wallet share for the full-year ended December 31, 2016. Within CB, record average loans increased 14% from the prior year as loans in the commercial and industrial client segment increased 9% and loans in the wholesale commercial real estate client segment increased 18%. AWM had record average loans, an increase of 5% over the prior year, and 79% of AWM's mutual fund assets under management ranked in the 1st or 2nd quartiles over the past 5 years.

For a detailed discussion of results by line of business ("LOB"), refer to the Business Segment Results on pages 51–52.

The Firm added to its capital, ending the full-year of 2016 with a TBVPS of $51.44, up 7% over the prior year. The Firm's estimated Basel III Advanced Fully Phased-In CET1 capital and ratio were $182 billion and 12.2%, respectively. The Fully Phased-In supplementary leverage ratio ("SLR") for the Firm and for JPMorgan Chase Bank, N.A. was 6.5% and 6.6%, respectively, at December 31, 2016. The Firm also was compliant with the Fully Phased-In U.S. LCR and had $524 billion of HQLA as of December 31, 2016. For further discussion of the LCR and HQLA, see Liquidity Risk Management on pages 110–115.

ROTCE and TBVPS are non-GAAP financial measures. Core loans are considered a key performance measure. Each of the Fully Phased-In capital and leverage measures is considered a key regulatory capital measure. For a further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50, and Capital Risk Management on pages 76–85.

JPMorgan Chase continues to support consumers, businesses and communities around the globe. The Firm provided credit and raised capital of $2.4 trillion for commercial and consumer clients during the full-year of 2016:

- $265 billion of credit for consumers
- $24 billion of credit for U.S. small businesses
- $772 billion of credit for corporations
- $1.2 trillion of capital raised for corporate clients and non-U.S. government entities
- $90 billion of credit and capital raised for nonprofit and U.S. government entities, including states, municipalities, hospitals and universities

On October 1, 2016, the Firm filed with the Federal Reserve and the FDIC its submission (the "2016 Resolution Submission") describing how the Firm remediated certain deficiencies, and providing a status report on its actions to address certain shortcomings, that had been identified by the Federal Reserve and the FDIC in April 2016 when those agencies provided feedback to the Firm as well as to seven other systemically important domestic banking institutions on their respective 2015 Resolution Plans.

Among the steps taken by the Firm to address the identified deficiencies and shortcomings were: (i) establishing a new subsidiary that has become an "intermediate holding company" and to which JPMorgan Chase & Co. has contributed the stock of substantially all of its direct subsidiaries (other than JPMorgan Chase Bank, N.A.), as well as other assets and intercompany indebtedness owing to JPMorgan Chase & Co.; (ii) increasing the Firm's liquidity reserves and pre-positioning significant amounts of capital and liquidity at the Firm's "material legal entities" (as defined in the 2016 Resolution Submission); (iii) refining the Firm's liquidity and capital governance frameworks, including establishing a Firmwide "trigger framework" that identifies key actions and escalations that would need to be taken, as well as decisions that would need to be made, at critical points in time if certain defined liquidity and/or capital metrics were to fall below defined thresholds; (iv) establishing clear, actionable legal entity rationalization criteria and related governance procedures; and (v) improving divestiture readiness, including determining and analyzing divestiture options in a crisis. On December 13, 2016, the Federal Reserve and the FDIC informed the Firm that they had determined that the Firm's 2016 Resolution Submission adequately remediated the identified deficiencies in the Firm's 2015 Resolution Plan. For more information, see the Federal Reserve and FDIC websites, and the Firm's website for the public portion of the 2016 Resolution Submission.

Business outlook

These current expectations are forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. Such forward-looking statements are based on the current beliefs and expectations of JPMorgan Chase's management and are subject to significant risks and uncertainties. These risks and uncertainties could cause the Firm's actual results to differ materially from those set forth in such forward-looking statements. See Forward-Looking Statements on page 138 and the Risk Factors section on pages 8–21.

Business outlook

JPMorgan Chase's outlook for the full-year 2017 should be viewed against the backdrop of the global and U.S. economies, financial markets activity, the geopolitical environment, the competitive environment, client activity levels, and regulatory and legislative developments in the U.S. and other countries where the Firm does business. Each of these inter-related factors will affect the performance of the Firm and its lines of business. The Firm expects it will continue to make appropriate adjustments to its businesses and operations in response to ongoing developments in the legal and regulatory, as well as business and economic, environment in which it operates.

In the first quarter of 2017, management expects net interest income to increase modestly compared with the fourth quarter of 2016. During 2017, assuming no change in interest rates since December 31, 2016, management expects net interest income could be approximately $3 billion higher than in 2016, reflecting the Federal Reserve's rate increase in December 2016 and expected loan growth. Management expects average core loan growth of approximately 10% in 2017.

The Firm continues to experience charge-off rates at or near historically low levels, reflecting favorable credit trends across the consumer and wholesale portfolios. Management expects total net charge-offs of approximately $5 billion in 2017. In Card, management expects the portfolio average net charge-off rate to increase in 2017, but remain below 3.00%, reflecting continued loan growth and the seasoning of newer vintages, with quarterly net-charge offs reflecting normal seasonal trends.

Management believes that the consumer allowance for credit losses could increase by approximately $300 million in 2017, reflecting growth across businesses, offset by reductions in the allowance for the residential real estate portfolio. Excluding the allowance related to the Oil & Gas and Natural Gas Pipelines and Metals & Mining portfolios, management expects that the wholesale allowance for credit losses could increase modestly in 2017 reflecting growth across businesses. Continued stability in the energy sector could result in a reduction in the allowance for credit losses in future periods. As management continually looks to enhance its credit loss estimation methodologies, the outlook for the allowance for credit losses does not take into consideration any such potential refinements.

The Firm continues to take a disciplined approach to managing its expenses, while investing in growth and innovation. As a result, Firmwide adjusted expense in 2017 is expected to be approximately $58 billion (excluding Firmwide legal expense).

In CCB, management expects Mortgage noninterest revenue to decrease approximately $700 million in 2017, driven by margin compression in a smaller mortgage market and continued run-off of the Servicing portfolio, as well as approximately $200 million of MSR gains in 2016 which are not expected to recur in 2017. Management expects Card Services noninterest revenue to decrease approximately $600 million in 2017, reflecting the amortization of premiums on strong new product originations and the absence in 2017 of a gain on the sale of Visa Europe interests in 2016, although total Card Services revenue is expected to increase due to strong growth in net interest income.

In the first quarter of 2017, management expects CCB expense to increase by approximately $150 million, compared to the prior quarter.

In CIB, Investment Banking revenue in the first quarter of 2017 is expected to be approximately in line with the fourth quarter of 2016, dependent on the timing of the closing of a number of transactions. Treasury Services revenue is expected to be approximately $950 million in the first quarter of 2017. In addition, management currently expects Markets revenue in the first quarter of 2017 to increase modestly compared to the prior year quarter, with results sensitive to market conditions in March in light of particularly strong revenue in March 2016. In Securities Services, management expects revenue of approximately $900 million in the first quarter of 2017.

In CB, management expects expense of approximately $775 million in the first quarter of 2017.

In AWM, management expects revenue to be approximately $3 billion in the first quarter of 2017.

CONSOLIDATED RESULTS OF OPERATIONS

This section provides a comparative discussion of JPMorgan Chase's Consolidated Results of Operations on a reported basis for the three-year period ended December 31, 2016, unless otherwise specified. Factors that relate primarily to a single business segment are discussed in more detail within that business segment. For a discussion of the Critical Accounting Estimates Used by the Firm that affect the Consolidated Results of Operations, see pages 132-134.

Revenue

Year ended December 31, (in millions)	2016	2015	2014
Investment banking fees	$ 6,448	$ 6,751	$ 6,542
Principal transactions[(a)]	11,566	10,408	10,531
Lending- and deposit-related fees	5,774	5,694	5,801
Asset management, administration and commissions	14,591	15,509	15,931
Securities gains	141	202	77
Mortgage fees and related income	2,491	2,513	3,563
Card income	4,779	5,924	6,020
Other income[(b)]	3,795	3,032	3,013
Noninterest revenue	**49,585**	50,033	51,478
Net interest income	46,083	43,510	43,634
Total net revenue	**$ 95,668**	$ 93,543	$ 95,112

(a) Effective January 1, 2016, changes in DVA on fair value option elected liabilities previously recorded in principal transactions revenue are recorded in other comprehensive income ("OCI"). For additional information, see the segment results of CIB and Accounting and Reporting Developments on pages 58-62 and page 135, respectively.
(b) Included operating lease income of $2.7 billion, $2.1 billion and $1.7 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Total net revenue increased by 2% primarily reflecting higher net interest income across all the Firm's business segments and higher Markets noninterest revenue in CIB, partially offset by lower card income in CCB and lower asset management fees in AWM.

Investment banking fees decreased predominantly due to lower equity underwriting fees driven by declines in industry-wide fee levels. For additional information on investment banking fees, see CIB segment results on pages 58–62 and Note 7.

Principal transactions revenue increased reflecting broad-based strength across products in CIB's Fixed Income Markets business. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit revenue improved driven by higher market-making revenue from the secondary market as clients' appetite for risk recovered. For additional information, see CIB and Corporate segment results on pages 58–62 and pages 69–70, respectively, and Note 7.

Asset management, administration and commissions revenue decreased reflecting lower asset management fees in AWM driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance fees, as well as due to lower brokerage commissions and other fees in CIB and AWM. For additional information, see the segment discussions of CIB and AWM on pages 58–62 and pages 66–68, respectively, and Note 7.

For information on lending- and deposit-related fees, see the segment results for CCB on pages 53–57, CIB on pages 58–62, and CB on pages 63–65 and Note 7; on securities gains, see the Corporate segment discussion on pages 69–70.

Mortgage fees and related income were relatively flat, as lower mortgage servicing revenue related to lower average third-party loans serviced was predominantly offset by higher MSR risk management results. For further information on mortgage fees and related income, see the segment discussion of CCB on pages 53–57 and Notes 7 and 17.

Card income decreased predominantly driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements, partially offset by higher card sales volume and other card-related fees. For further information, see CCB segment results on pages 53–57 and Note 7.

Other income increased primarily reflecting:

- higher operating lease income from growth in auto operating lease assets in CCB
- a gain on the sale of Visa Europe interests in CCB
- a gain related to the redemption of guaranteed capital debt securities ("trust preferred securities")
- the absence of losses recognized in 2015 related to the accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits
- a gain on disposal of an asset in AWM at the beginning of 2016

partially offset by

- a $514 million benefit recorded in the prior year from a legal settlement in Corporate.

For further information on other income, see Note 7.

Net interest income increased primarily driven by loan growth across the businesses and the net impact of higher rates, partially offset by lower investment securities balances and higher interest expense on long-term debt. The Firm's average interest-earning assets were $2.1 trillion in 2016, and the net interest yield on these assets, on a fully taxable equivalent ("FTE") basis, was 2.25%, an increase of 11 basis points from the prior year.

2015 compared with 2014

Total net revenue for 2015 was down by 2%, predominantly driven by lower Corporate private equity gains, lower CIB revenue reflecting the impact of business simplification initiatives, and lower CCB Mortgage Banking revenue. These decreases were partially offset by a benefit from a legal settlement in Corporate, and higher operating lease income, predominantly in CCB.

Investment banking fees increased reflecting higher advisory fees, partially offset by lower equity and debt underwriting fees. The increase in advisory fees was driven by a greater share of fees for completed transactions as well as growth in industry-wide fee levels. The decrease in equity underwriting fees resulted from lower industry-wide issuance, and the decrease in debt underwriting fees resulted primarily from lower loan syndication and bond underwriting fees on lower industry-wide fee levels.

Principal transactions revenue decreased reflecting lower private equity gains in Corporate driven by lower valuation gains and lower net gains on sales as the Firm exits this non-core business. The decrease was partially offset by higher client-driven market-making revenue, particularly in foreign exchange, interest rate and equity-related products in CIB, as well as a gain of approximately $160 million on CCB's investment in Square, Inc. upon its initial public offering.

Asset management, administration and commissions revenue decreased largely as a result of lower fees in CIB and lower performance fees in AWM. The decrease was partially offset by higher asset management fees as a result of net client inflows into assets under management and the impact of higher average market levels in AWM and CCB.

Mortgage fees and related income decreased reflecting lower servicing revenue, largely as a result of lower average third-party loans serviced, and lower net production revenue reflecting a lower repurchase benefit.

For information on lending- and deposit-related fees, see the segment results for CCB on pages 53–57, CIB on pages 58–62, and CB on pages 63–65 and Note 7; on securities gains, see the Corporate segment discussion on pages 69–70; and card income, see CCB segment results on pages 53–57.

Other income was relatively flat reflecting a $514 million benefit from a legal settlement in Corporate, higher operating lease income as a result of growth in auto operating lease assets in CCB, and the absence of losses related to the exit of non-core portfolios in Card. These increases were offset by the impact of business simplification in CIB; the absence of a benefit recognized in 2014 from a franchise tax settlement; and losses related to the accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits.

Net interest income was relatively flat as lower loan yields, lower investment securities net interest income, and lower trading asset balance and yields were offset by higher average loan balances and lower interest expense on deposits. The Firm's average interest-earning assets were $2.1 trillion in 2015, and the net interest yield on these assets, on a FTE basis, was 2.14%, a decrease of 4 basis points from the prior year.

Provision for credit losses

Year ended December 31, (in millions)	**2016**	2015	2014
Consumer, excluding credit card	**$ 467**	$ (81)	$ 419
Credit card	**4,042**	3,122	3,079
Total consumer	**4,509**	3,041	3,498
Wholesale	**852**	786	(359)
Total provision for credit losses	**$ 5,361**	$ 3,827	$ 3,139

2016 compared with 2015

The provision for credit losses reflected an increase in the total consumer provision and, to a lesser extent, the wholesale provision. The increase in the total consumer provision was predominantly driven by:

- a $920 million increase related to the credit card portfolio, due to a $600 million addition in the allowance for loan losses, as well as $320 million of higher net charge-offs, driven by loan growth (including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), and
- a $470 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies.

The increase in the wholesale provision was largely driven by the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. For a more detailed discussion of the credit portfolio and the allowance for credit losses, see the segment discussions of CCB on pages 53–57, CIB on pages 58–62 , CB on pages 63–65, the Allowance For Credit Losses on pages 105–107 and Note 15.

2015 compared with 2014

The provision for credit losses increased as a result of an increase in the wholesale provision, largely reflecting the impact of downgrades in the Oil & Gas portfolio. The increase was partially offset by a decrease in the consumer provision, reflecting lower net charge-offs due to continued discipline in credit underwriting, as well as improvement in the economy driven by increasing home prices and lower unemployment levels. The decrease in the consumer provision was partially offset by a lower reduction in the allowance for loan losses.

Noninterest expense

Year ended December 31, (in millions)	**2016**	2015	2014
Compensation expense	**$29,979**	$29,750	$30,160
Noncompensation expense:			
Occupancy	**3,638**	3,768	3,909
Technology, communications and equipment	**6,846**	6,193	5,804
Professional and outside services	**6,655**	7,002	7,705
Marketing	**2,897**	2,708	2,550
Other[(a)(b)]	**5,756**	9,593	11,146
Total noncompensation expense	**25,792**	29,264	31,114
Total noninterest expense	**$55,771**	$59,014	$61,274

(a) Included legal (benefit)/expense of $(317) million, $3.0 billion and $2.9 billion for the years ended December 31, 2016, 2015 and 2014, respectively.
(b) Included FDIC-related expense of $1.3 billion, $1.2 billion and $1.0 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Total noninterest expense decreased by 5% driven by lower legal expense.

Compensation expense was relatively flat predominantly driven by higher performance-based compensation expense and investments in several businesses, offset by the impact of continued expense reduction initiatives, including lower headcount in certain businesses.

Noncompensation expense decreased as a result of lower legal expense (including lower legal professional services expense), the impact of efficiencies, and reduced non-U.S. tax surcharges. These factors were partially offset by higher depreciation expense from growth in auto operating lease assets and higher investments in marketing. For a further discussion of legal expense, see Note 31.

2015 compared with 2014

Total noninterest expense decreased by 4% as a result of lower CIB expense, predominantly reflecting the impact of business simplification; and lower CCB expense resulting from efficiencies related to declines in headcount-related expense and lower professional fees. These decreases were partially offset by investment in the businesses, including for infrastructure and controls.

Compensation expense decreased predominantly driven by lower performance-based incentives and reduced headcount, partially offset by higher postretirement benefit costs and investment in the businesses, including for infrastructure and controls.

Noncompensation expense decreased reflecting benefits from business simplification in CIB; lower professional and outside services expense, reflecting lower legal services expense and a reduced number of contractors in the businesses; lower amortization of intangibles; and the absence of a goodwill impairment in Corporate. These factors were partially offset by higher depreciation expense, largely associated with higher auto operating lease assets in CCB; higher marketing expense in CCB; and higher FDIC-related assessments. Legal expense was relatively flat compared with the prior year.

Income tax expense

Year ended December 31, (in millions, except rate)	**2016**	2015	2014
Income before income tax expense	**$34,536**	$ 30,702	$ 30,699
Income tax expense	**9,803**	6,260	8,954
Effective tax rate	**28.4%**	20.4%	29.2%

2016 compared with 2015

The effective tax rate in 2016 was affected by changes in the mix of income and expense subject to U.S. federal and state and local taxes, tax benefits related to the utilization of certain deferred tax assets, as well as the adoption of new accounting guidance related to employee stock-based incentive payments. These tax benefits were partially offset by higher income tax expense from tax audits. The lower effective tax rate in 2015 was predominantly driven by $2.9 billion of tax benefits, which reduced the Firm's effective tax rate by 9.4 percentage points. The recognition of tax benefits in 2015 resulted from the resolution of various tax audits, as well as the release of U.S. deferred taxes associated with the restructuring of certain non-U.S. entities. For additional details on the impact of the new accounting guidance, see Accounting and Reporting Developments on page 135 and for further information see Note 26.

2015 compared with 2014

The effective tax rate decreased predominantly due to the recognition in 2015 of tax benefits of $2.9 billion and other changes in the mix of income and expense subject to U.S. federal, state and local income taxes, partially offset by prior-year tax adjustments. See above for details on the $2.9 billion of tax benefits.

CONSOLIDATED BALANCE SHEETS ANALYSIS

The following is a discussion of the significant changes between December 31, 2016 and 2015.

Selected Consolidated balance sheets data

December 31, (in millions)	2016	2015	Change
Assets			
Cash and due from banks	$ 23,873	$ 20,490	17%
Deposits with banks	365,762	340,015	8
Federal funds sold and securities purchased under resale agreements	229,967	212,575	8
Securities borrowed	96,409	98,721	(2)
Trading assets:			
Debt and equity instruments	308,052	284,162	8
Derivative receivables	64,078	59,677	7
Securities	289,059	290,827	(1)
Loans	894,765	837,299	7
Allowance for loan losses	(13,776)	(13,555)	2
Loans, net of allowance for loan losses	880,989	823,744	7
Accrued interest and accounts receivable	52,330	46,605	12
Premises and equipment	14,131	14,362	(2)
Goodwill	47,288	47,325	–
Mortgage servicing rights	6,096	6,608	(8)
Other intangible assets	862	1,015	(15)
Other assets	112,076	105,572	6
Total assets	$ 2,490,972	$ 2,351,698	6%

Cash and due from banks and deposits with banks

The increase was primarily driven by deposit growth in excess of loan growth. The Firm's excess cash is placed with various central banks, predominantly Federal Reserve Banks.

Federal funds sold and securities purchased under resale agreements

The increase was due to higher demand for securities to cover short positions related to client-driven market-making activities in CIB, and the deployment of excess cash by Treasury and Chief Investment Office ("CIO"). For additional information on the Firm's Liquidity Risk Management, see pages 110–115.

Trading assets and liabilities–debt and equity instruments

The increase in trading assets and liabilities was predominantly related to client-driven market-making activities in CIB. The increase in trading assets reflected higher debt and, to a lesser extent, equity instrument inventory levels to facilitate client demand. The increase in trading liabilities reflected higher levels of client-driven short positions in both debt and equity instruments. For additional information, refer to Note 3.

Trading assets and liabilities–derivative receivables and payables

The change in derivative receivables and payables was predominantly related to client-driven market-making activities in CIB. The increase in derivative receivables reflected the impact of market movements, which increased foreign exchange receivables, partially offset by reduced commodity derivative receivables. The decrease in derivative payables reflected the impact of market movements, which reduced commodity payables. For additional information, refer to Derivative contracts on pages 102–103, and Notes 3 and 6.

Securities

The decrease was predominantly due to net sales, maturities and paydowns during the year of non-agency mortgage-backed securities ("MBS"), corporate debt securities and asset-backed securities ("ABS"), offset by purchases of U.S. Treasuries. For additional information, see Notes 3 and 12.

Loans and allowance for loan losses

The increase in loans was driven by higher consumer and wholesale loans. The increase in consumer loans was due to retention of originated high-quality prime mortgages in CCB and AWM, and growth in credit card and auto loans in CCB. The increase in wholesale loans was predominantly driven by originations of commercial real estate loans in CB and commercial and industrial loans across multiple industries in CB and CIB.

The increase in the allowance for loan losses was attributable to additions to the wholesale allowance driven by downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. The consumer allowance was flat from the prior year and reflected reductions in the allowance for loan losses in the residential real estate portfolio reflecting continued improvement in home prices and delinquencies, and due to runoff in the student loan portfolio; these factors were offset by additions to the allowance reflecting the impact of loan growth in the credit card portfolio (including newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), as well as due to loan growth in the auto and business banking loan portfolios. For a more detailed discussion of loans and the allowance for loan losses, refer to Credit Risk Management on pages 86–107, and Notes 3, 4, 14 and 15.

Accrued interest and accounts receivable

The increase reflected higher receivables from merchants in CCB and higher client receivables related to client-driven activity in CIB.

Mortgage servicing rights

For additional information on MSRs, see Note 17.

Other assets

The increase reflected higher auto operating lease assets from growth in business volume in CCB and higher cash collateral pledged in CIB.

Selected Consolidated balance sheets data

December 31, (in millions)	**2016**	2015	Change
Liabilities			
Deposits	**$ 1,375,179**	$ 1,279,715	7
Federal funds purchased and securities loaned or sold under repurchase agreements	**165,666**	152,678	9
Commercial paper	**11,738**	15,562	(25)
Other borrowed funds	**22,705**	21,105	8
Trading liabilities:			
Debt and equity instruments	**87,428**	74,107	18
Derivative payables	**49,231**	52,790	(7)
Accounts payable and other liabilities	**190,543**	177,638	7
Beneficial interests issued by consolidated variable interest entities ("VIEs")	**39,047**	41,879	(7)
Long-term debt	**295,245**	288,651	2
Total liabilities	**2,236,782**	2,104,125	6
Stockholders' equity	**254,190**	247,573	3
Total liabilities and stockholders' equity	**$ 2,490,972**	$ 2,351,698	6%

Deposits

The increase was attributable to higher consumer and wholesale deposits. The consumer increase reflected continuing strong growth from existing and new customers, and the impact of low attrition rates. The wholesale increase was driven by growth in operating deposits related to client activity in CIB's Treasury Services business, and inflows in AWM primarily from business growth and the impact of new rules governing money market funds. For more information on deposits, refer to the Liquidity Risk Management discussion on pages 110–115; and Notes 3 and 19.

Federal funds purchased and securities loaned or sold under repurchase agreements

The increase was predominantly due to higher client-driven market-making activities in CIB. For additional information on the Firm's Liquidity Risk Management, see pages 110–115.

Commercial paper

The decrease reflected lower issuance in the wholesale markets consistent with Treasury and CIO's short-term funding plans. For additional information, see Liquidity Risk Management on pages 110–115.

Accounts payable and other liabilities

The increase was largely driven by higher client-driven activity in CIB.

Beneficial interests issued by consolidated VIEs

The decrease was predominantly due to a reduction in commercial paper issued by conduits to third parties, partially offset by net new credit card securitizations. For further information on Firm-sponsored VIEs and loan securitization trusts, see Off-Balance Sheet Arrangements on pages 45–46 and Note 16.

Long-term debt

The increase was due to net issuance of structured notes driven by client demand in CIB, and other net issuance consistent with Treasury and CIO's long-term funding plans, including liquidity actions related to the 2016 Resolution Submission. For additional information on the Firm's long-term debt activities, see Liquidity Risk Management on pages 110–115 and Note 21.

Stockholders' equity

The increase was due to net income offset partially by cash dividends on common and preferred stock, and repurchases of common stock. For additional information on changes in stockholders' equity, see page 144, and on the Firm's capital actions, see Capital actions on page 84.

In the normal course of business, the Firm enters into various contractual obligations that may require future cash payments. Certain obligations are recognized on-balance sheet, while others are off-balance sheet under accounting principles generally accepted in the U.S. ("U.S. GAAP"). The Firm is involved with several types of off–balance sheet arrangements, including through nonconsolidated SPEs, which are a type of VIE, and through lending-related financial instruments (e.g., commitments and guarantees).

Special-purpose entities

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. SPEs are an important part of the financial markets, including the mortgage- and asset-backed securities and commercial paper markets, as they provide market liquidity by facilitating investors' access to specific portfolios of assets and risks. SPEs may be organized as trusts, partnerships or corporations and are typically established for a single, discrete purpose. SPEs are not typically operating entities and usually have a limited life and no employees. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors.

JPMorgan Chase uses SPEs as a source of liquidity for itself and its clients by securitizing financial assets, and by creating investment products for clients. The Firm is involved with SPEs through multi-seller conduits, investor intermediation activities, and loan securitizations. See Note 16 for further information on these types of SPEs.

The Firm holds capital, as deemed appropriate, against all SPE-related transactions and related exposures, such as derivative transactions and lending-related commitments and guarantees.

The Firm has no commitments to issue its own stock to support any SPE transaction, and its policies require that transactions with SPEs be conducted at arm's length and reflect market pricing. Consistent with this policy, no JPMorgan Chase employee is permitted to invest in SPEs with which the Firm is involved where such investment would violate the Firm's Code of Conduct. These rules prohibit employees from self-dealing and acting on behalf of the Firm in transactions with which they or their family have any significant financial interest.

Implications of a credit rating downgrade to JPMorgan Chase Bank, N.A.

For certain liquidity commitments to SPEs, JPMorgan Chase Bank, N.A. could be required to provide funding if its short-term credit rating were downgraded below specific levels, primarily "P-1", "A-1" and "F1" for Moody's Investors Service ("Moody's"), Standard & Poor's and Fitch, respectively. These liquidity commitments support the issuance of asset-backed commercial paper by Firm-administered consolidated SPEs. In the event of a short-term credit rating downgrade, JPMorgan Chase Bank, N.A., absent other solutions, would be required to provide funding to the SPE if the commercial paper could not be reissued as it matured. The aggregate amounts of commercial paper outstanding held by third parties as of December 31, 2016 and 2015, was $2.7 billion and $8.7 billion, respectively. The aggregate amounts of commercial paper issued by these SPEs could increase in future periods should clients of the Firm-administered consolidated SPEs draw down on certain unfunded lending-related commitments. These unfunded lending-related commitments were $7.4 billion and $5.6 billion at December 31, 2016 and 2015, respectively. The Firm could facilitate the refinancing of some of the clients' assets in order to reduce the funding obligation. For further information, see the discussion of Firm-administered multi-seller conduits in Note 16.

The Firm also acts as liquidity provider for certain municipal bond vehicles. The Firm's obligation to perform as liquidity provider is conditional and is limited by certain termination events, which include bankruptcy or failure to pay by the municipal bond issuer and any credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. See Note 16 for additional information.

Off–balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to meet the financing needs of its customers. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the counterparty draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the counterparty subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its actual future credit exposure or funding requirements. For further discussion of lending-related financial instruments, guarantees and other commitments, and the Firm's accounting for them, see Lending-related commitments on page 101 and Note 29. For a discussion of liabilities associated with loan sales and securitization-related indemnifications, see Note 29.

Contractual cash obligations

The accompanying table summarizes, by remaining maturity, JPMorgan Chase's significant contractual cash obligations at December 31, 2016. The contractual cash obligations included in the table below reflect the minimum contractual obligation under legally enforceable contracts with terms that are both fixed and determinable. Excluded from the below table are certain liabilities with variable cash flows and/or no obligation to return a stated amount of principal at maturity.

The carrying amount of on-balance sheet obligations on the Consolidated balance sheets may differ from the minimum contractual amount of the obligations reported below. For a discussion of mortgage repurchase liabilities and other obligations, see Note 29.

Contractual cash obligations

By remaining maturity at December 31, (in millions)	2016					2015
	2017	2018-2019	2020-2021	After 2021	**Total**	Total
On-balance sheet obligations						
Deposits[(a)]	**$ 1,356,641**	**$ 5,512**	**$ 3,542**	**$ 3,171**	**$ 1,368,866**	$ 1,276,139
Federal funds purchased and securities loaned or sold under repurchase agreements	**163,978**	**1,307**	**2**	**379**	**165,666**	152,738
Commercial paper	**11,738**	**—**	**—**	**—**	**11,738**	15,562
Other borrowed funds[(a)]	**14,759**	**—**	**—**	**—**	**14,759**	11,331
Beneficial interests issued by consolidated VIEs	**17,290**	**16,240**	**2,767**	**2,630**	**38,927**	41,092
Long-term debt[(a)]	**44,380**	**78,676**	**61,772**	**103,487**	**288,315**	280,206
Other[(b)]	**4,172**	**1,328**	**984**	**2,496**	**8,980**	8,372
Total on-balance sheet obligations	**1,612,958**	**103,063**	**69,067**	**112,163**	**1,897,251**	1,785,440
Off-balance sheet obligations						
Unsettled reverse repurchase and securities borrowing agreements[(c)]	**50,722**	**—**	**—**	**—**	**50,722**	42,482
Contractual interest payments[(d)]	**9,640**	**10,317**	**7,638**	**21,267**	**48,862**	46,149
Operating leases[(e)]	**1,598**	**2,780**	**2,036**	**3,701**	**10,115**	11,829
Equity investment commitments[(f)]	**356**	**103**	**30**	**579**	**1,068**	921
Contractual purchases and capital expenditures	**1,382**	**723**	**236**	**225**	**2,566**	2,598
Obligations under co-brand programs	**187**	**233**	**201**	**247**	**868**	496
Total off-balance sheet obligations	**63,885**	**14,156**	**10,141**	**26,019**	**114,201**	104,475
Total contractual cash obligations	**$ 1,676,843**	**$ 117,219**	**$ 79,208**	**$ 138,182**	**$ 2,011,452**	$ 1,889,915

(a) Excludes structured notes on which the Firm is not obligated to return a stated amount of principal at the maturity of the notes, but is obligated to return an amount based on the performance of the structured notes.
(b) Primarily includes dividends declared on preferred and common stock, deferred annuity contracts, pension and other postretirement employee benefit obligations and insurance liabilities.
(c) For further information, refer to unsettled reverse repurchase and securities borrowing agreements in Note 29.
(d) Includes accrued interest and future contractual interest obligations. Excludes interest related to structured notes for which the Firm's payment obligation is based on the performance of certain benchmarks.
(e) Includes noncancelable operating leases for premises and equipment used primarily for banking purposes and for energy-related tolling service agreements. Excludes the benefit of noncancelable sublease rentals of $1.4 billion and $1.9 billion at December 31, 2016 and 2015, respectively. See Note 30 for more information on lease commitments.
(f) At December 31, 2016 and 2015, included unfunded commitments of $48 million and $50 million, respectively, to third-party private equity funds, and $1.0 billion and $871 million of unfunded commitments, respectively, to other equity investments.

	Year ended December 31,		
(in millions)	**2016**	2015	2014
Net cash provided by/(used in)			
Operating activities	**$ 20,196**	$ 73,466	$ 36,593
Investing activities	**(114,949)**	106,980	(165,636)
Financing activities	**98,271**	(187,511)	118,228
Effect of exchange rate changes on cash	**(135)**	(276)	(1,125)
Net increase/(decrease) in cash and due from banks	**$ 3,383**	$ (7,341)	$ (11,940)

Operating activities

JPMorgan Chase's operating assets and liabilities support the Firm's lending and capital markets activities, including the origination or purchase of loans initially designated as held-for-sale. Operating assets and liabilities can vary significantly in the normal course of business due to the amount and timing of cash flows, which are affected by client-driven and risk management activities and market conditions. The Firm believes cash flows from operations, available cash balances and its capacity to generate cash through secured and unsecured sources are sufficient to meet the Firm's operating liquidity needs.

Cash provided by operating activities in 2016, 2015 and 2014 reflected net income after noncash operating adjustments. Additionally, in 2016 cash provided reflected increases in accounts payable and trading liabilities related to client-driven market-making activities in CIB. The increase in trading liabilities reflected higher levels of client-driven short positions in both debt and equity instruments. Cash used in 2016 reflected an increase in trading assets, an increase in accounts receivable from merchants in CCB and higher client receivables related to client-driven activities in CIB; and higher net originations and purchases from loan held-for-sale activities. The increase in trading assets reflected higher debt and, to a lesser extent, equity instrument inventory levels to facilitate client demand. Cash provided in 2015 resulted from a decrease in trading assets, predominantly due to client-driven market-making activities in CIB, resulting in lower levels of debt and equity securities. Additionally, cash provided reflected a decrease in accounts receivable due to lower client receivables and higher net proceeds from loan sales activities. This was partially offset by cash used due to a decrease in accounts payable and other liabilities, resulting from lower brokerage customer payables related to client activity in CIB. In 2014, cash provided reflected higher net proceeds from loan securitizations and sales activities.

Investing activities

The Firm's investing activities predominantly include originating loans for investment, depositing cash at banks, and investing in the securities portfolio and other short-term interest-earning assets. Cash used in investing activities in 2016 resulted from net originations of consumer and wholesale loans. The increase in consumer loans was due to retention of originated high-quality prime mortgages in CCB and AWM, and growth of credit card and auto loans in CCB. The increase in wholesale loans was predominantly driven by originations of commercial real estate loans in CB and commercial and industrial loans across multiple industries in CB and CIB. Additionally, in 2016, cash outflows reflected an increase in deposits with banks primarily due to growth in deposits in excess of growth in loans; an increase in securities purchased under resale agreements due to higher demand for securities to cover short positions related to client-driven market-making activities in CIB and the deployment of excess cash by Treasury and CIO. Cash provided by investing activities during 2015 predominantly resulted from lower deposits with banks due to the Firm's actions to reduce wholesale non-operating deposits; and net proceeds from paydowns, maturities, sales and purchases of investment securities. Partially offsetting these net inflows was cash used for net originations of consumer and wholesale loans, a portion of which reflected a shift from investment securities. Cash used in investing activities during 2014 resulted from increases in deposits with banks attributable to higher levels of excess funds; cash was also used for growth in wholesale and consumer loans in 2014. Partially offsetting these cash outflows in 2014 was a net decline in securities purchased under resale agreements due to a shift in the deployment of the Firm's excess cash by Treasury and CIO. Investing activities in 2014 also reflected net proceeds from paydowns, maturities, sales and purchases of investment securities.

Financing activities

The Firm's financing activities includes acquiring customer deposits, issuing long-term debt, as well as preferred and common stock. Cash provided by financing activities in 2016 resulted from higher consumer and wholesale deposits, and an increase in securities loaned or sold under repurchase agreements, predominantly due to higher client-driven market-making activities in CIB. Cash used in financing activities in 2015 resulted from lower wholesale deposits partially offset by higher consumer deposits. Additionally, in 2015 cash outflows were attributable to lower levels of commercial paper due to the discontinuation of a cash management product that offered customers the option of sweeping their deposits into commercial paper; lower commercial paper issuances in the wholesale markets; and a decrease in securities loaned or sold under repurchase agreements due to a decline in secured financings. Cash provided by financing activities in 2014 predominantly resulted from higher consumer and wholesale deposits. For all periods, cash was provided by net proceeds from long-term borrowings; and cash was used for repurchases of common stock and cash dividends on common and preferred stock.

* * *

For a further discussion of the activities affecting the Firm's cash flows, see Consolidated Balance Sheets Analysis on pages 43–44, Capital Risk Management on pages 76–85, and Liquidity Risk Management on pages 110–115.

EXPLANATION AND RECONCILIATION OF THE FIRM'S USE OF NON-GAAP FINANCIAL MEASURES AND KEY PERFORMANCE MEASURES

Non-GAAP financial measures

The Firm prepares its Consolidated Financial Statements using U.S. GAAP; these financial statements appear on pages 141–145. That presentation, which is referred to as "reported" basis, provides the reader with an understanding of the Firm's results that can be tracked consistently from year to year and enables a comparison of the Firm's performance with other companies' U.S. GAAP financial statements.

In addition to analyzing the Firm's results on a reported basis, management reviews the Firm's results, including the overhead ratio, and the results of the lines of business, on a "managed" basis, which are non-GAAP financial measures. The Firm's definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue for the Firm (and each of the reportable business segments) on an FTE basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. These non-GAAP financial measures allow management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense. These adjustments have no impact on net income as reported by the Firm as a whole or by the lines of business.

Management also uses certain non-GAAP financial measures at the Firm and business-segment level, because these other non-GAAP financial measures provide information to investors about the underlying operational performance and trends of the Firm or of the particular business segment, as the case may be, and, therefore, facilitate a comparison of the Firm or the business segment with the performance of its relevant competitors. For additional information on these non-GAAP measures, see Business Segment Results on pages 51–70.

Additionally, certain credit metrics and ratios disclosed by the Firm exclude PCI loans, and are therefore non-GAAP measures. For additional information on these non-GAAP measures, see Credit Risk Management on pages 86–107.

Non-GAAP financial measures used by the Firm may not be comparable to similarly named non-GAAP financial measures used by other companies.

The following summary table provides a reconciliation from the Firm's reported U.S. GAAP results to managed basis.

Year ended December 31, (in millions, except ratios)	**2016**			2015			2014		
	Reported Results	Fully taxable-equivalent adjustments[a]	Managed basis	Reported Results	Fully taxable-equivalent adjustments[a]	Managed basis	Reported Results	Fully taxable-equivalent adjustments[a]	Managed basis
Other income	**$ 3,795**	**$ 2,265**	**$ 6,060**	$ 3,032	$ 1,980	$ 5,012	$ 3,013	$ 1,788	$ 4,801
Total noninterest revenue	**49,585**	**2,265**	**51,850**	50,033	1,980	52,013	51,478	1,788	53,266
Net interest income	**46,083**	**1,209**	**47,292**	43,510	1,110	44,620	43,634	985	44,619
Total net revenue	**95,668**	**3,474**	**99,142**	93,543	3,090	96,633	95,112	2,773	97,885
Pre-provision profit	**39,897**	**3,474**	**43,371**	34,529	3,090	37,619	33,838	2,773	36,611
Income before income tax expense	**34,536**	**3,474**	**38,010**	30,702	3,090	33,792	30,699	2,773	33,472
Income tax expense	**9,803**	**3,474**	**13,277**	6,260	3,090	9,350	8,954	2,773	11,727
Overhead ratio	**58%**	**NM**	**56%**	63%	NM	61%	64%	NM	63%

(a) Predominantly recognized in CIB and CB business segments and Corporate.

Net interest income excluding CIB's Markets businesses

In addition to reviewing net interest income on a managed basis, management also reviews net interest income excluding net interest income arising from CIB's Markets businesses to assess the performance of the Firm's lending, investing (including asset-liability management) and deposit-raising activities. CIB's Markets businesses represent both Fixed Income Markets and Equity Markets. The data presented below are non-GAAP financial measures due to the exclusion of net interest income from CIB's Markets businesses ("CIB Markets").

Management believes this exclusion provides investors and analysts with another measure by which to analyze the non-markets-related business trends of the Firm and provides a comparable measure to other financial institutions that are primarily focused on lending, investing and deposit-raising activities.

Year ended December 31, (in millions, except rates)	**2016**	2015	2014
Net interest income – managed basis[a][b]	**$ 47,292**	$ 44,620	$ 44,619
Less: CIB Markets net interest income[c]	**6,334**	5,298	6,032
Net interest income excluding CIB Markets[a]	**$ 40,958**	$ 39,322	$ 38,587
Average interest-earning assets	**$ 2,101,604**	$ 2,088,242	$ 2,049,093
Less: Average CIB Markets interest-earning assets[c]	**520,307**	510,292	522,989
Average interest-earning assets excluding CIB Markets	**$ 1,581,297**	$ 1,577,950	$ 1,526,104
Net interest yield on average interest-earning assets – managed basis	2.25%	2.14%	2.18%
Net interest yield on average CIB Markets interest-earning assets[c]	1.22	1.04	1.15
Net interest yield on average interest-earning assets excluding CIB Markets	2.59%	2.49%	2.53%

(a) Interest includes the effect of related hedges. Taxable-equivalent amounts are used where applicable.

(b) For a reconciliation of net interest income on a reported and managed basis, see reconciliation from the Firm's reported U.S. GAAP results to managed basis on page 48.

(c) Prior period amounts were revised to align with CIB's Markets businesses. For further information on CIB's Markets businesses, see page 61.

Calculation of certain U.S. GAAP and non-GAAP financial measures

Certain U.S. GAAP and non-GAAP financial measures are calculated as follows:

Book value per share ("BVPS")
Common stockholders' equity at period-end /
Common shares at period-end

Overhead ratio
Total noninterest expense / Total net revenue

Return on assets ("ROA")
Reported net income / Total average assets

Return on common equity ("ROE")
Net income* / Average common stockholders' equity

Return on tangible common equity ("ROTCE")
Net income* / Average tangible common equity

Tangible book value per share ("TBVPS")
Tangible common equity at period-end / Common shares at period-end

* Represents net income applicable to common equity

Tangible common equity, ROTCE and TBVPS

Tangible common equity ("TCE"), ROTCE and TBVPS are each non-GAAP financial measures. TCE represents the Firm's common stockholders' equity (i.e., total stockholders' equity less preferred stock) less goodwill and identifiable intangible assets (other than MSRs), net of related deferred tax liabilities. ROTCE measures the Firm's net income applicable to common equity as a percentage of average TCE. TBVPS represents the Firm's TCE at period-end divided by common shares at period-end. TCE, ROTCE, and TBVPS are utilized by the Firm, as well as investors and analysts, in assessing the Firm's use of equity. The following summary table provides a reconciliation from the Firm's common stockholders' equity to TCE.

	Period-end		Average		
			Year ended December 31,		
(in millions, except per share and ratio data)	**Dec 31, 2016**	Dec 31, 2015	**2016**	2015	2014
Common stockholders' equity	**$ 228,122**	$ 221,505	**$ 224,631**	$ 215,690	$ 207,400
Less: Goodwill	**47,288**	47,325	**47,310**	47,445	48,029
Less: Certain identifiable intangible assets	**862**	1,015	**922**	1,092	1,378
Add: Deferred tax liabilities[(a)]	**3,230**	3,148	**3,212**	2,964	2,950
Tangible common equity	**$ 183,202**	$ 176,313	**$ 179,611**	$ 170,117	$ 160,943
Return on tangible common equity	**NA**	NA	**13%**	13%	13%
Tangible book value per share	**$ 51.44**	$ 48.13	**NA**	NA	NA

(a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.

Key performance measures

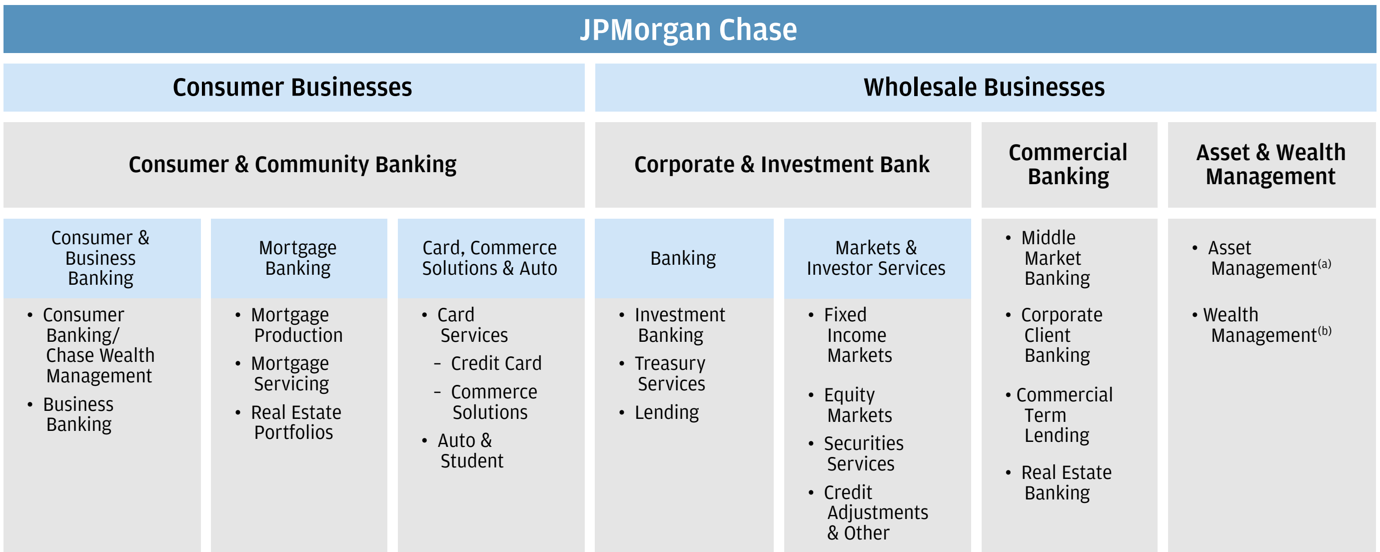
The Firm's capital, RWA, and capital and leverage ratios that are presented under Basel III Standardized and Advanced Fully Phased-In rules and the Firm's, JPMorgan Chase Bank, N.A.'s and Chase Bank USA, N.A.'s SLRs calculated under the Basel III Advanced Fully Phased-In rules are considered key regulatory capital measures. Such measures are used by banking regulators, investors and analysts to assess the Firm's regulatory capital position and to compare the Firm's regulatory capital to that of other financial services companies.

For additional information on these measures, see Capital Risk Management on pages 76–85.

Core loans are also considered a key performance measure. Core loans represent loans considered central to the Firm's ongoing businesses; and exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit. Core loans are utilized by the Firm and its investors and analysts in assessing actual growth in the loan portfolio.

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management (formerly Asset Management). In addition, there is a Corporate segment.

The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a definition of managed basis, see Explanation and Reconciliation of the Firm's use of Non-GAAP Financial Measures, on pages 48–50.



(a) Formerly Global Investment Management
(b) Formerly Global Wealth Management

Description of business segment reporting methodology

Results of the business segments are intended to reflect each segment as if it were essentially a stand-alone business. The management reporting process that derives business segment results includes the allocation of certain income and expense items described in more detail below. The Firm also assesses the level of capital required for each line of business on at least an annual basis. For further information about line of business capital, see Line of business equity on page 83.

The Firm periodically assesses the assumptions, methodologies and reporting classifications used for segment reporting, and further refinements may be implemented in future periods.

Revenue sharing

When business segments join efforts to sell products and services to the Firm's clients, the participating business segments agree to share revenue from those transactions. The segment results reflect these revenue-sharing agreements.

Funds transfer pricing

Funds transfer pricing is used to allocate interest income and expense to each business segment and to transfer the primary interest rate risk and liquidity risk exposures to Treasury and CIO within Corporate. The funds transfer pricing process considers the interest rate risk, liquidity risk and regulatory requirements of a business segment as if it were operating independently. This process is overseen by senior management and reviewed by the Firm's Asset-Liability Committee ("ALCO").

Debt expense and preferred stock dividend allocation

As part of the funds transfer pricing process, largely all of the cost of the credit spread component of outstanding unsecured long-term debt and preferred stock dividends is allocated to the reportable business segments, while the balance of the cost is retained in Corporate. The methodology to allocate the cost of unsecured long-term debt and preferred stock dividend to the business segments is aligned with the Firm's process to allocate capital. The allocated cost of unsecured long-term debt is included in a business segment's net interest income, and net income is reduced by preferred stock dividends to arrive at a business segment's net income applicable to common equity.

Business segment capital allocation changes

The amount of capital assigned to each business is referred to as common equity. On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate capital. Through the end of 2016, capital was allocated to the lines of business based on a single measure, Basel III Advanced Fully Phased-In RWA. Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk. The Firm will consider further changes to its capital allocation methodology as the regulatory framework evolves. In addition, under the new methodology, capital is no longer allocated to each line of business for goodwill and other intangibles associated with acquisitions effected by the line of business.

Expense allocation

Where business segments use services provided by corporate support units, or another business segment, the costs of those services are allocated to the respective business segments. The expense is generally allocated based on actual cost and use of services provided. In contrast, certain other costs related to corporate support units, or to certain technology and operations, are not allocated to the business segments and are retained in Corporate. Expense retained in Corporate generally includes parent company costs that would not be incurred if the segments were stand-alone businesses; adjustments to align corporate support units; and other items not aligned with a particular business segment.

The following provides a comparative discussion of business segment results as of or for the years ended December 31, 2016, 2015 and 2014.

Segment Results – Managed Basis

The following tables summarize the business segment results for the periods indicated.

Year ended December 31,	Total net revenue			Total noninterest expense			Pre-provision profit/(loss)		
(in millions)	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Consumer & Community Banking	**$ 44,915**	$ 43,820	$ 44,368	**$ 24,905**	$ 24,909	$ 25,609	**$ 20,010**	$ 18,911	$ 18,759
Corporate & Investment Bank	**35,216**	33,542	34,595	**18,992**	21,361	23,273	**16,224**	12,181	11,322
Commercial Banking	**7,453**	6,885	6,882	**2,934**	2,881	2,695	**4,519**	4,004	4,187
Asset & Wealth Management	**12,045**	12,119	12,028	**8,478**	8,886	8,538	**3,567**	3,233	3,490
Corporate	**(487)**	267	12	**462**	977	1,159	**(949)**	(710)	(1,147)
Total	**$ 99,142**	$ 96,633	$ 97,885	**$ 55,771**	$ 59,014	$ 61,274	**$ 43,371**	$ 37,619	$ 36,611

Year ended December 31,	Provision for credit losses			Net income/(loss)			Return on common equity		
(in millions, except ratios)	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Consumer & Community Banking	**$ 4,494**	$ 3,059	$ 3,520	**$ 9,714**	$ 9,789	$ 9,185	**18%**	18%	18%
Corporate & Investment Bank	**563**	332	(161)	**10,815**	8,090	6,908	**16**	12	10
Commercial Banking	**282**	442	(189)	**2,657**	2,191	2,635	**16**	15	18
Asset & Wealth Management	**26**	4	4	**2,251**	1,935	2,153	**24**	21	23
Corporate	**(4)**	(10)	(35)	**(704)**	2,437	864	**NM**	NM	NM
Total	**$ 5,361**	$ 3,827	$ 3,139	**$ 24,733**	$ 24,442	$ 21,745	**10%**	11%	10%

Consumer & Community Banking offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Mortgage Banking (including Mortgage Production, Mortgage Servicing and Real Estate Portfolios) and Card, Commerce Solutions & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Mortgage Banking includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Commerce Solutions & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, originates and services auto loans and leases, and services student loans.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Revenue			
Lending- and deposit-related fees	$ 3,231	$ 3,137	$ 3,039
Asset management, administration and commissions	2,093	2,172	2,096
Mortgage fees and related income	2,490	2,511	3,560
Card income	4,364	5,491	5,779
All other income	3,077	2,281	1,463
Noninterest revenue	15,255	15,592	15,937
Net interest income	29,660	28,228	28,431
Total net revenue	44,915	43,820	44,368
Provision for credit losses	4,494	3,059	3,520
Noninterest expense			
Compensation expense	9,723	9,770	10,538
Noncompensation expense[(a)]	15,182	15,139	15,071
Total noninterest expense	24,905	24,909	25,609
Income before income tax expense	15,516	15,852	15,239
Income tax expense	5,802	6,063	6,054
Net income	$ 9,714	$ 9,789	$ 9,185
Revenue by line of business			
Consumer & Business Banking	$ 18,659	$ 17,983	$ 18,226
Mortgage Banking	7,361	6,817	7,826
Card, Commerce Solutions & Auto	18,895	19,020	18,316
Mortgage fees and related income details:			
Net production revenue	853	769	1,190
Net mortgage servicing revenue[(b)]	1,637	1,742	2,370
Mortgage fees and related income	$ 2,490	$ 2,511	$ 3,560
Financial ratios			
Return on common equity	18%	18%	18%
Overhead ratio	55	57	58

Note: In the discussion and the tables which follow, CCB presents certain financial measures which exclude the impact of PCI loans; these are non-GAAP financial measures.

(a) Included operating lease depreciation expense of $1.9 billion, $1.4 billion and $1.2 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Included MSR risk management of $217 million, $(117) million and $(28) million for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Consumer & Community Banking net income was $9.7 billion, a decrease of 1% compared with the prior year, driven by higher provision for credit losses predominantly offset by higher net revenue.

Net revenue was $44.9 billion, an increase of 2% compared with the prior year. Net interest income was $29.7 billion, up 5%, driven by higher deposit balances and higher loan balances, partially offset by deposit spread compression and an increase in the reserve for uncollectible interest and fees in Credit Card. Noninterest revenue was $15.3 billion, down 2%, driven by higher new account origination costs and the impact of renegotiated co-brand partnership agreements in Credit Card and lower mortgage servicing revenue predominantly as a result of a lower level of third-party loans serviced; these factors were predominantly offset by higher auto lease and card sales volume, higher card- and deposit-related fees, higher MSR risk management results and a gain on the sale of Visa Europe interests. See Note 17 for further information regarding changes in value of the MSR asset and related hedges, and mortgage fees and related income.

The provision for credit losses was $4.5 billion, an increase of 47% from the prior year. The increase in the provision was driven by:

- a $920 million increase related to the credit card portfolio, due to a $600 million addition in the allowance for loan losses, as well as $320 million of higher net charge-offs, driven by loan growth, including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio,
- a $450 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies and
- a $150 million increase related to the auto and business banking portfolio, due to additions to the allowance for loan losses and higher net charge-offs, reflecting loan growth in the portfolios.

Noninterest expense of $24.9 billion was flat compared with the prior year, driven by lower legal expense and branch efficiencies offset by higher auto lease depreciation and higher investment in marketing.

2015 compared with 2014

Consumer & Community Banking net income was $9.8 billion, an increase of 7% compared with the prior year, driven by lower noninterest expense and lower provision for credit losses, partially offset by lower net revenue.

Net revenue was $43.8 billion, a decrease of 1% compared with the prior year. Net interest income was $28.2 billion, down 1%, driven by spread compression, predominantly offset by higher deposit balances, higher loan balances largely resulting from originations of high-quality mortgage loans that have been retained, and improved credit quality including lower reversals of interest and fees due to lower net charge-offs in Credit Card. Noninterest revenue was $15.6 billion, down 2%, driven by lower mortgage servicing revenue largely as a result of lower average third-party loans serviced, lower net mortgage production revenue reflecting a lower repurchase benefit and the impact of renegotiated co-brand partnership agreements in Credit Card, largely offset by higher auto lease and card sales volume, the impact of non-core portfolio exits in Credit Card in the prior year, and a gain on the investment in Square, Inc. upon its initial public offering.

The provision for credit losses was $3.1 billion, a decrease of 13% from the prior year, reflecting lower net charge-offs, partially offset by a lower reduction in the allowance for loan losses. The current-year provision reflected a $1.0 billion reduction in the allowance for loan losses due to continued improvement in home prices and lower delinquencies as well as increased granularity in the impairment estimates in the residential real estate portfolio and runoff in the student loan portfolio. The prior-year provision reflected a $1.3 billion reduction in the allowance for loan losses due to continued improvement in home prices and lower delinquencies in the residential real estate portfolio, a decrease in the Credit Card asset-specific allowance resulting from increased granularity of the impairment estimates and lower balances related to credit card loans modified in troubled debt restructurings ("TDRs"), runoff in the student loan portfolio and lower estimated losses in auto loans.

Noninterest expense was $24.9 billion, a decrease of 3% from the prior year, driven by lower headcount-related expense and lower professional fees, partially offset by higher auto lease depreciation.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2016	2015	2014
Selected balance sheet data (period-end)			
Total assets	**$535,310**	$502,652	$455,634
Loans:			
Consumer & Business Banking	**24,307**	22,730	21,200
Home equity	**50,296**	58,734	67,994
Residential mortgage and other	**181,196**	164,500	115,575
Mortgage Banking	**231,492**	223,234	183,569
Credit Card	**141,816**	131,463	131,048
Auto	**65,814**	60,255	54,536
Student	**7,057**	8,176	9,351
Total loans	**470,486**	445,858	399,704
Core loans	**382,608**	341,881	273,494
Deposits	**618,337**	557,645	502,520
Common equity	**51,000**	51,000	51,000
Selected balance sheet data (average)			
Total assets	**$516,354**	$472,972	$447,750
Loans:			
Consumer & Business Banking	**23,431**	21,894	20,152
Home equity	**54,545**	63,261	72,440
Residential mortgage and other	**177,010**	140,294	110,231
Mortgage Banking	**231,555**	203,555	182,671
Credit Card	**131,165**	125,881	125,113
Auto	**63,573**	56,487	52,961
Student	**7,623**	8,763	9,987
Total loans	**457,347**	416,580	390,884
Core loans	**361,316**	301,700	253,803
Deposits	**586,637**	530,938	486,919
Common equity	**51,000**	51,000	51,000
Headcount	**132,802**	127,094	137,186

Selected metrics

As of or for the year ended December 31, (in millions, except ratio data)	2016	2015	2014
Credit data and quality statistics			
Nonaccrual loans[(a)(b)]	**$ 4,708**	$ 5,313	$ 6,401
Net charge-offs[(c)]			
Consumer & Business Banking	**257**	253	305
Home equity	**184**	283	473
Residential mortgage and other	**14**	2	10
Mortgage Banking	**198**	285	483
Credit Card	**3,442**	3,122	3,429
Auto	**285**	214	181
Student	**162**	210	375
Total net charge-offs	**$ 4,344**	$ 4,084	$ 4,773
Net charge-off rate[(c)]			
Consumer & Business Banking	**1.10%**	1.16 %	1.51%
Home equity[(d)]	**0.45**	0.60	0.87
Residential mortgage and other[(d)]	**0.01**	–	0.01
Mortgage Banking[(d)]	**0.10**	0.18	0.37
Credit Card[(e)]	**2.63**	2.51	2.75
Auto	**0.45**	0.38	0.34
Student	**2.13**	2.40	3.75
Total net charge-offs rate[(d)]	**1.04**	1.10	1.40
30+ day delinquency rate			
Mortgage Banking[(f)(g)]	**1.23%**	1.57 %	2.61%
Credit Card[(h)]	**1.61**	1.43	1.44
Auto	**1.19**	1.35	1.23
Student[(i)]	**1.60**	1.81	2.35
90+ day delinquency rate - Credit Card[(h)]	**0.81**	0.72	0.70
Allowance for loan losses			
Consumer & Business Banking	**$ 753**	$ 703	$ 703
Mortgage Banking, excluding PCI loans	**1,328**	1,588	2,188
Mortgage Banking – PCI loans[(c)]	**2,311**	2,742	3,325
Credit Card	**4,034**	3,434	3,439
Auto	**474**	399	350
Student	**249**	299	399
Total allowance for loan losses[(c)]	**$ 9,149**	$ 9,165	$ 10,404

(a) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as they are all performing.
(b) At December 31, 2016, 2015 and 2014, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of $5.0 billion, $6.3 billion and $7.8 billion respectively; and (2) student loans insured by U.S. government agencies under the Federal Family Education Loan Program ("FFELP") of $263 million, $290 million and $367 million, respectively. These amounts have been excluded based upon the government guarantee.
(c) Net charge-offs and the net charge-off rates for the years ended December 31, 2016, 2015 and 2014, excluded $156 million, $208 million, and $533 million, respectively, of write-offs in the PCI portfolio. These write-offs decreased the allowance for loan losses for PCI loans. For further information on PCI write-offs, see summary of changes in the allowance on page 106.

(d) Excludes the impact of PCI loans. For the years ended December 31, 2016, 2015 and 2014, the net charge-off rates including the impact of PCI loans were as follows: (1) home equity of 0.34%, 0.45% and 0.65%, respectively; (2) residential mortgage and other of 0.01%, –% and 0.01%, respectively; (3) Mortgage Banking of 0.09%, 0.14% and 0.27%, respectively; and (4) total CCB of 0.95%, 0.99% and 1.22%, respectively.
(e) Average credit card loans included loans held-for-sale of $84 million, $1.6 billion and $509 million for the years ended December 31, 2016, 2015 and 2014, respectively. These amounts are excluded when calculating the net charge-off rate.
(f) At December 31, 2016, 2015 and 2014, excluded mortgage loans insured by U.S. government agencies of $7.0 billion, $8.4 billion and $9.7 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.
(g) Excludes PCI loans. The 30+ day delinquency rate for PCI loans was 9.82%, 11.21% and 13.33% at December 31, 2016, 2015 and 2014, respectively.
(h) Period-end credit card loans included loans held-for-sale of $105 million, $76 million and $3.0 billion at December 31, 2016, 2015 and 2014, respectively. These amounts are excluded when calculating delinquency rates.
(i) Excluded student loans insured by U.S. government agencies under FFELP of $468 million, $526 million and $654 million at December 31, 2016, 2015 and 2014, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.

Selected metrics

As of or for the year ended December 31, (in billions, except ratios and where otherwise noted)	2016	2015	2014
Business Metrics			
CCB households (in millions)	**60.0**	57.8	57.2
Number of branches	**5,258**	5,413	5,602
Active digital customers (in thousands)[a]	**43,836**	39,242	36,396
Active mobile customers (in thousands)[b]	**26,536**	22,810	19,084
Debit and credit card sales volume	**$ 817.9**	$ 753.8	$ 707.0
Consumer & Business Banking			
Average deposits	**$ 570.8**	$ 515.2	$ 472.3
Deposit margin	**1.81%**	1.90%	2.21%
Business banking origination volume	**$ 7.3**	$ 6.8	$ 6.6
Client investment assets	**234.5**	218.6	213.5
Mortgage Banking			
Mortgage origination volume by channel			
Retail	**$ 44.3**	$ 36.1	$ 29.5
Correspondent	**59.3**	70.3	48.5
Total mortgage origination volume[c]	**$ 103.6**	$ 106.4	$ 78.0
Total loans serviced (period-end)	**$ 846.6**	$ 910.1	$ 948.8
Third-party mortgage loans serviced (period-end)	**591.5**	674.0	751.5
MSR carrying value (period-end)	**6.1**	6.6	7.4
Ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end)	**1.03%**	0.98%	0.98%
MSR revenue multiple[d]	**2.94x**	2.80x	2.72x
Credit Card, excluding Commercial Card			
Credit card sales volume	**$ 545.4**	$ 495.9	$ 465.6
New accounts opened (in millions)	**10.4**	8.7	8.8
Card Services			
Net revenue rate	**11.29%**	12.33%	12.03%
Commerce Solutions			
Merchant processing volume	**$1,063.4**	$ 949.3	$ 847.9
Auto			
Loan and lease origination volume	**$ 35.4**	$ 32.4	$ 27.5
Average Auto operating lease assets	**11.0**	7.8	6.1

(a) Users of all web and/or mobile platforms who have logged in within the past 90 days.
(b) Users of all mobile platforms who have logged in within the past 90 days.
(c) Firmwide mortgage origination volume was $117.4 billion, $115.2 billion and $83.3 billion for the years ended December 31, 2016, 2015 and 2014, respectively.
(d) Represents the ratio of MSR carrying value (period-end) to third-party mortgage loans serviced (period-end) divided by the ratio of loan servicing-related revenue to third-party mortgage loans serviced (average).

Mortgage servicing-related matters

The Firm has resolved the majority of the consent orders and settlements into which it entered with federal and state governmental agencies and private parties related to mortgage servicing, origination, and residential mortgage-backed securities activities. However, among those obligations, the mortgage servicing-related Consent Order entered into with the Federal Reserve on April 13, 2011, as amended on February 28, 2013, and certain other settlements remain outstanding. The Audit Committee of the Board of Directors provides governance and oversight of the Federal Reserve Consent Order.

The Federal Reserve Consent Order and other obligations under certain mortgage-related settlements are the subject of ongoing reporting to various regulators and independent overseers. The Firm's compliance with certain of these settlements is detailed in periodic reports published by the independent overseers. The Firm is committed to fulfilling its commitments with appropriate diligence.

CORPORATE & INVESTMENT BANK

The Corporate & Investment Bank, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian which provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Selected income statement data

Year ended December 31, (in millions)	2016	2015	2014
Revenue			
Investment banking fees	**$ 6,424**	$ 6,736	$ 6,570
Principal transactions	**11,089**	9,905	8,947
Lending- and deposit-related fees	**1,581**	1,573	1,742
Asset management, administration and commissions	**4,062**	4,467	4,687
All other income[(a)]	**1,169**	1,012	1,474
Noninterest revenue	**24,325**	23,693	23,420
Net interest income[(a)]	**10,891**	9,849	11,175
Total net revenue	**35,216**	33,542	34,595
Provision for credit losses	**563**	332	(161)
Noninterest expense			
Compensation expense	**9,546**	9,973	10,449
Noncompensation expense	**9,446**	11,388	12,824
Total noninterest expense	**18,992**	21,361	23,273
Income before income tax expense	**15,661**	11,849	11,483
Income tax expense	**4,846**	3,759	4,575
Net income	**$ 10,815**	$ 8,090	$ 6,908

(a) Included tax-equivalent adjustments, predominantly due to income tax credits related to alternative energy investments; income tax credits and amortization of the cost of investments in affordable housing projects; and tax-exempt income from municipal bonds of $2.0 billion, $1.7 billion and $1.6 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

Selected income statement data

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Financial ratios			
Return on common equity	**16%**	12%	10%
Overhead ratio	**54**	64	67
Compensation expense as percentage of total net revenue	**27**	30	30
Revenue by business			
Investment Banking	**$ 5,950**	$ 6,376	$ 6,122
Treasury Services	**3,643**	3,631	3,728
Lending	**1,208**	1,461	1,547
Total Banking	**10,801**	11,468	11,397
Fixed Income Markets	**15,259**	12,592	14,075
Equity Markets	**5,740**	5,694	5,044
Securities Services	**3,591**	3,777	4,351
Credit Adjustments & Other[(a)]	**(175)**	11	(272)
Total Markets & Investor Service	**24,415**	22,074	23,198
Total net revenue	**$35,216**	$33,542	$34,595

(a) Effective January 1, 2016, consists primarily of credit valuation adjustments ("CVA") managed by the Credit Portfolio Group, Funding valuation adjustment ("FVA") and DVA on derivatives. Results are primarily reported in Principal transactions. Prior periods also include DVA on fair value option elected liabilities. Results are presented net of associated hedging activities and net of CVA and FVA amounts allocated to Fixed Income Markets and Equity Markets. Effective January 1, 2016, changes in DVA on fair value option elected liabilities is recognized in OCI. For additional information, see Accounting and Reporting Developments on page 135 and Notes 3, 4 and 25.

2016 compared with 2015

Net income was $10.8 billion, up 34% compared with the prior year, driven by lower noninterest expense and higher net revenue, partially offset by a higher provision for credit losses.

Banking revenue was $10.8 billion, down 6% compared with the prior year. Investment banking revenue was $6.0 billion, down 7% from the prior year, largely driven by lower equity underwriting fees. The Firm maintained its #1 ranking for Global Investment Banking fees, according to Dealogic. Equity underwriting fees were $1.2 billion, down 19% driven by lower industry-wide fee levels; however, the Firm improved its market share and maintained its #1 ranking in equity underwriting fees globally as well as in both North America and Europe and its #1 ranking by volumes across all products, according to Dealogic. Advisory fees were $2.1 billion, down 1%; the Firm maintained its #2 ranking for M&A, according to Dealogic. Debt underwriting fees were $3.2 billion; the Firm maintained its #1 ranking globally in fees across high grade, high yield, and loan products, according to Dealogic. Treasury Services revenue was $3.6 billion. Lending revenue was $1.2 billion, down 17% from the prior year, reflecting fair value losses on hedges of accrual loans.

Markets & Investor Services revenue was $24.4 billion, up 11% from the prior year. Fixed Income Markets revenue was $15.3 billion, up 21% from the prior year, driven by broad strength across products. Rates performance was strong, with increased client activity driven by high issuance-based flows, global political developments, and central bank actions. Credit and Securitized Products revenue improved driven by higher market-making revenue from the secondary market as clients' risk appetite recovered, and due to increased financing activity. Equity Markets revenue was $5.7 billion, up 1%, compared to a strong prior-year. Securities Services revenue was $3.6 billion, down 5% from the prior year, largely driven by lower fees and commissions. Credit Adjustments and Other was a loss of $175 million driven by valuation adjustments, compared with an $11 million gain in prior-year, which included funding spread gains on fair value option elected liabilities.

The provision for credit losses was $563 million, compared to $332 million in the prior year, reflecting a higher allowance for credit losses, including the impact of select downgrades within the Oil & Gas portfolio.

Noninterest expense was $19.0 billion, down 11% compared with the prior year, driven by lower legal and compensation expenses.

2015 compared with 2014

Net income was $8.1 billion, up 17% compared with $6.9 billion in the prior year. The increase primarily reflected lower income tax expenses largely reflecting the release in 2015 of U.S. deferred taxes associated with the restructuring of certain non-U.S. entities and lower noninterest expense partially offset by lower net revenue, both driven by business simplification, as well as higher provisions for credit losses.

Banking revenue was $11.5 billion, up 1% versus the prior year. Investment banking revenue was $6.4 billion, up 4% from the prior year, driven by higher advisory fees, partially offset by lower debt and equity underwriting fees. Advisory fees were $2.1 billion, up 31% on a greater share of fees for completed transactions as well as growth in the industry-wide fee levels. The Firm maintained its #2 ranking for M&A, according to Dealogic. Debt underwriting fees were $3.2 billion, down 6%, primarily related to lower bond underwriting and loan syndication fees on lower industry-wide fee levels. The Firm ranked #1 globally in fee share across high grade, high yield and loan products. Equity underwriting fees were $1.4 billion, down 9%, driven by lower industry-wide fee levels. The Firm was #1 in equity underwriting fees in 2015, up from #3 in 2014. Treasury Services revenue was $3.6 billion, down 3% compared with the prior year, primarily driven by lower net interest income. Lending revenue was $1.5 billion, down 6% from the prior year, driven by lower trade finance revenue on lower loan balances.

Markets & Investor Services revenue was $22.1 billion, down 5% from the prior year. Fixed Income Markets revenue was $12.6 billion, down 11% from the prior year, primarily driven by the impact of business simplification as well as lower revenue in credit-related products on an industry-wide slowdown, partially offset by increased revenue in Rates and Currencies & Emerging Markets on higher client activity. The lower Fixed Income revenue also reflected higher interest costs on higher long-term debt. Equity Markets revenue was $5.7 billion, up 13%, primarily driven by higher equity derivatives revenue across all regions. Securities Services revenue was $3.8 billion, down 13% from the prior year, driven by lower fees as well as lower net interest income.

The provision for credit losses was $332 million, compared to a benefit of $161 million in the prior year, reflecting a higher allowance for credit losses, including the impact of select downgrades within the Oil & Gas portfolio.

Noninterest expense was $21.4 billion, down 8% compared with the prior year, driven by the impact of business simplification as well as lower legal and compensation expenses.

Selected metrics

As of or for the year ended December 31, (in millions, except headcount)	2016	2015	2014
Selected balance sheet data (period-end)			
Assets	**$ 803,511**	$ 748,691	$ 861,466
Loans:			
Loans retained[(a)]	**111,872**	106,908	96,409
Loans held-for-sale and loans at fair value	**3,781**	3,698	5,567
Total loans	**115,653**	110,606	101,976
Core Loans	**115,243**	110,084	100,772
Common equity	**64,000**	62,000	61,000
Selected balance sheet data (average)			
Assets	**$ 815,321**	$ 824,208	$ 854,712
Trading assets-debt and equity instruments	**300,606**	302,514	317,535
Trading assets-derivative receivables	**63,387**	67,263	64,833
Loans:			
Loans retained[(a)]	**111,082**	98,331	95,764
Loans held-for-sale and loans at fair value	**3,812**	4,572	7,599
Total loans	**114,894**	102,903	103,363
Core Loans[(b)]	**114,455**	102,142	99,500
Common equity	**64,000**	62,000	61,000
Headcount	**48,748**	49,067	50,965

(a) Loans retained includes credit portfolio loans, loans held by consolidated Firm-administered multi-seller conduits, trade finance loans, other held-for-investment loans and overdrafts.
(b) Prior period amounts were revised to conform with current period presentation.

Selected metrics

As of or for the year ended December 31, (in millions, except ratios)	2016	2015	2014
Credit data and quality statistics			
Net charge-offs/ (recoveries)	**$ 168**	$ (19)	$ (12)
Nonperforming assets:			
Nonaccrual loans:			
Nonaccrual loans retained[(a)]	**467**	428	110
Nonaccrual loans held-for-sale and loans at fair value	**109**	10	11
Total nonaccrual loans	**576**	438	121
Derivative receivables	**223**	204	275
Assets acquired in loan satisfactions	**79**	62	67
Total nonperforming assets	**878**	704	463
Allowance for credit losses:			
Allowance for loan losses	**1,420**	1,258	1,034
Allowance for lending-related commitments	**801**	569	439
Total allowance for credit losses	**2,221**	1,827	1,473
Net charge-off/(recovery) rate	**0.15%**	(0.02)%	(0.01)%
Allowance for loan losses to period-end loans retained	**1.27**	1.18	1.07
Allowance for loan losses to period-end loans retained, excluding trade finance and conduits[(b)]	**1.86**	1.88	1.82
Allowance for loan losses to nonaccrual loans retained[(a)]	**304**	294	940
Nonaccrual loans to total period-end loans	**0.50**	0.40	0.12

(a) Allowance for loan losses of $113 million, $177 million and $18 million were held against these nonaccrual loans at December 31, 2016, 2015 and 2014, respectively.
(b) Management uses allowance for loan losses to period-end loans retained, excluding trade finance and conduits, a non-GAAP financial measure, to provide a more meaningful assessment of CIB's allowance coverage ratio.

Investment banking fees

	Year ended December 31,		
(in millions)	2016	2015	2014
Advisory	**$ 2,110**	$ 2,133	$ 1,627
Equity underwriting	**1,159**	1,434	1,571
Debt underwriting[(a)]	**3,155**	3,169	3,372
Total investment banking fees	**$ 6,424**	$ 6,736	$ 6,570

(a) Includes loans syndication

League table results – wallet share

Year ended December 31,	2016 Share	2016 Rank	2015 Share	2015 Rank	2014 Share	2014 Rank
Based on fees[(a)]						
Debt, equity and equity-related						
Global	**7.2%**	**#1**	7.7%	#1	7.6%	#1
U.S.	**11.9**	**1**	11.7	1	10.7	1
Long-term debt[(b)]						
Global	**6.9**	**1**	8.3	1	7.9	1
U.S.	**11.1**	**2**	11.9	1	11.7	1
Equity and equity-related						
Global[(c)]	**7.6**	**1**	7.0	1	7.2	3
U.S.	**13.4**	**1**	11.4	1	9.6	3
M&A[(d)]						
Global	**8.6**	**2**	8.4	2	8.0	2
U.S.	**10.1**	**2**	9.9	2	9.7	2
Loan syndications						
Global	**9.4**	**1**	7.5	1	9.3	1
U.S.	**11.9**	**2**	10.8	2	13.0	1
Global investment banking fees [(e)]	**8.1%**	**#1**	7.9%	#1	8.0%	#1

(a) Source: Dealogic as of January 3, 2017. Reflects the ranking of revenue wallet and market share.
(b) Long-term debt rankings include investment-grade, high-yield, supranationals, sovereigns, agencies, covered bonds, ABS and MBS; and exclude money market, short-term debt, and U.S. municipal securities.
(c) Global equity and equity-related ranking includes rights offerings and Chinese A-Shares.
(d) Global M&A reflect the removal of any withdrawn transactions. U.S. M&A revenue wallet represents wallet from client parents based in the U.S.
(e) Global investment banking fees exclude money market, short-term debt and shelf deals.

Markets Revenue

The following table summarizes select income statement data for the Markets businesses. Markets includes both Fixed Income Markets and Equity Markets. Markets revenue comprises principal transactions, fees, commissions and other income, as well as net interest income. For a description of the composition of these income statement line items, see Notes 7 and 8.

Principal transactions reflects revenue on financial instruments and commodities transactions that arise from client-driven market making activity. Principal transactions revenue includes amounts recognized upon executing new transactions with market participants, as well as "inventory-related revenue", which is revenue recognized from gains and losses on derivatives and other instruments that the Firm has been holding in anticipation of, or in response to, client demand, and changes in the fair value of instruments used by the Firm to actively manage the risk exposure arising from such inventory. Principal transactions revenue recognized upon executing new transactions with market participants is driven by many factors including the level of client activity, the bid-offer spread (which is the difference between the price at which a market participant is willing to sell an instrument to the Firm and the price at which another market participant is willing to buy it from the Firm, and vice versa), market liquidity and volatility. These factors are interrelated and sensitive to the same factors that drive inventory-related revenue, which include general market conditions, such as interest rates, foreign exchange rates, credit spreads, and equity and commodity prices, as well as other macroeconomic conditions.

For the periods presented below, the predominant source of principal transactions revenue was the amounts recognized upon executing new transactions.

Year ended December 31, (in millions, except where otherwise noted)	2016 Fixed Income Markets	2016 Equity Markets	2016 Total Markets	2015 Fixed Income Markets	2015 Equity Markets	2015 Total Markets	2014 Fixed Income Markets	2014 Equity Markets	2014 Total Markets
Principal transactions	**$ 8,347**	**$ 3,130**	**$ 11,477**	$ 6,899	$ 3,038	$ 9,937	$ 7,014	$ 2,362	$ 9,376
Lending- and deposit-related fees	**220**	**2**	**222**	194	–	194	222	2	224
Asset management, administration and commissions	**388**	**1,551**	**1,939**	383	1,704	2,087	345	1,684	2,029
All other income	**1,014**	**13**	**1,027**	854	(84)	770	1,399	59	1,458
Noninterest revenue	**9,969**	**4,696**	**14,665**	8,330	4,658	12,988	8,980	4,107	13,087
Net interest income	**5,290**	**1,044**	**6,334**	4,262	1,036	5,298	5,095	937	6,032
Total net revenue	**$ 15,259**	**$ 5,740**	**$ 20,999**	$ 12,592	$ 5,694	$ 18,286	$ 14,075	$ 5,044	$ 19,119
Loss days[(a)]			**0**			2			0

(a) Loss days represent the number of days for which Markets posted losses. The loss days determined under this measure differ from the loss days that are determined based on the disclosure of market risk-related gains and losses for the Firm in the value-at-risk ("VaR") back-testing discussion on pages 118-120.

Selected metrics

As of or for the year ended December 31, (in millions, except where otherwise noted)	2016	2015	2014
Assets under custody ("AUC") by asset class (period-end) (in billions):			
Fixed Income	$ 12,166	$ 12,042	$ 12,328
Equity	6,428	6,194	6,524
Other[(a)]	1,926	1,707	1,697
Total AUC	$ 20,520	$ 19,943	$ 20,549
Client deposits and other third party liabilities (average)[(b)]	$ 376,287	$ 395,297	$ 417,369
Trade finance loans (period-end)	15,923	19,255	25,713

(a) Consists of mutual funds, unit investment trusts, currencies, annuities, insurance contracts, options and other contracts.
(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.

International metrics

Year ended December 31, (in millions, except where otherwise noted)	2016	2015	2014
Total net revenue[(a)]			
Europe/Middle East/Africa	$ 10,786	$ 10,894	$ 11,598
Asia/Pacific	4,915	4,901	4,698
Latin America/Caribbean	1,225	1,096	1,179
Total international net revenue	16,926	16,891	17,475
North America	18,290	16,651	17,120
Total net revenue	$ 35,216	$ 33,542	$ 34,595
Loans retained (period-end)[(a)]			
Europe/Middle East/Africa	$ 26,696	$ 24,622	$ 27,155
Asia/Pacific	14,508	17,108	19,992
Latin America/Caribbean	7,607	8,609	8,950
Total international loans	48,811	50,339	56,097
North America	63,061	56,569	40,312
Total loans retained	$111,872	$106,908	$ 96,409
Client deposits and other third-party liabilities (average)[(a)(b)]			
Europe/Middle East/Africa	$135,979	$141,062	$ 152,712
Asia/Pacific	68,110	67,111	66,933
Latin America/Caribbean	22,914	23,070	22,360
Total international	$227,003	$231,243	$ 242,005
North America	149,284	164,054	175,364
Total client deposits and other third-party liabilities	$376,287	$395,297	$ 417,369
AUC (period-end) (in billions)[(a)]			
North America	$ 12,290	$ 12,034	$ 11,987
All other regions	8,230	7,909	8,562
Total AUC	$ 20,520	$ 19,943	$ 20,549

(a) Total net revenue is based predominantly on the domicile of the client or location of the trading desk, as applicable. Loans outstanding (excluding loans held-for-sale and loans at fair value), client deposits and other third-party liabilities, and AUC are based predominantly on the domicile of the client.
(b) Client deposits and other third party liabilities pertain to the Treasury Services and Securities Services businesses.

Commercial Banking delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from $20 million to $2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Selected income statement data

Year ended December 31, (in millions)	2016	2015	2014
Revenue			
Lending- and deposit-related fees	**$ 917**	$ 944	$ 978
Asset management, administration and commissions	**69**	88	92
All other income[a]	**1,334**	1,333	1,279
Noninterest revenue	**2,320**	2,365	2,349
Net interest income	**5,133**	4,520	4,533
Total net revenue[b]	**7,453**	6,885	6,882
Provision for credit losses	**282**	442	(189)
Noninterest expense			
Compensation expense	**1,332**	1,238	1,203
Noncompensation expense	**1,602**	1,643	1,492
Total noninterest expense	**2,934**	2,881	2,695
Income before income tax expense	**4,237**	3,562	4,376
Income tax expense	**1,580**	1,371	1,741
Net income	**$ 2,657**	$ 2,191	$ 2,635

(a) Includes revenue from investment banking products and commercial card transactions.
(b) Total net revenue included tax-equivalent adjustments from income tax credits related to equity investments in designated community development entities that provide loans to qualified businesses in low-income communities, as well as tax-exempt income related to municipal financing activities of $505 million, $493 million and $462 million for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Net income was $2.7 billion, an increase of 21% compared with the prior year, driven by higher net revenue and a lower provision for credit losses, partially offset by higher noninterest expense.

Net revenue was $7.5 billion, an increase of 8% compared with the prior year. Net interest income was $5.1 billion, an increase of 14% compared with the prior year, driven by higher loan balances and deposit spreads. Noninterest revenue was $2.3 billion, a decrease of 2% compared with the prior year, largely driven by lower lending-and-deposit-related fees and other revenue, partially offset by higher investment banking revenue.

Noninterest expense was $2.9 billion, an increase of 2% compared with the prior year, reflecting increased hiring of bankers and business-related support staff and investments in technology.

The provision for credit losses was $282 million and $442 million for 2016 and 2015, respectively, with both periods driven by downgrades in the Oil & Gas portfolio and select client downgrades in other industries.

2015 compared with 2014

Net income was $2.2 billion, a decrease of 17% compared with the prior year, driven by a higher provision for credit losses and higher noninterest expense.

Net revenue was $6.9 billion, flat compared with the prior year. Net interest income was $4.5 billion, flat compared with the prior year, with interest income from higher loan balances offset by spread compression. Noninterest revenue was $2.4 billion, flat compared with the prior year, with higher investment banking revenue offset by lower lending-related fees.

Noninterest expense was $2.9 billion, an increase of 7% compared with the prior year, reflecting investment in controls.

The provision for credit losses was $442 million, reflecting an increase in the allowance for credit losses for Oil & Gas exposure and select client downgrades in other industries. The prior year was a benefit of $189 million.

CB product revenue consists of the following:

Lending includes a variety of financing alternatives, which are primarily provided on a secured basis; collateral includes receivables, inventory, equipment, real estate or other assets. Products include term loans, revolving lines of credit, bridge financing, asset-based structures, leases, and standby letters of credit.

Treasury services includes revenue from a broad range of products and services that enable CB clients to manage payments and receipts, as well as invest and manage funds.

Investment banking includes revenue from a range of products providing CB clients with sophisticated capital-raising alternatives, as well as balance sheet and risk management tools through advisory, equity underwriting, and loan syndications. Revenue from Fixed Income and Equity Markets products used by CB clients is also included. Investment banking revenue, gross, represents total revenue related to investment banking products sold to CB clients.

Other product revenue primarily includes tax-equivalent adjustments generated from Community Development Banking activities and certain income derived from principal transactions.

CB is divided into four primary client segments: Middle Market Banking, Corporate Client Banking, Commercial Term Lending, and Real Estate Banking.

Middle Market Banking covers corporate, municipal and nonprofit clients, with annual revenue generally ranging between $20 million and $500 million.

Corporate Client Banking covers clients with annual revenue generally ranging between $500 million and $2 billion and focuses on clients that have broader investment banking needs.

Commercial Term Lending primarily provides term financing to real estate investors/owners for multifamily properties as well as office, retail and industrial properties.

Real Estate Banking provides full-service banking to investors and developers of institutional-grade real estate investment properties.

Other primarily includes lending and investment-related activities within the Community Development Banking business.

Selected income statement data (continued)

Year ended December 31, (in millions, except ratios)	2016	2015	2014
Revenue by product			
Lending	**$ 3,795**	$ 3,429	$ 3,358
Treasury services	**2,797**	2,581	2,681
Investment banking[a]	**785**	730	684
Other	**76**	145	159
Total Commercial Banking net revenue	**$ 7,453**	$ 6,885	$ 6,882
Investment banking revenue, gross[b]	**$ 2,286**	$ 2,179	$ 1,986
Revenue by client segment[c]			
Middle Market Banking	**$ 2,885**	$ 2,706	$ 2,765
Corporate Client Banking	**2,392**	2,184	2,134
Commercial Term Lending	**1,408**	1,275	1,252
Real Estate Banking	**456**	358	369
Other	**312**	362	362
Total Commercial Banking net revenue	**$ 7,453**	$ 6,885	$ 6,882
Financial ratios			
Return on common equity	**16%**	15%	18%
Overhead ratio	**39**	42	39

(a) Includes total Firm revenue from investment banking products sold to CB clients, net of revenue sharing with the CIB.
(b) Represents total Firm revenue from investment banking products sold to CB clients.
(c) Certain clients were transferred from Middle Market Banking to Corporate Client Banking and from Real Estate Banking to Corporate Client Banking during 2016. Prior period client segment amounts were revised to conform with the current period presentation.

Selected metrics (continued)

As of or for the year ended December 31, (in millions, except headcount)	2016	2015	2014
Selected balance sheet data (period-end)			
Total assets	**$ 214,341**	$ 200,700	$ 195,267
Loans:			
Loans retained	**188,261**	167,374	147,661
Loans held-for-sale and loans at fair value	**734**	267	845
Total loans	**$ 188,995**	$ 167,641	$ 148,506
Core loans	**188,673**	166,939	147,392
Common equity	**16,000**	14,000	14,000
Period-end loans by client segment[a]			
Middle Market Banking	**$ 53,931**	$ 50,502	$ 50,040
Corporate Client Banking	**43,025**	37,708	30,564
Commercial Term Lending	**71,249**	62,860	54,038
Real Estate Banking	**14,722**	11,234	9,024
Other	**6,068**	5,337	4,840
Total Commercial Banking loans	**$ 188,995**	$ 167,641	$ 148,506
Selected balance sheet data (average)			
Total assets	**$ 207,532**	$ 198,076	$ 191,857
Loans:			
Loans retained	**178,670**	157,389	140,982
Loans held-for-sale and loans at fair value	**723**	492	782
Total loans	**$ 179,393**	$ 157,881	$ 141,764
Core loans	**178,875**	156,975	140,390
Client deposits and other third-party liabilities	**174,396**	191,529	204,017
Common equity	**16,000**	14,000	14,000
Average loans by client segment[a]			
Middle Market Banking	**$ 52,244**	$ 50,336	$ 50,076
Corporate Client Banking	**41,754**	34,495	27,732
Commercial Term Lending	**66,700**	58,138	51,120
Real Estate Banking	**13,063**	9,917	8,324
Other	**5,632**	4,995	4,512
Total Commercial Banking loans	**$ 179,393**	$ 157,881	$ 141,764
Headcount	**8,365**	7,845	7,426

(a) Certain clients were transferred from Middle Market Banking to Corporate Client Banking and from Real Estate Banking to Corporate Client Banking during 2016. Prior period client segment amounts were revised to conform with the current period presentation.

Selected metrics (continued)

As of or for the year ended December 31, (in millions, except ratios)	2016	2015	2014
Credit data and quality statistics			
Net charge-offs/(recoveries)	**$ 163**	$ 21	$ (7)
Nonperforming assets			
Nonaccrual loans:			
Nonaccrual loans retained[a]	**1,149**	375	317
Nonaccrual loans held-for-sale and loans at fair value	**—**	18	14
Total nonaccrual loans	**1,149**	393	331
Assets acquired in loan satisfactions	**1**	8	10
Total nonperforming assets	**1,150**	401	341
Allowance for credit losses:			
Allowance for loan losses	**2,925**	2,855	2,466
Allowance for lending-related commitments	**248**	198	165
Total allowance for credit losses	**3,173**	3,053	2,631
Net charge-off/(recovery) rate[b]	**0.09%**	0.01%	—%
Allowance for loan losses to period-end loans retained	**1.55**	1.71	1.67
Allowance for loan losses to nonaccrual loans retained[a]	**255**	761	778
Nonaccrual loans to period-end total loans	**0.61**	0.23	0.22

(a) An allowance for loan losses of $155 million, $64 million and $45 million was held against nonaccrual loans retained at December 31, 2016, 2015 and 2014, respectively.

(b) Loans held-for-sale and loans at fair value were excluded when calculating the net charge-off/(recovery) rate.

ASSET & WEALTH MANAGEMENT

Asset & Wealth Management, with client assets of $2.5 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Selected income statement data

Year ended December 31, (in millions, except ratios and headcount)	2016	2015	2014
Revenue			
Asset management, administration and commissions	**$ 8,414**	$ 9,175	$ 9,024
All other income	**598**	388	564
Noninterest revenue	**9,012**	9,563	9,588
Net interest income	**3,033**	2,556	2,440
Total net revenue	**12,045**	12,119	12,028
Provision for credit losses	**26**	4	4
Noninterest expense			
Compensation expense	**5,065**	5,113	5,082
Noncompensation expense	**3,413**	3,773	3,456
Total noninterest expense	**8,478**	8,886	8,538
Income before income tax expense	**3,541**	3,229	3,486
Income tax expense	**1,290**	1,294	1,333
Net income	**$ 2,251**	$ 1,935	$ 2,153
Revenue by line of business			
Asset Management	**$ 5,970**	$ 6,301	$ 6,327
Wealth Management	**6,075**	5,818	5,701
Total net revenue	**$12,045**	$12,119	$12,028
Financial ratios			
Return on common equity	**24%**	21%	23%
Overhead ratio	**70**	73	71
Pre-tax margin ratio:			
Asset Management	**31**	31	31
Wealth Management	**28**	22	27
Asset & Wealth Management	**29**	27	29
Headcount	**21,082**	20,975	19,735
Number of client advisors	**2,504**	2,778	2,836

2016 compared with 2015

Net income was $2.3 billion, an increase of 16% compared with the prior year, reflecting lower noninterest expense, partially offset by lower net revenue.

Net revenue was $12.0 billion, a decrease of 1%. Net interest income was $3.0 billion, up 19%, driven by higher deposit and loan spreads and loan growth. Noninterest revenue was $9.0 billion, a decrease of 6%, reflecting the impact of lower average equity market levels, a reduction in revenue related to the disposal of assets at the beginning of 2016, and lower performance fees and placement fees.

Revenue from Asset Management was $6.0 billion, down 5% from the prior year, driven by a reduction in revenue related to the disposal of assets at the beginning of 2016, the impact of lower average equity market levels and lower performance fees. Revenue from Wealth Management was $6.1 billion, up 4% from the prior year, reflecting higher net interest income from higher deposit and loan spreads and continued loan growth, partially offset by the impact of lower average equity market levels and lower placement fees.

Noninterest expense was $8.5 billion, a decrease of 5%, predominantly due to a reduction in expense related to the disposal of assets at the beginning of 2016 and lower legal expense.

2015 compared with 2014

Net income was $1.9 billion, a decrease of 10% compared with the prior year, reflecting higher noninterest expense, predominantly offset by higher net revenue.

Net revenue was $12.1 billion, an increase of 1%. Net interest income was $2.6 billion, up 5%, driven by higher loan balances and spreads. Noninterest revenue was $9.6 billion, flat from last year, as net client inflows into assets under management and the impact of higher average market levels were predominantly offset by lower performance fees and the sale of Retirement Plan Services ("RPS") in 2014.

Revenue from Asset Management was $6.3 billion, flat from the prior year as the sale of RPS in 2014 and lower performance fees were largely offset by net client inflows. Revenue from Wealth Management was $5.8 billion, up 2% from the prior year due to higher net interest income from higher loan balances and spreads and net client inflows, partially offset by lower brokerage revenue.

Noninterest expense was $8.9 billion, an increase of 4%, predominantly due to higher legal expense and investment in both infrastructure and controls.

AWM's lines of business consist of the following:

Asset Management provides comprehensive global investment services, including asset management, pension analytics, asset-liability management and active risk-budgeting strategies.

Wealth Management offers investment advice and wealth management, including investment management, capital markets and risk management, tax and estate planning, banking, lending and specialty-wealth advisory services.

AWM's client segments consist of the following:

Private Banking clients include high- and ultra-high-net-worth individuals, families, money managers, business owners and small corporations worldwide.

Institutional clients include both corporate and public institutions, endowments, foundations, nonprofit organizations and governments worldwide.

Retail clients include financial intermediaries and individual investors.

Asset Management has two high-level measures of its overall fund performance.

- **Percentage of mutual fund assets under management in funds rated 4- or 5-star:** Mutual fund rating services rank funds based on their risk-adjusted performance over various periods. A 5-star rating is the best rating and represents the top 10% of industry-wide ranked funds. A 4-star rating represents the next 22.5% of industry-wide ranked funds. A 3-star rating represents the next 35% of industry-wide ranked funds. A 2-star rating represents the next 22.5% of industry-wide ranked funds. A 1-star rating is the worst rating and represents the bottom 10% of industry-wide ranked funds. The "overall Morningstar rating" is derived from a weighted average of the performance associated with a fund's three-, five- and ten-year (if applicable) Morningstar Rating metrics. For U.S. domiciled funds, separate star ratings are given at the individual share class level. The Nomura "star rating" is based on three-year risk-adjusted performance only. Funds with fewer than three years of history are not rated and hence excluded from this analysis. All ratings, the assigned peer categories and the asset values used to derive this analysis are sourced from these fund rating providers mentioned in footnote (a). The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on star ratings at the share class level for U.S. domiciled funds, and at a "primary share class" level to represent the star rating of all other funds except for Japan where Nomura provides ratings at the fund level. The "primary share class", as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.
- **Percentage of mutual fund assets under management in funds ranked in the 1st or 2nd quartile (one, three and five years):** All quartile rankings, the assigned peer categories and the asset values used to derive this analysis are sourced from the fund ranking providers mentioned in footnote (b). Quartile rankings are done on the net-of-fee absolute return of each fund. The data providers re-denominate the asset values into U.S. dollars. This % of AUM is based on fund performance and associated peer rankings at the share class level for U.S. domiciled funds, at a "primary share class" level to represent the quartile ranking of the U.K., Luxembourg and Hong Kong funds and at the fund level for all other funds. The "primary share class", as defined by Morningstar, denotes the share class recommended as being the best proxy for the portfolio and in most cases will be the most retail version (based upon annual management charge, minimum investment, currency and other factors). Where peer group rankings given for a fund are in more than one "primary share class" territory both rankings are included to reflect local market competitiveness (applies to "Offshore Territories" and "HK SFC Authorized" funds only). The performance data could have been different if all funds/accounts would have been included. Past performance is not indicative of future results.

Selected metrics

As of or for the year ended December 31, (in millions, except ranking data and ratios)	**2016**	2015	2014
% of JPM mutual fund assets rated as 4- or 5-star[(a)(b)]	**63%**	52%	51%
% of JPM mutual fund assets ranked in 1st or 2nd quartile:[(c)]			
1 year	**54**	62	72
3 years	**72**	78	72
5 years[(b)]	**79**	79	76
Selected balance sheet data (period-end)			
Total assets	**$ 138,384**	$ 131,451	$ 128,701
Loans[(d)]	**118,039**	111,007	104,279
Core loans	**118,039**	111,007	104,279
Deposits	**161,577**	146,766	155,247
Common equity	**9,000**	9,000	9,000
Selected balance sheet data (average)			
Total assets	**$ 132,875**	$ 129,743	$ 126,440
Loans	**112,876**	107,418	99,805
Core loans	**112,876**	107,418	99,805
Deposits	**153,334**	149,525	150,121
Common equity	**9,000**	9,000	9,000
Credit data and quality statistics			
Net charge-offs	**$ 16**	$ 12	$ 6
Nonaccrual loans	**390**	218	218
Allowance for credit losses:			
Allowance for loan losses	**274**	266	271
Allowance for lending-related commitments	**4**	5	5
Total allowance for credit losses	**278**	271	276
Net charge-off rate	**0.01%**	0.01%	0.01%
Allowance for loan losses to period-end loans	**0.23**	0.24	0.26
Allowance for loan losses to nonaccrual loans	**70**	122	124
Nonaccrual loans to period-end loans	**0.33**	0.20	0.21

(a) Represents the "overall star rating" derived from Morningstar for the U.S., the U.K., Luxembourg, Hong Kong and Taiwan domiciled funds; and Nomura "star rating" for Japan domiciled funds. Includes only Asset Management retail open-ended mutual funds that have a rating. Excludes money market funds, Undiscovered Managers Fund, and Brazil and India domiciled funds.

(b) Prior period amounts were revised to conform with current period presentation.

(c) Quartile ranking sourced from: Lipper for the U.S. and Taiwan domiciled funds; Morningstar for the U.K., Luxembourg and Hong Kong domiciled funds; Nomura for Japan domiciled funds and FundDoctor for South Korea domiciled funds. Includes only Asset Management retail open-ended mutual funds that are ranked by the aforementioned sources. Excludes money market funds, Undiscovered Managers Fund, and Brazil and India domiciled funds.

(d) Included $32.8 billion, $26.6 billion and $22.1 billion of prime mortgage loans reported in the Consumer, excluding credit card, loan portfolio at December 31, 2016, 2015 and 2014, respectively.

Client assets

2016 compared with 2015

Client assets were $2.5 trillion, an increase of 4% compared with the prior year. Assets under management were $1.8 trillion, an increase of 3% from the prior year reflecting inflows into both liquidity and long-term products and the effect of higher market levels, partially offset by asset sales at the beginning of 2016.

2015 compared with 2014

Client assets were $2.4 trillion, a decrease of 2% compared with the prior year. Assets under management were $1.7 trillion, a decrease of 1% from the prior year reflecting the effect of lower market levels, partially offset by net inflows to long-term products.

Client assets

December 31, (in billions)	2016	2015	2014
Assets by asset class			
Liquidity[(a)]	**$ 436**	$ 430	$ 425
Fixed income[(a)]	**420**	376	395
Equity	**351**	353	375
Multi-asset and alternatives	**564**	564	549
Total assets under management	**1,771**	1,723	1,744
Custody/brokerage/ administration/deposits	**682**	627	643
Total client assets	**$ 2,453**	$ 2,350	$ 2,387
Memo:			
Alternatives client assets[(b)]	**$ 154**	$ 172	$ 166
Assets by client segment			
Private Banking	**$ 435**	$ 437	$ 428
Institutional	**869**	816	827
Retail	**467**	470	489
Total assets under management	**$ 1,771**	$ 1,723	$ 1,744
Private Banking	**$ 1,098**	$ 1,050	$ 1,057
Institutional	**886**	824	835
Retail	**469**	476	495
Total client assets	**$ 2,453**	$ 2,350	$ 2,387

(a) Prior period amounts were revised to conform with current period presentation.
(b) Represents assets under management, as well as client balances in brokerage accounts.

Client assets (continued)

Year ended December 31, (in billions)	2016	2015	2014
Assets under management rollforward			
Beginning balance	**$ 1,723**	$ 1,744	$ 1,598
Net asset flows:			
Liquidity[(a)]	**24**	–	14
Fixed income[(a)]	**30**	(8)	37
Equity	**(29)**	1	5
Multi-asset and alternatives	**22**	22	42
Market/performance/other impacts	**1**	(36)	48
Ending balance, December 31	**$ 1,771**	$ 1,723	$ 1,744
Client assets rollforward			
Beginning balance	**$ 2,350**	$ 2,387	$ 2,343
Net asset flows	**63**	27	118
Market/performance/other impacts	**40**	(64)	(74)
Ending balance, December 31	**$ 2,453**	$ 2,350	$ 2,387

(a) Prior period amounts were revised to conform with current period presentation.

International metrics

Year ended December 31, (in billions, except where otherwise noted)	2016	2015	2014
Total net revenue (in millions)[(a)]			
Europe/Middle East/Africa	**$ 1,849**	$ 1,946	$ 2,080
Asia/Pacific	**1,077**	1,130	1,199
Latin America/Caribbean	**726**	795	841
Total international net revenue	**3,652**	3,871	4,120
North America	**8,393**	8,248	7,908
Total net revenue	**$ 12,045**	$ 12,119	$ 12,028
Assets under management			
Europe/Middle East/Africa	**$ 309**	$ 302	$ 329
Asia/Pacific	**123**	123	126
Latin America/Caribbean	**45**	45	46
Total international assets under management	**477**	470	501
North America	**1,294**	1,253	1,243
Total assets under management	**$ 1,771**	$ 1,723	$ 1,744
Client assets			
Europe/Middle East/Africa	**$ 359**	$ 351	$ 391
Asia/Pacific	**177**	173	174
Latin America/Caribbean	**114**	110	115
Total international client assets	**650**	634	680
North America	**1,803**	1,716	1,707
Total client assets	**$ 2,453**	$ 2,350	$ 2,387

(a) Regional revenue is based on the domicile of the client.

The Corporate segment consists of Treasury and Chief Investment Office and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Compliance, Finance, Human Resources, Internal Audit, Risk Management, Oversight & Control, Corporate Responsibility and various Other Corporate groups.

Selected income statement data

Year ended December 31, (in millions, except headcount)	2016	2015	2014
Revenue			
Principal transactions	**$ 210**	$ 41	$ 1,197
Securities gains	**140**	190	71
All other income	**588**	569	704
Noninterest revenue	**938**	800	1,972
Net interest income	**(1,425)**	(533)	(1,960)
Total net revenue[(a)]	**(487)**	267	12
Provision for credit losses	**(4)**	(10)	(35)
Noninterest expense[(b)]	**462**	977	1,159
Loss before income tax benefit	**(945)**	(700)	(1,112)
Income tax benefit	**(241)**	(3,137)	(1,976)
Net income/(loss)	**$ (704)**	$ 2,437	$ 864
Total net revenue			
Treasury and CIO	**(787)**	(493)	(1,317)
Other Corporate	**300**	760	1,329
Total net revenue	**$ (487)**	$ 267	$ 12
Net income/(loss)			
Treasury and CIO	**(715)**	(235)	(1,165)
Other Corporate	**11**	2,672	2,029
Total net income/(loss)	**$ (704)**	$ 2,437	$ 864
Selected balance sheet data (period-end)			
Total assets (period-end)	**$799,426**	$ 768,204	$ 931,206
Loans	**1,592**	2,187	2,871
Core loans[(c)]	**1,589**	2,182	2,848
Headcount	**32,358**	29,617	26,047

(a) Included tax-equivalent adjustments, predominantly due to tax-exempt income from municipal bond investments of $885 million, $839 million and $730 million for the years ended December 31, 2016, 2015 and 2014, respectively.

(b) Included legal expense/(benefit) of $(385) million, $832 million and $821 million for the years ended December 31, 2016, 2015 and 2014, respectively.

(c) Average core loans were $1.9 billion, $2.5 billion and $3.3 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

2016 compared with 2015

Net loss was $704 million, compared with net income of $2.4 billion in the prior year.

Net revenue was a loss of $487 million, compared with a gain of $267 million in the prior year. The prior year included a $514 million benefit from a legal settlement.

Net interest income was a loss of $1.4 billion, compared with a loss of $533 million in the prior year. The loss in the current year was primarily driven by higher interest expense on long-term debt and lower investment securities balances during the year, partially offset by higher interest income on deposits with banks and securities purchased under resale agreements as a result of higher rates.

Noninterest expense was $462 million, a decrease of $515 million from the prior year driven by lower legal expense, partially offset by higher compensation expense.

The prior year reflected tax benefits of $2.6 billion predominantly from the resolution of various tax audits.

2015 compared with 2014

Net income was $2.4 billion, compared with net income of $864 million in the prior year.

Net revenue was $267 million, compared with $12 million in the prior year. The current year included a $514 million benefit from a legal settlement. Treasury and CIO included a benefit of approximately $178 million associated with recognizing the unamortized discount on certain debt securities which were called at par and a $173 million pretax loss primarily related to accelerated amortization of cash flow hedges associated with the exit of certain non-operating deposits. Private Equity gains were $1.2 billion lower compared with the prior year, reflecting lower valuation gains and lower net gains on sales as the Firm exits this non-core business.

Noninterest expense was $977 million, a decrease of $182 million from the prior year which had included a $276 million goodwill impairment related to the sale of a portion of the Private Equity business.

The current year reflected tax benefits of $2.6 billion predominantly from the resolution of various tax audits compared with tax benefits of $1.1 billion in the prior year.

Treasury and CIO overview

Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The risks managed by Treasury and CIO arise from the activities undertaken by the Firm's four major reportable business segments to serve their respective client bases, which generate both on- and off-balance sheet assets and liabilities.

Treasury and CIO achieve the Firm's asset-liability management objectives generally by investing in high-quality securities that are managed for the longer-term as part of the Firm's investment securities portfolio. Treasury and CIO also use derivatives to meet the Firm's asset-liability management objectives. For further information on derivatives, see Note 6. The investment securities portfolio primarily consists of U.S. and non-U.S. government securities, agency and nonagency mortgage-backed securities, other ABS, corporate debt securities and obligations of U.S. states and municipalities. At December 31, 2016, the investment securities portfolio was $286.8 billion, and the average credit rating of the securities comprising the portfolio was AA+ (based upon external ratings where available and where not available, based primarily upon internal ratings that correspond to ratings as defined by S&P and Moody's). During 2016, the Firm transferred commercial mortgage-backed securities and obligations of U.S. states and municipalities with a fair value of $7.5 billion from available-for-sale ("AFS") to held-to maturity ("HTM"). These securities were transferred at fair value. The transfers reflect the Firm's intent to hold the securities to maturity in order to reduce the impact of price volatility on accumulated other comprehensive income ("AOCI").
See Note 12 for further information on the details of the Firm's investment securities portfolio.

For further information on liquidity and funding risk, see Liquidity Risk Management on pages 110–115. For information on interest rate, foreign exchange and other risks, Treasury and CIO VaR and the Firm's earnings-at-risk, see Market Risk Management on pages 116–123.

Selected income statement and balance sheet data

As of or for the year ended December 31, (in millions)	2016	2015	2014
Securities gains	$ 132	$ 190	$ 71
Investment securities portfolio (average) [a]	278,250	314,802	349,285
Investment securities portfolio (period–end)[b]	286,838	287,777	343,146
Mortgage loans (average)	1,790	2,501	3,308
Mortgage loans (period-end)	1,513	2,136	2,834

(a) Average investment securities included HTM balances of $51.4 billion, $50.0 billion and $47.2 billion for the years ended December 31, 2016, 2015 and 2014, respectively.
(b) Period-end investment securities included HTM securities of $50.2 billion, $49.1 billion, $49.3 billion at December 31, 2016, 2015 and 2014, respectively.

Private equity portfolio information[a]

December 31, (in millions)	2016	2015	2014
Carrying value	$ 1,797	$ 2,103	$ 5,866
Cost	2,649	3,798	6,281

(a) For more information on the Firm's methodologies regarding the valuation of the Private Equity portfolio, see Note 3.

2016 compared with 2015

The carrying value of the private equity portfolio at December 31, 2016 was $1.8 billion, down from $2.1 billion at December 31, 2015, driven by portfolio sales.

2015 compared with 2014

The carrying value of the private equity portfolio at December 31, 2015 was $2.1 billion, down from $5.9 billion at December 31, 2014, driven by the sale of a portion of the Private Equity business and porfolio sales.

Risk is an inherent part of JPMorgan Chase's business activities. When the Firm extends a consumer or wholesale loan, advises customers on their investment decisions, makes markets in securities, or offers other products or services, the Firm takes on some degree of risk. The Firm's overall objective is to manage its businesses, and the associated risks, in a manner that balances serving the interests of its clients, customers and investors and protects the safety and soundness of the Firm.

Firmwide Risk Management is overseen and managed on an enterprise-wide basis. The Firm's approach to risk management covers a broad spectrum of economic and other core risk areas, such as credit, market, liquidity, model, principal, country, operational, compliance, conduct, legal, capital and reputation risk, with controls and governance established for each area, as appropriate.

The Firm believes that effective risk management requires:

- Acceptance of responsibility, including identification and escalation of risk issues, by all individuals within the Firm;
- Ownership of risk identification, assessment, data and management within each of the lines of business and corporate functions; and
- Firmwide structures for risk governance.

The Firm's Operating Committee, which consists of the Firm's Chief Executive Officer ("CEO"), Chief Risk Officer ("CRO"), Chief Operating Officer ("COO"), Chief Financial Officer ("CFO") and other senior executives, is the ultimate management escalation point in the Firm, and may refer matters to the Firm's Board of Directors. The Operating Committee is responsible and accountable to the Firm's Board of Directors.

The Firm strives for continual improvement through efforts to enhance controls, ongoing employee training and development, talent retention, and other measures. The Firm follows a disciplined and balanced compensation framework with strong internal governance and independent Board oversight. The impact of risk and control issues are carefully considered in the Firm's performance evaluation and incentive compensation processes.

The following sections outline the key risks that are inherent in the Firm's business activities:

Risk	Definition	Select risk management metrics	Page references
I. Economic risks			
(i) Capital risk	The risk that the Firm has an insufficient level and composition of capital to support its business activities and associated risks during both normal economic environments and under stressed conditions.	Risk-based capital ratios and leverage ratios; stress	76-85
(ii) Consumer Credit risk	The risk of loss arising from the default of a customer.	Total exposure; geographic and customer concentrations; delinquencies; loss experience; stressed credit performance	89-95
(iii) Wholesale Credit risk	The risk of loss arising from the default of a client or counterparty.	Total exposure; industry, geographic and client concentrations; risk ratings; loss experience; stressed credit performance	96-104
(iv) Country risk	The risk that a sovereign event or action alters the value or terms of contractual obligations of obligors, counterparties and issuers, or adversely affects markets related to a particular country.	Default exposure at 0% recovery; stress; risk ratings; ratings based capital limits	108-109
(v) Liquidity risk	The risk that the Firm will be unable to meet its contractual and contingent obligations or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.	LCR; stress by material legal entity	110-115
(vi) Market risk	The risk of loss arising from potential adverse changes in the value of the Firm's assets and liabilities or future results, resulting from changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices, implied volatilities or credit spreads; this includes the structural interest rate and foreign exchange risks managed on a firmwide basis in Treasury and CIO.	VaR; P&L drawdown; economic stress testing; sensitivities; earnings-at-risk; and foreign exchange ("FX") net open position	116-123
(vii) Principal risk	The risk of an adverse change in the value of privately-held financial assets and instruments, typically representing an ownership or junior capital positions that have unique risks due to their illiquidity or for which there is less observable market or valuation data.	Carrying value, stress	124
II. Other core risks			
(i) Compliance risk	The risk of failure to comply with applicable laws, rules, and regulations.	Risk based monitoring and testing for timely compliance with financial obligations	125
(ii) Conduct risk	The risk that an employee's action or inaction causes undue harm to the Firm's clients, damages market integrity, undermines the Firm's reputation, or negatively impacts the Firm's culture.	Relevant risk and control self-assessment results, employee compliance information, code of conduct case information	126
(iii) Legal risk	The risk of loss or imposition of damages, fines, penalties or other liability arising from the failure to comply with a contractual obligation or to comply with laws, rules or regulations to which the Firm is subject.	Not applicable	127
(iv) Model risk	The risk of the potential for adverse consequences from decisions based on incorrect or misused model outputs.	Model status, model tier	128
(v) Operational risk	The risk of loss resulting from inadequate or failed processes or systems, human factors, or due to external events that are neither market- nor credit-related such as cyber and technology related events.	Risk and control self-assessment results, firm-specific loss experience; industry loss experience; business environment and internal control factors; key risk indicators; key control indicators; operating metrics	129-130
(vi) Reputation risk	The risk that an action, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public.	Not applicable	131

Governance and oversight

The Firm's overall appetite for risk is governed by a "Risk Appetite" framework. The framework and the Firm's risk appetite are set and approved by the Firm's CEO, CFO, CRO and COO. LOB-level risk appetite is set by the respective LOB CEO, CFO and CRO and is approved by the Firm's CEO, CFO, CRO and COO. Quantitative parameters and qualitative factors are used to monitor and measure the Firm's capacity to take risk against stated risk appetite. Quantitative parameters have been established to assess stressed net income, capital, credit risk, market risk, structural interest rate risk and liquidity risk. Qualitative factors have been established for select risks. Risk Appetite results are reported quarterly to the Board of Directors' Risk Policy Committee ("DRPC").

The Firm's CRO is the head of the Independent Risk Management ("IRM") function and reports to the CEO and the DRPC. The CEO appoints the CRO to create the Risk Management Framework subject to approval by the DRPC in the form of the Primary Risk Policies. The Chief Compliance Officer ("CCO"), who reports to the CRO, is also responsible for reporting to the Audit Committee for the Global Compliance Program. The Firm's Global Compliance Program focuses on overseeing compliance with laws, rules and regulations applicable to the Firm's products and services to clients and counterparties.

The IRM function, comprised of Risk Management and Compliance Organizations, is independent of the businesses. The IRM function sets various standards for the risk management governance framework, including risk policy, identification, measurement, assessment, testing, limit setting (e.g., risk appetite, thresholds, etc.), monitoring and reporting. Various groups within the IRM function are aligned to the LOBs and to corporate functions, regions and core areas of risk such as credit, market, country and liquidity risks, as well as operational, model and reputational risk governance.

The Firm places key reliance on each of its LOBs and other functional areas giving rise to risk. Each LOB or other functional area giving rise to risk is expected to operate its activities within the parameters identified by the IRM function, and within their own management-identified risk and control standards. Because these LOBs and functional areas are accountable for identifying and addressing the risks in their respective businesses and for operating within a sound control environment, they are considered the "first line of defense" within the Firm's risk governance framework.

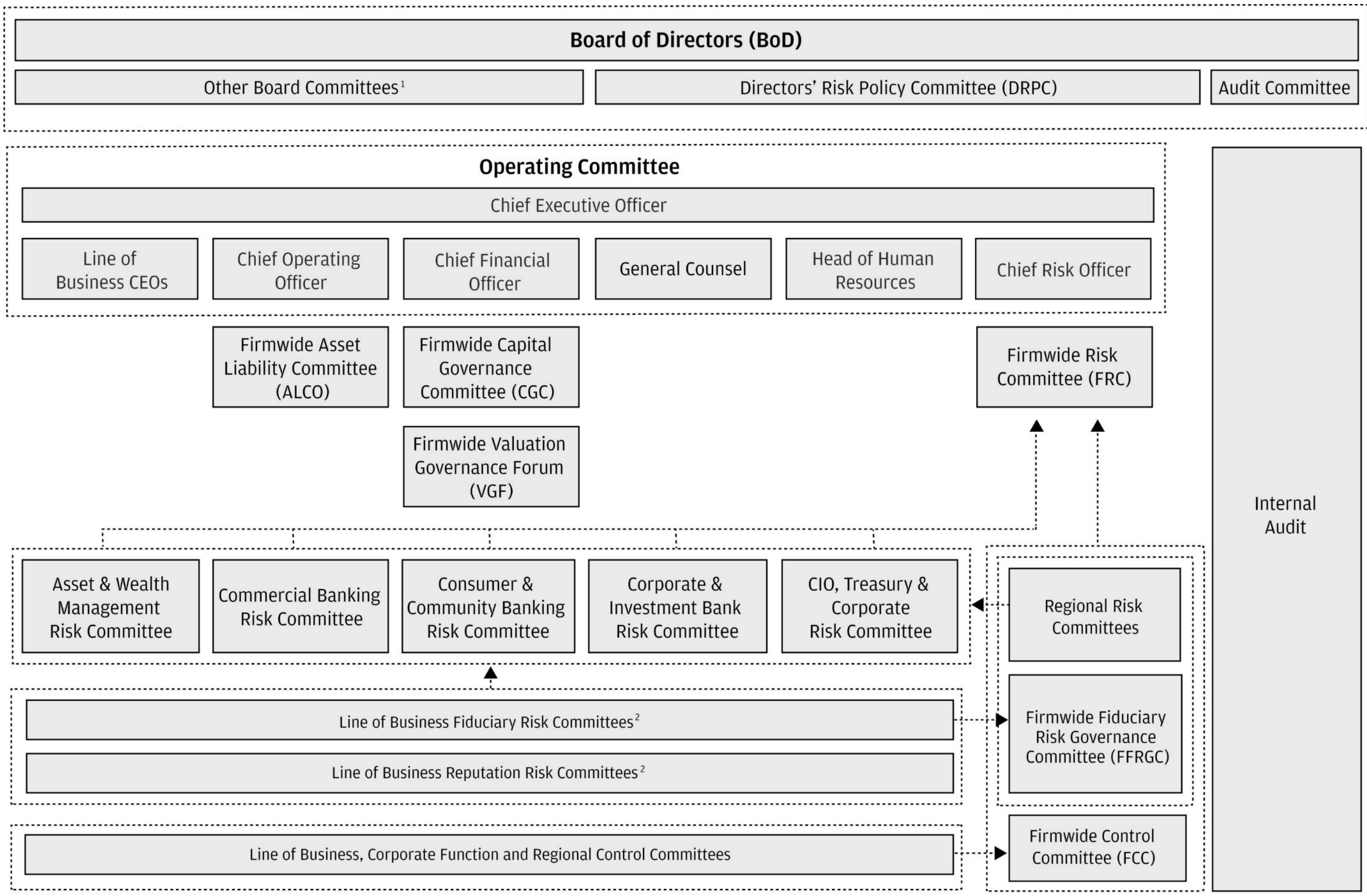
The Firmwide Oversight and Control Group consists of dedicated control officers within each of the lines of business and corporate functions, as well as having a central oversight function. The group is charged with enhancing the Firm's control environment by looking within and across the lines of business and corporate functions to help identify and remediate control issues. The group enables the Firm to detect control problems more quickly, escalate issues promptly and engage other stakeholders to understand common themes and interdependencies among the various parts of the Firm.

As the "second line of defense", the IRM function provides oversight and independent challenge, consistent with its policies and framework, to the risk-creating LOBs and functional areas.

Internal Audit, a function independent of the businesses and the IRM function, tests and evaluates the Firm's risk governance and management, as well as its internal control processes. This function, the "third line of defense" in the risk governance framework, brings a systematic and disciplined approach to evaluating and improving the effectiveness of the Firm's governance, risk management and internal control processes. The Internal Audit Function is headed by the General Auditor, who reports to the Audit Committee.

The independent status of the IRM function is supported by a governance structure that provides for escalation of risk issues to senior management, the Firmwide Risk Committee, or the Board of Directors.

The chart below illustrates the key senior management level committees in the Firm's risk governance structure. Other committees, forums and paths of escalation are in place that are responsible for management and oversight of risk, although they are not shown in the chart below.



1 Other Board Committees include the Compensation & Management Development Committee, Corporate Governance & Nominating Committee and Public Responsibility Committee.
2 As applicable.

The Board of Directors provides oversight of risk principally through the DRPC, Audit Committee and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee. Each committee of the Board oversees reputation risk issues within its scope of responsibility.

The Directors' Risk Policy Committee of the Board oversees the Firm's global risk management framework and approves the primary risk management policies of the Firm. The Committee's responsibilities include oversight of management's exercise of its responsibility to assess and manage the Firm's risks, and its capital and liquidity planning and analysis. Breaches in risk appetite, liquidity issues that may have a material adverse impact on the Firm and other significant risk-related matters are escalated to the Committee.

The Audit Committee of the Board assists the Board in its oversight of management's responsibilities to assure that there is an effective system of controls reasonably designed to safeguard the assets and income of the Firm, assure the integrity of the Firm's financial statements and maintain compliance with the Firm's ethical standards, policies, plans and procedures, and with laws and regulations. In addition, the Audit Committee assists the Board in its oversight of the Firm's independent registered public accounting firm's qualifications, independence and performance, and of the performance of the Firm's Internal Audit function.

The Compensation & Management Development Committee ("CMDC") assists the Board in its oversight of the Firm's compensation programs and reviews and approves the Firm's overall compensation philosophy, incentive compensation pools, and compensation practices consistent with key business objectives and safety and soundness. The Committee reviews Operating Committee members' performance against their goals, and approves their compensation awards. The Committee also periodically reviews the Firm's diversity programs and management development and succession planning, and provides oversight of the Firm's culture and conduct programs.

Among the Firm's senior management-level committees that are primarily responsible for key risk-related functions are:

The Firmwide Risk Committee ("FRC") is the Firm's highest management-level risk committee. It provides oversight of the risks inherent in the Firm's businesses. The Committee is co-chaired by the Firm's CEO and CRO. This Committee serves as an escalation point for risk topics and issues raised by its members, the Line of Business Risk

Committees, Firmwide Control Committee, Firmwide Fiduciary Risk Governance Committee, and regional Risk Committees, as appropriate. The Committee escalates significant issues to the DRPC, as appropriate.

The Firmwide Control Committee ("FCC") provides a forum for senior management to review and discuss firmwide operational risks including existing and emerging issues, and operational risk metrics, and to review operational risk management execution in the context of the Operational Risk Management Framework ("ORMF") which provides the framework for the governance, assessment, measurement, and monitoring and reporting of operational risk. The FCC is co-chaired by the Chief Control Officer and the Firmwide Risk Executive for Operational Risk Governance. The committee relies upon the prompt escalation of issues from businesses and functions as the primary owners of the operational risk. Operational risk issues may be escalated by business or function control committees to the FCC, which may, in turn, escalate to the FRC, as appropriate.

The Firmwide Fiduciary Risk Governance Committee is a forum for risk matters related to the Firm's fiduciary activities. The Committee oversees the firmwide fiduciary risk governance framework, which supports the consistent identification and escalation of fiduciary risk issues by the relevant lines of business; establishes policies and best practices to effectuate the Committee's oversight responsibility; and creates metrics reporting to track fiduciary activity and issue resolution Firmwide. The Committee escalates significant fiduciary issues to the FRC, the DRPC and the Audit Committee, as appropriate.

Line of Business and Regional Risk Committees review the ways in which the particular line of business or the business operating in a particular region could be exposed to adverse outcomes with a focus on identifying, accepting, escalating and/or requiring remediation of matters brought to these committees. These committees may escalate to the FRC, as appropriate. LOB risk committees are co-chaired by the LOB CEO and the LOB CRO. Each LOB risk committee may create sub-committees with requirements for escalation. The regional committees are established similarly, as appropriate, for the region.

In addition, each line of business and function is required to have a Control Committee. These control committees oversee the control environment of their respective business or function. As part of that mandate, they are responsible for reviewing data which indicates the quality and stability of the processes in a business or function, reviewing key operational risk issues and focusing on processes with shortcomings and overseeing process remediation. These committees escalate to the FCC, as appropriate.

The Firmwide Asset Liability Committee ("ALCO"), chaired by the Firm's Treasurer and Chief Investment Officer under the direction of the COO, monitors the Firm's balance sheet, liquidity risk and structural interest rate risk. ALCO reviews the Firm's overall structural interest rate risk position, funding requirements and strategy, and securitization programs (and any required liquidity support by the Firm of such programs). ALCO is responsible for reviewing and approving the Firm's Funds Transfer Pricing Policy (through which lines of business "transfer" interest rate risk to Treasury and CIO) and the Firm's Intercompany Funding and Liquidity Policy. ALCO is also responsible for reviewing the Firm's Contingency Funding Plan.

The Firmwide Capital Governance Committee, chaired by the Head of the Regulatory Capital Management Office is responsible for reviewing the Firm's Capital Management Policy and the principles underlying capital issuance and distribution alternatives and decisions. The Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm's businesses.

The Firmwide Valuation Governance Forum ("VGF") is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the firmwide head of the Valuation Control Group ("VCG") (under the direction of the Firm's Controller), and includes sub-forums covering the Corporate & Investment Bank, Consumer & Community Banking, Commercial Banking, Asset & Wealth Management and certain corporate functions, including Treasury and CIO.

In addition, the JPMorgan Chase Bank, N.A. Board of Directors is responsible for the oversight of management of the Bank. The JPMorgan Chase Bank, N.A. Board accomplishes this function acting directly and through the principal standing committees of the Firm's Board of Directors. Risk oversight on behalf of JPMorgan Chase Bank N.A. is primarily the responsibility of the DRPC and Audit Committee of the Firm's Board of Directors and, with respect to compensation and other management-related matters, the Compensation & Management Development Committee of the Firm's Board of Directors.

Risk measurement

The Firm has a broad spectrum of risk management metrics, as appropriate for each risk category. For further information on risk management metrics, see table on key risks on page 72. Additionally, the Firm is exposed to certain potential low-probability, but plausible and material, idiosyncratic risks that are not well-captured by its other existing risk analysis and reporting metrics. These idiosyncratic risks may arise in a number of ways, such as changes in legislation, an unusual combination of market events, or specific counterparty events. The Firm has a process intended to identify these risks in order to allow the Firm to monitor vulnerabilities that are not adequately covered by its other standard risk measurements.

CAPITAL RISK MANAGEMENT

Capital risk is the risk the Firm has an insufficient level and composition of capital to support its business activities and associated risks during both normal economic environments and under stressed conditions.

A strong capital position is essential to the Firm's business strategy and competitive position. Maintaining a strong balance sheet to manage through economic volatility is considered a strategic imperative of the Firm's Board of Directors, CEO and Operating Committee. The Firm's balance sheet philosophy focuses on risk-adjusted returns, strong capital and robust liquidity. The Firm's capital management strategy focuses on maintaining long-term stability to enable it to build and invest in market-leading businesses, even in a highly stressed environment. Prior to making any decisions on future business activities, senior management considers the implications on the Firm's capital. In addition to considering the Firm's earnings outlook, senior management evaluates all sources and uses of capital with a view to preserving the Firm's capital strength.

The Firm's capital management objectives are to hold capital sufficient to:

- Maintain "well-capitalized" status for the Firm and its principal bank subsidiaries;
- Support risks underlying business activities;
- Maintain sufficient capital in order to continue to build and invest in its businesses through the cycle and in stressed environments;
- Retain flexibility to take advantage of future investment opportunities;
- Serve as a source of strength to its subsidiaries;
- Meet capital distribution objectives; and
- Maintain sufficient capital resources to operate throughout a resolution period in accordance with the Firm's preferred resolution strategy.

These objectives are achieved through the establishment of minimum capital targets and a strong capital governance framework. Capital management is intended to be flexible in order to react to a range of potential events. The Firm's minimum capital targets are based on the most binding of three pillars: an internal assessment of the Firm's capital needs; an estimate of required capital under the CCAR and Dodd-Frank Act stress testing requirements; and Basel III Fully Phased-In regulatory minimums. Where necessary, each pillar may include a management-established buffer. The capital governance framework requires regular monitoring of the Firm's capital positions, stress testing and defining escalation protocols, both at the Firm and material legal entity levels.

The following tables present the Firm's Transitional and Fully Phased-In risk-based and leverage-based capital metrics under both the Basel III Standardized and Advanced Approaches. The Firm's Basel III ratios exceed both the current and Fully Phased-In regulatory minimums as of December 31, 2016 and 2015. For further discussion of these capital metrics and the Standardized and Advanced approaches, refer to Monitoring and management of capital on pages 78–82.

December 31, 2016 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios [c]	Standardized	Advanced	Minimum capital ratios [d]
Risk-based capital metrics:						
CET1 capital	**$ 182,967**	**$ 182,967**		**$ 181,734**	**$ 181,734**	
Tier 1 capital	**208,112**	**208,112**		**207,474**	**207,474**	
Total capital	**239,553**	**228,592**		**237,487**	**226,526**	
Risk-weighted assets	**1,464,981**	**1,476,915**		**1,474,665**	**1,487,180**	
CET1 capital ratio	**12.5%**	**12.4%**	6.25%	**12.3%**	**12.2%**	10.5%
Tier 1 capital ratio	**14.2**	**14.1**	7.75	**14.1**	**14.0**	12.0
Total capital ratio	**16.4**	**15.5**	9.75	**16.1**	**15.2**	14.0
Leverage-based capital metrics:						
Adjusted average assets	**2,484,631**	**2,484,631**		**2,485,480**	**2,485,480**	
Tier 1 leverage ratio[a]	**8.4%**	**8.4%**	4.0	**8.3%**	**8.3%**	4.0
SLR leverage exposure	**NA**	**$ 3,191,990**		**NA**	**$ 3,192,839**	
SLR[b]	**NA**	**6.5%**	NA	**NA**	**6.5%**	5.0 [e]

December 31, 2015 (in millions, except ratios)	Transitional			Fully Phased-In		
	Standardized	Advanced	Minimum capital ratios [c]	Standardized	Advanced	Minimum capital ratios [d]
Risk-based capital metrics:						
CET1 capital	$ 175,398	$ 175,398		$ 173,189	$ 173,189	
Tier 1 capital	200,482	200,482		199,047	199,047	
Total capital	234,413	224,616		229,976	220,179	
Risk-weighted assets	1,465,262	1,485,336		1,474,870	1,495,520	
CET1 capital ratio	12.0%	11.8%	4.5%	11.7%	11.6%	10.5%
Tier 1 capital ratio	13.7	13.5	6.0	13.5	13.3	12.0
Total capital ratio	16.0	15.1	8.0	15.6	14.7	14.0
Leverage-based capital metrics:						
Adjusted average assets	2,358,471	2,358,471		2,360,499	2,360,499	
Tier 1 leverage ratio[a]	8.5%	8.5%	4.0	8.4%	8.4%	4.0
SLR leverage exposure	NA	3,079,797		NA	$ 3,079,119	
SLR[b]	NA	6.5%	NA	NA	6.5%	5.0 [e]

Note: As of December 31, 2016 and 2015, the lower of the Standardized or Advanced capital ratios under each of the Transitional and Fully Phased-In approaches in the table above represents the Firm's Collins Floor, as discussed in Monitoring and management of Capital on page 78.

(a) The Tier 1 leverage ratio is calculated by dividing Tier 1 capital by adjusted average assets.
(b) The SLR leverage ratio is calculated by dividing Tier 1 capital by SLR leverage exposure.
(c) Represents the Transitional minimum capital ratios applicable to the Firm under Basel III as of December 31, 2016 and 2015. At December 31, 2016, the CET1 minimum capital ratio includes 0.625% resulting from the phase-in of the Firm's 2.5% capital conservation buffer and 1.125%, resulting from the phase-in of the Firm's 4.5% global systemically important banks ("GSIB") surcharge.
(d) Represents the minimum capital ratios applicable to the Firm on a Fully Phased-In Basel III basis. At December 31, 2016, the ratios include the Firm's estimate of its Fully Phased-In U.S. GSIB surcharge of 3.5%. The minimum capital ratios will be fully phased-in effective January 1, 2019. For additional information on the GSIB surcharge, see page 79.
(e) In the case of the SLR, the Fully Phased-In minimum ratio is effective beginning January 1, 2018.

Strategy and governance

The Firm's CEO, in conjunction with the Board of Directors, establishes principles and guidelines for capital planning, issuance, usage and distributions, and minimum capital targets for the level and composition of capital in both business-as-usual and highly stressed environments. The DRPC assesses and approves the capital management and governance processes of the Firm. The Firm's Audit Committee is responsible for reviewing and approving the capital stress testing end-to-end control framework.

The Capital Governance Committee and the Regulatory Capital Management Office ("RCMO") support the Firm's strategic capital decision-making. The Capital Governance Committee oversees the capital adequacy assessment process, including the overall design, scenario development and macro assumptions and ensures that capital stress test programs are designed to adequately capture the risks specific to the Firm's businesses. RCMO, which reports to the Firm's CFO, is responsible for designing and monitoring the Firm's execution of its capital policies and strategies once approved by the Board, as well as reviewing and monitoring the execution of its capital adequacy assessment process. The Basel Independent Review function ("BIR"), which reports to the RCMO and has direct access to both the DRPC and Capital Governance Committee, conducts independent assessments of the Firm's regulatory capital framework to ensure compliance with the applicable U.S. Basel rules in support of senior management's responsibility for assessing and managing capital and for the DRPC's oversight of management in executing that responsibility. For additional discussion on the DRPC, see Enterprise-wide Risk Management on pages 71–75.

Monitoring and management of capital

In its monitoring and management of capital, the Firm takes into consideration an assessment of economic risk and all regulatory capital requirements to determine the level of capital needed to meet and maintain the objectives discussed above, as well as to support the framework for allocating capital to its business segments. While economic risk is considered prior to making decisions on future business activities, in most cases, the Firm considers risk-based regulatory capital to be a proxy for economic risk capital.

Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements for the Firm's national banks, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. The U.S. capital requirements generally follow the Capital Accord of the Basel Committee, as amended from time to time.

Basel III overview

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its insured depository institution ("IDI") subsidiaries. Basel III presents two comprehensive methodologies for calculating RWA: a general (standardized) approach ("Basel III Standardized"), and an advanced approach ("Basel III Advanced"). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 ("transitional period").

Basel III establishes capital requirements for calculating credit risk and market risk RWA, and in the case of Basel III Advanced, operational risk RWA. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced. In addition to the RWA calculated under these methodologies, the Firm may supplement such amounts to incorporate management judgment and feedback from its bank regulators.

Basel III also includes a requirement for Advanced Approach banking organizations, including the Firm, to calculate SLR. For additional information on SLR, see page 82.

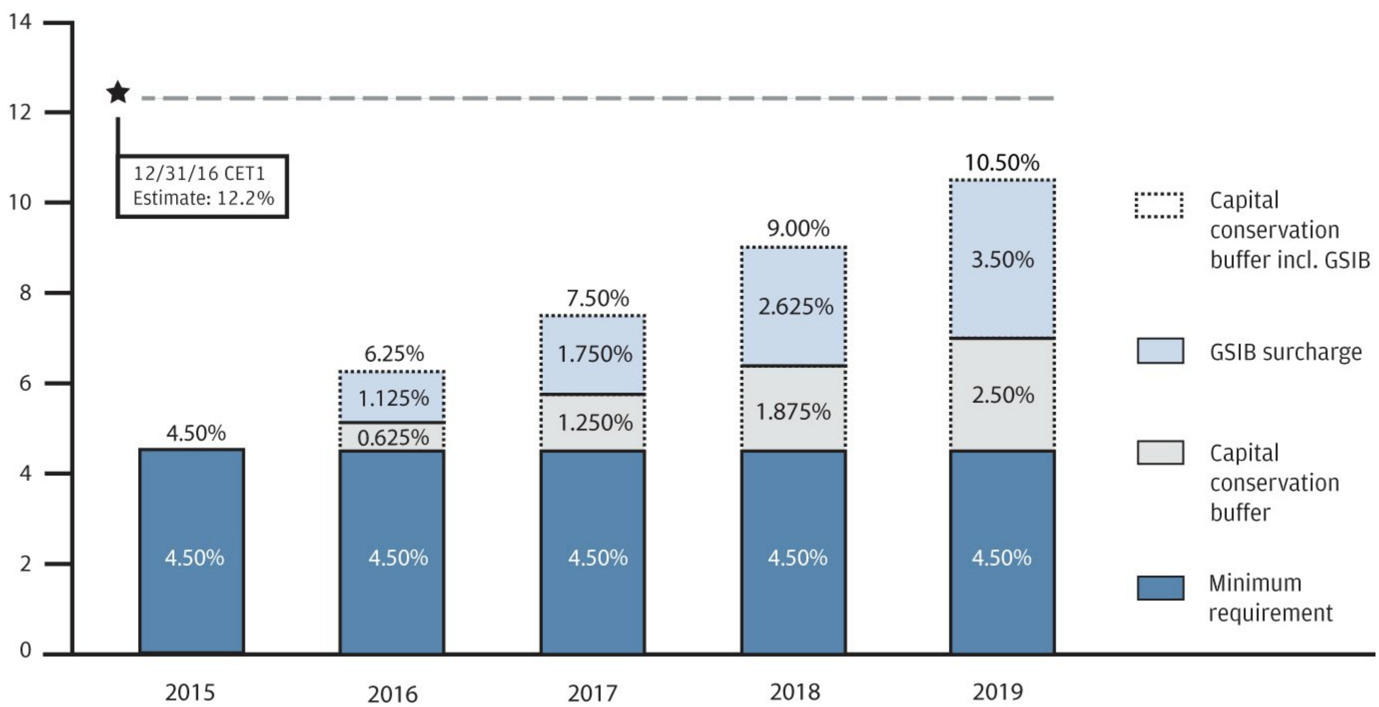
Basel III Fully Phased-In

Basel III capital rules will become fully phased-in on January 1, 2019, at which point the Firm will continue to calculate its capital ratios under both the Basel III Standardized and Advanced Approaches. The Firm manages each of the businesses, as well as the corporate functions, primarily on a Basel III Fully Phased-In basis. For additional information on the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.'s capital, RWA and capital ratios under Basel III Standardized and Advanced Fully Phased-In rules and SLRs calculated under the Basel III Advanced Fully Phased-In rules, all of which are considered key regulatory capital measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50.

The Firm's estimates of its Basel III Standardized and Advanced Fully Phased-In capital, RWA and capital ratios and SLRs for the Firm, JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. are based on the current published U.S. Basel III rules and on the application of such rules to the Firm's businesses as currently conducted. The actual impact on the Firm's capital ratios and SLR as of the effective date of the rules may differ from the Firm's current estimates depending on changes the Firm may make to its businesses in the future, further implementation guidance from the regulators, and regulatory approval of certain of the Firm's internal risk models (or, alternatively, regulatory disapproval of the Firm's internal risk models that have previously been conditionally approved).

Risk-based capital regulatory minimums

The following chart presents the Basel III minimum CET1 capital ratio during the transitional periods and on a fully phased-in basis under the Basel III rules currently in effect.



The Basel III rules include minimum capital ratio requirements that are subject to phase-in periods through the end of 2018. The capital adequacy of the Firm and its national bank subsidiaries, both during the transitional period and upon full-phase in, is evaluated against the Basel III approach (Standardized or Advanced) which results for each quarter in the lower ratio as required by the Collins Amendment of the Dodd-Frank Act (the "Collins Floor"). Additional information regarding the Firm's capital ratios, as well as the U.S. federal regulatory capital standards to which the Firm is subject, is presented in Note 28. For further information on the Firm's Basel III measures, see the Firm's Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website (http://investor.shareholder.com/jpmorganchase/basel.cfm).

All banking institutions are currently required to have a minimum capital ratio of 4.5% of CET1 capital. Certain banking organizations, including the Firm, are required to hold additional amounts of capital to serve as a "capital conservation buffer". The capital conservation buffer is intended to be used to absorb potential losses in times of financial or economic stress. If not maintained, the Firm could be limited in the amount of capital that may be distributed, including dividends and common equity repurchases. The capital conservation buffer is subject to a phase-in period that began January 1, 2016 and continues through the end of 2018.

As an expansion of the capital conservation buffer, the Firm is also required to hold additional levels of capital in the form of a GSIB surcharge and a countercyclical capital buffer.

Under the Federal Reserve's final rule, GSIBs, including the Firm, are required to calculate their GSIB surcharge on an annual basis under two separately prescribed methods, and are subject to the higher of the two. The first ("Method 1"), reflects the GSIB surcharge as prescribed by the Basel Committee's assessment methodology, and is calculated across five criteria: size, cross-jurisdictional activity, interconnectedness, complexity and substitutability. The second ("Method 2"), modifies the Method 1 requirements to include a measure of short-term wholesale funding in place of substitutability, and introduces a GSIB score "multiplication factor".

The Firm's Fully Phased-In GSIB surcharge for 2016 was calculated to be 2.5% under Method 1 and 4.5% under Method 2. Accordingly, the Firm's minimum capital ratios applicable in 2016 include a GSIB surcharge of 1.125%, resulting from the application of the transition provisions to the 4.5% fully phased-in GSIB surcharge. For 2017, the Firm has calculated its Fully Phased-In GSIB surcharge to be 2.5% under Method 1 and 3.5% under Method 2 resulting in the inclusion of a GSIB surcharge of 1.75% in the Firm's minimum capital ratios after application of the transition provisions.

The countercyclical capital buffer takes into account the macro financial environment in which large, internationally active banks function. On September 8, 2016 the Federal Reserve published the framework that will apply to the setting of the countercyclical capital buffer. As of October 24, 2016 the Federal Reserve reaffirmed setting the U.S. countercyclical capital buffer at 0%, and stated that it will review the amount at least annually. The countercyclical capital buffer can be increased if the Federal Reserve, FDIC and OCC determine that credit growth in the economy has become excessive and can be set at up to an additional 2.5% of RWA subject to a 12-month implementation period.

Based on the Firm's most recent estimate of its GSIB surcharge and the current countercyclical buffer being set at 0%, the Firm estimates its Fully Phased-In CET1 capital requirement, at January 1, 2019, would be 10.5% (reflecting the 4.5% CET1 capital requirement, the Fully Phased-In 2.5% capital conservation buffer and the GSIB surcharge of 3.5%). As well as meeting the capital ratio requirements of Basel III, the Firm must, in order to be "well-capitalized", maintain a minimum 6% Tier 1 capital and a 10% Total capital requirement. At December 31, 2016 and 2015, JPMorgan Chase maintained Basel III Standardized Transitional and Basel III Advanced Transitional ratios in excess of the well-capitalized standards established by the Federal Reserve.

The Firm continues to believe that over the next several years, it will operate with a Basel III CET1 capital ratio between 11% and 12.5%. It is the Firm's intention that the Firm's capital ratios continue to meet regulatory minimums as they are fully implemented in 2019 and thereafter.

Each of the Firm's IDI subsidiaries must maintain a minimum 6.5% CET1, 8% Tier 1 capital, 10% Total capital and 5% Tier 1 leverage requirement to meet the definition of "well-capitalized" under the Prompt Corrective Action ("PCA") requirements of the FDIC Improvement Act ("FDICIA") for IDI subsidiaries.

Capital

A reconciliation of total stockholders' equity to Basel III Fully Phased-In CET1 capital, Tier 1 capital and Basel III Advanced and Standardized Fully Phased-In Total capital is presented in the table below. For additional information on the components of regulatory capital, see Note 28.

Capital components

(in millions)	December 31, 2016
Total stockholders' equity	**$ 254,190**
Less: Preferred stock	26,068
Common stockholders' equity	**228,122**
Less:	
Goodwill	47,288
Other intangible assets	862
Add:	
Deferred tax liabilities[a]	3,230
Less: Other CET1 capital adjustments	1,468
Standardized/Advanced CET1 capital	**181,734**
Preferred stock	26,068
Less:	
Other Tier 1 adjustments[b]	328
Standardized/Advanced Tier 1 capital	**$ 207,474**
Long-term debt and other instruments qualifying as Tier 2 capital	$ 15,253
Qualifying allowance for credit losses	14,854
Other	(94)
Standardized Fully Phased-In Tier 2 capital	**$ 30,013**
Standardized Fully Phased-in Total capital	**$ 237,487**
Adjustment in qualifying allowance for credit losses for Advanced Tier 2 capital	(10,961)
Advanced Fully Phased-In Tier 2 capital	**$ 19,052**
Advanced Fully Phased-In Total capital	**$ 226,526**

(a) Represents deferred tax liabilities related to tax-deductible goodwill and to identifiable intangibles created in nontaxable transactions, which are netted against goodwill and other intangibles when calculating TCE.
(b) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule) acquired after December 31, 2013. The deduction was not material as of December 31, 2016.

The following table presents a reconciliation of the Firm's Basel III Transitional CET1 capital to the Firm's estimated Basel III Fully Phased-In CET1 capital as of December 31, 2016.

(in millions)	December 31, 2016
Transitional CET1 capital	**$ 182,967**
AOCI phase-in[(a)]	(156)
CET1 capital deduction phase-in[(b)]	(695)
Intangible assets deduction phase-in[(c)]	(312)
Other adjustments to CET1 capital[(d)]	(70)
Fully Phased-In CET1 capital	**$ 181,734**

(a) Includes the remaining balance of AOCI related to AFS debt securities and defined benefit pension and other postretirement employee benefit ("OPEB") plans that will qualify as Basel III CET1 capital upon full phase-in.
(b) Predominantly includes regulatory adjustments related to changes in DVA, as well as CET1 deductions for defined benefit pension plan assets and deferred tax assets related to net operating loss ("NOL") and tax credit carryforwards.
(c) Relates to intangible assets, other than goodwill and MSRs, that are required to be deducted from CET1 capital upon full phase-in.
(d) Includes minority interest and the Firm's investments in its own CET1 capital instruments.

Capital rollforward

The following table presents the changes in Basel III Fully Phased-In CET1 capital, Tier 1 capital and Tier 2 capital for the year ended December 31, 2016.

Year Ended December 31, (in millions)	2016
Standardized/Advanced CET1 capital at December 31, 2015	$ 173,189
Net income applicable to common equity	23,086
Dividends declared on common stock	(6,912)
Net purchase of treasury stock	(7,163)
Changes in additional paid-in capital	(873)
Changes related to AOCI[(a)]	(1,280)
Adjustment related to DVA[(a)]	954
Other	733
Increase in Standardized/Advanced CET1 capital	8,545
Standardized/Advanced CET1 capital at December 31, 2016	**$ 181,734**
Standardized/Advanced Tier 1 capital at December 31, 2015	$ 199,047
Change in CET1 capital	8,545
Net issuance of noncumulative perpetual preferred stock	–
Other	(118)
Increase in Standardized/Advanced Tier 1 capital	8,427
Standardized/Advanced Tier 1 capital at December 31, 2016	**$ 207,474**
Standardized Tier 2 capital at December 31, 2015	$ 30,929
Change in long-term debt and other instruments qualifying as Tier 2	(1,426)
Change in qualifying allowance for credit losses	513
Other	(3)
Increase in Standardized Tier 2 capital	(916)
Standardized Tier 2 capital at December 31, 2016	**$ 30,013**
Standardized Total capital at December 31, 2016	**$ 237,487**
Advanced Tier 2 capital at December 31, 2015	$ 21,132
Change in long-term debt and other instruments qualifying as Tier 2	(1,426)
Change in qualifying allowance for credit losses	(651)
Other	(3)
Increase in Advanced Tier 2 capital	(2,080)
Advanced Tier 2 capital at December 31, 2016	**$ 19,052**
Advanced Total capital at December 31, 2016	**$ 226,526**

(a) Effective January 1, 2016, the adjustment reflects the impact of the adoption of DVA through OCI. For further discussion of the accounting change refer to Note 25.

RWA rollforward

The following table presents changes in the components of RWA under Basel III Standardized and Advanced Fully Phased-In for the year ended December 31, 2016. The amounts in the rollforward categories are estimates, based on the predominant driver of the change.

	Standardized			Advanced			
Year ended December 31, 2016 (in billions)	Credit risk RWA	Market risk RWA	**Total RWA**	Credit risk RWA	Market risk RWA	Operational risk RWA	**Total RWA**
December 31, 2015	$ 1,333	$ 142	**$ 1,475**	$ 954	$ 142	$ 400	**$ 1,496**
Model & data changes[a]	–	(14)	**(14)**	2	(14)	–	**(12)**
Portfolio runoff[b]	(13)	(2)	**(15)**	(15)	(2)	–	**(17)**
Movement in portfolio levels[c]	27	2	**29**	18	2	–	**20**
Changes in RWA	14	(14)	**–**	5	(14)	–	**(9)**
December 31, 2016	**$ 1,347**	**$ 128**	**$ 1,475**	**$ 959**	**$ 128**	**$ 400**	**$ 1,487**

(a) Model & data changes refer to movements in levels of RWA as a result of revised methodologies and/or treatment per regulatory guidance (exclusive of rule changes).
(b) Portfolio runoff for credit risk RWA reflects reduced risk from position rolloffs in legacy portfolios in Mortgage Banking (under both the Standardized and Advanced framework), and for market risk RWA reflects reduced risk from position rolloffs in legacy portfolios in the wholesale businesses.
(c) Movement in portfolio levels for credit risk RWA refers to changes in book size, composition, credit quality, and market movements; and for market risk RWA refers to changes in position and market movements.

Supplementary leverage ratio

The SLR is defined as Tier 1 capital under Basel III divided by the Firm's total leverage exposure. Total leverage exposure is calculated by taking the Firm's total average on-balance sheet assets, less amounts permitted to be deducted for Tier 1 capital, and adding certain off-balance sheet exposures, such as undrawn commitments and derivatives potential future exposure.

U.S. bank holding companies, including the Firm, are required to have a minimum SLR of 5% and IDI subsidiaries, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A., are required to have a minimum SLR of 6%, both beginning January 1, 2018. As of December 31, 2016, the Firm estimates that JPMorgan Chase Bank, N.A.'s and Chase Bank USA, N.A.'s Fully Phased-In SLRs are approximately 6.6% and 9.6%, respectively.

The following table presents the components of the Firm's Fully Phased-In SLR as of December 31, 2016.

(in millions, except ratio)	**December 31, 2016**
Fully Phased-in Tier 1 Capital	**$ 207,474**
Total average assets	2,532,457
Less: amounts deducted from Tier 1 capital	46,977
Total adjusted average assets[a]	2,485,480
Off-balance sheet exposures[b]	707,359
SLR leverage exposure	**$ 3,192,839**
SLR	**6.5%**

(a) Adjusted average assets, for purposes of calculating the SLR, includes total quarterly average assets adjusted for on-balance sheet assets that are subject to deduction from Tier 1 capital, predominantly goodwill and other intangible assets.
(b) Off-balance sheet exposures are calculated as the average of the three month-end spot balances in the reporting quarter.

Line of business equity

The Firm's framework for allocating capital to its business segments (line of business equity) is based on the following objectives:

- Integrate firmwide and line of business capital management activities;
- Measure performance consistently across all lines of business; and
- Provide comparability with peer firms for each of the lines of business.

Each business segment is allocated capital by taking into consideration stand-alone peer comparisons and regulatory capital requirements (as estimated under Basel III Advanced Fully Phased-In). For 2016, capital was allocated to each business segment for, among other things, goodwill and other intangibles associated with acquisitions effected by the line of business. ROE is measured and internal targets for expected returns are established as key measures of a business segment's performance.

Line of business common equity

Year ended December 31, (in billions)	Yearly average 2016	2015	2014
Consumer & Community Banking	**$ 51.0**	$ 51.0	$ 51.0
Corporate & Investment Bank	**64.0**	62.0	61.0
Commercial Banking	**16.0**	14.0	14.0
Asset & Wealth Management	**9.0**	9.0	9.0
Corporate	**84.6**	79.7	72.4
Total common stockholders' equity	**$ 224.6**	$ 215.7	$ 207.4

On at least an annual basis, the Firm assesses the level of capital required for each line of business as well as the assumptions and methodologies used to allocate capital. Through the end of 2016, capital was allocated to the lines of business based on a single measure, Basel III Advanced Fully Phased-In RWA. Effective January 1, 2017, the Firm's methodology used to allocate capital to the Firm's business segments was updated. The new methodology incorporates Basel III Standardized Fully Phased-In RWA (as well as Basel III Advanced Fully Phased-In RWA), leverage, the GSIB surcharge, and a simulation of capital in a severe stress environment. The methodology will continue to be weighted towards Basel III Advanced Fully Phased-In RWA because the Firm believes it to be the best proxy for economic risk. The Firm will consider further changes to its capital allocation methodology as the regulatory framework evolves. In addition, under the new methodology, capital is no longer allocated to each line of business for goodwill and other intangibles associated with acquisitions effected by the line of business. The Firm will continue to establish internal ROE targets for its business segments, against which they will be measured, as a key performance indicator.

The table below reflects the Firm's assessed level of capital required for each line of business as of the dates indicated.

Line of business common equity

(in billions)	January 1, 2017	December 31, 2016	2015
Consumer & Community Banking	**$ 51.0**	$ 51.0	$ 51.0
Corporate & Investment Bank	**70.0**	64.0	62.0
Commercial Banking	**20.0**	16.0	14.0
Asset & Wealth Management	**9.0**	9.0	9.0
Corporate	**78.1**	88.1	85.5
Total common stockholders' equity	**$ 228.1**	$ 228.1	$ 221.5

Planning and stress testing

Comprehensive Capital Analysis and Review

The Federal Reserve requires large bank holding companies, including the Firm, to submit a capital plan on an annual basis. The Federal Reserve uses the CCAR and Dodd-Frank Act stress test processes to ensure that large BHCs have sufficient capital during periods of economic and financial stress, and have robust, forward-looking capital assessment and planning processes in place that address each BHC's unique risks to enable them to absorb losses under certain stress scenarios. Through the CCAR, the Federal Reserve evaluates each BHC's capital adequacy and internal capital adequacy assessment processes ("ICAAP"), as well as its plans to make capital distributions, such as dividend payments or stock repurchases.

On June 29, 2016, the Federal Reserve informed the Firm that it did not object, on either a quantitative or qualitative basis, to the Firm's 2016 capital plan. For information on actions taken by the Firm's Board of Directors following the 2016 CCAR results, see Capital actions on page 84.

The Firm's CCAR process is integrated into and employs the same methodologies utilized in the Firm's ICAAP process, as discussed below.

Internal Capital Adequacy Assessment Process

Semiannually, the Firm completes the ICAAP, which provides management with a view of the impact of severe and unexpected events on earnings, balance sheet positions, reserves and capital. The Firm's ICAAP integrates stress testing protocols with capital planning.

The process assesses the potential impact of alternative economic and business scenarios on the Firm's earnings and capital. Economic scenarios, and the parameters underlying those scenarios, are defined centrally and applied uniformly across the businesses. These scenarios are articulated in terms of macroeconomic factors, which are key drivers of business results; global market shocks, which generate short-term but severe trading losses; and idiosyncratic operational risk events. The scenarios are intended to capture and stress key vulnerabilities and idiosyncratic risks facing the Firm. However, when defining a broad range of scenarios, realized events can always be worse. Accordingly, management considers additional stresses outside these scenarios, as necessary. ICAAP results are reviewed by management and the Board of Directors.

Capital actions

Dividends

The Firm's common stock dividend policy reflects JPMorgan Chase's earnings outlook, desired dividend payout ratio, capital objectives, and alternative investment opportunities. On May 17, 2016, the Firm announced that its Board of Directors increased the quarterly common stock dividend to $0.48 per share, effective with the dividend paid on July 31, 2016. The Firm's dividends are subject to the Board of Directors' approval at the customary times those dividends are to be declared.

For information regarding dividend restrictions, see Note 22 and Note 27.

The following table shows the common dividend payout ratio based on net income applicable to common equity.

Year ended December 31,	**2016**	2015	2014
Common dividend payout ratio	**30%**	28%	29%

Common equity

During the year ended December 31, 2016, warrant holders exercised their right to purchase 22.5 million shares of the Firm's common stock. The Firm issued from treasury stock 11.1 million shares of its common stock as a result of these exercises. As of December 31, 2016, 24.9 million warrants remained outstanding, compared with 47.4 million outstanding as of December 31, 2015.

On March 17, 2016, the Firm announced that its Board of Directors had authorized the repurchase of up to an additional $1.9 billion of common equity (common stock and warrants) through June 30, 2016 under its equity repurchase program. This amount is in addition to the $6.4 billion of common equity that was previously authorized for repurchase between April 1, 2015 and June 30, 2016.

Following receipt in June 2016 of the Federal Reserve's non-objection to the Firm's 2016 capital plan, the Firm's Board of Directors authorized the repurchase of up to $10.6 billion of common equity (common stock and warrants) between July 1, 2016 and June 30, 2017.

This authorization includes shares repurchased to offset issuances under the Firm's equity-based compensation plans.

As of December 31, 2016, $6.1 billion of authorized repurchase capacity remained under the program.

The following table sets forth the Firm's repurchases of common equity for the years ended December 31, 2016, 2015 and 2014. There were no warrants repurchased during the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	**2016**	2015	2014
Total number of shares of common stock repurchased	**140.4**	89.8	82.3
Aggregate purchase price of common stock repurchases	**$ 9,082**	$ 5,616	$ 4,760

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity – for example, during internal trading blackout periods. All purchases under a Rule 10b5-1 plan must be made according to a predefined plan established when the Firm is not aware of material nonpublic information.

The authorization to repurchase common equity will be utilized at management's discretion, and the timing of purchases and the exact amount of common equity that may be repurchased is subject to various factors, including market conditions; legal and regulatory considerations affecting the amount and timing of repurchase activity; the Firm's capital position (taking into account goodwill and intangibles); internal capital generation; and alternative investment opportunities. The repurchase program does not include specific price targets or timetables; may be executed through open market purchases or privately negotiated transactions, or utilize Rule 10b5-1 programs; and may be suspended at any time.

For additional information regarding repurchases of the Firm's equity securities, see Part II, Item 5: Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities on page 22.

Preferred stock

Preferred stock dividends declared were $1.6 billion for the year ended December 31, 2016. For additional information on the Firm's preferred stock, see Note 22.

Redemption of outstanding trust preferred securities

The Firm redeemed $1.6 billion and $1.5 billion of trust preferred securities in the years ended December 31, 2016 and 2015, respectively.

Other capital requirements

TLAC

On December 15, 2016, the Federal Reserve issued its final TLAC rule which requires the top-tier holding companies of eight U.S. global systemically important bank holding companies, including the Firm, among other things, to maintain minimum levels of external TLAC and external long-term debt that satisfies certain eligibility criteria ("eligible LTD") by January 1, 2019. The minimum external TLAC requirement is the greater of (A) 18% of the financial institution's RWA plus applicable buffers, including its GSIB surcharge as calculated under Method 1 and (B) 7.5% of its total leverage exposure plus a buffer equal to 2.0%. The required minimum level of eligible long-term debt is equal to the greater of (A) 6% of the financial institution's RWA, plus its U.S. Method 2 GSIB surcharge and (B) 4.5% of the Firm's total leverage exposure. The final rule permanently grandfathered all long-term debt issued before December 31, 2016, to the extent these securities would be ineligible only due to containing impermissible acceleration rights or being governed by foreign law. While the Firm may have to raise long-term debt to be in full compliance with the rule, management estimates the net amount to be raised is not material and the timing for raising such funds is manageable.

Broker-dealer regulatory capital

JPMorgan Chase's principal U.S. broker-dealer subsidiary is JPMorgan Securities. Prior to October 1, 2016 the Firm had two principal U.S. broker-dealer subsidiaries. Effective October 1, 2016 JPMorgan Clearing merged with JPMorgan Securities. JPMorgan Securities is the surviving entity in the merger and its name remain unchanged.

JPMorgan Securities is subject to Rule 15c3-1 under the Securities Exchange Act of 1934 (the "Net Capital Rule"). JPMorgan Securities is also registered as futures commission merchants and subject to Rule 1.17 of the CFTC.

JPMorgan Securities has elected to compute its minimum net capital requirements in accordance with the "Alternative Net Capital Requirements" of the Net Capital Rule. At December 31, 2016, JPMorgan Securities' net capital, as defined by the Net Capital Rule, was $14.7 billion, exceeding the minimum requirement by $11.9 billion.

In addition to its minimum net capital requirement, JPMorgan Securities is required to hold tentative net capital in excess of $1.0 billion and is also required to notify the SEC in the event that tentative net capital is less than $5.0 billion, in accordance with the market and credit risk standards of Appendix E of the Net Capital Rule. As of December 31, 2016, JPMorgan Securities had tentative net capital in excess of the minimum and notification requirements.

J.P. Morgan Securities plc is a wholly owned subsidiary of JPMorgan Chase Bank, N.A. and is the Firm's principal operating subsidiary in the U.K. It has authority to engage in banking, investment banking and broker-dealer activities. J.P. Morgan Securities plc is jointly regulated by the U.K. PRA and the FCA. J.P. Morgan Securities plc is subject to the European Union Capital Requirements Regulation and the U.K. PRA capital rules, under which it has implemented Basel III.

At December 31, 2016, J.P. Morgan Securities plc had estimated total capital of $34.5 billion, its estimated CET1 capital ratio was 13.8% and its estimated total capital ratio was 17.4%. Both ratios exceeded the minimum standards of 4.5% and 8.0%, respectively, under the transitional requirements of the European Union's ("EU") Basel III Capital Requirements Directive and Regulation, as well as the additional capital requirements specified by the PRA.

CREDIT RISK MANAGEMENT

Credit risk is the risk of loss arising from the default of a customer, client or counterparty. The Firm provides credit to a variety of customers, ranging from large corporate and institutional clients to individual consumers and small businesses. In its consumer businesses, the Firm is exposed to credit risk primarily through its mortgage banking, credit card, auto, business banking and student lending businesses. Originated mortgage loans are retained in the mortgage portfolio, securitized or sold to U.S. government agencies and U.S. government-sponsored enterprises; other types of consumer loans are typically retained on the balance sheet. In its wholesale businesses, the Firm is exposed to credit risk through its underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through its operating services activities (such as cash management and clearing activities), securities financing activities, investment securities portfolio, and cash placed with banks. A portion of the loans originated or acquired by the Firm's wholesale businesses are generally retained on the balance sheet; the Firm's syndicated loan business distributes a significant percentage of originations into the market and is an important component of portfolio management.

Credit risk management

Credit risk management is an independent risk management function that monitors and measures credit risk throughout the Firm and defines credit risk policies and procedures. The credit risk function reports to the Firm's CRO. The Firm's credit risk management governance includes the following activities:

- Establishing a comprehensive credit risk policy framework
- Monitoring and managing credit risk across all portfolio segments, including transaction and exposure approval
- Setting industry concentration limits and establishing underwriting guidelines
- Assigning and managing credit authorities in connection with the approval of all credit exposure
- Managing criticized exposures and delinquent loans
- Estimating credit losses and ensuring appropriate credit risk-based capital management

Risk identification and measurement

The Credit Risk Management function measures, limits, manages and monitors credit risk across the Firm's businesses. To measure credit risk, the Firm employs several methodologies for estimating the likelihood of obligor or counterparty default. Methodologies for measuring credit risk vary depending on several factors, including type of asset (e.g., consumer versus wholesale), risk measurement parameters (e.g., delinquency status and borrower's credit score versus wholesale risk-rating) and risk management and collection processes (e.g., retail collection center versus centrally managed workout groups). Credit risk measurement is based on the probability of default of an obligor or counterparty, the loss severity given a default event and the exposure at default.

Based on these factors and related market-based inputs, the Firm estimates credit losses for its exposures. Probable credit losses inherent in the consumer and wholesale held-for-investment loan portfolios are reflected in the allowance for loan losses, and probable credit losses inherent in lending-related commitments are reflected in the allowance for lending-related commitments. These losses are estimated using statistical analyses and other factors as described in Note 15. In addition, potential and unexpected credit losses are reflected in the allocation of credit risk capital and represent the potential volatility of actual losses relative to the established allowances for loan losses and lending-related commitments. The analyses for these losses include stress testing that considers alternative economic scenarios as described in the Stress testing section below. For further information, see Critical Accounting Estimates used by the Firm on pages 132–134.

The methodologies used to estimate credit losses depend on the characteristics of the credit exposure, as described below.

Scored exposure
The scored portfolio is generally held in CCB and predominantly includes residential real estate loans, credit card loans, certain auto and business banking loans, and student loans. For the scored portfolio, credit loss estimates are based on statistical analysis of credit losses over discrete periods of time. The statistical analysis uses portfolio modeling, credit scoring, and decision-support tools, which consider loan-level factors such as delinquency status, credit scores, collateral values, and other risk factors. Credit loss analyses also consider, as appropriate, uncertainties and other factors, including those related to current macroeconomic and political conditions, the quality of underwriting standards, and other internal and external factors. The factors and analysis are updated on a quarterly basis or more frequently as market conditions dictate.

Risk-rated exposure
Risk-rated portfolios are generally held in CIB, CB and AWM, but also include certain business banking and auto dealer loans held in CCB that are risk-rated because they have characteristics similar to commercial loans. For the risk-rated portfolio, credit loss estimates are based on estimates of the probability of default ("PD") and loss severity given a default. The probability of default is the likelihood that a borrower will default on its obligation; the loss given default ("LGD") is the estimated loss on the loan that would be realized upon the default and takes into consideration collateral and structural support for each credit facility. The estimation process includes assigning risk ratings to each borrower and credit facility to differentiate risk within the portfolio. These risk ratings are reviewed regularly by Credit Risk Management and revised as needed to reflect the

borrower's current financial position, risk profile and related collateral. The calculations and assumptions are based on both internal and external historical experience and management judgment and are reviewed regularly.

Stress testing

Stress testing is important in measuring and managing credit risk in the Firm's credit portfolio. The process assesses the potential impact of alternative economic and business scenarios on estimated credit losses for the Firm. Economic scenarios and the underlying parameters are defined centrally, articulated in terms of macroeconomic factors and applied across the businesses. The stress test results may indicate credit migration, changes in delinquency trends and potential losses in the credit portfolio. In addition to the periodic stress testing processes, management also considers additional stresses outside these scenarios, including industry and country-specific stress scenarios, as necessary. The Firm uses stress testing to inform decisions on setting risk appetite both at a Firm and LOB level, as well as to assess the impact of stress on individual counterparties.

Risk monitoring and management

The Firm has developed policies and practices that are designed to preserve the independence and integrity of the approval and decision-making process of extending credit to ensure credit risks are assessed accurately, approved properly, monitored regularly and managed actively at both the transaction and portfolio levels. The policy framework establishes credit approval authorities, concentration limits, risk-rating methodologies, portfolio review parameters and guidelines for management of distressed exposures. In addition, certain models, assumptions and inputs used in evaluating and monitoring credit risk are independently validated by groups that are separate from the line of businesses.

Consumer credit risk is monitored for delinquency and other trends, including any concentrations at the portfolio level, as certain of these trends can be modified through changes in underwriting policies and portfolio guidelines. Consumer Risk Management evaluates delinquency and other trends against business expectations, current and forecasted economic conditions, and industry benchmarks. Historical and forecasted trends are incorporated into the modeling of estimated consumer credit losses and are part of the monitoring of the credit risk profile of the portfolio.

Wholesale credit risk is monitored regularly at an aggregate portfolio, industry, and individual client and counterparty level with established concentration limits that are reviewed and revised as deemed appropriate by management, typically on an annual basis. Industry and counterparty limits, as measured in terms of exposure and economic risk appetite, are subject to stress-based loss constraints. In addition, wrong-way risk – the risk that exposure to a counterparty is positively correlated with the impact of a default by the same counterparty, which could cause exposure to increase at the same time as the counterparty's capacity to meet its obligations is decreasing – is actively monitored as this risk could result in greater exposure at default compared with a transaction with another counterparty that does not have this risk.

Management of the Firm's wholesale credit risk exposure is accomplished through a number of means, including:

- Loan underwriting and credit approval process
- Loan syndications and participations
- Loan sales and securitizations
- Credit derivatives
- Master netting agreements
- Collateral and other risk-reduction techniques

In addition to Credit Risk Management, an independent Credit Review function, is responsible for:

- Independently validating or changing the risk grades assigned to exposures in the Firm's wholesale and commercial-oriented retail credit portfolios, and assessing the timeliness of risk grade changes initiated by responsible business units; and
- Evaluating the effectiveness of business units' credit management processes, including the adequacy of credit analyses and risk grading/LGD rationales, proper monitoring and management of credit exposures, and compliance with applicable grading policies and underwriting guidelines.

For further discussion of consumer and wholesale loans, see Note 14.

Risk reporting

To enable monitoring of credit risk and effective decision-making, aggregate credit exposure, credit quality forecasts, concentration levels and risk profile changes are reported regularly to senior members of Credit Risk Management. Detailed portfolio reporting of industry, customer, product and geographic concentrations occurs monthly, and the appropriateness of the allowance for credit losses is reviewed by senior management at least on a quarterly basis. Through the risk reporting and governance structure, credit risk trends and limit exceptions are provided regularly to, and discussed with, risk committees, senior management and the Board of Directors as appropriate.

CREDIT PORTFOLIO

In the following tables, reported loans include loans retained (i.e., held-for-investment); loans held-for-sale; and certain loans accounted for at fair value. In addition, the Firm records certain loans accounted for at fair value in trading assets. For further information regarding these loans, see Note 3 and Note 4. For additional information on the Firm's loans, lending-related commitments, and derivative receivables, including the Firm's accounting policies, see Note 14, Note 29, and Note 6, respectively. For further information regarding the credit risk inherent in the Firm's cash placed with banks, investment securities portfolio, and securities financing portfolio, see Note 5, Note 12, and Note 13, respectively.

For discussion of the consumer credit environment and consumer loans, see Consumer Credit Portfolio on pages 89–95 and Note 14. For discussion of wholesale credit environment and wholesale loans, see Wholesale Credit Portfolio on pages 96–104 and Note 14.

Total credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming[(b)(c)]	
	2016	2015	**2016**	2015
Loans retained	**$ 889,907**	$ 832,792	**$ 6,721**	$ 6,303
Loans held-for-sale	**2,628**	1,646	**162**	101
Loans at fair value	**2,230**	2,861	**—**	25
Total loans – reported	**894,765**	837,299	**6,883**	6,429
Derivative receivables	**64,078**	59,677	**223**	204
Receivables from customers and other	**17,560**	13,497	**—**	—
Total credit-related assets	**976,403**	910,473	**7,106**	6,633
Assets acquired in loan satisfactions				
Real estate owned	**NA**	NA	**370**	347
Other	**NA**	NA	**59**	54
Total assets acquired in loan satisfactions	**NA**	NA	**429**	401
Total assets	**976,403**	910,473	**7,535**	7,034
Lending-related commitments	**976,702**	940,395	**506**	193
Total credit portfolio	**$1,953,105**	$1,850,868	**$ 8,041**	$ 7,227
Credit derivatives used in credit portfolio management activities[(a)]	**$ (22,114)**	$ (20,681)	**$ —**	$ (9)
Liquid securities and other cash collateral held against derivatives	**(22,705)**	(16,580)	**NA**	NA

Year ended December 31, (in millions, except ratios)	2016	2015
Net charge-offs	**$ 4,692**	$ 4,086
Average retained loans		
Loans – reported	**861,345**	780,293
Loans – reported, excluding residential real estate PCI loans	**822,973**	736,543
Net charge-off rates		
Loans – reported	**0.54%**	0.52%
Loans – reported, excluding PCI	**0.57**	0.55

(a) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 103–104 and Note 6.

(b) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as each of the pools is performing.

(c) At December 31, 2016 and 2015, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of $5.0 billion and $6.3 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of $263 million and $290 million, respectively, that are 90 or more days past due; and (3) Real estate owned ("REO") insured by U.S. government agencies of $142 million and $343 million, respectively. These amounts have been excluded based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance issued by the Federal Financial Institutions Examination Council ("FFIEC").

CONSUMER CREDIT PORTFOLIO

The Firm's consumer portfolio consists primarily of residential real estate loans, credit card loans, auto loans, business banking loans and student loans, and associated lending-related commitments. The Firm's focus is on serving primarily the prime segment of the consumer credit market. The credit performance of the consumer portfolio continues to benefit from discipline in credit underwriting as well as improvement in the economy driven by increasing home prices and lower unemployment. Both early-stage delinquencies (30–89 days delinquent) and late-stage delinquencies (150+ days delinquent) for residential real estate, excluding government guaranteed loans, declined from December 31, 2015 levels. The Credit Card 30+ day delinquency rate and the net charge-off rate increased from the prior year but remain near record lows. For further information on consumer loans, see Note 14.

The following table presents consumer credit-related information with respect to the credit portfolio held by CCB, prime mortgage and home equity loans held by AWM, and prime mortgage loans held by Corporate. For further information about the Firm's nonaccrual and charge-off accounting policies, see Note 14.

Consumer credit portfolio

As of or for the year ended December 31, (in millions, except ratios)	Credit exposure		Nonaccrual loans[h][i]		Net charge-offs/ (recoveries)[j]		Average annual net charge-off rate[j][k]	
	2016	2015	**2016**	2015	**2016**	2015	**2016**	2015
Consumer, excluding credit card								
Loans, excluding PCI loans and loans held-for-sale								
Home equity	**$ 39,063**	$ 45,559	**$ 1,845**	$ 2,191	**$ 189**	$ 291	**0.45%**	0.59%
Residential mortgage	**192,163**	166,239	**2,247**	2,503	**12**	(4)	**0.01**	–
Auto[a]	**65,814**	60,255	**214**	116	**285**	214	**0.45**	0.38
Business banking[b]	**22,698**	21,208	**286**	263	**257**	253	**1.17**	1.23
Student and other	**8,989**	10,096	**175**	242	**166**	200	**1.74**	1.89
Total loans, excluding PCI loans and loans held-for-sale	**328,727**	303,357	**4,767**	5,315	**909**	954	**0.28**	0.35
Loans – PCI								
Home equity	**12,902**	14,989	**NA**	NA	**NA**	NA	**NA**	NA
Prime mortgage	**7,602**	8,893	**NA**	NA	**NA**	NA	**NA**	NA
Subprime mortgage	**2,941**	3,263	**NA**	NA	**NA**	NA	**NA**	NA
Option ARMs[c]	**12,234**	13,853	**NA**	NA	**NA**	NA	**NA**	NA
Total loans – PCI	**35,679**	40,998	**NA**	NA	**NA**	NA	**NA**	NA
Total loans – retained	**364,406**	344,355	**4,767**	5,315	**909**	954	**0.25**	0.30
Loans held-for-sale	**238** [g]	466 [g]	**53**	98	**–**	–	**–**	–
Total consumer, excluding credit card loans	**364,644**	344,821	**4,820**	5,413	**909**	954	**0.25**	0.30
Lending-related commitments[d]	**54,797**	58,478						
Receivables from customers[e]	**120**	125						
Total consumer exposure, excluding credit card	**419,561**	403,424						
Credit Card								
Loans retained[f]	**141,711**	131,387	**–**	–	**3,442**	3,122	**2.63**	2.51
Loans held-for-sale	**105**	76	**–**	–	**–**	–	**–**	–
Total credit card loans	**141,816**	131,463	**–**	–	**3,442**	3,122	**2.63**	2.51
Lending-related commitments[d]	**553,891**	515,518						
Total credit card exposure	**695,707**	646,981						
Total consumer credit portfolio	**$ 1,115,268**	$ 1,050,405	**$ 4,820**	$ 5,413	**$ 4,351**	$ 4,076	**0.89%**	0.92%
Memo: Total consumer credit portfolio, excluding PCI	**$ 1,079,589**	$ 1,009,407	**$ 4,820**	$ 5,413	**$ 4,351**	$ 4,076	**0.96%**	1.02%

(a) At December 31, 2016 and 2015, excluded operating lease assets of $13.2 billion and $9.2 billion, respectively.
(b) Predominantly includes Business Banking loans as well as deposit overdrafts.
(c) At December 31, 2016 and 2015, approximately 66% and 64%, respectively, of the PCI option adjustable rate mortgages ("ARMs") portfolio has been modified into fixed-rate, fully amortizing loans.
(d) Credit card and home equity lending-related commitments represent the total available lines of credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit would be used at the same time. For credit card and home equity commitments (if certain conditions are met), the Firm can reduce or cancel these lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice.
(e) Receivables from customers represent margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.
(f) Includes billed interest and fees net of an allowance for uncollectible interest and fees.
(g) Predominantly represents prime mortgage loans held-for-sale.
(h) At December 31, 2016 and 2015, nonaccrual loans excluded loans 90 or more days past due as follows: (1) mortgage loans insured by U.S. government agencies of $5.0 billion and $6.3 billion, respectively; and (2) student loans insured by U.S. government agencies under the FFELP of $263 million and $290 million, respectively. These amounts have been excluded from nonaccrual loans based upon the government guarantee. In addition, the Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status, as permitted by regulatory guidance issued by the FFIEC.
(i) Excludes PCI loans. The Firm is recognizing interest income on each pool of PCI loans as they are all performing.

(j) Net charge-offs and net charge-off rates excluded write-offs in the PCI portfolio of $156 million and $208 million for the years ended December 31, 2016 and 2015. These write-offs decreased the allowance for loan losses for PCI loans. See Allowance for Credit Losses on pages 105–107 for further details.
(k) Average consumer loans held-for-sale were $496 million and $2.1 billion for the years ended December 31, 2016 and 2015, respectively. These amounts were excluded when calculating net charge-off rates.

Consumer, excluding credit card

Portfolio analysis

Consumer loan balances increased during the year ended December 31, 2016, predominantly due to originations of high-quality prime mortgage and auto loans that have been retained on the balance sheet, partially offset by paydowns and the charge-off or liquidation of delinquent loans. The credit environment remained favorable as the economy strengthened and home prices increased.

PCI loans are excluded from the following discussions of individual loan products and are addressed separately below. For further information about the Firm's consumer portfolio, including information about delinquencies, loan modifications and other credit quality indicators, see Note 14.

Home equity: The home equity portfolio declined from December 31, 2015 primarily reflecting loan paydowns and charge-offs. Both early-stage and late-stage delinquencies declined from December 31, 2015. Nonaccrual loans improved from December 31, 2015 primarily as a result of loss mitigation activities. Net charge-offs for the year ended December 31, 2016, declined when compared with the prior year as a result of improvement in home prices and delinquencies.

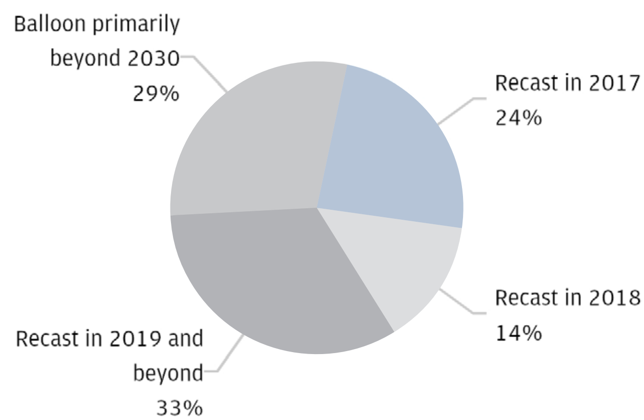
At December 31, 2016, approximately 90% of the Firm's home equity portfolio consists of home equity lines of credit ("HELOCs") and the remainder consists of home equity loans ("HELOANs"). HELOANs are generally fixed-rate, closed-end, amortizing loans, with terms ranging from 3–30 years. In general, HELOCs originated by the Firm are revolving loans for a 10-year period, after which time the HELOC recasts into a loan with a 20-year amortization period. At the time of origination, the borrower typically selects one of two minimum payment options that will generally remain in effect during the revolving period: a monthly payment of 1% of the outstanding balance, or interest-only payments based on a variable index (typically Prime). HELOCs originated by Washington Mutual were generally revolving loans for a 10-year period, after which time the HELOC converts to an interest-only loan with a balloon payment at the end of the loan's term.

The carrying value of HELOCs outstanding was $34 billion at December 31, 2016. Of such amounts, approximately:

- $13 billion have recast from interest-only to fully amortizing payments or have been modified,
- $15 billion are scheduled to recast from interest-only to fully amortizing payments in future periods, and
- $6 billion are interest-only balloon HELOCs, which primarily mature after 2030.

The following chart illustrates the payment recast composition of the approximately $21 billion of HELOCs scheduled to recast in the future, based upon their current contractual terms.

HELOCs scheduled to recast (at December 31, 2016)



The Firm has considered this payment recast risk in its allowance for loan losses based upon the estimated amount of payment shock (i.e., the excess of the fully-amortizing payment over the interest-only payment in effect prior to recast) expected to occur at the payment recast date, along with the corresponding estimated PD and loss severity assumptions. As part of its allowance estimate, the Firm also expects, based on observed activity in recent years, that approximately 30% of the carrying value of HELOCs scheduled to recast will voluntarily prepay prior to or after the recast. The HELOCs that have previously recast to fully amortizing payments generally have higher delinquency rates than the HELOCs within the revolving period, primarily as a result of the payment shock at the time of recast. Certain other factors, such as future developments in both unemployment rates and home prices, could also have a significant impact on the performance of these loans.

The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are exhibiting a material deterioration in their credit risk profile. The Firm will continue to evaluate both the near-term and longer-term recast risks inherent in its HELOC portfolio to ensure that changes in the Firm's estimate of incurred losses are appropriately considered in the allowance for loan losses and that the Firm's account management practices are appropriate given the portfolio's risk profile.

Junior lien loans where the borrower has a senior lien loan that is either delinquent or has been modified are considered high-risk seconds. Such loans are considered to pose a higher risk of default than junior lien loans for which the senior lien loan is neither delinquent nor modified. At December 31, 2016, the Firm estimated that the carrying value of its home equity portfolio contained approximately $1.1 billion of current junior lien loans that were considered high risk seconds, compared with $1.4 billion at December 31, 2015. The Firm estimates the balance of its total exposure to high-risk seconds on a quarterly basis using internal data and loan level credit bureau data (which typically provides the delinquency status of the senior lien loan). The Firm considers the increased PD associated with these high-risk seconds in estimating the allowance for loan losses and classifies those loans that are subordinated to a first lien loan that is more than 90 days delinquent as nonaccrual loans. The estimated balance of these high-risk seconds may vary from quarter to quarter for reasons such as the movement of related senior lien loans into and out of the 30+ day delinquency bucket. The Firm continues to monitor the risks associated with these loans. For further information, see Note 14.

Residential mortgage: The residential mortgage portfolio predominantly consists of high-quality prime mortgage loans with a small component (approximately 2%) of the residential mortgage portfolio in subprime mortgage loans. These subprime mortgage loans continue to run-off and are performing in line with expectations. The residential mortgage portfolio, including loans held-for-sale, increased from December 31, 2015 due to retained originations of primarily high-quality fixed rate prime mortgage loans partially offset by paydowns. Both early-stage and late-stage delinquencies showed improvement from December 31, 2015. Nonaccrual loans decreased from the prior year primarily as a result of loss mitigation activities. Net charge-offs for the year ended December 31, 2016 remain low, reflecting continued improvement in home prices and delinquencies.

At December 31, 2016 and 2015, the Firm's residential mortgage portfolio, including loans held-for-sale, included $9.5 billion and $11.1 billion, respectively, of mortgage loans insured and/or guaranteed by U.S. government agencies, of which $7.0 billion and $8.4 billion, respectively, were 30 days or more past due (of these past due loans, $5.0 billion and $6.3 billion, respectively, were 90 days or more past due). The Firm monitors its exposure to certain potential unrecoverable claim payments related to government insured loans and considers this exposure in estimating the allowance for loan losses.

At December 31, 2016 and 2015, the Firm's residential mortgage portfolio included $19.1 billion and $17.8 billion, respectively, of interest-only loans. These loans have an interest-only payment period generally followed by an adjustable-rate or fixed-rate fully amortizing payment period to maturity and are typically originated as higher-balance loans to higher-income borrowers. To date, losses on this portfolio generally have been consistent with the broader residential mortgage portfolio and the Firm's expectations. The Firm continues to monitor the risks associated with these loans.

Auto: Auto loans increased from December 31, 2015, as a result of growth in new originations. Nonaccrual loans increased compared with December 31, 2015, primarily due to downgrades of select auto dealer risk-rated loans. Net charge-offs for the year ended December 31, 2016 increased compared with the prior year, as a result of higher retail auto loan balances and a moderate increase in loss severity. The auto portfolio predominantly consists of prime-quality loans.

Business banking: Business banking loans increased compared with December 31, 2015 as a result of growth in loan originations. Nonaccrual loans at December 31, 2016 and net charge-offs for the year ended December 31, 2016 increased from the prior year as a result of growth in the portfolio.

Student and other: Student and other loans decreased from December 31, 2015 primarily as a result of the run-off of the student loan portfolio as the Firm ceased originations of student loans during the fourth quarter of 2013. Nonaccrual loans and net charge-offs also declined as a result of the run-off of the student loan portfolio.

Purchased credit-impaired loans: PCI loans decreased as the portfolio continues to run off. As of December 31, 2016, approximately 12% of the option ARM PCI loans were delinquent and approximately 66% of the portfolio had been modified into fixed-rate, fully amortizing loans. Substantially all of the remaining loans are making amortizing payments, although such payments are not necessarily fully amortizing. This latter group of loans is subject to the risk of payment shock due to future payment recast. Default rates generally increase on option ARM loans when payment recast results in a payment increase. The expected increase in default rates is considered in the Firm's quarterly impairment assessment.

The following table provides a summary of lifetime principal loss estimates included in either the nonaccretable difference or the allowance for loan losses.

Summary of PCI loans lifetime principal loss estimates

	Lifetime loss estimates[(a)]		Life-to-date liquidation losses[(b)]	
December 31, (in billions)	**2016**	2015	**2016**	2015
Home equity	**$ 14.4**	$ 14.5	**$ 12.8**	$ 12.7
Prime mortgage	**4.0**	4.0	**3.7**	3.7
Subprime mortgage	**3.2**	3.3	**3.1**	3.0
Option ARMs	**10.0**	10.0	**9.7**	9.5
Total	**$ 31.6**	$ 31.8	**$ 29.3**	$ 28.9

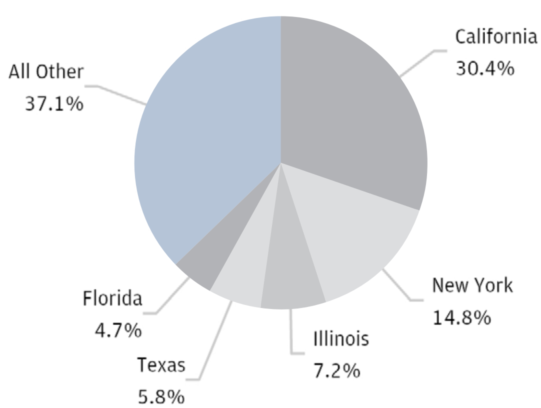
(a) Includes the original nonaccretable difference established in purchase accounting of $30.5 billion for principal losses plus additional principal losses recognized subsequent to acquisition through the provision and allowance for loan losses. The remaining nonaccretable difference for principal losses was $1.1 billion and $1.5 billion at December 31, 2016 and 2015, respectively.
(b) Life-to-date liquidation losses represent both realization of loss upon loan resolution and any principal forgiven upon modification.

For further information on the Firm's PCI loans, including write-offs, see Note 14.

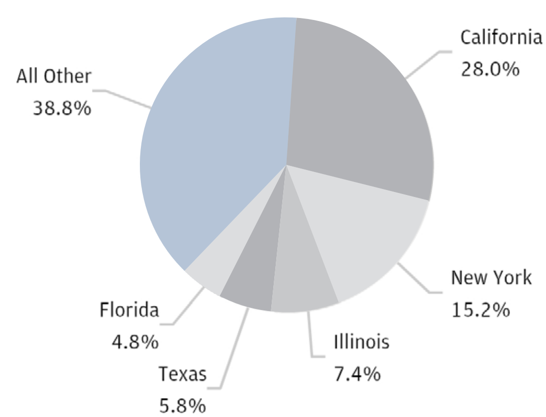
Geographic composition of residential real estate loans

At December 31, 2016, $139.7 billion, or 63% of total retained residential real estate loan portfolio, excluding mortgage loans insured by U.S. government agencies and PCI loans, were concentrated in California, New York, Illinois, Texas and Florida, compared with $123.0 billion, or 61%, at December 31, 2015. California had the greatest concentration of retained residential loans with 30% at December 31, 2016, compared with 28% at December 31, 2015. The unpaid principal balance of PCI loans concentrated in California represented 55% of total PCI loans at both December 31, 2016 and 2015. The following charts illustrate the percentages of the total retained residential real estate portfolio held in the top 5 states, excluding mortgage loans insured by U.S. government agencies and PCI loans. For further information on the geographic composition of the Firm's residential real estate loans, see Note 14.

Top 5 States - Residential real estate, excluding PCI loans (at December 31, 2016)



Top 5 States - Residential real estate, excluding PCI loans (at December 31, 2015)



Current estimated loan-to-values of residential real estate loans

The current estimated average loan-to-value ("LTV") ratio for residential real estate loans retained, excluding mortgage loans insured by U.S. government agencies and PCI loans, was 58% at December 31, 2016 compared with 59% at December 31, 2015.

Although the delinquency rate for loans with high LTV ratios is generally greater than the delinquency rate for loans in which the borrower has greater equity in the collateral, the average LTV ratios have declined consistent with improvements in home prices, reducing the number of loans with a current estimated LTV ratio greater than 100%.

The current estimated average LTV ratio for residential real estate PCI loans, based on the unpaid principal balances, was 64% at December 31, 2016, compared with 69% at December 31, 2015. Of the total PCI portfolio, 4% of the loans had a current estimated LTV ratio greater than 100%, and 1% had a current LTV ratio greater than 125% at December 31, 2016, compared with 6% and 1%, respectively, at December 31, 2015.

While the current estimated collateral value is greater than the net carrying value of PCI loans, the ultimate performance of this portfolio is highly dependent on borrowers' behavior and ongoing ability and willingness to continue to make payments on homes with negative equity, as well as on the cost of alternative housing.

For further information on current estimated LTVs of residential real estate loans, see Note 14.

Loan modification activities – residential real estate loans

The performance of modified loans generally differs by product type due to differences in both the credit quality and the types of modifications provided. Performance metrics for modifications to the residential real estate portfolio, excluding PCI loans, that have been seasoned more than six months show weighted-average redefault rates of 21% for home equity and 22% for residential mortgages. The cumulative performance metrics for modifications to the PCI residential real estate portfolio that have been seasoned more than six months show weighted average redefault rates of 20% for home equity, 19% for prime mortgages, 16% for option ARMs and 32% for subprime mortgages. The cumulative redefault rates reflect the performance of modifications completed under both the U.S. Government's Home Affordable Modification Program ("HAMP") and the Firm's proprietary modification programs (primarily the Firm's modification program that was modeled after HAMP) from October 1, 2009, through December 31, 2016.

Certain loans that were modified under HAMP and the Firm's proprietary modification programs have interest rate reset provisions ("step-rate modifications"). Interest rates on these loans generally began to increase commencing in 2014 by 1% per year, and continue to do so, until the rate reaches a specified cap, typically at a prevailing market interest rate for a fixed-rate loan as of the modification date. At December 31, 2016, the carrying value of non-PCI loans and the unpaid principal balance of PCI loans modified in active step-rate modifications were $3 billion and $9 billion, respectively. The Firm continues to monitor this risk exposure and the impact of these potential interest rate increases is considered in the Firm's allowance for loan losses.

The following table presents information as of December 31, 2016 and 2015, relating to modified retained residential real estate loans for which concessions have been granted to borrowers experiencing financial difficulty. Modifications of PCI loans continue to be accounted for and reported as PCI loans, and the impact of the modification is incorporated into the Firm's quarterly assessment of estimated future cash flows. Modifications of consumer loans other than PCI loans are generally accounted for and reported as TDRs. For further information on modifications for the years ended December 31, 2016 and 2015, see Note 14.

Modified residential real estate loans

December 31, (in millions)	2016 Retained loans	2016 Nonaccrual retained loans[d]	2015 Retained loans	2015 Nonaccrual retained loans[d]
Modified residential real estate loans, excluding PCI loans[a][b]				
Home equity	**$ 2,264**	**$ 1,116**	$ 2,358	$ 1,220
Residential mortgage	**6,032**	**1,755**	6,690	1,957
Total modified residential real estate loans, excluding PCI loans	**$ 8,296**	**$ 2,871**	$ 9,048	$ 3,177
Modified PCI loans[c]				
Home equity	**$ 2,447**	**NA**	$ 2,526	NA
Prime mortgage	**5,052**	**NA**	5,686	NA
Subprime mortgage	**2,951**	**NA**	3,242	NA
Option ARMs	**9,295**	**NA**	10,427	NA
Total modified PCI loans	**$19,745**	**NA**	$21,881	NA

(a) Amounts represent the carrying value of modified residential real estate loans.
(b) At December 31, 2016 and 2015, $3.4 billion and $3.8 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., Federal Housing Administration ("FHA"), U.S. Department of Veterans Affairs ("VA"), Rural Housing Service of the U.S. Department of Agriculture ("RHS")) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure. For additional information about sales of loans in securitization transactions with Ginnie Mae, see Note 16.
(c) Amounts represent the unpaid principal balance of modified PCI loans.
(d) As of December 31, 2016 and 2015, nonaccrual loans included $2.3 billion and $2.5 billion, respectively, of TDRs for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status, see Note 14.

Nonperforming assets

The following table presents information as of December 31, 2016 and 2015, about consumer, excluding credit card, nonperforming assets.

Nonperforming assets[(a)]

December 31, (in millions)	2016	2015
Nonaccrual loans[(b)]		
Residential real estate	**$ 4,145**	$ 4,792
Other consumer	**675**	621
Total nonaccrual loans	**4,820**	5,413
Assets acquired in loan satisfactions		
Real estate owned	**292**	277
Other	**57**	48
Total assets acquired in loan satisfactions	**349**	325
Total nonperforming assets	**$ 5,169**	$ 5,738

(a) At December 31, 2016 and 2015, nonperforming assets excluded: (1) mortgage loans insured by U.S. government agencies of $5.0 billion and $6.3 billion, respectively, that are 90 or more days past due; (2) student loans insured by U.S. government agencies under the FFELP of $263 million and $290 million, respectively, that are 90 or more days past due; and (3) real estate owned insured by U.S. government agencies of $142 million and $343 million, respectively. These amounts have been excluded based upon the government guarantee.
(b) Excludes PCI loans which are accounted for on a pool basis. Since each pool is accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows, the past-due status of the pools, or that of individual loans within the pools, is not meaningful. The Firm is recognizing interest income on each pool of loans as they are all performing.

Nonaccrual loans in the residential real estate portfolio decreased to $4.1 billion from $4.8 billion at December 31, 2016, and 2015, respectively, of which 29% and 31% were greater than 150 days past due, respectively. In the aggregate, the unpaid principal balance of residential real estate loans greater than 150 days past due was charged down by approximately 43% and 44% to the estimated net realizable value of the collateral at December 31, 2016 and 2015, respectively.

Active and suspended foreclosure: For information on loans that were in the process of active or suspended foreclosure, see Note 14.

Nonaccrual loans: The following table presents changes in the consumer, excluding credit card, nonaccrual loans for the years ended December 31, 2016 and 2015.

Nonaccrual loans

Year ended December 31, (in millions)	2016	2015
Beginning balance	**$ 5,413**	$ 6,509
Additions	**3,858**	3,662
Reductions:		
Principal payments and other[(a)]	**1,437**	1,668
Charge-offs	**843**	800
Returned to performing status	**1,589**	1,725
Foreclosures and other liquidations	**582**	565
Total reductions	**4,451**	4,758
Net changes	**(593)**	(1,096)
Ending balance	**$ 4,820**	$ 5,413

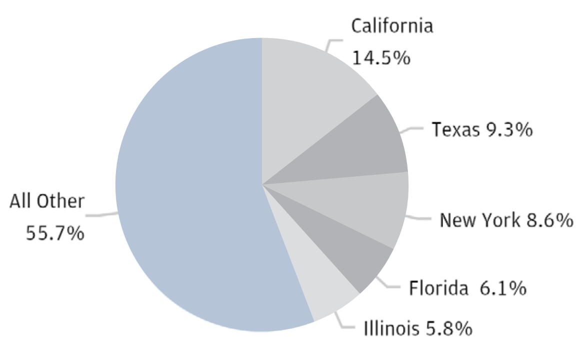
(a) Other reductions includes loan sales.

Credit card

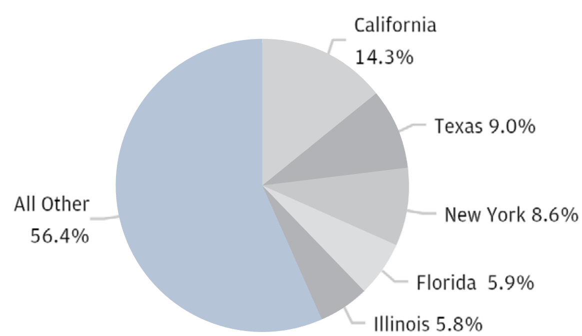
Total credit card loans increased from December 31, 2015 due to strong new account growth and higher sales volume. The December 31, 2016 30+ day delinquency rate increased to 1.61% from 1.43% at December 31, 2015. For the years ended December 31, 2016 and 2015, the net charge-off rates were 2.63% and 2.51%, respectively. The credit card portfolio continues to reflect a largely well-seasoned, rewards-based portfolio that has good U.S. geographic diversification. New originations continue to grow as a percentage of the total portfolio, in line with the Firm's credit parameters; these originations have generated higher loss rates, as anticipated, than the more seasoned portion of the portfolio, given the higher mix of near-prime accounts being originated. These near-prime accounts have net revenue rates and returns on equity that are higher than the portfolio average.

Loans outstanding in the top five states of California, Texas, New York, Florida and Illinois consisted of $62.8 billion in receivables, or 44% of the retained loan portfolio, at December 31, 2016, compared with $57.5 billion, or 44%, at December 31, 2015. The greatest geographic concentration of credit card retained loans is in California, which represented 15% and 14% of total retained loans at December 31, 2016 and 2015, respectively. For further information on the geographic and FICO composition of the Firm's credit card loans, see Note 14.

**Top 5 States Credit Card - Retained
(at December 31, 2016)**



**Top 5 States Credit Card - Retained
(at December 31, 2015)**



Modifications of credit card loans

At December 31, 2016 and 2015, the Firm had $1.2 billion and $1.5 billion, respectively, of credit card loans outstanding that have been modified in TDRs. These balances included both credit card loans with modified payment terms and credit card loans that reverted back to their pre-modification payment terms because the cardholder did not comply with the modified payment terms. The decrease in modified credit card loans outstanding from December 31, 2015, was attributable to a reduction in new modifications as well as ongoing payments and charge-offs on previously modified credit card loans.

Consistent with the Firm's policy, all credit card loans typically remain on accrual status until charged off. However, the Firm establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income.

For additional information about loan modification programs to borrowers, see Note 14.

WHOLESALE CREDIT PORTFOLIO

The Firm's wholesale businesses are exposed to credit risk through underwriting, lending, market-making, and hedging activities with and for clients and counterparties, as well as through various operating services such as cash management and clearing activities. A portion of the loans originated or acquired by the Firm's wholesale businesses is generally retained on the balance sheet. The Firm distributes a significant percentage of the loans it originates into the market as part of its syndicated loan business and to manage portfolio concentrations and credit risk.

The wholesale credit portfolio, excluding the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios, continued to be generally stable for the year ended December 31, 2016, characterized by low levels of criticized exposure, nonaccrual loans and charge-offs. See industry discussion on pages 97–101 for further information. Growth in retained loans was predominantly driven within the commercial real estate portfolio in Commercial Banking, and across multiple commercial and industrial industries in Commercial Banking and the Corporate & Investment Bank. Discipline in underwriting across all areas of lending continues to remain a key point of focus. The wholesale portfolio is actively managed, in part by conducting ongoing, in-depth reviews of client credit quality and transaction structure, inclusive of collateral where applicable; and of industry, product and client concentrations.

Wholesale credit portfolio

December 31, (in millions)	Credit exposure		Nonperforming[c]	
	2016	2015	**2016**	2015
Loans retained	**$383,790**	$357,050	**$ 1,954**	$ 988
Loans held-for-sale	**2,285**	1,104	**109**	3
Loans at fair value	**2,230**	2,861	**–**	25
Loans – reported	**388,305**	361,015	**2,063**	1,016
Derivative receivables	**64,078**	59,677	**223**	204
Receivables from customers and other[a]	**17,440**	13,372	**–**	–
Total wholesale credit-related assets	**469,823**	434,064	**2,286**	1,220
Lending-related commitments	**368,014**	366,399	**506**	193
Total wholesale credit exposure	**$837,837**	$800,463	**$ 2,792**	$ 1,413
Credit derivatives used in credit portfolio management activities[b]	**$ (22,114)**	$ (20,681)	**$ –**	$ (9)
Liquid securities and other cash collateral held against derivatives	**(22,705)**	(16,580)	**NA**	NA

(a) Receivables from customers and other include $17.3 billion and $13.3 billion of margin loans at December 31, 2016 and 2015, respectively, to prime brokerage customers; these are classified in accrued interest and accounts receivable on the Consolidated balance sheets.

(b) Represents the net notional amount of protection purchased and sold through credit derivatives used to manage both performing and nonperforming wholesale credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. For additional information, see Credit derivatives on pages 103–104, and Note 6.

(c) Excludes assets acquired in loan satisfactions.

The following tables present the maturity and ratings profiles of the wholesale credit portfolio as of December 31, 2016 and 2015. The ratings scale is based on the Firm’s internal risk ratings, which generally correspond to the ratings defined by S&P and Moody’s. For additional information on wholesale loan portfolio risk ratings, see Note 14.

Wholesale credit exposure – maturity and ratings profile

	Maturity profile[d]				Ratings profile			
					Investment-grade	Noninvestment-grade		
December 31, 2016 (in millions, except ratios)	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	**Total**	AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below	**Total**	Total % of IG
Loans retained	**$ 117,238**	**$ 167,235**	**$ 99,317**	**$ 383,790**	**$ 289,923**	**$ 93,867**	**$ 383,790**	**76%**
Derivative receivables				**64,078**			**64,078**	
Less: Liquid securities and other cash collateral held against derivatives				**(22,705)**			**(22,705)**	
Total derivative receivables, net of all collateral	**14,019**	**8,510**	**18,844**	**41,373**	**33,081**	**8,292**	**41,373**	**80**
Lending-related commitments	**88,399**	**271,825**	**7,790**	**368,014**	**269,820**	**98,194**	**368,014**	**73**
Subtotal	**219,656**	**447,570**	**125,951**	**793,177**	**592,824**	**200,353**	**793,177**	**75**
Loans held-for-sale and loans at fair value[a]				**4,515**			**4,515**	
Receivables from customers and other				**17,440**			**17,440**	
Total exposure – net of liquid securities and other cash collateral held against derivatives				**$ 815,132**			**$ 815,132**	
Credit derivatives used in credit portfolio management activities[b][c]	**$ (1,354)**	**$ (16,537)**	**$ (4,223)**	**$ (22,114)**	**$ (18,710)**	**$ (3,404)**	**$ (22,114)**	**85%**

	Maturity profile[d]				Ratings profile			
					Investment-grade	Noninvestment-grade		
December 31, 2015 (in millions, except ratios)	Due in 1 year or less	Due after 1 year through 5 years	Due after 5 years	Total	AAA/Aaa to BBB-/Baa3	BB+/Ba1 & below	Total	Total % of IG
Loans retained	$ 110,348	$ 155,902	$ 90,800	$ 357,050	$ 267,736	$ 89,314	$ 357,050	75%
Derivative receivables				59,677			59,677	
Less: Liquid securities and other cash collateral held against derivatives				(16,580)			(16,580)	
Total derivative receivables, net of all collateral	11,399	12,836	18,862	43,097	34,773	8,324	43,097	81
Lending-related commitments	105,514	251,042	9,843	366,399	267,922	98,477	366,399	73
Subtotal	227,261	419,780	119,505	766,546	570,431	196,115	766,546	74
Loans held-for-sale and loans at fair value[a]				3,965			3,965	
Receivables from customers and other				13,372			13,372	
Total exposure – net of liquid securities and other cash collateral held against derivatives				$ 783,883			$ 783,883	
Credit derivatives used in credit portfolio management activities [b][c]	$ (808)	$ (14,427)	$ (5,446)	$ (20,681)	$ (17,754)	$ (2,927)	$ (20,681)	86%

(a) Represents loans held-for-sale, primarily related to syndicated loans and loans transferred from the retained portfolio, and loans at fair value.
(b) These derivatives do not qualify for hedge accounting under U.S. GAAP.
(c) The notional amounts are presented on a net basis by underlying reference entity and the ratings profile shown is based on the ratings of the reference entity on which protection has been purchased. Predominantly all of the credit derivatives entered into by the Firm where it has purchased protection for credit portfolio management activities are executed with investment-grade counterparties.
(d) The maturity profile of retained loans, lending-related commitments and derivative receivables is based on remaining contractual maturity. Derivative contracts that are in a receivable position at December 31, 2016, may become a payable prior to maturity based on their cash flow profile or changes in market conditions.

Wholesale credit exposure – industry exposures

The Firm focuses on the management and diversification of its industry exposures, paying particular attention to industries with actual or potential credit concerns. Exposures deemed criticized align with the U.S. banking regulators’ definition of criticized exposures, which consist of the special mention, substandard and doubtful categories. The total criticized component of the portfolio, excluding loans held-for-sale and loans at fair value, was $19.8 billion at December 31, 2016, compared with $14.6 billion at December 31, 2015, driven by downgrades, including within the Oil & Gas, Natural Gas Pipelines, and Metals & Mining portfolios.

Below are summaries of the Firm's exposures as of December 31, 2016 and 2015. For additional information on industry concentrations, see Note 5.

Wholesale credit exposure – industries[a]

As of or for the year ended **December 31, 2016** (in millions)	Credit exposure[e]	Investment-grade	Noninvestment-grade: Noncriticized	Noninvestment-grade: Criticized performing	Noninvestment-grade: Criticized nonperforming	Selected metrics: 30 days or more past due and accruing loans	Selected metrics: Net charge-offs/ (recoveries)	Selected metrics: Credit derivative hedges[f]	Selected metrics: Liquid securities and other cash collateral held against derivative receivables
Real Estate	$ 135,041	$ 104,575	$ 29,295	$ 971	$ 200	$ 157	$ (7)	$ (54)	$ (27)
Consumer & Retail	85,435	55,495	28,146	1,554	240	75	24	(424)	(69)
Technology, Media & Telecommunications	62,950	39,756	21,619	1,559	16	9	2	(589)	(30)
Industrials	55,449	36,597	17,690	1,026	136	128	3	(434)	(40)
Healthcare	47,866	37,852	9,092	882	40	86	37	(286)	(246)
Banks & Finance Cos	44,614	35,308	8,892	404	10	21	(2)	(1,336)	(7,319)
Oil & Gas	40,099	18,497	12,138	8,069	1,395	31	222	(1,532)	(18)
Asset Managers	31,886	27,378	4,507	1	–	14	–	–	(5,737)
Utilities	29,622	24,184	4,960	392	86	8	–	(306)	39
State & Municipal Govt[b]	28,263	27,603	624	6	30	107	(1)	(130)	398
Central Govt	20,408	20,123	276	9	–	4	–	(11,691)	(4,183)
Transportation	19,029	12,170	6,362	444	53	9	10	(93)	(188)
Automotive	16,635	9,229	7,204	201	1	7	–	(401)	(14)
Chemicals & Plastics	14,988	10,365	4,451	142	30	3	–	(35)	(3)
Metals & Mining	13,419	5,523	6,744	1,133	19	–	36	(621)	(62)
Insurance	13,151	10,766	2,252	–	133	9	–	(275)	(2,538)
Financial Markets Infrastructure	8,732	7,980	752	–	–	–	–	–	(390)
Securities Firms	3,867	1,543	2,324	–	–	–	–	(273)	(491)
All other[c]	144,428	128,456	15,305	373	294	650	17	(3,634)	(1,787)
Subtotal	$ 815,882	$ 613,400	$ 182,633	$ 17,166	$ 2,683	$ 1,318	$ 341	$ (22,114)	$ (22,705)
Loans held-for-sale and loans at fair value	4,515								
Receivables from customers and other	17,440								
Total[d]	$ 837,837								

As of or for the year ended December 31, 2015 (in millions)	Credit exposure[e]	Investment-grade	Noninvestment-grade			Selected metrics			
			Noncriticized	Criticized performing	Criticized nonperforming	30 days or more past due and accruing loans	Net charge-offs/ (recoveries)	Credit derivative hedges[f]	Liquid securities and other cash collateral held against derivative receivables
Real Estate	$ 116,857	$ 88,076	$ 27,087	$ 1,463	$ 231	$ 208	$ (14)	$ (54)	$ (47)
Consumer & Retail	85,460	53,647	29,659	1,947	207	18	13	(288)	(94)
Technology, Media & Telecommunications	57,382	29,205	26,925	1,208	44	5	(1)	(806)	(21)
Industrials	54,386	36,519	16,663	1,164	40	59	8	(386)	(39)
Healthcare	46,053	37,858	7,755	394	46	129	(7)	(24)	(245)
Banks & Finance Cos	43,398	35,071	7,654	610	63	17	(5)	(974)	(5,509)
Oil & Gas	42,077	24,379	13,158	4,263	277	22	13	(530)	(37)
Asset Managers	23,815	20,214	3,570	31	–	18	–	(6)	(4,453)
Utilities	30,853	24,983	5,655	168	47	3	–	(190)	(289)
State & Municipal Govt[b]	29,114	28,307	745	7	55	55	(8)	(146)	(81)
Central Govt	17,968	17,871	97	–	–	7	–	(9,359)	(2,393)
Transportation	19,227	13,258	5,801	167	1	15	3	(51)	(243)
Automotive	13,864	9,182	4,580	101	1	4	(2)	(487)	(1)
Chemicals & Plastics	15,232	10,910	4,017	274	31	9	–	(17)	–
Metals & Mining	14,049	6,522	6,434	1,008	85	1	–	(449)	(4)
Insurance	11,889	9,812	1,958	26	93	23	–	(157)	(1,410)
Financial Markets Infrastructure	7,973	7,304	669	–	–	–	–	–	(167)
Securities Firms	4,412	1,505	2,907	–	–	3	–	(102)	(256)
All other[c]	149,117	130,488	18,095	370	164	1,015	10	(6,655)	(1,291)
Subtotal	$ 783,126	$ 585,111	$ 183,429	$ 13,201	$ 1,385	$ 1,611	$ 10	$ (20,681)	$ (16,580)
Loans held-for-sale and loans at fair value	3,965								
Receivables from customers and other	13,372								
Total[d]	$ 800,463								

(a) The industry rankings presented in the table as of December 31, 2015, are based on the industry rankings of the corresponding exposures at December 31, 2016, not actual rankings of such exposures at December 31, 2015.
(b) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2016 and 2015, noted above, the Firm held: $9.1 billion and $7.6 billion, respectively, of trading securities; $31.6 billion and $33.6 billion, respectively, of AFS securities; and $14.5 billion and $12.8 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 3 and Note 12.
(c) All other includes: individuals; SPEs; holding companies; and private education and civic organizations, representing approximately 56%, 36%, 4% and 4%, respectively, at December 31, 2016, and 54%, 37%, 5% and 4%, respectively, at December 31, 2015.
(d) Excludes cash placed with banks of $380.2 billion and$351.0 billion, at December 31, 2016 and 2015, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks.
(e) Credit exposure is net of risk participations and excludes the benefit of credit derivatives used in credit portfolio management activities held against derivative receivables or loans and liquid securities and other cash collateral held against derivative receivables.
(f) Represents the net notional amounts of protection purchased and sold through credit derivatives used to manage the credit exposures; these derivatives do not qualify for hedge accounting under U.S. GAAP. The All other category includes purchased credit protection on certain credit indices.

Presented below is a discussion of certain industries to which the Firm has significant exposures and/or which present actual or potential credit concerns.

Real Estate

Exposure to the Real Estate industry was approximately 16.1% and 14.6% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to this industry increased by $18.2 billion, or 16%, in 2016 to $135.0 billion primarily driven by Commercial Banking. The investment-grade percentage of the portfolio increased to 77% in 2016, up from 75% in 2015. As of December 31, 2016, $106.3 billion of the exposure was drawn, of which 83% was investment-grade, and 83% of the $135.0 billion exposure was secured. As of December 31, 2016, $80.1 billion of the $135.0 billion was multifamily, largely in California; of the $80.1 billion, 82% was investment-grade and 98% was secured. For further information on commercial real estate loans, see Note 14.

Oil & Gas and Natural Gas Pipelines

The following table presents Oil & Gas and Natural Gas Pipeline exposures as of December 31, 2016, and December 31, 2015.

(in millions, except ratios)	December 31, 2016 Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn
Exploration & Production ("E&P") and Oilfield Services[(a)]	$ 20,829	$ 1,256	$ 22,085	26%	34%
Other Oil & Gas[(b)]	17,392	622	18,014	71	30
Total Oil & Gas	**38,221**	**1,878**	**40,099**	**46**	**33**
Natural Gas Pipelines[(c)]	4,253	106	4,359	66	30
Total Oil & Gas and Natural Gas Pipelines	**$ 42,474**	**$ 1,984**	**$ 44,458**	**48**	**32**

(in millions, except ratios)	December 31, 2015 Loans and Lending-related Commitments	Derivative Receivables	Credit exposure	% Investment-grade	% Drawn
E&P and Oilfield Services[(a)]	$ 23,055	$ 400	$ 23,455	44%	36%
Other Oil & Gas[(b)]	17,120	1,502	18,622	76	27
Total Oil & Gas	40,175	1,902	42,077	58	32
Natural Gas Pipelines[(c)]	4,093	158	4,251	64	21
Total Oil & Gas and Natural Gas Pipelines	$ 44,268	$ 2,060	$ 46,328	59	31

(a) Noninvestment-grade exposure to E&P and Oilfield Services is largely secured.
(b) Other Oil & Gas includes Integrated Oil & Gas companies, Midstream/Oil Pipeline companies and refineries.
(c) Natural Gas Pipelines is reported within the Utilities Industry.

Exposure to the Oil & Gas and Natural Gas Pipelines portfolios was approximately 5.3% and 5.8% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to these industries decreased by $1.9 billion in 2016 to $44.5 billion; of the $44.5 billion, $14.4 billion was drawn at year-end. As of December 31, 2016, approximately $21.4 billion of the exposure was investment-grade, of which approximately $5.3 billion was drawn, and approximately $23.1 billion of the exposure was noninvestment grade, of which approximately $9.0 billion was drawn; 21% of the total exposure to the Oil & Gas and Natural Gas Pipelines industries was criticized. Secured lending, of which approximately half is reserve-based lending to the Exploration & Production sub-sector of the Oil & Gas industry, was $14.3 billion as of December 31, 2016; 44% of the secured lending exposure was drawn. Exposure to commercial real estate, which is reported within the Real Estate industry, in certain areas of Texas, California and Colorado that are deemed sensitive to the Oil & Gas industry, was $4.5 billion as of December 31, 2016. While the overall trends and sentiment have been stabilizing, the Firm continues to actively monitor and manage its exposure to these portfolios.

Metals & Mining

Exposure to the Metals & Mining industry was approximately 1.6% and 1.8% of the Firm's total wholesale exposure as of December 31, 2016 and 2015, respectively. Exposure to the Metals & Mining industry decreased by $630 million in 2016 to $13.4 billion, of which $4.4 billion was drawn. The portfolio largely consisted of exposure in North America, and was concentrated in the Steel and Diversified Mining sub-sectors. Approximately 41% and 46% of the exposure in the Metals & Mining portfolio was investment-grade as of December 31, 2016 and December 31, 2015, respectively. While the overall trends and sentiment have been stabilizing, the Firm continues to actively monitor and manage its exposure to this industry.

Loans

In the normal course of its wholesale business, the Firm provides loans to a variety of customers, ranging from large corporate and institutional clients to high-net-worth individuals. For further discussion on loans, including information on credit quality indicators and sales of loans, see Note 14.

The following table presents the change in the nonaccrual loan portfolio for the years ended December 31, 2016 and 2015. Wholesale nonaccrual loans increased primarily driven by downgrades in the Oil & Gas portfolio.

Wholesale nonaccrual loan activity[(a)]

Year ended December 31, (in millions)	2016	2015
Beginning balance	$ 1,016	$ 624
Additions	2,981	1,307
Reductions:		
Paydowns and other	1,148	534
Gross charge-offs	385	87
Returned to performing status	242	286
Sales	159	8
Total reductions	1,934	915
Net changes	1,047	392
Ending balance	$ 2,063	$ 1,016

(a) Loans are placed on nonaccrual status when management believes full payment of principal or interest is not expected, regardless of delinquency status, or when principal or interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection.

The following table presents net charge-offs/recoveries, which are defined as gross charge-offs less recoveries, for the years ended December 31, 2016 and 2015. The amounts in the table below do not include gains or losses from sales of nonaccrual loans.

Wholesale net charge-offs/(recoveries)

Year ended December 31, (in millions, except ratios)	2016	2015
Loans – reported		
Average loans retained	$ 371,778	$ 337,407
Gross charge-offs	398	95
Gross recoveries	(57)	(85)
Net charge-offs	341	10
Net charge-off rate	0.09%	—%

Lending-related commitments

The Firm uses lending-related financial instruments, such as commitments (including revolving credit facilities) and guarantees, to meet the financing needs of its customers. The contractual amounts of these financial instruments represent the maximum possible credit risk should the counterparties draw down on these commitments or the Firm fulfill its obligations under these guarantees, and the counterparties subsequently fail to perform according to the terms of these contracts.

In the Firm's view, the total contractual amount of these wholesale lending-related commitments is not representative of the Firm's future credit exposure or funding requirements. In determining the amount of credit risk exposure the Firm has to wholesale lending-related commitments, the Firm has estimated a loan-equivalent amount for each commitment. The loan-equivalent amount of the Firm's lending-related commitments was $204.6 billion and $212.4 billion as of December 31, 2016 and 2015, respectively.

Clearing services

The Firm provides clearing services for clients entering into securities and derivative transactions. Through the provision of these services the Firm is exposed to the risk of non-performance by its clients and may be required to share in losses incurred by central counterparties. Where possible, the Firm seeks to mitigate its credit risk to its clients through the collection of adequate margin at inception and throughout the life of the transactions and can also cease provision of clearing services if clients do not adhere to their obligations under the clearing agreement. For further discussion of clearing services, see Note 29.

Derivative contracts

In the normal course of business, the Firm uses derivative instruments predominantly for market-making activities. Derivatives enable customers to manage exposures to fluctuations in interest rates, currencies and other markets. The Firm also uses derivative instruments to manage its own credit and other market risk exposure. The nature of the counterparty and the settlement mechanism of the derivative affect the credit risk to which the Firm is exposed. For OTC derivatives the Firm is exposed to the credit risk of the derivative counterparty. For exchange-traded derivatives ("ETD"), such as futures and options and "cleared" over-the-counter ("OTC-cleared") derivatives, the Firm is generally exposed to the credit risk of the relevant CCP. Where possible, the Firm seeks to mitigate its credit risk exposures arising from derivative transactions through the use of legally enforceable master netting arrangements and collateral agreements. For further discussion of derivative contracts, counterparties and settlement types, see Note 6.

The following table summarizes the net derivative receivables for the periods presented.

Derivative receivables

December 31, (in millions)	2016	2015
Interest rate	$ 28,302	$ 26,363
Credit derivatives	1,294	1,423
Foreign exchange	23,271	17,177
Equity	4,939	5,529
Commodity	6,272	9,185
Total, net of cash collateral	64,078	59,677
Liquid securities and other cash collateral held against derivative receivables[(a)]	(22,705)	(16,580)
Total, net of all collateral	$ 41,373	$ 43,097

(a) Includes collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.

Derivative receivables reported on the Consolidated balance sheets were $64.1 billion and $59.7 billion at December 31, 2016 and 2015, respectively. These amounts represent the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm. However, in management's view, the appropriate measure of current credit risk should also take into consideration additional liquid securities (primarily U.S. government and agency securities and other group of seven nations ("G7") government bonds) and other cash collateral held by the Firm aggregating $22.7 billion and $16.6 billion at December 31, 2016 and 2015, respectively, that may be used as security when the fair value of the client's exposure is in the Firm's favor. The change in derivative receivables was predominantly related to client-driven market-making activities in CIB. The increase in derivative receivables reflected the impact of market movements, which increased foreign exchange receivables, partially offset by reduced commodity derivative receivables.

In addition to the collateral described in the preceding paragraph, the Firm also holds additional collateral (primarily cash, G7 government securities, other liquid government-agency and guaranteed securities, and corporate debt and equity securities) delivered by clients at the initiation of transactions, as well as collateral related to contracts that have a non-daily call frequency and collateral that the Firm has agreed to return but has not yet settled as of the reporting date. Although this collateral does not reduce the balances and is not included in the table above, it is available as security against potential exposure that could arise should the fair value of the client's derivative transactions move in the Firm's favor. The derivative receivables fair value, net of all collateral, also does not include other credit enhancements, such as letters of credit. For additional information on the Firm's use of collateral agreements, see Note 6.

While useful as a current view of credit exposure, the net fair value of the derivative receivables does not capture the potential future variability of that credit exposure. To capture the potential future variability of credit exposure, the Firm calculates, on a client-by-client basis, three measures of potential derivatives-related credit loss: Peak, Derivative Risk Equivalent ("DRE"), and Average exposure ("AVG"). These measures all incorporate netting and collateral benefits, where applicable.

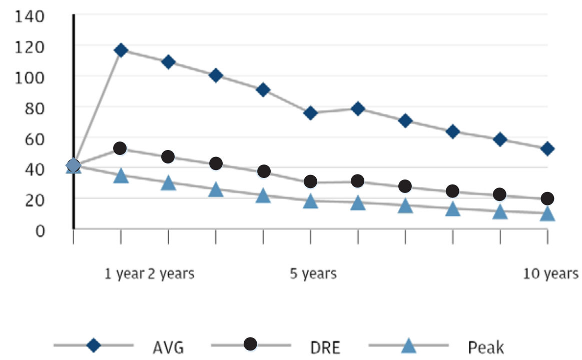
Peak represents a conservative measure of potential exposure to a counterparty calculated in a manner that is broadly equivalent to a 97.5% confidence level over the life of the transaction. Peak is the primary measure used by the Firm for setting of credit limits for derivative transactions, senior management reporting and derivatives exposure management. DRE exposure is a measure that expresses the risk of derivative exposure on a basis intended to be equivalent to the risk of loan exposures. DRE is a less extreme measure of potential credit loss than Peak and is used for aggregating derivative credit risk exposures with loans and other credit risk.

Finally, AVG is a measure of the expected fair value of the Firm's derivative receivables at future time periods, including the benefit of collateral. AVG exposure over the total life of the derivative contract is used as the primary metric for pricing purposes and is used to calculate credit capital and the CVA, as further described below. The three year AVG exposure was $31.1 billion and $32.4 billion at December 31, 2016 and 2015, respectively, compared with derivative receivables, net of all collateral, of $41.4 billion and $43.1 billion at December 31, 2016 and 2015, respectively.

The fair value of the Firm's derivative receivables incorporates an adjustment, the CVA, to reflect the credit quality of counterparties. The CVA is based on the Firm's AVG to a counterparty and the counterparty's credit spread in the credit derivatives market. The primary components of changes in CVA are credit spreads, new deal activity or unwinds, and changes in the underlying market environment. The Firm believes that active risk management is essential to controlling the dynamic credit risk in the derivatives portfolio. In addition, the Firm's risk management process takes into consideration the potential impact of wrong-way risk, which is broadly defined as the potential for increased correlation between the Firm's exposure to a counterparty (AVG) and the counterparty's credit quality. Many factors may influence the nature and magnitude of these correlations over time. To the extent that these correlations are identified, the Firm may adjust the CVA associated with that counterparty's AVG. The Firm risk manages exposure to changes in CVA by entering into credit derivative transactions, as well as interest rate, foreign exchange, equity and commodity derivative transactions.

The accompanying graph shows exposure profiles to the Firm's current derivatives portfolio over the next 10 years as calculated by the Peak, DRE and AVG metrics. The three measures generally show that exposure will decline after the first year, if no new trades are added to the portfolio.

Exposure profile of derivatives measures
December 31, 2016
(in billions)



The following table summarizes the ratings profile by derivative counterparty of the Firm's derivative receivables, including credit derivatives, net of all collateral, at the dates indicated. The ratings scale is based on the Firm's internal ratings, which generally correspond to the ratings as defined by S&P and Moody's.

Ratings profile of derivative receivables

Rating equivalent	2016		2015[(a)]	
December 31, (in millions, except ratios)	Exposure net of all collateral	% of exposure net of all collateral	Exposure net of all collateral	% of exposure net of all collateral
AAA/Aaa to AA-/Aa3	**$ 11,449**	**28%**	$ 10,371	24%
A+/A1 to A-/A3	**8,505**	**20**	10,595	25
BBB+/Baa1 to BBB-/Baa3	**13,127**	**32**	13,807	32
BB+/Ba1 to B-/B3	**7,308**	**18**	7,500	17
CCC+/Caa1 and below	**984**	**2**	824	2
Total	**$ 41,373**	**100%**	$ 43,097	100%

(a) Prior period amounts have been revised to conform with the current period presentation.

As previously noted, the Firm uses collateral agreements to mitigate counterparty credit risk. The percentage of the Firm's derivatives transactions subject to collateral agreements – excluding foreign exchange spot trades, which are not typically covered by collateral agreements due to their short maturity – was 90% as of December 31, 2016, largely unchanged compared with 87% as of December 31, 2015.

Credit derivatives
The Firm uses credit derivatives for two primary purposes: first, in its capacity as a market-maker, and second, as an end-user to manage the Firm's own credit risk associated with various exposures. For a detailed description of credit derivatives, see Credit derivatives in Note 6.

Credit portfolio management activities
Included in the Firm's end-user activities are credit derivatives used to mitigate the credit risk associated with traditional lending activities (loans and unfunded commitments) and derivatives counterparty exposure in the Firm's wholesale businesses (collectively, "credit portfolio management" activities). Information on credit portfolio management activities is provided in the table below. For further information on derivatives used in credit portfolio management activities, see Credit derivatives in Note 6.

The Firm also uses credit derivatives as an end-user to manage other exposures, including credit risk arising from certain securities held in the Firm's market-making businesses. These credit derivatives are not included in credit portfolio management activities; for further information on these credit derivatives as well as credit derivatives used in the Firm's capacity as a market-maker in credit derivatives, see Credit derivatives in Note 6.

Credit derivatives used in credit portfolio management activities

	Notional amount of protection purchased [(a)]			
December 31, (in millions)		**2016**		**2015**
Credit derivatives used to manage:				
Loans and lending-related commitments	**$**	**2,430**	$	2,289
Derivative receivables		**19,684**		18,392
Credit derivatives used in credit portfolio management activities	**$**	**22,114**	$	20,681

(a) Amounts are presented net, considering the Firm's net protection purchased or sold with respect to each underlying reference entity or index.

The credit derivatives used in credit portfolio management activities do not qualify for hedge accounting under U.S. GAAP; these derivatives are reported at fair value, with gains and losses recognized in principal transactions revenue. In contrast, the loans and lending-related commitments being risk-managed are accounted for on an accrual basis. This asymmetry in accounting treatment, between loans and lending-related commitments and the credit derivatives used in credit portfolio management activities, causes earnings volatility that is not representative, in the Firm's view, of the true changes in value of the Firm's overall credit exposure.

The effectiveness of credit default swaps ("CDS") as a hedge against the Firm's exposures may vary depending on a number of factors, including the named reference entity (i.e., the Firm may experience losses on specific exposures that are different than the named reference entities in the purchased CDS); the contractual terms of the CDS (which may have a defined credit event that does not align with an actual loss realized by the Firm); and the maturity of the Firm's CDS protection (which in some cases may be shorter than the Firm's exposures). However, the Firm generally seeks to purchase credit protection with a maturity date that is the same or similar to the maturity date of the exposure for which the protection was purchased, and remaining differences in maturity are actively monitored and managed by the Firm.

ALLOWANCE FOR CREDIT LOSSES

JPMorgan Chase's allowance for loan losses covers both the consumer (primarily scored) portfolio and wholesale (risk-rated) portfolio. The allowance represents management's estimate of probable credit losses inherent in the Firm's loan portfolio. Management also determines an allowance for wholesale and certain consumer lending-related commitments.

For a further discussion of the components of the allowance for credit losses and related management judgments, see Critical Accounting Estimates Used by the Firm on pages 132–134 and Note 15.

At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm, and discussed with the DRPC and the Audit Committee. As of December 31, 2016, JPMorgan Chase deemed the allowance for credit losses to be appropriate and sufficient to absorb probable credit losses inherent in the portfolio.

The consumer allowance for loan losses remained relatively unchanged from December 31, 2015. Changes to the allowance for loan losses included reductions in the residential real estate portfolio, reflecting continued improvements in home prices and lower delinquencies, as well as runoff in the student loan portfolio. These reductions were offset by increases in the allowance for loan losses reflecting loan growth in the credit card portfolio (including newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio), as well as loan growth in the auto and business banking loan portfolios. For additional information about delinquencies and nonaccrual loans in the consumer, excluding credit card, loan portfolio, see Consumer Credit Portfolio on pages 89–95 and Note 14.

The wholesale allowance for credit losses increased from December 31, 2015, reflecting the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios. For additional information on the wholesale portfolio, see Wholesale Credit Portfolio on pages 96–104 and Note 14.

Summary of changes in the allowance for credit losses

	2016				2015			
Year ended December 31, (in millions, except ratios)	Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses								
Beginning balance at January 1,	**$ 5,806**	**$ 3,434**	**$ 4,315**	**$ 13,555**	$ 7,050	$ 3,439	$ 3,696	$ 14,185
Gross charge-offs	**1,500**	**3,799**	**398**	**5,697**	1,658	3,488	95	5,241
Gross recoveries	**(591)**	**(357)**	**(57)**	**(1,005)**	(704)	(366)	(85)	(1,155)
Net charge-offs	**909**	**3,442**	**341**	**4,692**	954	3,122	10	4,086
Write-offs of PCI loans[a]	**156**	**–**	**–**	**156**	208	–	–	208
Provision for loan losses	**467**	**4,042**	**571**	**5,080**	(82)	3,122	623	3,663
Other	**(10)**	**–**	**(1)**	**(11)**	–	(5)	6	1
Ending balance at December 31,	**$ 5,198**	**$ 4,034**	**$ 4,544**	**$ 13,776**	$ 5,806	$ 3,434	$ 4,315	$ 13,555
Impairment methodology								
Asset-specific[b]	**$ 308**	**$ 358**	**$ 342**	**$ 1,008**	$ 364	$ 460	$ 274	$ 1,098
Formula-based	**2,579**	**3,676**	**4,202**	**10,457**	2,700	2,974	4,041	9,715
PCI	**2,311**	**–**	**–**	**2,311**	2,742	–	–	2,742
Total allowance for loan losses	**$ 5,198**	**$ 4,034**	**$ 4,544**	**$ 13,776**	$ 5,806	$ 3,434	$ 4,315	$ 13,555
Allowance for lending-related commitments								
Beginning balance at January 1,	**$ 14**	**$ –**	**$ 772**	**$ 786**	$ 13	$ –	$ 609	$ 622
Provision for lending-related commitments	**–**	**–**	**281**	**281**	1	–	163	164
Other	**12**	**–**	**(1)**	**11**	–	–	–	–
Ending balance at December 31,	**$ 26**	**$ –**	**$ 1,052**	**$ 1,078**	$ 14	$ –	$ 772	$ 786
Impairment methodology								
Asset-specific	**$ –**	**$ –**	**$ 169**	**$ 169**	$ –	$ –	$ 73	$ 73
Formula-based	**26**	**–**	**883**	**909**	14	–	699	713
Total allowance for lending-related commitments[c]	**$ 26**	**$ –**	**$ 1,052**	**$ 1,078**	$ 14	$ –	$ 772	$ 786
Total allowance for credit losses	**$ 5,224**	**$ 4,034**	**$ 5,596**	**$ 14,854**	$ 5,820	$ 3,434	$ 5,087	$ 14,341
Memo:								
Retained loans, end of period	**$ 364,406**	**$ 141,711**	**$ 383,790**	**$ 889,907**	$ 344,355	$ 131,387	$ 357,050	$ 832,792
Retained loans, average	**358,486**	**131,081**	**371,778**	**861,345**	318,612	124,274	337,407	780,293
PCI loans, end of period	**35,679**	**–**	**3**	**35,682**	40,998	–	4	41,002
Credit ratios								
Allowance for loan losses to retained loans	**1.43%**	**2.85%**	**1.18%**	**1.55%**	1.69%	2.61%	1.21%	1.63%
Allowance for loan losses to retained nonaccrual loans[d]	**109**	**NM**	**233**	**205**	109	NM	437	215
Allowance for loan losses to retained nonaccrual loans excluding credit card	**109**	**NM**	**233**	**145**	109	NM	437	161
Net charge-off rates	**0.25**	**2.63**	**0.09**	**0.54**	0.30	2.51	–	0.52
Credit ratios, excluding residential real estate PCI loans								
Allowance for loan losses to retained loans	**0.88**	**2.85**	**1.18**	**1.34**	1.01	2.61	1.21	1.37
Allowance for loan losses to retained nonaccrual loans[d]	**61**	**NM**	**233**	**171**	58	NM	437	172
Allowance for loan losses to retained nonaccrual loans excluding credit card	**61**	**NM**	**233**	**111**	58	NM	437	117
Net charge-off rates	**0.28%**	**2.63%**	**0.09%**	**0.57%**	0.35%	2.51%	–%	0.55%

Note: In the table above, the financial measures which exclude the impact of PCI loans are non-GAAP financial measures.

(a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation).

(b) Includes risk-rated loans that have been placed on nonaccrual status and loans that have been modified in a TDR. The asset-specific credit card allowance for loan losses modified in a TDR is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(c) The allowance for lending-related commitments is reported in accounts payable and other liabilities on the Consolidated balance sheets.

(d) The Firm's policy is generally to exempt credit card loans from being placed on nonaccrual status as permitted by regulatory guidance.

Provision for credit losses

For the year ended December 31, 2016, the provision for credit losses was $5.4 billion, compared with $3.8 billion for the year ended December 31, 2015.

The total consumer provision for credit losses increased for the year ended December 31, 2016 when compared with the prior year. The increase in the provision was driven by:

- a $920 million increase related to the credit card portfolio, due to a $600 million addition in the allowance for loan losses, as well as $320 million of higher net charge-offs, driven by loan growth, including growth in newer vintages which, as anticipated, have higher loss rates compared to the overall portfolio,
- a $450 million lower benefit related to the residential real estate portfolio, as the current year reduction in the allowance for loan losses was lower than the prior year. The reduction in both periods reflected continued improvements in home prices and lower delinquencies and
- a $150 million increase related to the auto and business banking portfolio, due to additions to the allowance for loan losses and higher net charge-offs, reflecting loan growth in the portfolios.

The wholesale provision for credit losses increased for the year ended December 31, 2016 reflecting the impact of downgrades in the Oil & Gas and Natural Gas Pipelines portfolios.

Year ended December 31, (in millions)	Provision for loan losses			Provision for lending-related commitments			Total provision for credit losses		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Consumer, excluding credit card	**$ 467**	$ (82)	$ 414	**$ –**	$ 1	$ 5	**$ 467**	$ (81)	$ 419
Credit card	**4,042**	3,122	3,079	**–**	–	–	**4,042**	3,122	3,079
Total consumer	**4,509**	3,040	3,493	**–**	1	5	**4,509**	3,041	3,498
Wholesale	**571**	623	(269)	**281**	163	(90)	**852**	786	(359)
Total	**$ 5,080**	$ 3,663	$ 3,224	**$ 281**	$ 164	$ (85)	**$ 5,361**	$ 3,827	$ 3,139

COUNTRY RISK MANAGEMENT

Country risk is the risk that a sovereign event or action alters the value or terms of contractual obligations of obligors, counterparties and issuers or adversely affects markets related to a particular country. The Firm has a comprehensive country risk management framework for assessing country risks, determining risk tolerance, and measuring and monitoring direct country exposures in the Firm. The Country Risk Management group is responsible for developing guidelines and policies for managing country risk in both emerging and developed countries. The Country Risk Management group actively monitors the various portfolios giving rise to country risk to ensure the Firm's country risk exposures are diversified and that exposure levels are appropriate given the Firm's strategy and risk tolerance relative to a country.

Country risk organization

The Country Risk Management group, part of the independent risk management function, works in close partnership with other risk functions to assess and monitor country risk within the Firm. The Firmwide Risk Executive for Country Risk reports to the Firm's CRO.

Country Risk Management is responsible for the following functions:

- Developing guidelines and policies consistent with a comprehensive country risk framework
- Assigning sovereign ratings and assessing country risks
- Measuring and monitoring country risk exposure and stress across the Firm
- Managing country limits and reporting trends and limit breaches to senior management
- Developing surveillance tools for early identification of potential country risk concerns
- Providing country risk scenario analysis

Country risk identification and measurement

The Firm is exposed to country risk through its lending and deposits, investing, and market-making activities, whether cross-border or locally funded. Country exposure includes activity with both government and private-sector entities in a country. Under the Firm's internal country risk management approach, country exposure is reported based on the country where the majority of the assets of the obligor, counterparty, issuer or guarantor are located or where the majority of its revenue is derived, which may be different than the domicile (legal residence) or country of incorporation of the obligor, counterparty, issuer or guarantor. Country exposures are generally measured by considering the Firm's risk to an immediate default of the counterparty or obligor, with zero recovery. Assumptions are sometimes required in determining the measurement and allocation of country exposure, particularly in the case of certain tranched credit derivatives. Different measurement approaches or assumptions would affect the amount of reported country exposure.

Under the Firm's internal country risk measurement framework:

- Lending exposures are measured at the total committed amount (funded and unfunded), net of the allowance for credit losses and cash and marketable securities collateral received
- Deposits are measured as the cash balances placed with central and commercial banks
- Securities financing exposures are measured at their receivable balance, net of collateral received
- Debt and equity securities are measured at the fair value of all positions, including both long and short positions
- Counterparty exposure on derivative receivables is measured at the derivative's fair value, net of the fair value of the related collateral. Counterparty exposure on derivatives can change significantly because of market movements
- Credit derivatives protection purchased and sold is reported based on the underlying reference entity and is measured at the notional amount of protection purchased or sold, net of the fair value of the recognized derivative receivable or payable. Credit derivatives protection purchased and sold in the Firm's market-making activities is measured on a net basis, as such activities often result in selling and purchasing protection related to the same underlying reference entity; this reflects the manner in which the Firm manages these exposures

Some activities may create contingent or indirect exposure related to a country (for example, providing clearing services or secondary exposure to collateral on securities financing receivables). These exposures are managed in the normal course of business through the Firm's credit, market, and operational risk governance, rather than through Country Risk Management.

The Firm's internal country risk reporting differs from the reporting provided under the FFIEC bank regulatory requirements. For further information on the FFIEC's reporting methodology, see Cross-border outstandings on page 292.

Country risk stress testing

The country risk stress framework aims to estimate losses arising from a country crisis by capturing the impact of large asset price movements in a country based on market shocks combined with counterparty specific assumptions. Country Risk Management periodically defines and runs ad hoc stress scenarios for individual countries in response to specific market events and sector performance concerns.

Country risk monitoring and control

The Country Risk Management group establishes guidelines for sovereign ratings reviews and limit management. Country stress and nominal exposures are measured under a comprehensive country limit framework. Country ratings and limits are actively monitored and reported on a regular basis. Country limit requirements are reviewed and approved by senior management as often as necessary, but at least annually. In addition, the Country Risk Management group uses surveillance tools, such as signaling models and ratings indicators, for early identification of potential country risk concerns.

Country risk reporting

The following table presents the Firm's top 20 exposures by country (excluding the U.S.) as of December 31, 2016. The selection of countries is based solely on the Firm's largest total exposures by country, based on the Firm's internal country risk management approach, and does not represent the Firm's view of any actual or potentially adverse credit conditions. Country exposures may fluctuate from period to period due to client activity and market flows.

The increase in exposure to Germany, Japan and Luxembourg since December 31, 2015 largely reflects higher Euro and Yen balances, predominantly placed on deposit at the central banks of these countries, driven by changing client positions and prevailing market and liquidity conditions.

Top 20 country exposures

	December 31, 2016			
(in billions)	Lending and deposits[a]	Trading and investing[b][c]	Other[d]	Total exposure
Germany	$ 46.9	$ 15.2	$ –	$ 62.1
United Kingdom	25.0	15.8	0.6	41.4
Japan	33.9	4.0	0.1	38.0
France	13.0	12.0	0.2	25.2
China	9.8	6.5	0.8	17.1
Canada	10.9	2.6	0.1	13.6
Australia	6.8	5.6	–	12.4
Netherlands	6.3	3.1	1.1	10.5
Luxembourg	10.0	0.2	–	10.2
Brazil	5.0	5.0	–	10.0
Switzerland	7.5	0.6	1.6	9.7
India	3.8	4.5	0.4	8.7
Italy	3.3	3.7	–	7.0
Korea	3.9	2.3	0.8	7.0
Hong Kong	2.1	1.4	1.9	5.4
Singapore	2.5	1.3	1.2	5.0
Mexico	3.1	1.4	–	4.5
Saudi Arabia	3.5	0.8	–	4.3
United Arab Emirates	3.2	1.1	–	4.3
Ireland	1.6	0.3	2.3	4.2

(a) Lending and deposits includes loans and accrued interest receivable (net of collateral and the allowance for loan losses), deposits with banks (including central banks), acceptances, other monetary assets, issued letters of credit net of participations, and unused commitments to extend credit. Excludes intra-day and operating exposures, such as from settlement and clearing activities.
(b) Includes market-making inventory, AFS securities, counterparty exposure on derivative and securities financings net of collateral and hedging.
(c) Includes single reference entity ("single-name"), index and tranched credit derivatives for which one or more of the underlying reference entities is in a country listed in the above table.
(d) Includes capital invested in local entities and physical commodity inventory.

LIQUIDITY RISK MANAGEMENT

Liquidity risk is the risk that the Firm will be unable to meet its contractual and contingent obligations or that it does not have the appropriate amount, composition and tenor of funding and liquidity to support its assets and liabilities.

Liquidity risk oversight

The Firm has a liquidity risk oversight function whose primary objective is to provide assessment, measurement, monitoring, and control of liquidity risk across the Firm. Liquidity risk oversight is managed through a dedicated firmwide Liquidity Risk Oversight group. The CIO, Treasury and Corporate ("CTC") CRO, who reports to the CRO, as part of the independent risk management function, has responsibility for firmwide Liquidity Risk Oversight. Liquidity Risk Oversight's responsibilities include but are not limited to:

- Establishing and monitoring limits, indicators, and thresholds, including liquidity appetite tolerances;
- Defining, monitoring, and reporting internal firmwide and material legal entity liquidity stress tests, and monitoring and reporting regulatory defined liquidity stress testing;
- Monitoring and reporting liquidity positions, balance sheet variances and funding activities;
- Conducting ad hoc analysis to identify potential emerging liquidity risks.

Risk governance and measurement

Specific committees responsible for liquidity governance include firmwide ALCO as well as line of business and regional ALCOs, and the CTC Risk Committee. In addition, the DRPC reviews and recommends to the Board of Directors, for formal approval, the Firm's liquidity risk tolerances, liquidity strategy, and liquidity policy at least annually. For further discussion of ALCO and other risk-related committees, see Enterprise-wide Risk Management on pages 71–75.

Internal Stress testing

Liquidity stress tests are intended to ensure the Firm has sufficient liquidity under a variety of adverse scenarios, including scenarios analyzed as part of the Firm's resolution and recovery planning. Stress scenarios are produced for JPMorgan Chase & Co. ("Parent Company") and the Firm's material legal entities on a regular basis and ad hoc stress tests are performed, as needed, in response to specific market events or concerns. Liquidity stress tests assume all of the Firm's contractual obligations are met and take into consideration varying levels of access to unsecured and secured funding markets, estimated non-contractual and contingent outflows and potential impediments to the availability and transferability of liquidity between jurisdictions and material legal entities such as regulatory, legal or other restrictions. Liquidity outflow assumptions are modeled across a range of time horizons and contemplate both market and idiosyncratic stress.

Results of stress tests are considered in the formulation of the Firm's funding plan and assessment of its liquidity position. The Parent Company acts as a source of funding for the Firm through stock and long-term debt issuances, and the IHC provides funding support to the ongoing operations of the Parent Company and its subsidiaries, as necessary. The Firm maintains liquidity at the Parent Company and the IHC, in addition to liquidity held at the operating subsidiaries, at levels sufficient to comply with liquidity risk tolerances and minimum liquidity requirements, to manage through periods of stress where access to normal funding sources is disrupted.

Liquidity management

Treasury and CIO is responsible for liquidity management. The primary objectives of effective liquidity management are to ensure that the Firm's core businesses and material legal entities are able to operate in support of client needs, meet contractual and contingent obligations through normal economic cycles as well as during stress events, and to manage an optimal funding mix, and availability of liquidity sources. The Firm manages liquidity and funding using a centralized, global approach across its entities, taking into consideration both their current liquidity profile and any potential changes over time, in order to optimize liquidity sources and uses.

In the context of the Firm's liquidity management, Treasury and CIO is responsible for:

- Analyzing and understanding the liquidity characteristics of the Firm, lines of business and legal entities' assets and liabilities, taking into account legal, regulatory, and operational restrictions;
- Defining and monitoring firmwide and legal entity-specific liquidity strategies, policies, guidelines, and contingency funding plans;
- Managing liquidity within approved liquidity risk appetite tolerances and limits;
- Setting transfer pricing in accordance with underlying liquidity characteristics of balance sheet assets and liabilities as well as certain off-balance sheet items.

Contingency funding plan

The Firm's contingency funding plan ("CFP"), which is reviewed by ALCO and approved by the DRPC, is a compilation of procedures and action plans for managing liquidity through stress events. The CFP incorporates the limits and indicators set by the Liquidity Risk Oversight group. These limits and indicators are reviewed regularly to identify the emergence of risks or vulnerabilities in the Firm's liquidity position. The CFP identifies the alternative contingent liquidity resources available to the Firm in a stress event.

LCR and NSFR

The U.S. LCR rule requires the Firm to measure the amount of HQLA held by the Firm in relation to estimated net cash outflows within a 30-day period during an acute stress event. The LCR was required to be 90% at January 1, 2016, increased to a minimum of 100% commencing January 1, 2017. At December 31, 2016, the Firm was compliant with the Fully Phased-In U.S. LCR.

On December 19, 2016 the Federal Reserve published final U.S. LCR public disclosure requirements for certain bank holding companies and nonbank financial companies. Starting with the second quarter of 2017, the Firm will be required to disclose quarterly its consolidated LCR pursuant to the U.S. LCR rule, including the Firm's average LCR for the quarter and the key quantitative components of the average LCR in a standardized template, along with a qualitative discussion of material drivers of the ratio, changes over time, and causes of such changes.

The Basel Committee final standard for the net stable funding ratio ("Basel NSFR") is intended to measure the adequacy of "available" and "required" amounts of stable funding over a one-year horizon. Basel NSFR will become a minimum standard by January 1, 2018 and requires that this ratio be equal to at least 100% on an ongoing basis.

On April 26, 2016, the U.S. NSFR proposal was released for large banks and bank holding companies and was largely consistent with Basel NSFR. The proposed requirement would apply beginning on January 1, 2018, consistent with the Basel NSFR timeline.

The Firm estimates it was compliant with the proposed U.S. NSFR as of December 31, 2016 based on its current understanding of the proposed rule.

HQLA

HQLA is the amount of assets that qualify for inclusion in the U.S. LCR. HQLA primarily consists of cash and certain unencumbered high quality liquid assets as defined in the final rule.

As of December 31, 2016, the Firm's HQLA was $524 billion, compared with $496 billion as of December 31, 2015. The increase in HQLA primarily reflects the impact of sales, maturities and paydowns in non-HQLA-eligible securities, as well as deposit growth in excess of loan growth. Certain of these actions resulted in increased excess liquidity at JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A. which is excluded from the Firm's HQLA as required under the U.S. LCR rules. The Firm's HQLA may fluctuate from period to period primarily due to normal flows from client activity.

The following table presents the Firm's estimated HQLA included in the U.S. LCR broken out by HQLA-eligible cash and securities as of December 31, 2016.

December 31, (in billions)		2016
HQLA		
Eligible cash[(a)]	$	323
Eligible securities[(b)]		201
Total HQLA[(c)]	$	524

(a) Cash on deposit at central banks.
(b) Predominantly includes U.S. agency MBS, U.S. Treasuries, and sovereign bonds net of applicable haircuts under U.S. LCR rules.
(c) Excludes excess HQLA at JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.

As of December 31, 2016, in addition to HQLA reported above, the Firm had approximately $262 billion of unencumbered marketable securities, such as equity securities and fixed income debt securities, available to raise liquidity, if required. This includes HQLA-eligible securities included as part of the excess liquidity at JPMorgan Chase Bank, N.A. The Firm also maintains borrowing capacity at various Federal Home Loan Banks ("FHLBs"), the Federal Reserve Bank discount window and various other central banks as a result of collateral pledged by the Firm to such banks. Although available, the Firm does not view the borrowing capacity at the Federal Reserve Bank discount window and the various other central banks as a primary source of liquidity. As of December 31, 2016, the Firm's remaining borrowing capacity at various FHLBs and the Federal Reserve Bank discount window was approximately $221 billion. This remaining borrowing capacity excludes the benefit of securities included in HQLA or other unencumbered securities that are currently held at the Federal Reserve Bank discount window, but for which the Firm has not drawn liquidity.

Funding

Sources of funds

Management believes that the Firm's unsecured and secured funding capacity is sufficient to meet its on- and off-balance sheet obligations.

The Firm funds its global balance sheet through diverse sources of funding including a stable deposit franchise as well as secured and unsecured funding in the capital markets. The Firm's loan portfolio ($894.8 billion at December 31, 2016), is funded with a portion of the Firm's deposits ($1,375.2 billion at December 31, 2016) and through securitizations and, with respect to a portion of the Firm's real estate-related loans, with secured borrowings from the FHLBs. Deposits in excess of the amount utilized to fund loans are primarily invested in the Firm's investment securities portfolio or deployed in cash or other short-term liquid investments based on their interest rate and liquidity risk characteristics. Securities borrowed or purchased under resale agreements and trading assets-debt and equity instruments are primarily funded by the Firm's securities loaned or sold under agreements to repurchase, trading liabilities–debt and equity instruments, and a portion of the Firm's long-term debt and stockholders' equity. In addition to funding securities borrowed or purchased under resale agreements and trading assets-debt and equity instruments, proceeds from the Firm's debt and equity issuances are used to fund certain loans and other financial and non-financial assets, or may be invested in the Firm's investment securities portfolio. See the discussion below for additional information relating to Deposits, Short-term funding, and Long-term funding and issuance.

Deposits

The table below summarizes, by line of business, the period-end and average deposit balances as of and for the years ended December 31, 2016 and 2015.

Deposits			Year ended December 31,	
As of or for the year ended December 31,			Average	
(in millions)	**2016**	2015	**2016**	2015
Consumer & Community Banking	**$ 618,337**	$ 557,645	**$ 586,637**	$ 530,938
Corporate & Investment Bank	**412,434**	395,228	**409,680**	414,064
Commercial Banking	**179,532**	172,470	**172,835**	184,132
Asset & Wealth Management	**161,577**	146,766	**153,334**	149,525
Corporate	**3,299**	7,606	**5,482**	17,129
Total Firm	**$ 1,375,179**	$ 1,279,715	**$ 1,327,968**	$ 1,295,788

A key strength of the Firm is its diversified deposit franchise, through each of its lines of business, which provides a stable source of funding and limits reliance on the wholesale funding markets. A significant portion of the Firm's deposits are consumer deposits, which are considered a stable source of liquidity. Additionally, the majority of the Firm's wholesale operating deposits are also considered to be stable sources of liquidity because they are generated from customers that maintain operating service relationships with the Firm.

The Firm's loans-to-deposits ratio was 65% at both December 31, 2016 and 2015.

As of December 31, 2016, total deposits for the Firm were $1,375.2 billion, compared with $1,279.7 billion at December 31, 2015 (61% of total liabilities at each of December 31, 2016 and 2015). The increase was attributable to higher consumer and wholesale deposits. The increase in consumer deposits reflected continuing strong growth from existing and new customers, and the impact of low attrition rates. The wholesale increase was driven by growth in operating deposits related to client activity in CIB's Treasury Services business, and inflows in AWM primarily from business growth and the impact of new rules governing money market funds.

The Firm believes average deposit balances are generally more representative of deposit trends. The increase in average deposits for the year ended December 31, 2016 compared with the year ended December 31, 2015, was predominantly driven by an increase in consumer deposits, partially offset by a reduction in wholesale non-operating deposits, driven by the Firm's actions in 2015 to reduce such deposits. For further discussions of deposit and liability balance trends, see the discussion of the Firm's business segments results and the Consolidated Balance Sheet Analysis on pages 51–70 and pages 43–44, respectively.

The following table summarizes short-term and long-term funding, excluding deposits, as of December 31, 2016 and 2015, and average balances for the years ended December 31, 2016 and 2015. For additional information, see the Consolidated Balance Sheet Analysis on pages 43–44 and Note 21.

Sources of funds (excluding deposits)

As of or for the year ended December 31, (in millions)	2016	2015	Average 2016	Average 2015
Commercial paper:				
Wholesale funding	**$ 11,738**	$ 15,562	**$ 15,001**	$ 19,340
Client cash management	**—**	—	**—**	18,800 [i]
Total commercial paper	**$ 11,738**	$ 15,562	**$ 15,001**	$ 38,140
Obligations of Firm-administered multi-seller conduits[a]	**$ 2,719**	$ 8,724	**$ 5,153**	$ 11,961
Other borrowed funds	**$ 22,705**	$ 21,105	**$ 21,139**	$ 28,816
Securities loaned or sold under agreements to repurchase:				
Securities sold under agreements to repurchase	**$ 149,826**	$ 129,598	**$ 160,458**	$ 168,163
Securities loaned[b]	**12,137**	16,877	**13,195**	18,633
Total securities loaned or sold under agreements to repurchase[b][c][d][e]	**$ 161,963**	$ 146,475	**$ 173,653**	$ 186,796
Senior notes	**$ 151,042**	$ 149,964	**$ 153,768**	$ 147,498
Trust preferred securities	**2,345**	3,969	**3,724**	4,341
Subordinated debt	**21,940**	25,027	**24,224**	27,310
Structured notes	**37,292**	32,813	**35,978**	31,309
Total long-term unsecured funding	**$ 212,619**	$ 211,773	**$ 217,694**	$ 210,458
Credit card securitization[a]	**31,181**	27,906	**29,428**	30,382
Other securitizations([a][f]	**1,527**	1,760	**1,669**	1,909
FHLB advances	**79,519**	71,581	**73,260**	70,150
Other long-term secured funding[g]	**3,107**	5,297	**4,619**	4,332
Total long-term secured funding	**$ 115,334**	$ 106,544	**$ 108,976**	$ 106,773
Preferred stock[h]	**$ 26,068**	$ 26,068	**26,068**	$ 24,040
Common stockholders' equity[h]	**$ 228,122**	$ 221,505	**224,631**	$ 215,690

(a) Included in beneficial interest issued by consolidated variable interest entities on the Firm's Consolidated balance sheets.
(b) Prior period amounts have been revised to conform with current period presentation.
(c) Excludes federal funds purchased.
(d) Excludes long-term structured repurchase agreements of $1.8 billion and $4.2 billion as of December 31, 2016 and 2015, respectively, and average balances of $2.9 billion and $3.9 billion for the years ended December 31, 2016 and 2015, respectively.
(e) Excludes long-term securities loaned of $1.2 billion and $1.3 billion as of December 31, 2016, and December 31, 2015, respectively, and average balances of $1.3 billion and $0.9 billion for the years ended December 31, 2016 and 2015, respectively.
(f) Other securitizations includes securitizations of student loans. The Firm's wholesale businesses also securitize loans for client-driven transactions, which are not considered to be a source of funding for the Firm and are not included in the table.
(g) Includes long-term structured notes which are secured.
(h) For additional information on preferred stock and common stockholders' equity see Capital Risk Management on pages 76–85, Consolidated statements of changes in stockholders' equity, Note 22 and Note 23.
(i) During 2015 the Firm discontinued its commercial paper customer sweep cash management program.

Short-term funding

The Firm's sources of short-term secured funding primarily consist of securities loaned or sold under agreements to repurchase. Securities loaned or sold under agreements to repurchase are secured predominantly by high-quality securities collateral, including government-issued debt and agency MBS, and constitute a significant portion of the federal funds purchased and securities loaned or sold under repurchase agreements on the Consolidated balance sheets. The decrease in the average balance of securities loaned or sold under agreements to repurchase for the year ended December 31, 2016, compared with the balance at December 31, 2015, was largely due to lower secured financing of trading assets-debt and equity instruments in the CIB related to client-driven market-making activities. The balances associated with securities loaned or sold under agreements to repurchase fluctuate over time due to customers' investment and financing activities; the Firm's demand for financing; the ongoing management of the mix of the Firm's liabilities, including its secured and unsecured financing (for both the investment securities and market-making portfolios); and other market and portfolio factors.

Long-term funding and issuance

Long-term funding provides additional sources of stable funding and liquidity for the Firm. The Firm's long-term funding plan is driven by expected client activity, liquidity considerations, and regulatory requirements, including TLAC requirements. Long-term funding objectives include maintaining diversification, maximizing market access and optimizing funding costs. The Firm evaluates various funding markets, tenors and currencies in creating its optimal long-term funding plan.

The significant majority of the Firm's long-term unsecured funding is issued by the Parent Company to provide maximum flexibility in support of both bank and nonbank subsidiary funding needs. The Parent Company advances substantially all net funding proceeds to the IHC. The IHC does not issue debt to external counterparties. The following table summarizes long-term unsecured issuance and maturities or redemptions for the years ended December 31, 2016 and 2015. For additional information, see Note 21.

Long-term unsecured funding

Year ended December 31, (in millions)	2016	2015
Issuance		
Senior notes issued in the U.S. market	$ 25,639	$ 19,212
Senior notes issued in non-U.S. markets	7,063	10,188
Total senior notes	**32,702**	29,400
Subordinated debt	1,093	3,210
Structured notes	22,865	22,165
Total long-term unsecured funding – issuance	**$ 56,660**	$ 54,775
Maturities/redemptions		
Senior notes	$ 29,989	$ 18,454
Trust preferred securities	1,630	1,500
Subordinated debt	3,596	6,908
Structured notes	15,925	18,099
Total long-term unsecured funding – maturities/redemptions	**$ 51,140**	$ 44,961

The Firm raises secured long-term funding through securitization of consumer credit card loans and advances from the FHLBs.

The following table summarizes the securitization issuance and FHLB advances and their respective maturities or redemption for the years ended December 31, 2016 and 2015.

Long-term secured funding

Year ended December 31,	Issuance		Maturities/Redemptions	
(in millions)	2016	2015	2016	2015
Credit card securitization	$ 8,277	$ 6,807	$ 5,025	$ 10,130
Other securitizations[(a)]	–	–	233	248
FHLB advances	17,150	16,550	9,209	9,960
Other long-term secured funding[(b)]	455	1,105	2,645	383
Total long-term secured funding	**$ 25,882**	$ 24,462	**$ 17,112**	$ 20,721

(a) Other securitizations includes securitizations of student loans.
(b) Includes long-term structured notes which are secured.

The Firm's wholesale businesses also securitize loans for client-driven transactions; those client-driven loan securitizations are not considered to be a source of funding for the Firm and are not included in the table above. For further description of the client-driven loan securitizations, see Note 16.

Credit ratings

The cost and availability of financing are influenced by credit ratings. Reductions in these ratings could have an adverse effect on the Firm's access to liquidity sources, increase the cost of funds, trigger additional collateral or funding requirements and decrease the number of investors and counterparties willing to lend to the Firm. Additionally, the Firm's funding requirements for VIEs and other third-party commitments may be adversely affected by a decline in credit ratings. For additional information on the impact of a credit ratings downgrade on the funding requirements for VIEs, and on derivatives and collateral agreements, see SPEs on page 45, and credit risk, liquidity risk and credit-related contingent features in Note 6 on page 181.

The credit ratings of the Parent Company and the Firm's principal bank and nonbank subsidiaries as of December 31, 2016, were as follows.

	JPMorgan Chase & Co.			JPMorgan Chase Bank, N.A. Chase Bank USA, N.A.			J.P. Morgan Securities LLC		
December 31, 2016	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook	Long-term issuer	Short-term issuer	Outlook
Moody's Investors Service	A3	P-2	Stable	Aa3	P-1	Stable	Aa3[(a)]	P-1	Stable
Standard & Poor's	A-	A-2	Stable	A+	A-1	Stable	A+	A-1	Stable
Fitch Ratings	A+	F1	Stable	AA-	F1+	Stable	AA-	F1+	Stable

(a) On February 22, 2017, Moody's published its updated rating methodologies for securities firms. Subsequently, as a result of this action, J.P. Morgan Securities LLC's long-term issuer rating was downgraded by one notch from Aa3 to A1. The short-term issuer rating was unchanged and the outlook remained stable.

Downgrades of the Firm's long-term ratings by one or two notches could result in an increase in its cost of funds, and access to certain funding markets could be reduced as noted above. The nature and magnitude of the impact of ratings downgrades depends on numerous contractual and behavioral factors (which the Firm believes are incorporated in its liquidity risk and stress testing metrics). The Firm believes that it maintains sufficient liquidity to withstand a potential decrease in funding capacity due to ratings downgrades.

JPMorgan Chase's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings, or stock price.

Critical factors in maintaining high credit ratings include a stable and diverse earnings stream, strong capital ratios, strong credit quality and risk management controls, diverse funding sources, and disciplined liquidity monitoring procedures. Rating agencies continue to evaluate economic and geopolitical trends, regulatory developments, future profitability, risk management practices, and litigation matters, as well as their broader ratings methodologies. Changes in any of these factors could lead to changes in the Firm's credit ratings.

Although the Firm closely monitors and endeavors to manage, to the extent it is able, factors influencing its credit ratings, there is no assurance that its credit ratings will not be changed in the future.

MARKET RISK MANAGEMENT

Market risk is the risk of loss arising from potential adverse changes in the value of the Firm's assets and liabilities resulting from changes in market variables such as interest rates, foreign exchange rates, equity prices, commodity prices, implied volatilities or credit spreads.

Market Risk Management

Market Risk Management monitors market risks throughout the Firm and defines market risk policies and procedures. The Market Risk Management function reports to the Firm's CRO.

Market Risk Management seeks to manage risk, facilitate efficient risk/return decisions, reduce volatility in operating performance and provide transparency into the Firm's market risk profile for senior management, the Board of Directors and regulators. Market Risk Management is responsible for the following functions:

- Establishment of a market risk policy framework
- Independent measurement, monitoring and control of line of business and firmwide market risk
- Definition, approval and monitoring of limits
- Performance of stress testing and qualitative risk assessments

Risk measurement

Tools used to measure risk

Because no single measure can reflect all aspects of market risk, the Firm uses various metrics, both statistical and nonstatistical, to assess risk including:

- VaR
- Economic-value stress testing
- Nonstatistical risk measures
- Loss advisories
- Profit and loss drawdowns
- Earnings-at-risk
- Other sensitivities

Risk monitoring and control

Market risk exposure is managed primarily through a series of limits set in the context of the market environment and business strategy. In setting limits, the Firm takes into consideration factors such as market volatility, product liquidity and accommodation of client business and management experience. The Firm maintains different levels of limits. Corporate level limits include VaR and stress limits. Similarly, line of business limits include VaR and stress limits and may be supplemented by loss advisories, nonstatistical measurements and profit and loss drawdowns. Limits may also be set within the lines of business, as well at the portfolio or legal entity level.

Market Risk Management sets limits and regularly reviews and updates them as appropriate, with any changes approved by line of business management and Market Risk Management. Senior management, including the Firm's CEO and CRO, are responsible for reviewing and approving certain of these risk limits on an ongoing basis. All limits that have not been reviewed within specified time periods by Market Risk Management are escalated to senior management. The lines of business are responsible for adhering to established limits against which exposures are monitored and reported.

Limit breaches are required to be reported in a timely manner to limit approvers, Market Risk Management and senior management. In the event of a breach, Market Risk Management consults with Firm senior management and the line of business senior management to determine the appropriate course of action required to return to compliance, which may include a reduction in risk in order to remedy the breach. Certain Firm or line of business-level limits that have been breached for three business days or longer, or by more than 30%, are escalated to senior management and the Firmwide Risk Committee.

The following table summarizes by line of business the predominant business activities that give rise to market risk, and the primary market risk management tools utilized to manage those risks.

Risk identification and classification by line of business

Line of Business	Predominant business activities and related market risks	Positions included in Risk Management VaR	Positions included in earnings-at-risk	Positions included in other sensitivity-based measurements

CCB	• Services mortgage loans which give rise to complex, non-linear interest rate and basis risk
	  • Non-linear risk arises primarily from prepayment options embedded in mortgages and changes in the probability of newly originated mortgage commitments actually closing
	  • Basis risk results from differences in the relative movements of the rate indices underlying mortgage exposure and other interest rates
	• Originates loans and takes deposits
		• Mortgage pipeline loans, classified as derivatives
		• Warehouse loans, classified as trading assets – debt instruments
		• MSRs
		• Hedges of pipeline loans, warehouse loans and MSRs, classified as derivatives
		• Interest-only securities, classified as trading assets - debt instruments, and related hedges, classified as derivatives
		• Marketable equity investments measured at fair value through earnings
			• Retained loan portfolio
			• Deposits	

CIB	• Makes markets and services clients across fixed income, foreign exchange, equities and commodities • Market risk arises from changes in market prices (e.g., rates and credit spreads) resulting in a potential decline in net income	• Trading assets/liabilities – debt and marketable equity instruments, and derivatives, including hedges of the retained loan portfolio • Certain securities purchased, loaned or sold under resale agreements and securities borrowed • Fair value option elected liabilities • Derivative CVA and associated hedges	• Retained loan portfolio • Deposits	• Private-equity investments measured at fair value • Derivatives DVA/FVA and fair value option elected liabilities DVA
CB	• Engages in traditional wholesale banking activities which include extensions of loans and credit facilities and taking deposits • Risk arises from changes in interest rates and prepayment risk with potential for adverse impact on net interest income and interest-rate sensitive fees		• Retained loan portfolio • Deposits	
AWM	• Provides initial capital investments in products such as mutual funds, which give rise to market risk arising from changes in market prices in such products	• Debt securities held in advance of distribution to clients, classified as trading assets - debt and equity instruments	• Retained loan portfolio • Deposits	• Initial seed capital investments and related hedges, classified as derivatives • Capital invested alongside third-party investors, typically in privately distributed collective vehicles managed by AWM (i.e., co-investments)
Corporate	• Manages the Firm’s liquidity, funding, structural interest rate and foreign exchange risks arising from activities undertaken by the Firm’s four major reportable business segments	• Derivative positions measured at fair value through noninterest revenue in earnings • Marketable equity investments measured at fair value through earnings	• Investment securities portfolio and related interest rate hedges • Deposits • Long-term debt and related interest rate hedges	• Private equity investments measured at fair value • Foreign exchange exposure related to Firm-issued non-USD long-term debt (“LTD”) and related hedges

As part of the Firm’s evaluation and periodic enhancement of its market risk measures, during the third quarter of 2016 the Firm refined the scope of positions included in risk management VaR. In particular, certain private equity positions in the CIB, exposure arising from non-U.S. dollar denominated funding activities in Corporate, as well as seed capital investments in AWM were removed from the VaR calculation. Commencing with the third quarter of 2016, exposure arising from these positions is captured using other sensitivity-based measures, such as a 10% decline in market value or a 1 basis point parallel shift in spreads, as appropriate. For more information, see Other sensitivity-based measures at page 123. The Firm believes this refinement to its reported VaR measures more appropriately captures the risk of its market risk sensitive instruments. This change did not impact Regulatory VaR as these positions are not included in the calculation of Regulatory VaR. Regulatory VaR is used to derive the Firm’s regulatory VaR-based capital requirements under Basel III.

Value-at-risk

JPMorgan Chase utilizes VaR, a statistical risk measure, to estimate the potential loss from adverse market moves in a normal market environment. The Firm has a single VaR framework used as a basis for calculating Risk Management VaR and Regulatory VaR.

The framework is employed across the Firm using historical simulation based on data for the previous 12 months. The framework's approach assumes that historical changes in market values are representative of the distribution of potential outcomes in the immediate future. The Firm believes the use of Risk Management VaR provides a stable measure of VaR that is closely aligned to the day-to-day risk management decisions made by the lines of business, and provides the appropriate information needed to respond to risk events on a daily basis.

The Firm's Risk Management VaR is calculated assuming a one-day holding period and an expected tail-loss methodology which approximates a 95% confidence level. Risk Management VaR provides a consistent framework to measure risk profiles and levels of diversification across product types and is used for aggregating risks and monitoring limits across businesses. Those VaR results are reported to senior management, the Board of Directors and regulators.

Under the Firm's Risk Management VaR methodology, assuming current changes in market values are consistent with the historical changes used in the simulation, the Firm would expect to incur VaR "back-testing exceptions," defined as losses greater than that predicted by VaR estimates, on average five times every 100 trading days. The number of VaR back-testing exceptions observed can differ from the statistically expected number of back-testing exceptions if the current level of market volatility is materially different from the level of market volatility during the 12 months of historical data used in the VaR calculation.

Underlying the overall VaR model framework are individual VaR models that simulate historical market returns for individual products and/or risk factors. To capture material market risks as part of the Firm's risk management framework, comprehensive VaR model calculations are performed daily for businesses whose activities give rise to market risk. These VaR models are granular and incorporate numerous risk factors and inputs to simulate daily changes in market values over the historical period; inputs are selected based on the risk profile of each portfolio, as sensitivities and historical time series used to generate daily market values may be different across product types or risk management systems. The VaR model results across all portfolios are aggregated at the Firm level.

Since VaR is based on historical data, it is an imperfect measure of market risk exposure and potential losses, and it is not used to estimate the impact of stressed market conditions or to manage any impact from potential stress events. In addition, based on their reliance on available historical data, limited time horizons, and other factors, VaR measures are inherently limited in their ability to measure certain risks and to predict losses, particularly those associated with market illiquidity and sudden or severe shifts in market conditions.

For certain products, specific risk parameters are not captured in VaR due to the lack of inherent liquidity and availability of appropriate historical data. The Firm uses proxies to estimate the VaR for these and other products when daily time series are not available. It is likely that using an actual price-based time series for these products, if available, would affect the VaR results presented. The Firm therefore considers other measures such as stress testing, in addition to VaR, to capture and manage its market risk positions.

The daily market data used in VaR models may be different than the independent third-party data collected for VCG price testing in its monthly valuation process. For example, in cases where market prices are not observable, or where proxies are used in VaR historical time series, the data sources may differ (see Valuation process in Note 3 for further information on the Firm's valuation process). Because VaR model calculations require daily data and a consistent source for valuation, it may not be practical to use the data collected in the VCG monthly valuation process for VaR model calculations.

The Firm's VaR model calculations are periodically evaluated and enhanced in response to changes in the composition of the Firm's portfolios, changes in market conditions, improvements in the Firm's modeling techniques and measurements, and other factors. Such changes may affect historical comparisons of VaR results. For information regarding model reviews and approvals, see Model Risk Management on page 128.

The Firm calculates separately a daily aggregated VaR in accordance with regulatory rules ("Regulatory VaR"), which is used to derive the Firm's regulatory VaR-based capital requirements under Basel III. This Regulatory VaR model framework currently assumes a ten business-day holding period and an expected tail loss methodology which approximates a 99% confidence level. Regulatory VaR is applied to "covered" positions as defined by Basel III, which may be different than the positions included in the Firm's Risk Management VaR. For example, credit derivative hedges of accrual loans are included in the Firm's Risk Management VaR, while Regulatory VaR excludes these credit derivative hedges. In addition, in contrast to the Firm's Risk Management VaR, Regulatory VaR currently excludes the diversification benefit for certain VaR models.

For additional information on Regulatory VaR and the other components of market risk regulatory capital for the Firm (e.g. VaR-based measure, stressed VaR-based measure and the respective backtesting), see JPMorgan Chase's Basel III Pillar 3 Regulatory Capital Disclosures reports, which are available on the Firm's website at: (http://investor.shareholder.com/jpmorganchase/basel.cfm).

The table below shows the results of the Firm's Risk Management VaR measure using a 95% confidence level.

Total VaR

As of or for the year ended December 31,	2016			2015			At December 31,	
(in millions)	Avg.	Min	Max	Avg.	Min	Max	2016	2015
CIB trading VaR by risk type								
Fixed income	**$ 45**	**$ 33**	**$ 65**	$ 42	$ 31	$ 60	**$ 37**	$ 37
Foreign exchange	**12**	**7**	**27**	9	6	16	**14**	6
Equities	**13**	**5**	**32**	18	11	26	**12**	21
Commodities and other	**9**	**7**	**11**	10	6	14	**9**	10
Diversification benefit to CIB trading VaR	**(36)** (a)	**NM** (b)	**NM** (b)	(35) (a)	NM (b)	NM (b)	**(38)** (a)	(28) (a)
CIB trading VaR	**43**	**28**	**79**	44	27	68	**34**	46
Credit portfolio VaR	**12**	**10**	**16**	14	10	20	**11**	10
Diversification benefit to CIB VaR	**(10)** (a)	**NM** (b)	**NM** (b)	(9) (a)	NM (b)	NM (b)	**(7)** (a)	(10) (a)
CIB VaR	**45**	**32**	**81**	49	34	71	**38**	46
Consumer & Community Banking VaR	**3**	**1**	**6**	4	2	8	**3**	4
Corporate VaR	**6**	**3**	**13**	4	3	7	**3**	5
Asset & Wealth Management VaR	**2**	**—**	**4**	3	2	4	**—**	3
Diversification benefit to other VaR	**(3)** (a)	**NM** (b)	**NM** (b)	(3) (a)	NM (b)	NM (b)	**(2)** (a)	(4) (a)
Other VaR	**8**	**4**	**16**	8	5	12	**4**	8
Diversification benefit to CIB and other VaR	**(8)** (a)	**NM** (b)	**NM** (b)	(10) (a)	NM (b)	NM (b)	**(4)** (a)	(9) (a)
Total VaR	**$ 45**	**$ 33**	**$ 78**	$ 47	$ 34	$ 67	**$ 38**	$ 45

(a) Average portfolio VaR and period-end portfolio VaR were less than the sum of the VaR of the components described above, which is due to portfolio diversification. The diversification effect reflects the fact that risks are not perfectly correlated.
(b) Designated as NM, because the minimum and maximum may occur on different days for distinct risk components, and hence it is not meaningful to compute a portfolio-diversification effect.

As discussed on page 117, during the third quarter of 2016 the Firm refined the scope of positions included in Risk Management VaR. In the absence of these refinements, the average VaR, without diversification, for each of the following reported components would have been higher by the following amounts for the full year 2016: CIB Equities VaR by $3 million; CIB trading VaR by $2 million; CIB VaR by $3 million; Corporate VaR by $4 million; AWM VaR by $2 million; Other VaR by $4 million; and Total VaR by $3 million. Additionally, the Total VaR at December 31, 2016 would have been higher by $7 million in the absence of these refinements.

Average Total VaR decreased $2 million for the full year ending December 31, 2016 as compared with the respective prior year period. The reduction in average Total VaR is due to the aforementioned scope changes as well as a lower risk profile in the Equities risk type. This was offset by changes in the risk profiles of the Foreign exchange and Fixed Income risk types. Additionally, average Credit portfolio VaR declined as a result of lower exposures arising from select positions.

The Firm's average Total VaR diversification benefit was $8 million or 18% of the sum for 2016, compared with $10 million or 21% of the sum for 2015.

The Firm continues to enhance its VaR model calculations and the time series inputs related to certain asset-backed products.

VaR can vary significantly as positions change, market volatility fluctuates, and diversification benefits change.

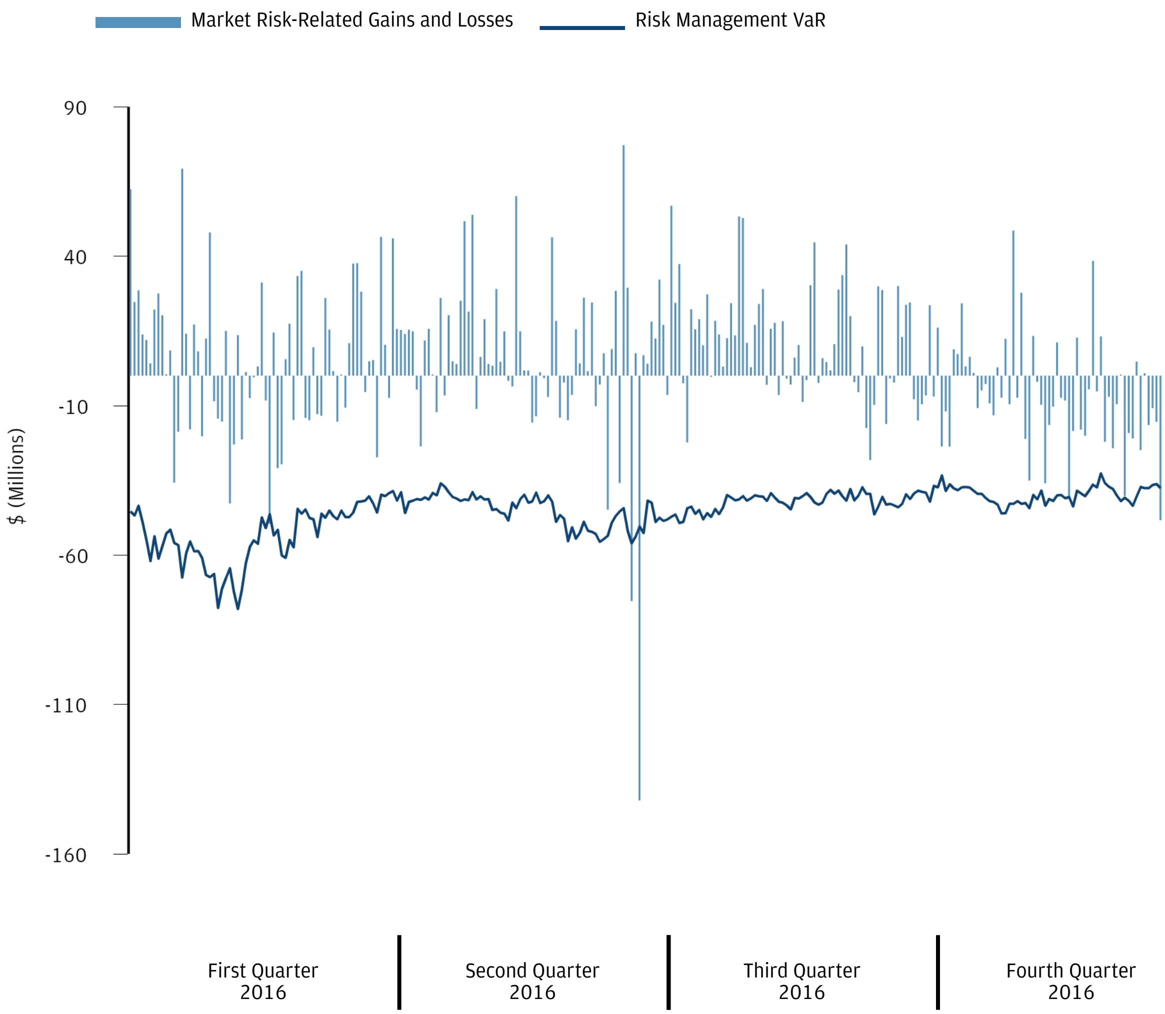
VaR back-testing

The Firm evaluates the effectiveness of its VaR methodology by back-testing, which compares the daily Risk Management VaR results with the daily gains and losses recognized on market-risk related revenue.

The Firm's definition of market risk-related gains and losses is consistent with the definition used by the banking regulators under Basel III. Under this definition market risk-related gains and losses are defined as: gains and losses on the positions included in the Firm's Risk Management VaR, excluding fees, commissions, certain valuation adjustments (e.g., liquidity and DVA), net interest income, and gains and losses arising from intraday trading.

The following chart compares the daily market risk-related gains and losses with the Firm's Risk Management VaR for the year ended December 31, 2016. As the chart presents market risk-related gains and losses related to those positions included in the Firm's Risk Management VaR, the results in the table below differ from the results of back-testing disclosed in the Market Risk section of the Firm's Basel III Pillar 3 Regulatory Capital Disclosures reports, which are based on Regulatory VaR applied to covered positions. The chart shows that for the year ended December 31, 2016 the Firm observed 5 VaR back-testing exceptions and posted Market-risk related gains on 151 of the 260 days in this period.

Daily Market Risk-Related Gains and Losses
vs. Risk Management VaR (1-day, 95% Confidence level)
Year ended December 31, 2016



For the year ended December 31, 2016, there were 5 back-testing exceptions. The two exceptions that occurred towards the end of June 2016, subsequent to the U.K. referendum on membership in the European Union, reflect the elevated market volatility observed across multiple asset classes following the outcome of the vote.

Other risk measures

Economic-value stress testing

Along with VaR, stress testing is an important tool in measuring and controlling risk. While VaR reflects the risk of loss due to adverse changes in markets using recent historical market behavior as an indicator of losses, stress testing is intended to capture the Firm's exposure to unlikely but plausible events in abnormal markets. The Firm runs weekly stress tests on market-related risks across the lines of business using multiple scenarios that assume significant changes in risk factors such as credit spreads, equity prices, interest rates, currency rates and commodity prices.

The Firm uses a number of standard scenarios that capture different risk factors across asset classes including geographical factors, specific idiosyncratic factors and extreme tail events. The stress framework calculates multiple magnitudes of potential stress for both market rallies and market sell-offs for each risk factor and combines them in multiple ways to capture different market scenarios. For example, certain scenarios assess the potential loss arising from current exposures held by the Firm due to a broad sell off in bond markets or an extreme widening in corporate credit spreads. The flexibility of the stress testing framework allows risk managers to construct new, specific scenarios that can be used to form decisions about future possible stress events.

Stress testing complements VaR by allowing risk managers to shock current market prices to more extreme levels relative to those historically realized, and to stress test the relationships between market prices under extreme scenarios. Stress scenarios are defined and reviewed by Market Risk Management, and significant changes are reviewed by the relevant LOB Risk Committees and may be redefined on a periodic basis to reflect current market conditions.

Stress-test results, trends and qualitative explanations based on current market risk positions are reported to the respective LOBs and the Firm's senior management to allow them to better understand the sensitivity of positions to certain defined events and to enable them to manage their risks with more transparency. Results are also reported to the Board of Directors.

The Firm's stress testing framework is utilized in calculating results under scenarios mandated by the Federal Reserve's CCAR and ICAAP processes. In addition, the results are incorporated into the quarterly assessment of the Firm's Risk Appetite Framework and are also presented to the DRPC.

Nonstatistical risk measures

Nonstatistical risk measures include sensitivities to variables used to value positions, such as credit spread sensitivities, interest rate basis point values and market values. These measures provide granular information on the Firm's market risk exposure. They are aggregated by line of business and by risk type, and are also used for monitoring internal market risk limits.

Loss advisories and profit and loss drawdowns

Loss advisories and profit and loss drawdowns are tools used to highlight trading losses above certain levels of risk tolerance. Profit and loss drawdowns are defined as the decline in net profit and loss since the year-to-date peak revenue level.

Earnings-at-risk

The VaR and sensitivity measures described above illustrate the economic sensitivity of the Firm's Consolidated balance sheets to changes in market variables. The effect of interest rate exposure on the Firm's reported net income is also important as interest rate risk represents one of the Firm's significant market risks. Interest rate risk arises not only from trading activities but also from the Firm's traditional banking activities, which include extension of loans and credit facilities, taking deposits and issuing debt. The Firm evaluates its structural interest rate risk exposure through earnings-at-risk, which measures the extent to which changes in interest rates will affect the Firm's net interest income and certain interest rate-sensitive fees. For a summary by line of business, identifying positions included in earnings-at-risk, see the table on page 117.

The CTC Risk Committee establishes the Firm's structural interest rate risk policies and market risk limits, which are subject to approval by the DRPC. Treasury and CIO, working in partnership with the lines of business, calculates the Firm's structural interest rate risk profile and reviews it with senior management including the CTC Risk Committee and the Firm's ALCO. In addition, oversight of structural interest rate risk is managed through a dedicated risk function reporting to the CTC CRO. This risk function is responsible for providing independent oversight and governance around assumptions and establishing and monitoring limits for structural interest rate risk. The Firm manages structural interest rate risk generally through its investment securities portfolio and interest rate derivatives.

Structural interest rate risk can occur due to a variety of factors, including:

- Differences in the timing among the maturity or repricing of assets, liabilities and off-balance sheet instruments
- Differences in the amounts of assets, liabilities and off-balance sheet instruments that are repricing at the same time
- Differences in the amounts by which short-term and long-term market interest rates change (for example, changes in the slope of the yield curve)
- The impact of changes in the maturity of various assets, liabilities or off-balance sheet instruments as interest rates change

The Firm manages interest rate exposure related to its assets and liabilities on a consolidated, firmwide basis. Business units transfer their interest rate risk to Treasury and CIO through a transfer-pricing system, which takes into account the elements of interest rate exposure that can be risk-managed in financial markets. These elements include asset and liability balances and contractual rates of interest, contractual principal payment schedules, expected prepayment experience, interest rate reset dates and maturities, rate indices used for repricing, and any interest rate ceilings or floors for adjustable rate products. All transfer-pricing assumptions are dynamically reviewed.

The Firm generates a baseline for net interest income and certain interest rate sensitive fees, and then conducts simulations of changes for interest rate-sensitive assets and liabilities denominated in U.S. dollar and other currencies ("non-U.S. dollar" currencies). Earnings-at-risk scenarios estimate the potential change in this baseline, over the following 12 months utilizing multiple assumptions. These scenarios consider the impact on exposures as a result of changes in interest rates from baseline rates, as well as pricing sensitivities of deposits, optionality and changes in product mix. The scenarios include forecasted balance sheet changes, as well as modeled prepayment and reinvestment behavior, but do not include assumptions about actions that could be taken by the Firm in response to any such instantaneous rate changes. Mortgage prepayment assumptions are based on scenario interest rates compared with underlying contractual rates, the time since origination, and other factors which are updated periodically based on historical experience. The Firm's earnings-at-risk scenarios are periodically evaluated and enhanced in response to changes in the composition of the Firm's balance sheet, changes in market conditions, improvements in the Firm's simulation and other factors.

The Firm's U.S. dollar sensitivities are presented in the table below. The non-U.S. dollar sensitivity scenarios are not material to the Firm's earnings-at-risk at December 31, 2016 and 2015.

JPMorgan Chase's 12-month earnings-at-risk sensitivity profiles

U.S. dollar	Instantaneous change in rates			
(in billions)	+200 bps	+100 bps	-100 bps	-200 bps
December 31, 2016	**$ 4.0**	**$ 2.4**	**NM** (a)	**NM** (a)
December 31, 2015	$ 5.2	$ 3.1	NM (a)	NM (a)

(a) Given the current level of market interest rates, downward parallel 100 and 200 basis point earnings-at-risk scenarios are not considered to be meaningful.

The Firm's benefit to rising rates on U.S. dollar assets and liabilities is largely a result of reinvesting at higher yields and assets repricing at a faster pace than deposits.

The Firm's net U.S. dollar sensitivity to a 200 bps and 100 bps instantaneous increase in rates decreased by approximately $1.2 billion and $700 million, respectively, when compared to December 31, 2015. The primary driver of that decrease was the updating of the Firm's baseline to reflect higher interest rates. As higher interest rates are reflected in the Firm's baselines, the magnitude of the sensitivity to further increases in rates would be expected to be less significant. The net change in mix in the Firm's spot and forecasted balance sheet also contributed to a decrease in the net U.S. dollar sensitivity when compared to December 31, 2015.

Separately, another U.S. dollar interest rate scenario used by the Firm – involving a steeper yield curve with long-term rates rising by 100 basis points and short-term rates staying at current levels – results in a 12-month benefit to net interest income of approximately $800 million. The increase under this scenario reflects the Firm reinvesting at the higher long-term rates, with funding costs remaining unchanged. The result of the comparable non-U.S. dollar scenario was not material to the Firm.

Non-U.S. dollar foreign exchange risk

Non-U.S. dollar FX risk is the risk that changes in foreign exchange rates affect the value of the Firm's assets or liabilities or future results. The Firm has structural non-U.S. dollar FX exposures arising from capital investments, forecasted expense and revenue, the investment securities portfolio and non-U.S. dollar-denominated debt issuance. Treasury and CIO, working in partnership with the lines of business, primarily manage these risks on behalf of the Firm. Treasury and CIO may hedge certain of these risks using derivatives within risk limits governed by the CTC Risk Committee.

Other sensitivity-based measures

The Firm quantifies the market risk of certain investment and funding activities by assessing the potential impact on net revenue and OCI due to changes in relevant market variables. For additional information on the positions captured in other sensitivity-based measures, please refer to the Risk identification and classification table on page 117.

The table below represents the potential impact to net revenue or OCI for market risk sensitive instruments that are not included in VaR or earnings-at-risk. Where appropriate, instruments used for hedging purposes are reported along with the positions being hedged. The sensitivities disclosed in the table below may not be representative of the actual gain or loss that would have been realized at December 31, 2016, as the movement in market parameters across maturities may vary and are not intended to imply management's expectation of future deterioration in these sensitivities.

(in millions) December 31, 2016 **Activity**	**Description**	**Sensitivity measure**		**Gain/(Loss)**
Investment Activities				
Investment management activities	Consists of seed capital and related hedges; and fund co-investments	10% decline in market value	$	(166)
Other investments	Consists of private equity and other investments held at fair value	10% decline in market value	$	(358)
Funding Activities				
Non-USD LTD Cross-currency basis	Represents the basis risk on derivatives used to hedge the foreign exchange risk on the non-USD LTD	1 basis point parallel tightening of cross currency basis	$	(7)
Non-USD LTD hedges FX exposure	Primarily represents the foreign exchange revaluation on the fair value of the derivative hedges	10% depreciation of currency	$	(23)
Funding Spread Risk - Derivatives	Impact of changes in the spread related to derivatives DVA/FVA	1 basis point parallel increase in spread	$	(4)
Funding Spread Risk - Fair value option elected liabilities[(a)]	Impact of changes in the spread related to fair value option elected liabilities DVA	1 basis point parallel increase in spread	$	17

(a) Impact recognized through OCI.

PRINCIPAL RISK MANAGEMENT

Principal investments are predominantly privately-held financial assets and instruments, typically representing ownership or junior capital positions, that have unique risks due to their illiquidity or for which there is less observable market or valuation data. Such positions are typically intended to be held over extended investment periods and, accordingly, the Firm has no expectation for short-term gain with respect to these investments. Principal investments cover multiple asset classes and are made either in stand-alone investing businesses or as part of a broader business platform. Asset classes include tax-oriented investments (e.g., affordable housing and alternative energy investments), private equity and various debt investments. Increasingly, new principal investment activity seeks to enhance or accelerate line of business strategic business initiatives.

The Firm's principal investments are managed under various lines of business and are reflected within the respective LOBs financial results. The Firm's approach to managing principal risk is consistent with the Firm's general risk governance structure. A Firmwide risk policy framework exists for all principal investing activities. All investments are approved by investment committees that include executives who are independent from the investing businesses. The Firm's independent control functions are responsible for reviewing the appropriateness of the carrying value of principal investments in accordance with relevant policies. Approved levels for such investments are established for each relevant business in order to manage the overall size of the portfolios. Industry, geographic and position level concentration limits are in place and are intended to ensure diversification of the portfolios. The Firm also conducts stress testing on these portfolios using specific scenarios that estimate losses based on significant market moves and/or other risk events.

Compliance risk is the risk of failure to comply with applicable laws, rules and regulations.

Overview

Each line of business is accountable for managing its compliance risk. The Firm's Compliance Organization ("Compliance"), which is independent of the lines of business, works closely with senior management to provide independent review, monitoring and oversight of business operations with a focus on compliance with the legal and regulatory obligations applicable to the offering of the Firm's products and services to clients and customers.

These compliance risks relate to a wide variety of legal and regulatory obligations, depending on the line of business and the jurisdiction, and include those related to products and services, relationships and interactions with clients and customers, and employee activities. For example, compliance risks include those associated with anti-money laundering compliance, trading activities, market conduct, and complying with the rules and regulations related to the offering of products and services across jurisdictional borders, among others.

Other Functions such as Finance (including Tax), Technology and Human Resources provide oversight of significant regulatory obligations that are specific to their respective areas of responsibility.

Compliance implements various practices designed to identify and mitigate compliance risk by establishing policies, testing, monitoring, training and providing guidance.

In recent years, the Firm has experienced heightened scrutiny by its regulators of its compliance with regulations, and with respect to its controls and operational processes. In certain instances, the Firm has entered into Consent Orders with its regulators requiring the Firm to take certain specified actions to remediate compliance with regulations and improve its controls. The Firm expects that such regulatory scrutiny will continue.

Governance and oversight

Compliance is led by the Firms' CCO who reports, effective September 2016, to the Firm's CRO.

The Firm maintains oversight and coordination of its Compliance Risk Management practices through the Firm's CCO, lines of business CCOs and regional CCOs to implement the Compliance program globally across the lines of business and regions. The Firm's CCO is a member of the FCC and the FRC. The Firm's CCO also provides regular updates to the Audit Committee and DRPC. In addition, from time to time, special committees of the Board have been established to oversee the Firm's compliance with regulatory Consent Orders.

The Firm has in place a Code of Conduct (the "Code"), and each employee is given annual training in respect of the Code and is required annually to affirm his or her compliance with the Code. The Code sets forth the Firm's core principles and fundamental values, including that no employee should ever sacrifice integrity - or give the impression that he or she has. The Code requires prompt reporting of any known or suspected violation of the Code, any internal Firm policy, or any law or regulation applicable to the Firm's business. It also requires the reporting of any illegal conduct, or conduct that violates the underlying principles of the Code, by any of the Firm's employees, customers, suppliers, contract workers, business partners, or agents. Specified employees are specially trained and designated as "code specialists" who act as a resource to employees on Code matters. In addition, concerns may be reported anonymously and the Firm prohibits retaliation against employees for the good faith reporting of any actual or suspected violations of the Code. The Code and the associated employee compliance program are focused on the regular assessment of certain key aspects of the Firm's culture and conduct initiatives.

Conduct risk is the risk that an employee's action or inaction causes undue harm to the Firm's clients and customers, damages market integrity, undermines the Firm's reputation, or negatively impacts the Firm's culture.

Overview

Each line of business or function is accountable for identifying and managing its conduct risk to provide appropriate engagement, ownership and sustainability of a culture consistent with the Firm's How We Do Business Principles ("Principles"). The Principles serve as a guide for how employees are expected to conduct themselves. With the Principles serving as a guide, the Firm's Code sets out the Firm's expectations for each employee and provides certain information and the resources to help employees conduct business ethically and in compliance with the law everywhere the Firm operates. For further discussion of the Code, see Compliance Risk Management on page 125.

Governance and oversight

The CMDC is the primary Board-level Committee that oversees the Firm's culture and conduct programs. The Audit Committee has responsibility to review the program established by management that monitors compliance with the Code. Additionally, the DRPC reviews, at least annually, the Firm's qualitative factors included in the Risk Appetite Framework, including conduct risk. The DRPC also meets annually with the CMDC to review and discuss aspects of the Firm's compensation practices.

Conduct risk management is incorporated into various aspects of people management practices throughout the employee life cycle, including recruiting, onboarding, training and development, performance management, promotion and compensation processes. Businesses undertake annual Risk and Control Self-Assessment ("RCSA") assessments; and, as part of these RCSA reviews, they identify their respective key inherent operational risks (including conduct risks), evaluate the design and effectiveness of their controls, identify control gaps and develop associated action plans. The Firm's Know Your Employee framework generally addresses how the Firm manages, oversees and responds to workforce conduct related matters that may otherwise expose the Firm to financial, reputational, compliance and other operating risks. The Firm also has a HR Control Forum, the primary purpose of which is to discuss conduct and accountability for more significant risk and control issues and review, when appropriate, employee actions including but not limited to promotion and compensation actions.

Legal risk is the risk of loss or imposition of damages, fines, penalties or other liability arising from the failure to comply with a contractual obligation or to comply with laws, rules or regulations to which the Firm is subject.

Overview

In addition to providing legal services and advice to the Firm, and communicating and helping the lines of business adjust to the legal and regulatory changes they face, including the heightened scrutiny and expectations of the Firm's regulators, the global Legal function is responsible for working with the businesses and corporate functions to fully understand and assess their adherence to laws, rules and regulations. In particular, Legal assists Oversight & Control, Risk, Finance, Compliance and Internal Audit in their efforts to ensure compliance with all applicable laws and regulations and the Firm's corporate standards for doing business. The Firm's lawyers also advise the Firm on potential legal exposures on key litigation and transactional matters, and perform a significant defense and advocacy role by defending the Firm against claims and potential claims and, when needed, pursuing claims against others. In addition, they advise the Firm's Conflicts Office which reviews the Firm's wholesale transactions that may have the potential to create conflicts of interest for the Firm.

Governance and oversight

The Firm's General Counsel reports to the CEO and is a member of the Operating Committee, the Firmwide Risk Committee and the FCC. The General Counsel's leadership team includes a General Counsel for each line of business, the heads of the Litigation and Corporate & Regulatory practices, as well as the Firm's Corporate Secretary. Each region (e.g., Latin America, Asia Pacific) has a General Counsel who is responsible for managing legal risk across all lines of business and functions in the region.

Legal works with various committees (including new business initiative and reputation risk committees) and the Firm's businesses to protect the Firm's reputation beyond any particular legal requirements.

Model risk is the potential for adverse consequences from decisions based on incorrect or misused model outputs.

The Firm uses models across various businesses and functions. The models are of varying levels of sophistication and are used for many purposes including, for example, the valuation of positions and the measurement of risk, such as assessing regulatory capital requirements, conducting stress testing, and making business decisions.

Model risks are owned by the users of the models within the various businesses and functions in the Firm based on the specific purposes of such models. Users and developers of models are responsible for developing, implementing and testing their models, as well as referring models to the Model Risk function for review and approval. Once models have been approved, model users and developers are responsible for maintaining a robust operating environment, and must monitor and evaluate the performance of the models on an ongoing basis. Model users and developers may seek to enhance models in response to changes in the portfolios and in product and market developments, as well as to capture improvements in available modeling techniques and systems capabilities.

The Model Risk function reviews and approves a wide range of models, including risk management, valuation and regulatory capital models used by the Firm. The Model Risk function is independent of model users and developers. The Firmwide Model Risk Executive reports to the Firm's CRO.

Models are tiered based on an internal standard according to their complexity, the exposure associated with the model and the Firm's reliance on the model. This tiering is subject to the approval of the Model Risk function. A model review conducted by the Model Risk function considers the model's suitability for the specific uses to which it will be put. The factors considered in reviewing a model include whether the model accurately reflects the characteristics of the product and its significant risks, the selection and reliability of model inputs, consistency with models for similar products, the appropriateness of any model-related adjustments, and sensitivity to input parameters and assumptions that cannot be observed from the market. When reviewing a model, the Model Risk function analyzes and challenges the model methodology and the reasonableness of model assumptions and may perform or require additional testing, including back-testing of model outcomes. Model reviews are approved by the appropriate level of management within the Model Risk function based on the relevant model tier.

Under the Firm's Model Risk Policy, the Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm's model risk policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim. These actions will depend on the model and may include, for example, limitation of trading activity.

For a summary of valuations based on models, see Critical Accounting Estimates Used by the Firm on pages 132–134 and Note 3.

Operational risk is the risk of loss resulting from inadequate or failed processes or systems, human factors or due to external events that are neither market- nor credit-related. Operational risk is inherent in the Firm's activities and can manifest itself in various ways, including fraudulent acts, business interruptions, inappropriate employee behavior, failure to comply with applicable laws and regulations or failure of vendors to perform in accordance with their arrangements. These events could result in financial losses, litigation and regulatory fines, as well as other damages to the Firm. The goal is to keep operational risk at appropriate levels in light of the Firm's financial strength, the characteristics of its businesses, and the markets and regulatory environments in which it operates.

Operational Risk Management Framework

To monitor and control operational risk, the Firm has an Operational Risk Management Framework which is designed to enable the Firm to maintain a sound and well-controlled operational environment. The ORMF is comprised of four main components: Governance, Risk Assessment, Measurement, and Monitoring and Reporting.

Governance

The lines of business and corporate functions are responsible for owning and managing their operational risks. The Firmwide Oversight and Control Group, which consists of control officers within each line of business and corporate function, is responsible for the day-to-day execution of the ORMF.

Line of business and corporate function control committees oversee the operational risk and control environments of their respective businesses and functions. These committees escalate operational risk issues to the FCC, as appropriate. For additional information on the FCC, see Enterprise Risk Management on pages 71–75.

The Firmwide Risk Executive for Operational Risk Governance ("ORG"), a direct report to the CRO, is responsible for defining the ORMF and establishing minimum standards for its execution. Operational Risk Officers report to both the line of business CROs and to the Firmwide Risk Executive for ORG, and are independent of the respective businesses or corporate functions they oversee.

The Firm's Operational Risk Appetite Policy is approved by the DRPC. This policy establishes the Operational Risk Management Framework for the Firm. The assessments of operational risk using this framework are reviewed with the DRPC.

Risk assessment

The Firm utilizes several tools to identify, assess, mitigate and manage its operational risk. One such tool is the RCSA program which is executed by LOBs and corporate functions in accordance with the minimum standards established by ORG. As part of the RCSA program, lines of business and corporate functions identify key operational risks inherent in their activities, evaluate the effectiveness of relevant controls in place to mitigate identified risks, and define actions to reduce residual risk. Action plans are developed for identified control issues and businesses are held accountable for tracking and resolving issues in a timely manner. Operational Risk Officers independently challenge the execution of the RCSA program and evaluate the appropriateness of the residual risk results.

In addition to the RCSA program, the Firm tracks and monitors events that have or could lead to actual operational risk losses, including litigation-related events. Responsible businesses and corporate functions analyze their losses to evaluate the efficacy of their control environment to assess where controls have failed, and to determine where targeted remediation efforts may be required. ORG provides oversight of these activities and may also perform independent assessments of significant operational risk events and areas of concentrated or emerging risk.

Measurement

In addition to the level of actual operational risk losses, operational risk measurement includes operational risk-based capital and operational risk losses under both baseline and stressed conditions.

The primary component of the operational risk capital estimate is the Loss Distribution Approach ("LDA") statistical model, which simulates the frequency and severity of future operational risk loss projections based on historical data. The LDA model is used to estimate an aggregate operational risk loss over a one-year time horizon, at a 99.9% confidence level. The LDA model incorporates actual internal operational risk losses in the quarter following the period in which those losses were realized, and the calculation generally continues to reflect such losses even after the issues or business activities giving rise to the losses have been remediated or reduced.

As required under the Basel III capital framework, the Firm's operational risk-based capital methodology, which uses the Advanced Measurement Approach, incorporates internal and external losses as well as management's view of tail risk captured through operational risk scenario analysis, and evaluation of key business environment and internal control metrics.

The Firm considers the impact of stressed economic conditions on operational risk losses and develops a forward looking view of material operational risk events that may occur in a stressed environment. The Firm's operational risk stress testing framework is utilized in calculating results for the Firm's CCAR and ICAAP processes.

For information related to operational risk RWA, CCAR or ICAAP, see Capital Risk Management section, pages 76–85.

Monitoring and reporting
ORG has established standards for consistent operational risk reporting. The standards also reinforce escalation protocols to senior management and to the Board of Directors. Operational risk reports are produced on a firmwide basis as well as by line of business and corporate function.

Other operational risks

As mentioned previously, operational risk can manifest itself in various ways. Risks such as Compliance risk, Conduct risk, Legal risk and Model risk as well as other operational risks, can lead to losses which are captured through the Firm's operational risk measurement processes. More information on Compliance risk, Conduct risk, Legal risk and Model risk are discussed on pages 125, 126, 127 and 128, respectively. Details on other select operational risks are provided below.

Cybersecurity risk
The Firm devotes significant resources to protect the security of the Firm's computer systems, software, networks and other technology assets. The Firm's security efforts are intended to protect against cybersecurity attacks by unauthorized parties to obtain access to confidential information, destroy data, disrupt or degrade service, sabotage systems or cause other damage. The Firm continues to make significant investments in enhancing its cyber defense capabilities and to strengthen its partnerships with the appropriate government and law enforcement agencies and other businesses in order to understand the full spectrum of cybersecurity risks in the environment, enhance defenses and improve resiliency against cybersecurity threats. Third parties with which the Firm does business or that facilitate the Firm's business activities (e.g., vendors, exchanges, clearing houses, central depositories, and financial intermediaries) could also be sources of cybersecurity risk to the Firm. Third party cybersecurity incidents such as system breakdowns or failures, misconduct by the employees of such parties, or cyberattacks could affect their ability to deliver a product or service to the Firm or result in lost or compromised information of the Firm or its clients. Clients can also be sources of cybersecurity risk to the Firm, particularly when their activities and systems are beyond the Firm's own security and control systems. However, where cybersecurity incidents are due to client failure to maintain the security of their own systems and processes, clients will generally be responsible for losses incurred.

To protect the confidentiality, integrity and availability of the Firm's infrastructure, resources and information, the Firm leverages the ORMF to ensure risks are identified and managed within defined corporate tolerances. The Firm's Board of Directors and the Audit Committee are regularly briefed on the Firm's cybersecurity policies and practices as well as its efforts regarding significant cybersecurity events.

Payment fraud risk
Payment fraud risk is the risk of external and internal parties unlawfully obtaining personal benefit at the expense of the Firm. Over the past year, the risk of payment fraud has increased across the industry, with the number of attempts hitting record highs. The complexities of these attacks along with perpetrators' strategies continue to evolve. A Payments Control Program has been established that includes Cybersecurity, Operations, Technology, Risk and the lines of business to manage the risk, implement controls and provide client education and awareness training. The program monitors and measures payment fraud activity, evaluates the Firm's cybersecurity defenses, limits access to sensitive data, and provides training to both employees and clients.

Third-party outsourcing risk
To identify and manage the operational risk inherent in its outsourcing activities, the Firm has a Third-Party Oversight ("TPO") framework to assist lines of business and corporate functions in selecting, documenting, onboarding, monitoring and managing their supplier relationships. The objective of the TPO framework is to hold third parties to the same high level of operational performance as is expected of the Firm's internal operations. The Third-Party Oversight group is responsible for Firmwide TPO training, monitoring, reporting and standards.

Business and technology resilience risk
Business disruptions can occur due to forces beyond the Firm's control such as severe weather, power or telecommunications loss, flooding, transit strikes, terrorist threats or infectious disease. The safety of the Firm's employees and customers is of the highest priority. The Firm's global resiliency program is intended to ensure that the Firm has the ability to recover its critical business functions and supporting assets (i.e., staff, technology and facilities) in the event of a business interruption. The program includes corporate governance, awareness and training, as well as strategic and tactical initiatives to identify, assess, and manage business interruption and public safety risks.

The strength and proficiency of the Firm's global resiliency program has played an integral role in maintaining the Firm's business operations during and quickly after various events.

Insurance

One of the ways operational loss may be mitigated is through insurance maintained by the Firm. The Firm purchases insurance to be in compliance with local laws and regulations (e.g., workers compensation), as well as to serve other needs (e.g., property loss and public liability). Insurance may also be required by third parties with whom the Firm does business. The insurance purchased is reviewed and approved by senior management.

REPUTATION RISK MANAGEMENT

Reputation risk is the risk that an action, transaction, investment or event will reduce trust in the Firm's integrity or competence by its various constituents, including clients, counterparties, investors, regulators, employees and the broader public. Maintaining the Firm's reputation is the responsibility of each individual employee of the Firm. The Firm's Reputation Risk Governance policy explicitly vests each employee with the responsibility to consider the reputation of the Firm when engaging in any activity. Since the types of events that could harm the Firm's reputation are so varied across the Firm's lines of business, each line of business has a separate reputation risk governance infrastructure in place, which consists of three key elements: clear, documented escalation criteria appropriate to the business; a designated primary discussion forum — in most cases, one or more dedicated reputation risk committees; and a list of designated contacts, to whom questions relating to reputation risk should be referred. Line of business reputation risk governance is overseen by a Firmwide Reputation Risk Governance function which provides oversight of the governance infrastructure and process to support the consistent identification, escalation, management and monitoring of reputation risk issues firmwide.

CRITICAL ACCOUNTING ESTIMATES USED BY THE FIRM

JPMorgan Chase's accounting policies and use of estimates are integral to understanding its reported results. The Firm's most complex accounting estimates require management's judgment to ascertain the appropriate carrying value of assets and liabilities. The Firm has established policies and control procedures intended to ensure that estimation methods, including any judgments made as part of such methods, are well-controlled, independently reviewed and applied consistently from period to period. The methods used and judgments made reflect, among other factors, the nature of the assets or liabilities and the related business and risk management strategies, which may vary across the Firm's businesses and portfolios. In addition, the policies and procedures are intended to ensure that the process for changing methodologies occurs in an appropriate manner. The Firm believes its estimates for determining the carrying value of its assets and liabilities are appropriate. The following is a brief description of the Firm's critical accounting estimates involving significant judgments.

Allowance for credit losses

JPMorgan Chase's allowance for credit losses covers the retained consumer and wholesale loan portfolios, as well as the Firm's wholesale and certain consumer lending-related commitments. The allowance for loan losses is intended to adjust the carrying value of the Firm's loan assets to reflect probable credit losses inherent in the loan portfolio as of the balance sheet date. Similarly, the allowance for lending-related commitments is established to cover probable credit losses inherent in the lending-related commitments portfolio as of the balance sheet date.

The allowance for credit losses includes a formula-based component, an asset-specific component, and a component related to PCI loans. The determination of each of these components involves significant judgment on a number of matters. For further discussion of these components, areas of judgment and methodologies used in establishing the Firm's allowance for credit losses, see Note 15.

Allowance for credit losses sensitivity

The Firm's allowance for credit losses is sensitive to numerous factors, which may differ depending on the portfolio. Changes in economic conditions or in the Firm's assumptions and estimates could affect its estimate of probable credit losses inherent in the portfolio at the balance sheet date. The Firm uses its best judgment to assess these economic conditions and loss data in estimating the allowance for credit losses and these estimates are subject to periodic refinement based on changes to underlying external or Firm-specific historical data. The use of alternate estimates, data sources, adjustments to modeled loss estimates for model imprecision and other factors would result in a different estimated allowance for credit losses.

To illustrate the potential magnitude of certain alternate judgments, the Firm estimates that changes in the following inputs would have the following effects on the Firm's modeled credit loss estimates as of December 31, 2016, without consideration of any offsetting or correlated effects of other inputs in the Firm's allowance for loan losses:

- For PCI loans, a combined 5% decline in housing prices and a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled credit loss estimates of approximately $600 million.
- For the residential real estate portfolio, excluding PCI loans, a combined 5% decline in housing prices and a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled annual loss estimates of approximately $125 million.
- For credit card loans, a 100 basis point increase in unemployment rates from current levels could imply an increase to modeled annual loss estimates of approximately $900 million.
- An increase in PD factors consistent with a one-notch downgrade in the Firm's internal risk ratings for its entire wholesale loan portfolio could imply an increase in the Firm's modeled loss estimates of approximately $2.3 billion.
- A 100 basis point increase in estimated LGD for the Firm's entire wholesale loan portfolio could imply an increase in the Firm's modeled credit loss estimates of approximately $175 million.

The purpose of these sensitivity analyses is to provide an indication of the isolated impacts of hypothetical alternative assumptions on modeled loss estimates. The changes in the inputs presented above are not intended to imply management's expectation of future deterioration of those risk factors. In addition, these analyses are not intended to estimate changes in the overall allowance for loan losses, which would also be influenced by the judgment management applies to the modeled loss estimates to reflect the uncertainty and imprecision of these modeled loss estimates based on then-current circumstances and conditions.

It is difficult to estimate how potential changes in specific factors might affect the overall allowance for credit losses because management considers a variety of factors and inputs in estimating the allowance for credit losses. Changes in these factors and inputs may not occur at the same rate and may not be consistent across all geographies or product types, and changes in factors may be directionally inconsistent, such that improvement in one factor may offset deterioration in other factors. In addition, it is difficult to predict how changes in specific economic conditions or assumptions could affect borrower behavior or other factors considered by management in estimating the allowance for credit losses. Given the process the Firm follows and the judgments made in evaluating the risk factors related to its loss estimates, management believes that its current estimate of the allowance for credit losses is appropriate.

Fair value of financial instruments, MSRs and commodities inventory

JPMorgan Chase carries a portion of its assets and liabilities at fair value. The majority of such assets and liabilities are measured at fair value on a recurring basis. Certain assets and liabilities are measured at fair value on a nonrecurring basis, including certain mortgage, home equity and other loans, where the carrying value is based on the fair value of the underlying collateral.

Assets measured at fair value

The following table includes the Firm's assets measured at fair value and the portion of such assets that are classified within level 3 of the valuation hierarchy. For further information, see Note 3.

December 31, 2016 (in billions, except ratio data)	Total assets at fair value	Total level 3 assets
Trading debt and equity instruments	$ 308.0	$ 7.9
Derivative receivables[(a)]	64.1	5.8
Trading assets	372.1	13.7
AFS securities	238.9	0.7
Loans	2.2	0.6
MSRs	6.1	6.1
Private equity investments[(b)]	1.7	1.6
Other	26.4	0.5
Total assets measured at fair value on a recurring basis	647.4	23.2
Total assets measured at fair value on a nonrecurring basis	1.6	0.8
Total assets measured at fair value	$ 649.0	$ 24.0
Total Firm assets	$ 2,491.0	
Level 3 assets as a percentage of total Firm assets[(a)]		1.0%
Level 3 assets as a percentage of total Firm assets at fair value[(a)]		3.7%

(a) For purposes of table above, the derivative receivables total reflects the impact of netting adjustments; however, the $5.8 billion of derivative receivables classified as level 3 does not reflect the netting adjustment as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.

(b) Private equity instruments represent investments within Corporate.

Valuation

Details of the Firm's processes for determining fair value are set out in Note 3. Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed models that use significant unobservable inputs and are therefore classified within level 3 of the valuation hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate model to use. Second, the lack of observability of certain significant inputs requires management to assess all relevant empirical data in deriving valuation inputs including, for example, transaction details, yield curves, interest rates, prepayment rates, default rates, volatilities, correlations, equity or debt prices, valuations of comparable instruments, foreign exchange rates and credit curves. For further discussion of the valuation of level 3 instruments, including unobservable inputs used, see Note 3.

For instruments classified in levels 2 and 3, management judgment must be applied to assess the appropriate level of valuation adjustments to reflect counterparty credit quality, the Firm's creditworthiness, market funding rates, liquidity considerations, unobservable parameters, and for portfolios that meet specified criteria, the size of the net open risk position. The judgments made are typically affected by the type of product and its specific contractual terms, and the level of liquidity for the product or within the market as a whole. For further discussion of valuation adjustments applied by the Firm see Note 3.

Imprecision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of methodologies or assumptions different than those used by the Firm could result in a different estimate of fair value at the reporting date. For a detailed discussion of the Firm's valuation process and hierarchy, and its determination of fair value for individual financial instruments, see Note 3.

Goodwill impairment

Under U.S. GAAP, goodwill must be allocated to reporting units and tested for impairment at least annually. The Firm's process and methodology used to conduct goodwill impairment testing is described in Note 17.

Management applies significant judgment when estimating the fair value of its reporting units. Estimates of fair value are dependent upon estimates of (a) the future earnings potential of the Firm's reporting units, including the estimated effects of regulatory and legislative changes, (b) long-term growth rates and (c) the estimated market cost of equity. Imprecision in estimating these factors can affect the estimated fair value of the reporting units.

Based upon the updated valuations for all of its reporting units, the Firm concluded that the goodwill allocated to its reporting units was not impaired at December 31, 2016. The fair values of these reporting units exceeded their carrying values by approximately 10% - 130% for all reporting units and did not indicate a significant risk of goodwill impairment based on current projections and valuations.

The projections for all of the Firm's reporting units are consistent with management's current short-term business outlook assumptions, and in the longer term, incorporate a set of macroeconomic assumptions and the Firm's best estimates of long-term growth and returns on equity of its businesses. Where possible, the Firm uses third-party and peer data to benchmark its assumptions and estimates.

Declines in business performance, increases in credit losses, increases in equity capital requirements, as well as deterioration in economic or market conditions, adverse estimates of regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

For additional information on goodwill, see Note 17.

Income taxes

JPMorgan Chase is subject to the income tax laws of the various jurisdictions in which it operates, including U.S. federal, state and local, and non-U.S. jurisdictions. These laws are often complex and may be subject to different interpretations. To determine the financial statement impact of accounting for income taxes, including the provision for income tax expense and unrecognized tax benefits, JPMorgan Chase must make assumptions and judgments about how to interpret and apply these complex tax laws to numerous transactions and business events, as well as make judgments regarding the timing of when certain items may affect taxable income in the U.S. and non-U.S. tax jurisdictions.

JPMorgan Chase's interpretations of tax laws around the world are subject to review and examination by the various taxing authorities in the jurisdictions where the Firm operates, and disputes may occur regarding its view on a tax position. These disputes over interpretations with the various taxing authorities may be settled by audit, administrative appeals or adjudication in the court systems of the tax jurisdictions in which the Firm operates. JPMorgan Chase regularly reviews whether it may be assessed additional income taxes as a result of the resolution of these matters, and the Firm records additional reserves as appropriate. In addition, the Firm may revise its estimate of income taxes due to changes in income tax laws, legal interpretations, and business strategies. It is possible that revisions in the Firm's estimate of income taxes may materially affect the Firm's results of operations in any reporting period.

The Firm's provision for income taxes is composed of current and deferred taxes. Deferred taxes arise from differences between assets and liabilities measured for financial reporting versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. The Firm has also recognized deferred tax assets in connection with certain NOLs and tax credits. The Firm performs regular reviews to ascertain whether its deferred tax assets are realizable. These reviews include management's estimates and assumptions regarding future taxable income, which also incorporates various tax planning strategies, including strategies that may be available to utilize NOLs before they expire. In connection with these reviews, if it is determined that a deferred tax asset is not realizable, a valuation allowance is established. The valuation allowance may be reversed in a subsequent reporting period if the Firm determines that, based on revised estimates of future taxable income or changes in tax planning strategies, it is more likely than not that all or part of the deferred tax asset will become realizable. As of December 31, 2016, management has determined it is more likely than not that the Firm will realize its deferred tax assets, net of the existing valuation allowance.

JPMorgan Chase does not record U.S. federal income taxes on the undistributed earnings of certain non-U.S. subsidiaries, to the extent management has determined such earnings have been reinvested abroad for an indefinite period of time. Changes to the income tax rates applicable to these non-U.S. subsidiaries may have a material impact on the effective tax rate in a future period if such changes were to occur.

The Firm adjusts its unrecognized tax benefits as necessary when additional information becomes available. Uncertain tax positions that meet the more-likely-than-not recognition threshold are measured to determine the amount of benefit to recognize. An uncertain tax position is measured at the largest amount of benefit that management believes is more likely than not to be realized upon settlement. It is possible that the reassessment of JPMorgan Chase's unrecognized tax benefits may have a material impact on its effective income tax rate in the period in which the reassessment occurs.

For additional information on income taxes, see Note 26.

Litigation reserves

For a description of the significant estimates and judgments associated with establishing litigation reserves, see Note 31.

Financial Accounting Standards Board ("FASB") Standards adopted during 2016

Standard	Summary of guidance	Effects on financial statements
Amendments to the consolidation analysis	• Eliminates the deferral issued by the FASB in February 2010 of VIE-related accounting requirements for certain investment funds, including mutual funds, private equity funds and hedge funds. • Amends the evaluation of fees paid to a decision-maker or a service provider, and exempts certain money market funds from consolidation.	• Adopted January 1, 2016. • There was no material impact on the Firm's Consolidated Financial Statements. • For further information, see Note 1.
Improvements to employee share-based payment accounting	• Requires that all excess tax benefits and tax deficiencies that pertain to employee stock-based incentive payments be recognized within income tax expense in the Consolidated statements of income, rather than within additional paid-in capital.	• Adopted January 1, 2016. • There was no material impact on the Firm's Consolidated Financial Statements.
Measuring the financial assets and financial liabilities of a consolidated collateralized financing entity	• Provides an alternative for consolidated financing VIEs to elect: (1) to measure their financial assets and liabilities separately under existing U.S. GAAP for fair value measurement with any differences in such fair values reflected in earnings; or (2) to measure both their financial assets and liabilities using the more observable of the fair value of the financial assets or the fair value of the financial liabilities.	• Adopted January 1, 2016. • There was no material impact on the Firm's Consolidated Financial Statements as the Firm has historically measured the financial assets and liabilities using the more observable fair value.
Recognition and measurement of financial assets and financial liabilities – DVA to OCI	• For financial liabilities where the fair value option has been elected, the portion of the total change in fair value caused by changes in the Firm's own credit risk (i.e., DVA) is required to be presented separately in OCI. • Requires a cumulative-effect adjustment to retained earnings as of the beginning of the period of adoption.	• Adopted January 1, 2016. • There was no material impact on the Firm's Consolidated Financial Statements. • For additional information about the impact of the adoption of the new accounting guidance, see Notes 3, 4 and 25.

FASB Standards issued but not yet adopted

Standard	Summary of guidance	Effects on financial statements
Revenue recognition – revenue from contracts with customers *Issued May 2014*	• Requires that revenue from contracts with customers be recognized upon transfer of control of a good or service in the amount of consideration expected to be received. • Changes the accounting for certain contract costs, including whether they may be offset against revenue in the Consolidated statements of income, and requires additional disclosures about revenue and contract costs. • May be adopted using a full retrospective approach or a modified, cumulative effect approach wherein the guidance is applied only to existing contracts as of the date of initial application, and to new contracts transacted after that date.	• Required effective date: January 1, 2018.[a] • Because the guidance does not apply to revenue associated with financial instruments, including loans and securities that are accounted for under other U.S. GAAP, the Firm does not expect the new revenue recognition guidance to have a material impact on the elements of its Consolidated statements of income most closely associated with financial instruments, including securities gains, interest income and interest expense. • The Firm plans to adopt the revenue recognition guidance in the first quarter of 2018. The Firm's implementation efforts include the identification of revenue within the scope of the guidance, as well as the evaluation of revenue contracts and related accounting policies. While the Firm has not yet identified any material changes in the timing of revenue recognition, the Firm's review is ongoing, and it continues to evaluate the presentation of certain contract costs (whether presented gross or offset against noninterest revenue).
Recognition and measurement of financial assets and financial liabilities *Issued January 2016*	• Requires that certain equity instruments be measured at fair value, with changes in fair value recognized in earnings. • Generally requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption.	• Required effective date: January 1, 2018. • The Firm is currently evaluating the potential impact on the Consolidated Financial Statements. The Firm's implementation efforts include the identification of securities within the scope of the guidance, the evaluation of the measurement alternative available for equity securities without a readily determinable fair value, and the related impact to accounting policies, presentation, and disclosures.
Leases *Issued February 2016*	• Requires lessees to recognize all leases longer than twelve months on the Consolidated balance sheets as lease liabilities with corresponding right-of-use assets. • Requires lessees and lessors to classify most leases using principles similar to existing lease accounting, but eliminates the "bright line" classification tests. • Expands qualitative and quantitative disclosures regarding leasing arrangements. • Requires adoption using a modified cumulative effect approach wherein the guidance is applied to all periods presented.	• Required effective date: January 1, 2019.[a] • The Firm is currently evaluating the potential impact on the Consolidated Financial Statements by reviewing its existing lease contracts and service contracts that may include embedded leases. The Firm expects to recognize lease liabilities and corresponding right-of-use assets (at their present value) related to predominantly all of the $10 billion of future minimum payments required under operating leases as disclosed in Note 30. However, the population of contracts subject to balance sheet recognition and their initial measurement remains under evaluation. The Firm does not expect material changes to the recognition of operating lease expense in its Consolidated statements of income.

FASB Standards issued but not yet adopted (continued)

Standard	Summary of guidance	Effects on financial statements
Financial instruments - credit losses *Issued June 2016*	• Replaces existing incurred loss impairment guidance and establishes a single allowance framework for financial assets carried at amortized cost (including HTM securities), which will reflect management's estimate of credit losses over the full remaining expected life of the financial assets. • Eliminates existing guidance for PCI loans, and requires recognition of an allowance for expected credit losses on financial assets purchased with more than insignificant credit deterioration since origination. • Amends existing impairment guidance for AFS securities to incorporate an allowance, which will allow for reversals of impairment losses in the event that the credit of an issuer improves. • Requires a cumulative-effect adjustment to retained earnings as of the beginning of the reporting period of adoption.	• Required effective date: January 1, 2020.[b] • The Firm has begun its implementation efforts by establishing a firmwide, cross-discipline governance structure. The Firm is currently identifying key interpretive issues, and is assessing existing credit loss forecasting models and processes against the new guidance to determine what modifications may be required. • The Firm expects that the new guidance will result in an increase in its allowance for credit losses due to several factors, including: 1. The allowance related to the Firm's loans and commitments will increase to cover credit losses over the full remaining expected life of the portfolio, and will consider expected future changes in macroeconomic conditions 2. The nonaccretable difference on PCI loans will be recognized as an allowance, offset by an increase in the carrying value of the related loans 3. An allowance will be established for estimated credit losses on HTM securities • The extent of the increase is under evaluation, but will depend upon the nature and characteristics of the Firm's portfolio at the adoption date, and the macroeconomic conditions and forecasts at that date.
Classification of certain cash receipts and cash payments in the statement of cash flows *Issued August 2016*	• Provides targeted amendments to the classification of certain cash flows, including treatment of cash payments for settlement of zero-coupon debt instruments and distributions received from equity method investments. • Requires retrospective application to all periods presented.	• Required effective date: January 1, 2018.[a] • The Firm is currently evaluating the potential impact on the Consolidated Financial Statements.
Treatment of restricted cash on the statement of cash flows *Issued November 2016*	• Requires inclusion of restricted cash in the cash and cash equivalents balances in the Consolidated statements of cash flows. • Requires additional disclosures to supplement the Consolidated statements of cash flows. • Requires retrospective application to all periods presented.	• Required effective date: January 1, 2018.[a] • The Firm is currently evaluating the potential impact on the Consolidated Financial Statements.
Definition of a business *Issued January 2017*	• Narrows the definition of a business and clarifies that, to be considered a business, the fair value of the gross assets acquired (or disposed of) may not be substantially all concentrated in a single identifiable asset or a group of similar assets. • In addition, in order to be considered a business, a set of activities and assets must include, at a minimum, an input and a substantive process that together significantly contribute to the ability to create outputs.	• Required effective date: January 1, 2018.[a] • No material impact is expected because the guidance is to be applied prospectively, although it is anticipated that after adoption, fewer transactions will be treated as acquisitions or dispositions of a business.
Goodwill *Issued January 2017*	• Requires an impairment loss to be recognized when the estimated fair value of a reporting unit falls below its carrying value. • Eliminates the second condition in the current guidance that requires an impairment loss to be recognized only if the estimated implied fair value of the goodwill is below its carrying value.	• Required effective date: January 1, 2020.[a] • Based on current impairment test results, the Firm does not expect a material effect on the Consolidated Financial Statements. • After adoption, the guidance may result in more frequent goodwill impairment losses due to the removal of the second condition.

(a) Early adoption is permitted.
(b) Early adoption is permitted on January 1, 2019.

FORWARD-LOOKING STATEMENTS

From time to time, the Firm has made and will make forward-looking statements. These statements can be identified by the fact that they do not relate strictly to historical or current facts. Forward-looking statements often use words such as "anticipate," "target," "expect," "estimate," "intend," "plan," "goal," "believe," or other words of similar meaning. Forward-looking statements provide JPMorgan Chase's current expectations or forecasts of future events, circumstances, results or aspirations. JPMorgan Chase's disclosures in this Annual Report contain forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995. The Firm also may make forward-looking statements in its other documents filed or furnished with the SEC. In addition, the Firm's senior management may make forward-looking statements orally to investors, analysts, representatives of the media and others.

All forward-looking statements are, by their nature, subject to risks and uncertainties, many of which are beyond the Firm's control. JPMorgan Chase's actual future results may differ materially from those set forth in its forward-looking statements. While there is no assurance that any list of risks and uncertainties or risk factors is complete, below are certain factors which could cause actual results to differ from those in the forward-looking statements:

- Local, regional and global business, economic and political conditions and geopolitical events;
- Changes in laws and regulatory requirements, including capital and liquidity requirements affecting the Firm's businesses, and the ability of the Firm to address those requirements;
- Heightened regulatory and governmental oversight and scrutiny of JPMorgan Chase's business practices, including dealings with retail customers;
- Changes in trade, monetary and fiscal policies and laws;
- Changes in income tax laws and regulations;
- Securities and capital markets behavior, including changes in market liquidity and volatility;
- Changes in investor sentiment or consumer spending or savings behavior;
- Ability of the Firm to manage effectively its capital and liquidity, including approval of its capital plans by banking regulators;
- Changes in credit ratings assigned to the Firm or its subsidiaries;
- Damage to the Firm's reputation;
- Ability of the Firm to deal effectively with an economic slowdown or other economic or market disruption;
- Technology changes instituted by the Firm, its counterparties or competitors;
- The success of the Firm's business simplification initiatives and the effectiveness of its control agenda;
- Ability of the Firm to develop new products and services, and the extent to which products or services previously sold by the Firm (including but not limited to mortgages and asset-backed securities) require the Firm to incur liabilities or absorb losses not contemplated at their initiation or origination;
- Acceptance of the Firm's new and existing products and services by the marketplace and the ability of the Firm to innovate and to increase market share;
- Ability of the Firm to attract and retain qualified employees;
- Ability of the Firm to control expense;
- Competitive pressures;
- Changes in the credit quality of the Firm's customers and counterparties;
- Adequacy of the Firm's risk management framework, disclosure controls and procedures and internal control over financial reporting;
- Adverse judicial or regulatory proceedings;
- Changes in applicable accounting policies, including the introduction of new accounting standards;
- Ability of the Firm to determine accurate values of certain assets and liabilities;
- Occurrence of natural or man-made disasters or calamities or conflicts and the Firm's ability to deal effectively with disruptions caused by the foregoing;
- Ability of the Firm to maintain the security of its financial, accounting, technology, data processing and other operational systems and facilities;
- Ability of the Firm to effectively defend itself against cyberattacks and other attempts by unauthorized parties to access information of the Firm or its customers or to disrupt the Firm's systems; and
- The other risks and uncertainties detailed in Part I, Item 1A: Risk Factors in the Firm's Annual Report on Form 10-K for the year ended December 31, 2016.

Any forward-looking statements made by or on behalf of the Firm speak only as of the date they are made, and JPMorgan Chase does not undertake to update forward-looking statements to reflect the impact of circumstances or events that arise after the date the forward-looking statements were made. The reader should, however, consult any further disclosures of a forward-looking nature the Firm may make in any subsequent Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, or Current Reports on Form 8-K.

Management's report on internal control over financial reporting

Management of JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm") is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed by, or under the supervision of, the Firm's principal executive and principal financial officers, or persons performing similar functions, and effected by JPMorgan Chase's Board of Directors, management and other personnel, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with accounting principles generally accepted in the United States of America.

JPMorgan Chase's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records, that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the Firm's assets; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Firm are being made only in accordance with authorizations of JPMorgan Chase's management and directors; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Firm's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. Management has completed an assessment of the effectiveness of the Firm's internal control over financial reporting as of December 31, 2016. In making the assessment, management used the "Internal Control — Integrated Framework" ("COSO 2013") promulgated by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO").

Based upon the assessment performed, management concluded that as of December 31, 2016, JPMorgan Chase's internal control over financial reporting was effective based upon the COSO 2013 framework. Additionally, based upon management's assessment, the Firm determined that there were no material weaknesses in its internal control over financial reporting as of December 31, 2016.

The effectiveness of the Firm's internal control over financial reporting as of December 31, 2016, has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in their report which appears herein.

James Dimon
Chairman and Chief Executive Officer

Marianne Lake
Executive Vice President and Chief Financial Officer

February 28, 2017

pwc

To the Board of Directors and Stockholders of JPMorgan Chase & Co.:

In our opinion, the accompanying consolidated balance sheets and the related consolidated statements of income, comprehensive income, changes in stockholders' equity and cash flows present fairly, in all material respects, the financial position of JPMorgan Chase & Co. and its subsidiaries (the "Firm") at December 31, 2016 and 2015 and the results of their operations and their cash flows for each of the three years in the period ended December 31, 2016 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Firm maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016 based on criteria established in *Internal Control – Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The Firm's management is responsible for these financial statements, for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying "Management's report on internal control over financial reporting". Our responsibility is to express opinions on these financial statements and on the Firm's internal control over financial reporting based on our integrated audits. We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free of material misstatement and whether effective internal control over financial reporting was maintained in all material respects. Our audits of the financial statements included examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

PricewaterhouseCoopers LLP

February 28, 2017

PricewaterhouseCoopers LLP • 300 Madison Avenue • New York, NY 10017

Consolidated statements of income

Year ended December 31, (in millions, except per share data)	2016	2015	2014
Revenue			
Investment banking fees	**$ 6,448**	$ 6,751	$ 6,542
Principal transactions	**11,566**	10,408	10,531
Lending- and deposit-related fees	**5,774**	5,694	5,801
Asset management, administration and commissions	**14,591**	15,509	15,931
Securities gains	**141**	202	77
Mortgage fees and related income	**2,491**	2,513	3,563
Card income	**4,779**	5,924	6,020
Other income	**3,795**	3,032	3,013
Noninterest revenue	**49,585**	50,033	51,478
Interest income	**55,901**	50,973	51,531
Interest expense	**9,818**	7,463	7,897
Net interest income	**46,083**	43,510	43,634
Total net revenue	**95,668**	93,543	95,112
Provision for credit losses	**5,361**	3,827	3,139
Noninterest expense			
Compensation expense	**29,979**	29,750	30,160
Occupancy expense	**3,638**	3,768	3,909
Technology, communications and equipment expense	**6,846**	6,193	5,804
Professional and outside services	**6,655**	7,002	7,705
Marketing	**2,897**	2,708	2,550
Other expense	**5,756**	9,593	11,146
Total noninterest expense	**55,771**	59,014	61,274
Income before income tax expense	**34,536**	30,702	30,699
Income tax expense	**9,803**	6,260	8,954
Net income	**$ 24,733**	$ 24,442	$ 21,745
Net income applicable to common stockholders	**$ 22,583**	$ 22,406	$ 20,077
Net income per common share data			
Basic earnings per share	**$ 6.24**	$ 6.05	$ 5.33
Diluted earnings per share	**6.19**	6.00	5.29
Weighted-average basic shares	**3,618.5**	3,700.4	3,763.5
Weighted-average diluted shares	**3,649.8**	3,732.8	3,797.5
Cash dividends declared per common share	**$ 1.88**	$ 1.72	$ 1.58

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of comprehensive income

Year ended December 31, (in millions)	2016	2015	2014
Net income	**$ 24,733**	$ 24,442	$ 21,745
Other comprehensive income/(loss), after-tax			
Unrealized gains/(losses) on investment securities	**(1,105)**	(2,144)	1,975
Translation adjustments, net of hedges	**(2)**	(15)	(11)
Cash flow hedges	**(56)**	51	44
Defined benefit pension and OPEB plans	**(28)**	111	(1,018)
DVA on fair value option elected liabilities	**(330)**	—	—
Total other comprehensive income/(loss), after-tax	**(1,521)**	(1,997)	990
Comprehensive income	**$ 23,212**	$ 22,445	$ 22,735

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated balance sheets

December 31, (in millions, except share data)	2016	2015
Assets		
Cash and due from banks	$ 23,873	$ 20,490
Deposits with banks	365,762	340,015
Federal funds sold and securities purchased under resale agreements (included **$21,506** and $23,141 at fair value)	229,967	212,575
Securities borrowed (included **$0** and $395 at fair value)	96,409	98,721
Trading assets (included assets pledged of **$115,847** and $115,284)	372,130	343,839
Securities (included **$238,891** and $241,754 at fair value and assets pledged of **$16,115** and $14,883)	289,059	290,827
Loans (included **$2,230** and $2,861 at fair value)	894,765	837,299
Allowance for loan losses	(13,776)	(13,555)
Loans, net of allowance for loan losses	880,989	823,744
Accrued interest and accounts receivable	52,330	46,605
Premises and equipment	14,131	14,362
Goodwill	47,288	47,325
Mortgage servicing rights	6,096	6,608
Other intangible assets	862	1,015
Other assets (included **$7,557** and $7,604 at fair value and assets pledged of **$1,603** and $1,286)	112,076	105,572
Total assets(a)	$ 2,490,972	$ 2,351,698
Liabilities		
Deposits (included **$13,912** and $12,516 at fair value)	$ 1,375,179	$ 1,279,715
Federal funds purchased and securities loaned or sold under repurchase agreements (included **$687** and $3,526 at fair value)	165,666	152,678
Commercial paper	11,738	15,562
Other borrowed funds (included **$9,105** and $9,911 at fair value)	22,705	21,105
Trading liabilities	136,659	126,897
Accounts payable and other liabilities (included **$9,120** and $4,401 at fair value)	190,543	177,638
Beneficial interests issued by consolidated VIEs (included **$120** and $787 at fair value)	39,047	41,879
Long-term debt (included **$37,686** and $33,065 at fair value)	295,245	288,651
Total liabilities(a)	2,236,782	2,104,125
Commitments and contingencies (see Notes 29, 30 and 31)		
Stockholders' equity		
Preferred stock ($1 par value; authorized 200,000,000 shares: issued **2,606,750** shares)	26,068	26,068
Common stock ($1 par value; authorized 9,000,000,000 shares; issued **4,104,933,895** shares)	4,105	4,105
Additional paid-in capital	91,627	92,500
Retained earnings	162,440	146,420
Accumulated other comprehensive income	(1,175)	192
Shares held in restricted stock units ("RSU") trust, at cost (**472,953** shares)	(21)	(21)
Treasury stock, at cost (**543,744,003** and 441,459,392 shares)	(28,854)	(21,691)
Total stockholders' equity	254,190	247,573
Total liabilities and stockholders' equity	$ 2,490,972	$ 2,351,698

(a) The following table presents information on assets and liabilities related to VIEs that are consolidated by the Firm at December 31, 2016 and 2015. The difference between total VIE assets and liabilities represents the Firm's interests in those entities, which were eliminated in consolidation.

December 31, (in millions)	2016	2015
Assets		
Trading assets	$ 3,185	$ 3,736
Loans	75,614	75,104
All other assets	3,321	2,765
Total assets	$ 82,120	$ 81,605
Liabilities		
Beneficial interests issued by consolidated VIEs	$ 39,047	$ 41,879
All other liabilities	490	809
Total liabilities	$ 39,537	$ 42,688

The assets of the consolidated VIEs are used to settle the liabilities of those entities. The holders of the beneficial interests do not have recourse to the general credit of JPMorgan Chase. At December 31, 2016 and 2015, the Firm provided limited program-wide credit enhancement of $2.4 billion and $2.0 billion, respectively, related to its Firm-administered multi-seller conduits, which are eliminated in consolidation. For further discussion, see Note 16.

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of changes in stockholders' equity

Year ended December 31, (in millions, except per share data)	2016	2015	2014
Preferred stock			
Balance at January 1	**$ 26,068**	$ 20,063	$ 11,158
Issuance of preferred stock	**—**	6,005	8,905
Balance at December 31	**26,068**	26,068	20,063
Common stock			
Balance at January 1 and December 31	**4,105**	4,105	4,105
Additional paid-in capital			
Balance at January 1	**92,500**	93,270	93,828
Shares issued and commitments to issue common stock for employee stock-based compensation awards, and related tax effects	**(334)**	(436)	(508)
Other	**(539)**	(334)	(50)
Balance at December 31	**91,627**	92,500	93,270
Retained earnings			
Balance at January 1	**146,420**	129,977	115,435
Cumulative effect of change in accounting principle	**(154)**	—	—
Net income	**24,733**	24,442	21,745
Dividends declared:			
Preferred stock	**(1,647)**	(1,515)	(1,125)
Common stock (**$1.88**, $1.72 and $1.58 per share for 2016, 2015 and 2014, respectively)	**(6,912)**	(6,484)	(6,078)
Balance at December 31	**162,440**	146,420	129,977
Accumulated other comprehensive income			
Balance at January 1	**192**	2,189	1,199
Cumulative effect of change in accounting principle	**154**	—	—
Other comprehensive income/(loss)	**(1,521)**	(1,997)	990
Balance at December 31	**(1,175)**	192	2,189
Shares held in RSU Trust, at cost			
Balance at January 1 and December 31	**(21)**	(21)	(21)
Treasury stock, at cost			
Balance at January 1	**(21,691)**	(17,856)	(14,847)
Purchase of treasury stock	**(9,082)**	(5,616)	(4,760)
Reissuance from treasury stock	**1,919**	1,781	1,751
Balance at December 31	**(28,854)**	(21,691)	(17,856)
Total stockholders' equity	**$ 254,190**	$ 247,573	$ 231,727

The Notes to Consolidated Financial Statements are an integral part of these statements.

Consolidated statements of cash flows

Year ended December 31, (in millions)	2016	2015	2014
Operating activities			
Net income	**$ 24,733**	$ 24,442	$ 21,745
Adjustments to reconcile net income to net cash provided by/(used in) operating activities:			
Provision for credit losses	**5,361**	3,827	3,139
Depreciation and amortization	**5,478**	4,940	4,759
Deferred tax expense	**4,651**	1,333	4,362
Other	**1,799**	1,785	2,113
Originations and purchases of loans held-for-sale	**(61,107)**	(48,109)	(67,525)
Proceeds from sales, securitizations and paydowns of loans held-for-sale	**60,196**	49,363	71,407
Net change in:			
Trading assets	**(20,007)**	62,212	(24,814)
Securities borrowed	**2,313**	12,165	1,020
Accrued interest and accounts receivable	**(5,815)**	22,664	(3,637)
Other assets	**(4,517)**	(3,701)	(9,166)
Trading liabilities	**5,198**	(28,972)	26,818
Accounts payable and other liabilities	**3,740**	(23,361)	6,058
Other operating adjustments	**(1,827)**	(5,122)	314
Net cash provided by operating activities	**20,196**	73,466	36,593
Investing activities			
Net change in:			
Deposits with banks	**(25,747)**	144,462	(168,426)
Federal funds sold and securities purchased under resale agreements	**(17,468)**	3,190	30,848
Held-to-maturity securities:			
Proceeds from paydowns and maturities	**6,218**	6,099	4,169
Purchases	**(143)**	(6,204)	(10,345)
Available-for-sale securities:			
Proceeds from paydowns and maturities	**65,950**	76,448	90,664
Proceeds from sales	**48,592**	40,444	38,411
Purchases	**(123,959)**	(70,804)	(121,504)
Proceeds from sales and securitizations of loans held-for-investment	**15,429**	18,604	20,115
Other changes in loans, net	**(80,996)**	(108,962)	(51,749)
All other investing activities, net	**(2,825)**	3,703	2,181
Net cash provided by/(used in) investing activities	**(114,949)**	106,980	(165,636)
Financing activities			
Net change in:			
Deposits	**97,336**	(88,678)	89,346
Federal funds purchased and securities loaned or sold under repurchase agreements	**13,007**	(39,415)	10,905
Commercial paper and other borrowed funds	**(2,461)**	(57,828)	9,242
Beneficial interests issued by consolidated VIEs	**(5,707)**	(5,632)	(834)
Proceeds from long-term borrowings	**83,070**	79,611	78,515
Payments of long-term borrowings	**(68,949)**	(67,247)	(65,275)
Proceeds from issuance of preferred stock	**—**	5,893	8,847
Treasury stock and warrants repurchased	**(9,082)**	(5,616)	(4,760)
Dividends paid	**(8,476)**	(7,873)	(6,990)
All other financing activities, net	**(467)**	(726)	(768)
Net cash provided by/(used in) financing activities	**98,271**	(187,511)	118,228
Effect of exchange rate changes on cash and due from banks	**(135)**	(276)	(1,125)
Net increase/(decrease) in cash and due from banks	**3,383**	(7,341)	(11,940)
Cash and due from banks at the beginning of the period	**20,490**	27,831	39,771
Cash and due from banks at the end of the period	**$ 23,873**	$ 20,490	$ 27,831
Cash interest paid	**$ 9,508**	$ 7,220	$ 8,194
Cash income taxes paid, net	**2,405**	9,423	1,392

The Notes to Consolidated Financial Statements are an integral part of these statements.

Note 1 – Basis of presentation

JPMorgan Chase & Co. ("JPMorgan Chase" or the "Firm"), a financial holding company incorporated under Delaware law in 1968, is a leading global financial services firm and one of the largest banking institutions in the U.S., with operations worldwide. The Firm is a leader in investment banking, financial services for consumers and small business, commercial banking, financial transaction processing and asset management. For a discussion of the Firm's business segments, see Note 33.

The accounting and financial reporting policies of JPMorgan Chase and its subsidiaries conform to U.S. GAAP. Additionally, where applicable, the policies conform to the accounting and reporting guidelines prescribed by regulatory authorities.

Certain amounts reported in prior periods have been reclassified to conform with the current presentation.

Consolidation

The Consolidated Financial Statements include the accounts of JPMorgan Chase and other entities in which the Firm has a controlling financial interest. All material intercompany balances and transactions have been eliminated.

Assets held for clients in an agency or fiduciary capacity by the Firm are not assets of JPMorgan Chase and are not included on the Consolidated balance sheets.

The Firm determines whether it has a controlling financial interest in an entity by first evaluating whether the entity is a voting interest entity or a variable interest entity.

Effective January 1, 2016, the Firm adopted new accounting guidance related to the consolidation of legal entities such as limited partnerships, limited liability corporations, and securitization structures. The guidance eliminated the deferral issued by the FASB in February 2010 of the accounting guidance for VIEs for certain investment funds, including mutual funds, private equity funds and hedge funds. In addition, the guidance amends the evaluation of fees paid to a decision-maker or a service provider, and exempts certain money market funds from consolidation. Furthermore, asset management funds structured as limited partnerships or certain limited liability companies are now evaluated for consolidation as voting interest entities if the non-managing partners or members have the ability to remove the Firm as the general partner or managing member without cause (i.e., kick-out rights) based on a simple majority vote, or the non-affiliated partners or members have rights to participate in important decisions. Accordingly, the Firm does not consolidate these voting interest entities. However, in the limited cases where the non-managing partners or members do not have substantive kick-out or participating rights, the Firm evaluates the funds as VIEs and consolidates if it is the general partner or managing member and has a potentially significant variable interest. There was no material impact on the Firm's Consolidated Financial Statements upon adoption of this accounting guidance.

Voting Interest Entities

Voting interest entities are entities that have sufficient equity and provide the equity investors voting rights that enable them to make significant decisions relating to the entity's operations. For these types of entities, the Firm's determination of whether it has a controlling interest is primarily based on the amount of voting equity interests held. Entities in which the Firm has a controlling financial interest, through ownership of the majority of the entities' voting equity interests, or through other contractual rights that give the Firm control, are consolidated by the Firm.

Investments in companies in which the Firm has significant influence over operating and financing decisions (but does not own a majority of the voting equity interests) are accounted for (i) in accordance with the equity method of accounting (which requires the Firm to recognize its proportionate share of the entity's net earnings), or (ii) at fair value if the fair value option was elected. These investments are generally included in other assets, with income or loss included in other income.

Certain Firm-sponsored asset management funds are structured as limited partnerships or limited liability companies. For many of these entities, the Firm is the general partner or managing member, but the non-affiliated partners or members have the ability to remove the Firm as the general partner or managing member without cause (i.e., kick-out rights), based on a simple majority vote, or the non-affiliated partners or members have rights to participate in important decisions. Accordingly, the Firm does not consolidate these funds. In the limited cases where the nonaffiliated partners or members do not have substantive kick-out or participating rights, the Firm consolidates the funds.

The Firm's investment companies have investments in both publicly-held and privately-held entities, including investments in buyouts, growth equity and venture opportunities. These investments are accounted for under investment company guidelines and accordingly, irrespective of the percentage of equity ownership interests held, are carried on the Consolidated balance sheets at fair value, and are recorded in other assets.

Variable Interest Entities

VIEs are entities that, by design, either (1) lack sufficient equity to permit the entity to finance its activities without additional subordinated financial support from other parties, or (2) have equity investors that do not have the ability to make significant decisions relating to the entity's operations through voting rights, or do not have the obligation to absorb the expected losses, or do not have the right to receive the residual returns of the entity.

The most common type of VIE is an SPE. SPEs are commonly used in securitization transactions in order to isolate certain assets and distribute the cash flows from those assets to investors. The basic SPE structure involves a company selling assets to the SPE; the SPE funds the purchase of those assets by issuing securities to investors. The legal documents that govern the transaction specify how the cash earned on the assets must be allocated to the SPE's investors and other parties that have rights to those cash flows. SPEs are generally structured to insulate investors from claims on the SPE's assets by creditors of other entities, including the creditors of the seller of the assets.

The primary beneficiary of a VIE (i.e., the party that has a controlling financial interest) is required to consolidate the assets and liabilities of the VIE. The primary beneficiary is the party that has both (1) the power to direct the activities of the VIE that most significantly impact the VIE's economic performance; and (2) through its interests in the VIE, the obligation to absorb losses or the right to receive benefits from the VIE that could potentially be significant to the VIE.

To assess whether the Firm has the power to direct the activities of a VIE that most significantly impact the VIE's economic performance, the Firm considers all the facts and circumstances, including its role in establishing the VIE and its ongoing rights and responsibilities. This assessment includes, first, identifying the activities that most significantly impact the VIE's economic performance; and second, identifying which party, if any, has power over those activities. In general, the parties that make the most significant decisions affecting the VIE (such as asset managers, collateral managers, servicers, or owners of call options or liquidation rights over the VIE's assets) or have the right to unilaterally remove those decision-makers are deemed to have the power to direct the activities of a VIE.

To assess whether the Firm has the obligation to absorb losses of the VIE or the right to receive benefits from the VIE that could potentially be significant to the VIE, the Firm considers all of its economic interests, including debt and equity investments, servicing fees, and derivatives or other arrangements deemed to be variable interests in the VIE. This assessment requires that the Firm apply judgment in determining whether these interests, in the aggregate, are considered potentially significant to the VIE. Factors considered in assessing significance include: the design of the VIE, including its capitalization structure; subordination of interests; payment priority; relative share of interests held across various classes within the VIE's capital structure; and the reasons why the interests are held by the Firm.

The Firm performs on-going reassessments of: (1) whether entities previously evaluated under the majority voting-interest framework have become VIEs, based on certain events, and therefore subject to the VIE consolidation framework; and (2) whether changes in the facts and circumstances regarding the Firm's involvement with a VIE cause the Firm's consolidation conclusion to change.

Use of estimates in the preparation of consolidated financial statements

The preparation of the Consolidated Financial Statements requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, revenue and expense, and disclosures of contingent assets and liabilities. Actual results could be different from these estimates.

Foreign currency translation

JPMorgan Chase revalues assets, liabilities, revenue and expense denominated in non-U.S. currencies into U.S. dollars using applicable exchange rates.

Gains and losses relating to translating functional currency financial statements for U.S. reporting are included in OCI within stockholders' equity. Gains and losses relating to nonfunctional currency transactions, including non-U.S. operations where the functional currency is the U.S. dollar, are reported in the Consolidated statements of income.

Offsetting assets and liabilities

U.S. GAAP permits entities to present derivative receivables and derivative payables with the same counterparty and the related cash collateral receivables and payables on a net basis on the Consolidated balance sheets when a legally enforceable master netting agreement exists. U.S. GAAP also permits securities sold and purchased under repurchase agreements to be presented net when specified conditions are met, including the existence of a legally enforceable master netting agreement. The Firm has elected to net such balances when the specified conditions are met.

The Firm uses master netting agreements to mitigate counterparty credit risk in certain transactions, including derivatives transactions, repurchase and reverse repurchase agreements, and securities borrowed and loaned agreements. A master netting agreement is a single contract with a counterparty that permits multiple transactions governed by that contract to be terminated and settled through a single payment in a single currency in the event of a default (e.g., bankruptcy, failure to make a required payment or securities transfer or deliver collateral or margin when due after expiration of any grace period). Upon the exercise of termination rights by the non-defaulting party (i) all transactions are terminated, (ii) all transactions are valued and the positive value or "in the money" transactions are netted against the negative value or "out of the money" transactions and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount. Upon exercise of repurchase agreement and securities loan default rights in general (i) all transactions are terminated and accelerated, (ii) all values of securities or cash held or to be delivered are calculated, and all such sums are netted against each other and (iii) the only remaining payment obligation is of one of the parties to pay the netted termination amount.

Typical master netting agreements for these types of transactions also often contain a collateral/margin agreement that provides for a security interest in, or title transfer of, securities or cash collateral/margin to the party that has the right to demand margin (the “demanding party”). The collateral/margin agreement typically requires a party to transfer collateral/margin to the demanding party with a value equal to the amount of the margin deficit on a net basis across all transactions governed by the master netting agreement, less any threshold. The collateral/margin agreement grants to the demanding party, upon default by the counterparty, the right to set-off any amounts payable by the counterparty against any posted collateral or the cash equivalent of any posted collateral/margin. It also grants to the demanding party the right to liquidate collateral/margin and to apply the proceeds to an amount payable by the counterparty.

For further discussion of the Firm’s derivative instruments, see Note 6. For further discussion of the Firm’s repurchase and reverse repurchase agreements, and securities borrowing and lending agreements, see Note 13.

Statements of cash flows

For JPMorgan Chase’s Consolidated statements of cash flows, cash is defined as those amounts included in cash and due from banks.

Significant accounting policies

The following table identifies JPMorgan Chase’s other significant accounting policies and the Note and page where a detailed description of each policy can be found.

Fair value measurement	Note 3	Page 149
Fair value option	Note 4	Page 168
Derivative instruments	Note 6	Page 174
Noninterest revenue	Note 7	Page 187
Interest income and interest expense	Note 8	Page 189
Pension and other postretirement employee benefit plans	Note 9	Page 189
Employee stock-based incentives	Note 10	Page 197
Securities	Note 12	Page 199
Securities financing activities	Note 13	Page 205
Loans	Note 14	Page 208
Allowance for credit losses	Note 15	Page 227
Variable interest entities	Note 16	Page 232
Goodwill and Mortgage servicing rights	Note 17	Page 240
Premises and equipment	Note 18	Page 244
Long-term debt	Note 21	Page 245
Income taxes	Note 26	Page 250
Off-balance sheet lending-related financial instruments, guarantees and other commitments	Note 29	Page 255
Litigation	Note 31	Page 262

Note 2 – Business changes and developments

None

Note 3 – Fair value measurement

JPMorgan Chase carries a portion of its assets and liabilities at fair value. These assets and liabilities are predominantly carried at fair value on a recurring basis (i.e., assets and liabilities that are measured and reported at fair value on the Firm's Consolidated balance sheets). Certain assets (e.g., certain mortgage, home equity and other loans where the carrying value is based on the fair value of the underlying collateral), liabilities and unfunded lending-related commitments are measured at fair value on a nonrecurring basis; that is, they are not measured at fair value on an ongoing basis but are subject to fair value adjustments only in certain circumstances (for example, when there is evidence of impairment).

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Fair value is based on quoted market prices or inputs, where available. If prices or quotes are not available, fair value is based on models that consider relevant transaction characteristics (such as maturity) and use as inputs observable or unobservable market parameters, including but not limited to yield curves, interest rates, volatilities, equity or debt prices, foreign exchange rates and credit curves. Valuation adjustments may be made to ensure that financial instruments are recorded at fair value, as described below.

The level of precision in estimating unobservable market inputs or other factors can affect the amount of gain or loss recorded for a particular position. Furthermore, while the Firm believes its valuation methods are appropriate and consistent with those of other market participants, the methods and assumptions used reflect management judgment and may vary across the Firm's businesses and portfolios.

The Firm uses various methodologies and assumptions in the determination of fair value. The use of different methodologies or assumptions by other market participants compared with those used by the Firm could result in a different estimate of fair value at the reporting date.

Valuation process

Risk-taking functions are responsible for providing fair value estimates for assets and liabilities carried on the Consolidated balance sheets at fair value. The Firm's VCG, which is part of the Firm's Finance function and independent of the risk-taking functions, is responsible for verifying these estimates and determining any fair value adjustments that may be required to ensure that the Firm's positions are recorded at fair value. The VGF is composed of senior finance and risk executives and is responsible for overseeing the management of risks arising from valuation activities conducted across the Firm. The VGF is chaired by the Firmwide head of the VCG (under the direction of the Firm's Controller), and includes sub-forums covering the CIB, CCB, CB, AWM and certain corporate functions including Treasury and CIO.

Price verification process

The VCG verifies fair value estimates provided by the risk-taking functions by leveraging independently derived prices, valuation inputs and other market data, where available. Where independent prices or inputs are not available, the VCG performs additional review to ensure the reasonableness of the estimates. The additional review may include evaluating the limited market activity including client unwinds, benchmarking valuation inputs to those used for similar instruments, decomposing the valuation of structured instruments into individual components, comparing expected to actual cash flows, reviewing profit and loss trends, and reviewing trends in collateral valuation. There are also additional levels of management review for more significant or complex positions.

The VCG determines any valuation adjustments that may be required to the estimates provided by the risk-taking functions. No adjustments are applied for instruments classified within level 1 of the fair value hierarchy (see below for further information on the fair value hierarchy). For other positions, judgment is required to assess the need for valuation adjustments to appropriately reflect liquidity considerations, unobservable parameters, and, for certain portfolios that meet specified criteria, the size of the net open risk position. The determination of such adjustments follows a consistent framework across the Firm:

- Liquidity valuation adjustments are considered where an observable external price or valuation parameter exists but is of lower reliability, potentially due to lower market activity. Liquidity valuation adjustments are applied and determined based on current market conditions. Factors that may be considered in determining the liquidity adjustment include analysis of: (1) the estimated bid-offer spread for the instrument being traded; (2) alternative pricing points for similar instruments in active markets; and (3) the range of reasonable values that the price or parameter could take.
- The Firm manages certain portfolios of financial instruments on the basis of net open risk exposure and, as permitted by U.S. GAAP, has elected to estimate the fair value of such portfolios on the basis of a transfer of the entire net open risk position in an orderly transaction. Where this is the case, valuation adjustments may be necessary to reflect the cost of exiting a larger-than-normal market-size net open risk position. Where applied, such adjustments are based on factors that a relevant market participant would consider in the transfer of the net open risk position, including the size of the adverse market move that is likely to occur during the period required to reduce the net open risk position to a normal market-size.
- Unobservable parameter valuation adjustments may be made when positions are valued using prices or input parameters to valuation models that are unobservable due to a lack of market activity or because they cannot

be implied from observable market data. Such prices or parameters must be estimated and are, therefore, subject to management judgment. Unobservable parameter valuation adjustments are applied to reflect the uncertainty inherent in the resulting valuation estimate.

- Where appropriate, the Firm also applies adjustments to its estimates of fair value in order to appropriately reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA) and the impact of funding (FVA), using a consistent framework across the Firm. For more information on such adjustments see Credit and funding adjustments on page 164 of this Note.

Valuation model review and approval

If prices or quotes are not available for an instrument or a similar instrument, fair value is generally determined using valuation models that consider relevant transaction data such as maturity and use as inputs market-based or independently sourced parameters. Where this is the case the price verification process described above is applied to the inputs to those models.

The Model Risk function reviews and approves a wide range of models, including risk management, valuation, and regulatory capital models used by the Firm. The Model Risk function is independent of model users and developers. The Firmwide Model Risk Executive reports to the Firm's CRO. When reviewing a model, the Model Risk function analyzes and challenges the model methodology, and the reasonableness of model assumptions and may perform or require additional testing, including back-testing of model outcomes.

The Model Risk function reviews and approves new models, as well as material changes to existing models, prior to implementation in the operating environment. In certain circumstances, the head of the Model Risk function may grant exceptions to the Firm's model risk policy to allow a model to be used prior to review or approval. The Model Risk function may also require the user to take appropriate actions to mitigate the model risk if it is to be used in the interim.

Valuation hierarchy

A three-level valuation hierarchy has been established under U.S. GAAP for disclosure of fair value measurements. The valuation hierarchy is based on the transparency of inputs to the valuation of an asset or liability as of the measurement date. The three levels are defined as follows.

- Level 1 – inputs to the valuation methodology are quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2 – inputs to the valuation methodology include quoted prices for similar assets and liabilities in active markets, and inputs that are observable for the asset or liability, either directly or indirectly, for substantially the full term of the financial instrument.
- Level 3 – one or more inputs to the valuation methodology are unobservable and significant to the fair value measurement.

A financial instrument's categorization within the valuation hierarchy is based on the lowest level of input that is significant to the fair value measurement.

The following table describes the valuation methodologies generally used by the Firm to measure its significant products/instruments at fair value, including the general classification of such instruments pursuant to the valuation hierarchy.

Product/instrument	Valuation methodology	Classifications in the valuation hierarchy
Securities financing agreements	Valuations are based on discounted cash flows, which consider: • Derivative features: for further information refer to the discussion of derivatives below. • Market rates for the respective maturity • Collateral	Predominantly level 2
Loans and lending-related commitments — wholesale		
Loans carried at fair value (e.g. trading loans and non-trading loans)	Where observable market data is available, valuations are based on: • Observed market prices (circumstances are infrequent) • Relevant broker quotes • Observed market prices for similar instruments Where observable market data is unavailable or limited, valuations are based on discounted cash flows, which consider the following: • Credit spreads derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed	Level 2 or 3
Loans held for investment and associated lending-related commitments	Valuations are based on discounted cash flows, which consider: • Credit spreads, derived from the cost of CDS; or benchmark credit curves developed by the Firm, by industry and credit rating • Prepayment speed Lending-related commitments are valued similar to loans and reflect the portion of an unused commitment expected, based on the Firm's average portfolio historical experience, to become funded prior to an obligor default For information regarding the valuation of loans measured at collateral value, see Note 14.	Predominantly level 3
Loans — consumer		
Held for investment consumer loans, excluding credit card	Valuations are based on discounted cash flows, which consider: • Credit losses – which consider expected and current default rates, and loss severity • Prepayment speed • Discount rates • Servicing costs For information regarding the valuation of loans measured at collateral value, see Note 14.	Predominantly level 3
Held for investment credit card receivables	Valuations are based on discounted cash flows, which consider: • Credit costs - the allowance for loan losses is considered a reasonable proxy for the credit cost • Projected interest income, late-fee revenue and loan repayment rates • Discount rates • Servicing costs	Level 3
Trading loans — conforming residential mortgage loans expected to be sold	Fair value is based on observable prices for mortgage-backed securities with similar collateral and incorporates adjustments to these prices to account for differences between the securities and the value of the underlying loans, which include credit characteristics, portfolio composition, and liquidity.	Predominantly level 2

Product/instrument	Valuation methodology, inputs and assumptions	Classifications in the valuation hierarchy
Investment and trading securities	Quoted market prices are used where available.	Level 1
	In the absence of quoted market prices, securities are valued based on: • Observable market prices for similar securities • Relevant broker quotes • Discounted cash flows In addition, the following inputs to discounted cash flows are used for the following products: *Mortgage- and asset-backed securities specific inputs:* • Collateral characteristics • Deal-specific payment and loss allocations • Current market assumptions related to yield, prepayment speed, conditional default rates and loss severity *Collateralized loan obligations ("CLOs") specific inputs:* • Collateral characteristics • Deal-specific payment and loss allocations • Expected prepayment speed, conditional default rates, loss severity • Credit spreads • Credit rating data	Level 2 or 3
Physical commodities	Valued using observable market prices or data	Predominantly level 1 and 2
Derivatives	Exchange-traded derivatives that are actively traded and valued using the exchange price.	Level 1
	Derivatives that are valued using models such as the Black-Scholes option pricing model, simulation models, or a combination of models, that use observable or unobservable valuation inputs (e.g., plain vanilla options and interest rate and CDS). Inputs include: • Contractual terms including the period to maturity • Readily observable parameters including interest rates and volatility • Credit quality of the counterparty and of the Firm • Market funding levels • Correlation levels In addition, specific inputs used for derivatives that are valued based on models with significant unobservable inputs are as follows: *Structured credit derivatives specific inputs include:* • CDS spreads and recovery rates • Credit correlation between the underlying debt instruments (levels are modeled on a transaction basis and calibrated to liquid benchmark tranche indices) • Actual transactions, where available, are used to regularly recalibrate unobservable parameters *Certain long-dated equity option specific inputs include:* • Long-dated equity volatilities *Certain interest rate and FX exotic options specific inputs include:* • Interest rate correlation • Interest rate spread volatility • Foreign exchange correlation • Correlation between interest rates and foreign exchange rates • Parameters describing the evolution of underlying interest rates *Certain commodity derivatives specific inputs include:* • Commodity volatility • Forward commodity price Additionally, adjustments are made to reflect counterparty credit quality (CVA), the Firm's own creditworthiness (DVA), and the impact of funding (FVA). See pages 164-165 of this Note.	Level 2 or 3

Product/instrument	Valuation methodology, inputs and assumptions	Classification in the valuation hierarchy
Mortgage servicing rights	See Mortgage servicing rights in Note 17.	Level 3
Private equity direct investments	*Private equity direct investments* Fair value is estimated using all available information; the range of potential inputs include: • Transaction prices • Trading multiples of comparable public companies • Operating performance of the underlying portfolio company • Adjustments as required, since comparable public companies are not identical to the company being valued, and for company-specific issues and lack of liquidity • Additional available inputs relevant to the investment	Level 2 or 3
Fund investments (e.g. mutual/ collective investment funds, private equity funds, hedge funds, and real estate funds)	Net asset value	
	• NAV is supported by the ability to redeem and purchase at the NAV level.	Level 1
	• Adjustments to the NAV as required, for restrictions on redemption (e.g., lock-up periods or withdrawal limitations) or where observable activity is limited	Level 2 or 3[a]
Beneficial interests issued by consolidated VIEs	Valued using observable market information, where available In the absence of observable market information, valuations are based on the fair value of the underlying assets held by the VIE	Level 2 or 3
Long-term debt, not carried at fair value	Valuations are based on discounted cash flows, which consider: • Market rates for respective maturity	Predominantly level 2
Structured notes (included in deposits, other borrowed funds and long-term debt)	• Valuations are based on discounted cash flow analyses that consider the embedded derivative and the terms and payment structure of the note. • The embedded derivative features are considered using models such as the Black-Scholes option pricing model, simulation models, or a combination of models that use observable or unobservable valuation inputs, depending on the embedded derivative. The specific inputs used vary according to the nature of the embedded derivative features, as described in the discussion above regarding derivatives valuation. Adjustments are then made to this base valuation to reflect the Firm's own creditworthiness (DVA) and to incorporate the impact of funding (FVA). See pages 164-165 of this Note.	Level 2 or 3

(a) Excludes certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient.

The following table presents the assets and liabilities reported at fair value as of December 31, 2016 and 2015, by major product category and fair value hierarchy.

Assets and liabilities measured at fair value on a recurring basis

	Fair value hierarchy				
December 31, 2016 (in millions)	Level 1	Level 2	Level 3	Derivative netting adjustments	Total fair value
Federal funds sold and securities purchased under resale agreements	$ –	$ 21,506	$ –	$ –	$ 21,506
Securities borrowed	–	–	–	–	–
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies[(a)]	13	40,586	392	–	40,991
Residential – nonagency	–	1,552	83	–	1,635
Commercial – nonagency	–	1,321	17	–	1,338
Total mortgage-backed securities	13	43,459	492	–	43,964
U.S. Treasury and government agencies[(a)]	19,554	5,201	–	–	24,755
Obligations of U.S. states and municipalities	–	8,403	649	–	9,052
Certificates of deposit, bankers' acceptances and commercial paper	–	1,649	–	–	1,649
Non-U.S. government debt securities	28,443	23,076	46	–	51,565
Corporate debt securities	–	22,751	576	–	23,327
Loans[(b)]	–	28,965	4,837	–	33,802
Asset-backed securities	–	5,250	302	–	5,552
Total debt instruments	48,010	138,754	6,902	–	193,666
Equity securities	96,759	281	231	–	97,271
Physical commodities[(c)]	5,341	1,620	–	–	6,961
Other	–	9,341	761	–	10,102
Total debt and equity instruments[(d)]	150,110	149,996	7,894	–	308,000
Derivative receivables:					
Interest rate	715	602,747	2,501	(577,661)	28,302
Credit	–	28,256	1,389	(28,351)	1,294
Foreign exchange	812	231,743	870	(210,154)	23,271
Equity	–	34,032	908	(30,001)	4,939
Commodity	158	18,360	125	(12,371)	6,272
Total derivative receivables[(e)]	1,685	915,138	5,793	(858,538)	64,078
Total trading assets[(f)]	151,795	1,065,134	13,687	(858,538)	372,078
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies[(a)]	–	64,005	–	–	64,005
Residential – nonagency	–	14,442	1	–	14,443
Commercial – nonagency	–	9,104	–	–	9,104
Total mortgage-backed securities	–	87,551	1	–	87,552
U.S. Treasury and government agencies[(a)]	44,072	29	–	–	44,101
Obligations of U.S. states and municipalities	–	31,592	–	–	31,592
Certificates of deposit	–	106	–	–	106
Non-U.S. government debt securities	22,793	12,495	–	–	35,288
Corporate debt securities	–	4,958	–	–	4,958
Asset-backed securities:					
Collateralized loan obligations	–	26,738	663	–	27,401
Other	–	6,967	–	–	6,967
Equity securities	926	–	–	–	926
Total available-for-sale securities	67,791	170,436	664	–	238,891
Loans	–	1,660	570	–	2,230
Mortgage servicing rights	–	–	6,096	–	6,096
Other assets:					
Private equity investments[(g)]	68	–	1,606	–	1,674
All other	4,289	–	617	–	4,906
Total other assets[(f)]	4,357	–	2,223	–	6,580
Total assets measured at fair value on a recurring basis	$ 223,943	$ 1,258,736 [(g)]	$ 23,240 [(g)]	$ (858,538)	$ 647,381
Deposits	$ –	$ 11,795	$ 2,117	$ –	$ 13,912
Federal funds purchased and securities loaned or sold under repurchase agreements	–	687	–	–	687
Other borrowed funds	–	7,971	1,134	–	9,105
Trading liabilities:					
Debt and equity instruments[(d)]	68,304	19,081	43	–	87,428
Derivative payables:					
Interest rate	539	569,001	1,238	(559,963)	10,815
Credit	–	27,375	1,291	(27,255)	1,411
Foreign exchange	902	231,815	2,254	(214,463)	20,508
Equity	–	35,202	3,160	(30,222)	8,140
Commodity	173	20,079	210	(12,105)	8,357
Total derivative payables[(e)]	1,614	883,472	8,153	(844,008)	49,231
Total trading liabilities	69,918	902,553	8,196	(844,008)	136,659
Accounts payable and other liabilities	9,107	–	13	–	9,120
Beneficial interests issued by consolidated VIEs	–	72	48	–	120
Long-term debt	–	23,792	13,894	–	37,686
Total liabilities measured at fair value on a recurring basis	$ 79,025	$ 946,870	$ 25,402	$ (844,008)	$ 207,289

December 31, 2015 (in millions)	Fair value hierarchy Level 1	Level 2	Level 3	Derivative netting adjustments	Total fair value
Federal funds sold and securities purchased under resale agreements	$ –	$ 23,141	$ –	$ –	$ 23,141
Securities borrowed	–	395	–	–	395
Trading assets:					
Debt instruments:					
Mortgage-backed securities:					
U.S. government agencies[a]	6	31,815	715	–	32,536
Residential – nonagency	–	1,299	194	–	1,493
Commercial – nonagency	–	1,080	115	–	1,195
Total mortgage-backed securities	6	34,194	1,024	–	35,224
U.S. Treasury and government agencies[a]	12,036	6,985	–	–	19,021
Obligations of U.S. states and municipalities	–	6,986	651	–	7,637
Certificates of deposit, bankers' acceptances and commercial paper	–	1,042	–	–	1,042
Non-U.S. government debt securities	27,974	25,064	74	–	53,112
Corporate debt securities	–	22,807	736	–	23,543
Loans[b]	–	22,211	6,604	–	28,815
Asset-backed securities	–	2,392	1,832	–	4,224
Total debt instruments	40,016	121,681	10,921	–	172,618
Equity securities	94,059	606	265	–	94,930
Physical commodities[c]	3,593	1,064	–	–	4,657
Other	–	11,152	744	–	11,896
Total debt and equity instruments[d]	137,668	134,503	11,930	–	284,101
Derivative receivables:					
Interest rate	354	666,491	2,766	(643,248)	26,363
Credit	–	48,850	2,618	(50,045)	1,423
Foreign exchange	734	177,525	1,616	(162,698)	17,177
Equity	–	35,150	709	(30,330)	5,529
Commodity	108	24,720	237	(15,880)	9,185
Total derivative receivables[e]	1,196	952,736	7,946	(902,201)	59,677
Total trading assets[f]	138,864	1,087,239	19,876	(902,201)	343,778
Available-for-sale securities:					
Mortgage-backed securities:					
U.S. government agencies[a]	–	55,066	–	–	55,066
Residential – nonagency	–	27,618	1	–	27,619
Commercial – nonagency	–	22,897	–	–	22,897
Total mortgage-backed securities	–	105,581	1	–	105,582
U.S. Treasury and government agencies[a]	10,998	38	–	–	11,036
Obligations of U.S. states and municipalities	–	33,550	–	–	33,550
Certificates of deposit	–	283	–	–	283
Non-U.S. government debt securities	23,199	13,477	–	–	36,676
Corporate debt securities	–	12,436	–	–	12,436
Asset-backed securities:					
Collateralized loan obligations	–	30,248	759	–	31,007
Other	–	9,033	64	–	9,097
Equity securities	2,087	–	–	–	2,087
Total available-for-sale securities	36,284	204,646	824	–	241,754
Loans	–	1,343	1,518	–	2,861
Mortgage servicing rights	–	–	6,608	–	6,608
Other assets:					
Private equity investments[g]	102	101	1,657	–	1,860
All other	3,815	28	744	–	4,587
Total other assets[f]	3,917	129	2,401	–	6,447
Total assets measured at fair value on a recurring basis	$ 179,065	$ 1,316,893	$ 31,227	$ (902,201)	$ 624,984
Deposits	$ –	$ 9,566	$ 2,950	$ –	$ 12,516
Federal funds purchased and securities loaned or sold under repurchase agreements	–	3,526	–	–	3,526
Other borrowed funds	–	9,272	639	–	9,911
Trading liabilities:					
Debt and equity instruments[d]	53,845	20,199	63	–	74,107
Derivative payables:					
Interest rate	216	633,060	1,890	(624,945)	10,221
Credit	–	48,460	2,069	(48,988)	1,541
Foreign exchange	669	187,890	2,341	(171,131)	19,769
Equity	–	36,440	2,223	(29,480)	9,183
Commodity	52	26,430	1,172	(15,578)	12,076
Total derivative payables[e]	937	932,280	9,695	(890,122)	52,790
Total trading liabilities	54,782	952,479	9,758	(890,122)	126,897
Accounts payable and other liabilities	4,382	–	19	–	4,401
Beneficial interests issued by consolidated VIEs	–	238	549	–	787
Long-term debt	–	21,452	11,613	–	33,065
Total liabilities measured at fair value on a recurring basis	$ 59,164	$ 996,533	$ 25,528	$ (890,122)	$ 191,103

(a) At December 31, 2016 and 2015, included total U.S. government-sponsored enterprise obligations of $80.6 billion and $67.0 billion, respectively, which were predominantly mortgage-related.
(b) At December 31, 2016 and 2015, included within trading loans were $16.5 billion and $11.8 billion, respectively, of residential first-lien mortgages, and $3.3 billion and $4.3 billion, respectively, of commercial first-lien mortgages. Residential mortgage loans include conforming mortgage loans originated with the intent to sell to U.S. government agencies of $11.0 billion and $5.3 billion, respectively, and reverse mortgages of $2.0 billion and $2.5 billion, respectively.
(c) Physical commodities inventories are generally accounted for at the lower of cost or market. "Market" is a term defined in U.S. GAAP as not exceeding fair value less costs to sell ("transaction costs"). Transaction costs for the Firm's physical commodities inventories are either not applicable or immaterial to the value of the inventory. Therefore, market approximates fair value for the Firm's physical commodities inventories. When fair value hedging has been applied (or when market is below cost), the carrying value of physical commodities approximates fair value, because under fair value hedge accounting, the cost basis is adjusted for changes in fair value. For a further discussion of the Firm's hedge accounting relationships, see Note 6. To provide consistent fair value disclosure information, all physical commodities inventories have been included in each period presented.
(d) Balances reflect the reduction of securities owned (long positions) by the amount of identical securities sold but not yet purchased (short positions).
(e) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral received and paid when a legally enforceable master netting agreement exists. For purposes of the tables above, the Firm does not reduce derivative receivables and derivative payables balances for this netting adjustment, either within or across the levels of the fair value hierarchy, as such netting is not relevant to a presentation based on the transparency of inputs to the valuation of an asset or liability. The level 3 balances would be reduced if netting were applied, including the netting benefit associated with cash collateral.
(f) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2016 and 2015, the fair values of these investments, which include certain hedge funds, private equity funds, real estate and other funds, were $1.0 billion and $1.2 billion, respectively. Included in the balances at December 31, 2016 and 2015, were trading assets of $52 million and $61 million, respectively, and other assets of $1.0 billion and $1.2 billion, respectively.
(g) Private equity instruments represent investments within Corporate. The portion of the private equity investment portfolio carried at fair value on a recurring basis had a cost basis of $2.5 billion and $3.5 billion at December 31, 2016 and 2015, respectively.

Transfers between levels for instruments carried at fair value on a recurring basis

For the years ended December 31, 2016 and 2015, there were no significant transfers between levels 1 and 2.

During the year ended December 31, 2016, transfers from level 3 to level 2 included the following:

- $1.4 billion of long-term debt driven by an increase in observability and a reduction of the significance in the unobservable inputs for certain structured notes.

During the year ended December 31, 2016, transfers from level 2 to level 3 included the following:

- $1.1 billion of gross equity derivative receivables and $1.0 billion of gross equity derivative payables as a result of a decrease in observability and an increase in the significance in unobservable inputs.
- $1.0 billion of trading loans driven by a decrease in observability.

During the year ended December 31, 2015, transfers from level 3 to level 2 included the following:

- $3.1 billion of long-term debt and $1.0 billion of deposits driven by an increase in observability on certain structured notes with embedded interest rate and FX derivatives and a reduction of the significance in the unobservable inputs for certain structured notes with embedded equity derivatives.
- $2.1 billion of gross equity derivatives for both receivables and payables as a result of an increase in observability and a decrease in the significance in unobservable inputs; partially offset by transfers into level 3 resulting in net transfers of approximately $1.2 billion for both receivables and payables.
- $2.8 billion of trading loans driven by an increase in observability of certain collateralized financing transactions.

During the year ended December 31, 2015, transfers from level 2 to level 3 included the following:

- $2.4 billion of corporate debt driven by a decrease in the significance in the unobservable inputs and an increase in observability for certain structured products

During the year ended December 31, 2014, transfers from level 3 to level 2 included the following:

- $4.3 billion and $4.4 billion of gross equity derivative receivables and payables, respectively, due to increased observability of certain equity option valuation inputs
- $2.7 billion of trading loans, $2.6 billion of margin loans, $2.3 billion of private equity investments, $2.0 billion of corporate debt, and $1.3 billion of long-term debt, based on increased liquidity and price transparency
- Transfers from level 2 into level 3 included $1.1 billion of other borrowed funds, $1.1 billion of trading loans and $1.0 billion of long-term debt, based on a decrease in observability of valuation inputs and price transparency.

All transfers are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Level 3 valuations

The Firm has established well-structured processes for determining fair value, including for instruments where fair value is estimated using significant unobservable inputs (level 3). For further information on the Firm's valuation process and a detailed discussion of the determination of fair value for individual financial instruments, see pages 150–153 of this Note.

Estimating fair value requires the application of judgment. The type and level of judgment required is largely dependent on the amount of observable market information available to the Firm. For instruments valued using internally developed models that use significant unobservable inputs and are therefore classified within level 3 of the fair value hierarchy, judgments used to estimate fair value are more significant than those required when estimating the fair value of instruments classified within levels 1 and 2.

In arriving at an estimate of fair value for an instrument within level 3, management must first determine the appropriate model to use. Second, due to the lack of observability of significant inputs, management must assess all relevant empirical data in deriving valuation inputs including, but not limited to, transaction details, yield curves, interest rates, prepayment speed, default rates, volatilities, correlations, equity or debt prices, valuations of comparable instruments, foreign exchange rates and credit curves.

The following table presents the Firm's primary level 3 financial instruments, the valuation techniques used to measure the fair value of those financial instruments, the significant unobservable inputs, the range of values for those inputs and, for certain instruments, the weighted averages of such inputs. While the determination to classify an instrument within level 3 is based on the significance of the unobservable inputs to the overall fair value measurement, level 3 financial instruments typically include observable components (that is, components that are actively quoted and can be validated to external sources) in addition to the unobservable components. The level 1 and/ or level 2 inputs are not included in the table. In addition, the Firm manages the risk of the observable components of level 3 financial instruments using securities and derivative positions that are classified within levels 1 or 2 of the fair value hierarchy.

The range of values presented in the table is representative of the highest and lowest level input used to value the significant groups of instruments within a product/ instrument classification. Where provided, the weighted averages of the input values presented in the table are calculated based on the fair value of the instruments that the input is being used to value.

In the Firm's view, the input range and the weighted average value do not reflect the degree of input uncertainty or an assessment of the reasonableness of the Firm's estimates and assumptions. Rather, they reflect the characteristics of the various instruments held by the Firm and the relative distribution of instruments within the range of characteristics. For example, two option contracts may have similar levels of market risk exposure and valuation uncertainty, but may have significantly different implied volatility levels because the option contracts have different underlyings, tenors, or strike prices. The input range and weighted average values will therefore vary from period-to-period and parameter-to-parameter based on the characteristics of the instruments held by the Firm at each balance sheet date.

For the Firm's derivatives and structured notes positions classified within level 3 at December 31, 2016, interest rate correlation inputs used in estimating fair value were concentrated towards the upper end of the range presented; equity correlation inputs were concentrated at the upper end of the range; the credit correlation inputs were distributed across the range presented; and the foreign exchange correlation inputs were concentrated at the upper end of the range presented. In addition, the interest rate volatility inputs used in estimating fair value were distributed across the range presented; equity volatilities were concentrated in the lower half end of the range; and forward commodity prices used in estimating the fair value of commodity derivatives were concentrated in the middle of the range presented.

Level 3 inputs[a]

December 31, 2016 (in millions, except for ratios and basis points)							
Product/Instrument	**Fair value**	**Principal valuation technique**	**Unobservable inputs**	**Range of input values**			**Weighted average**
Residential mortgage-backed securities and loans	$ 2,861	Discounted cash flows	Yield	4%	-	18%	5%
			Prepayment speed	0%	-	20%	8%
			Conditional default rate	0%	-	34%	15%
			Loss severity	0%	-	90%	37%
Commercial mortgage-backed securities and loans[b]	1,555	Discounted cash flows	Yield	1%	-	32%	8%
			Conditional default rate	0%	-	100%	69%
			Loss severity		40%		40%
Corporate debt securities, obligations of U.S. states and municipalities, and other[c]	764	Discounted cash flows	Credit spread	40bps	-	375bps	96bps
			Yield	1%	-	17%	9%
	3,744	Market comparables	Price	$ 0	-	$121	$91
Net interest rate derivatives	1,263	Option pricing	Interest rate correlation	(30)%	-	100%	
			Interest rate spread volatility	3%	-	38%	
Net credit derivatives[b][c]	98	Discounted cash flows	Credit correlation	30%	-	85%	
Net foreign exchange derivatives	(1,384)	Option pricing	Foreign exchange correlation	(30)%	-	65%	
Net equity derivatives	(2,252)	Option pricing	Equity volatility	20%	-	60%	
Net commodity derivatives	(85)	Discounted cash flows	Forward commodity price	$ 46	-	$59 per barrel	
Collateralized loan obligations	663	Discounted cash flows	Credit spread	303bps	-	475bps	339bps
			Prepayment speed		20%		20%
			Conditional default rate		2%		2%
			Loss severity		30%		30%
	158	Market comparables	Price	$ 0	-	$111	$73
MSRs	6,096	Discounted cash flows	Refer to Note 17				
Private equity investments	1,606	Market comparables	EBITDA multiple	6.4x	-	11.5x	7.9x
Long-term debt, other borrowed funds, and deposits[d]	16,669	Option pricing	Interest rate correlation	(30)%	-	100%	
			Interest rate spread volatility	3%	-	38%	
			Foreign exchange correlation	(30)%	-	65%	
			Equity correlation	(50)%	-	80%	
	476	Discounted cash flows	Credit correlation	30%	-	85%	

(a) The categories presented in the table have been aggregated based upon the product type, which may differ from their classification on the Consolidated balance sheets. Furthermore, the inputs presented for each valuation technique in the table are, in some cases, not applicable to every instrument valued using the technique as the characteristics of the instruments can differ.

(b) The unobservable inputs and associated input ranges for approximately $394 million of credit derivative receivables and $226 million of credit derivative payables with underlying commercial mortgage risk have been included in the inputs and ranges provided for commercial mortgage-backed securities and loans.

(c) The unobservable inputs and associated input ranges for approximately $362 million of credit derivative receivables and $333 million of credit derivative payables with underlying ABS risk have been included in the inputs and ranges provided for corporate debt securities, obligations of U.S. states and municipalities and other.

(d) Long-term debt, other borrowed funds and deposits include structured notes issued by the Firm that are predominantly financial instruments containing embedded derivatives. The estimation of the fair value of structured notes includes the derivative features embedded within the instrument. The significant unobservable inputs are broadly consistent with those presented for derivative receivables.

Changes in and ranges of unobservable inputs

The following discussion provides a description of the impact on a fair value measurement of a change in each unobservable input in isolation, and the interrelationship between unobservable inputs, where relevant and significant. The impact of changes in inputs may not be independent, as a change in one unobservable input may give rise to a change in another unobservable input. Where relationships do exist between two unobservable inputs, those relationships are discussed below. Relationships may also exist between observable and unobservable inputs (for example, as observable interest rates rise, unobservable prepayment rates decline); such relationships have not been included in the discussion below. In addition, for each of the individual relationships described below, the inverse relationship would also generally apply.

The following discussion also provides a description of attributes of the underlying instruments and external market factors that affect the range of inputs used in the valuation of the Firm's positions.

Yield – The yield of an asset is the interest rate used to discount future cash flows in a discounted cash flow calculation. An increase in the yield, in isolation, would result in a decrease in a fair value measurement.

Credit spread – The credit spread is the amount of additional annualized return over the market interest rate that a market participant would demand for taking exposure to the credit risk of an instrument. The credit spread for an instrument forms part of the discount rate used in a discounted cash flow calculation. Generally, an increase in the credit spread would result in a decrease in a fair value measurement.

The yield and the credit spread of a particular mortgage-backed security primarily reflect the risk inherent in the instrument. The yield is also impacted by the absolute level of the coupon paid by the instrument (which may not correspond directly to the level of inherent risk). Therefore, the range of yield and credit spreads reflects the range of risk inherent in various instruments owned by the Firm. The risk inherent in mortgage-backed securities is driven by the subordination of the security being valued and the characteristics of the underlying mortgages within the collateralized pool, including borrower FICO scores, LTV ratios for residential mortgages and the nature of the property and/or any tenants for commercial mortgages. For corporate debt securities, obligations of U.S. states and municipalities and other similar instruments, credit spreads reflect the credit quality of the obligor and the tenor of the obligation.

Prepayment speed – The prepayment speed is a measure of the voluntary unscheduled principal repayments of a prepayable obligation in a collateralized pool. Prepayment speeds generally decline as borrower delinquencies rise. An increase in prepayment speeds, in isolation, would result in a decrease in a fair value measurement of assets valued at a premium to par and an increase in a fair value measurement of assets valued at a discount to par.

Prepayment speeds may vary from collateral pool to collateral pool, and are driven by the type and location of the underlying borrower, and the remaining tenor of the obligation as well as the level and type (e.g., fixed or floating) of interest rate being paid by the borrower. Typically collateral pools with higher borrower credit quality have a higher prepayment rate than those with lower borrower credit quality, all other factors being equal.

Conditional default rate – The conditional default rate is a measure of the reduction in the outstanding collateral balance underlying a collateralized obligation as a result of defaults. While there is typically no direct relationship between conditional default rates and prepayment speeds, collateralized obligations for which the underlying collateral has high prepayment speeds will tend to have lower conditional default rates. An increase in conditional default rates would generally be accompanied by an increase in loss severity and an increase in credit spreads. An increase in the conditional default rate, in isolation, would result in a decrease in a fair value measurement. Conditional default rates reflect the quality of the collateral underlying a securitization and the structure of the securitization itself. Based on the types of securities owned in the Firm's market-making portfolios, conditional default rates are most typically at the lower end of the range presented.

Loss severity – The loss severity (the inverse concept is the recovery rate) is the expected amount of future realized losses resulting from the ultimate liquidation of a particular loan, expressed as the net amount of loss relative to the outstanding loan balance. An increase in loss severity is generally accompanied by an increase in conditional default rates. An increase in the loss severity, in isolation, would result in a decrease in a fair value measurement.

The loss severity applied in valuing a mortgage-backed security investment depends on factors relating to the underlying mortgages, including the LTV ratio, the nature of the lender's lien on the property and other instrument-specific factors.

Correlation – Correlation is a measure of the relationship between the movements of two variables (e.g., how the change in one variable influences the change in the other). Correlation is a pricing input for a derivative product where the payoff is driven by one or more underlying risks. Correlation inputs are related to the type of derivative (e.g., interest rate, credit, equity and foreign exchange) due to the nature of the underlying risks. When parameters are positively correlated, an increase in one parameter will result in an increase in the other parameter. When parameters are negatively correlated, an increase in one parameter will result in a decrease in the other parameter. An increase in correlation can result in an increase or a decrease in a fair value measurement. Given a short correlation position, an increase in correlation, in isolation, would generally result in a decrease in a fair value measurement. The range of correlation inputs between risks within the same asset class are generally narrower than those between underlying risks across asset classes. In addition, the ranges of credit correlation inputs tend to be narrower than those affecting other asset classes.

The level of correlation used in the valuation of derivatives with multiple underlying risks depends on a number of factors including the nature of those risks. For example, the correlation between two credit risk exposures would be different than that between two interest rate risk exposures. Similarly, the tenor of the transaction may also impact the correlation input, as the relationship between the underlying risks may be different over different time periods. Furthermore, correlation levels are very much dependent on market conditions and could have a relatively wide range of levels within or across asset classes over time, particularly in volatile market conditions.

Volatility – Volatility is a measure of the variability in possible returns for an instrument, parameter or market index given how much the particular instrument, parameter or index changes in value over time. Volatility is a pricing input for options, including equity options, commodity options, and interest rate options. Generally, the higher the volatility of the underlying, the riskier the instrument. Given a long position in an option, an increase in volatility, in isolation, would generally result in an increase in a fair value measurement.

The level of volatility used in the valuation of a particular option-based derivative depends on a number of factors, including the nature of the risk underlying the option (e.g., the volatility of a particular equity security may be significantly different from that of a particular commodity index), the tenor of the derivative as well as the strike price of the option.

EBITDA multiple – EBITDA multiples refer to the input (often derived from the value of a comparable company) that is multiplied by the historic and/or expected earnings before interest, taxes, depreciation and amortization (“EBITDA”) of a company in order to estimate the company’s value. An increase in the EBITDA multiple, in isolation, net of adjustments, would result in an increase in a fair value measurement.

Changes in level 3 recurring fair value measurements

The following tables include a rollforward of the Consolidated balance sheets amounts (including changes in fair value) for financial instruments classified by the Firm within level 3 of the fair value hierarchy for the years ended December 31, 2016, 2015 and 2014. When a determination is made to classify a financial instrument within level 3, the determination is based on the significance of the unobservable parameters to the overall fair value measurement. However, level 3 financial instruments typically include, in addition to the unobservable or level 3 components, observable components (that is, components that are actively quoted and can be validated to external sources); accordingly, the gains and losses in the table below include changes in fair value due in part to observable factors that are part of the valuation methodology. Also, the Firm risk-manages the observable components of level 3 financial instruments using securities and derivative positions that are classified within level 1 or 2 of the fair value hierarchy; as these level 1 and level 2 risk management instruments are not included below, the gains or losses in the following tables do not reflect the effect of the Firm’s risk management activities related to such level 3 instruments.

Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs: Fair value at January 1, 2016	Total realized/ unrealized gains/ (losses)	Purchases[g]	Sales	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2016	Change in unrealized gains/ (losses) related to financial instruments held at Dec. 31, 2016
Assets:								
Trading assets:								
Debt instruments:								
Mortgage-backed securities:								
U.S. government agencies	$ 715	$ (20)	$ 135	$ (295)	$ (115)	$ (28)	$ 392	$ (36)
Residential – nonagency	194	4	252	(319)	(20)	(28)	83	5
Commercial – nonagency	115	(11)	69	(29)	(3)	(124)	17	3
Total mortgage-backed securities	1,024	(27)	456	(643)	(138)	(180)	492	(28)
Obligations of U.S. states and municipalities	651	19	149	(132)	(38)	—	649	—
Non-U.S. government debt securities	74	(4)	91	(97)	(7)	(11)	46	(7)
Corporate debt securities	736	2	445	(359)	(189)	(59)	576	(22)
Loans	6,604	(343)	2,228	(2,598)	(1,311)	257	4,837	(169)
Asset-backed securities	1,832	39	655	(712)	(968)	(544)	302	19
Total debt instruments	10,921	(314)	4,024	(4,541)	(2,651)	(537)	6,902	(207)
Equity securities	265	—	90	(108)	(40)	24	231	7
Other	744	79	649	(287)	(360)	(64)	761	28
Total trading assets – debt and equity instruments	11,930	(235) [c]	4,763	(4,936)	(3,051)	(577)	7,894	(172) [c]
Net derivative receivables:[a]								
Interest rate	876	756	193	(57)	(713)	208	1,263	(144)
Credit	549	(742)	10	(2)	211	72	98	(622)
Foreign exchange	(725)	67	64	(124)	(649)	(17)	(1,384)	(350)
Equity	(1,514)	(145)	277	(852)	213	(231)	(2,252)	(86)
Commodity	(935)	194	1	10	645	—	(85)	(36)
Total net derivative receivables	(1,749)	130 [c]	545	(1,025)	(293)	32	(2,360)	(1,238) [c]
Available-for-sale securities:								
Asset-backed securities	823	1	—	—	(119)	(42)	663	1
Other	1	—	—	—	—	—	1	—
Total available-for-sale securities	824	1 [d]	—	—	(119)	(42)	664	1 [d]
Loans	1,518	(49) [c]	259	(7)	(838)	(313)	570	— [c]
Mortgage servicing rights	6,608	(163) [e]	679	(109)	(919)	—	6,096	(163) [e]
Other assets:								
Private equity investments	1,657	80 [c]	457	(485)	(103)	—	1,606	1 [c]
All other	744	50 [f]	30	(11)	(196)	—	617	47 [f]

Year ended December 31, 2016 (in millions)	Fair value measurements using significant unobservable inputs: Fair value at January 1, 2016	Total realized/ unrealized (gains)/ losses	Purchases[g]	Sales	Issuances	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2016	Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2016
Liabilities:[b]									
Deposits	$ 2,950	$ (56) [c]	$ —	$ —	$ 1,375	$ (1,283)	$ (869)	$ 2,117	$ 23 [c]
Federal funds purchased and securities loaned or sold under repurchase agreements	—	—	—	—	—	(2)	2	—	—
Other borrowed funds	639	(230) [c]	—	—	1,876	(1,210)	59	1,134	(70) [c]
Trading liabilities – debt and equity instruments	63	(12) [c]	(15)	23	—	(22)	6	43	(18) [c]
Accounts payable and other liabilities	19	—	—	—	—	(6)	—	13	—
Beneficial interests issued by consolidated VIEs	549	(31) [c]	—	—	143	(613)	—	48	6 [c]
Long-term debt	11,613	216 [c]	—	—	8,949	(5,810)	(1,074)	13,894	540 [c]

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs: Fair value at January 1, 2015	Total realized/ unrealized gains/ (losses)	Purchases[g]	Sales	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2015	Change in unrealized gains/ (losses) related to financial instruments held at Dec. 31, 2015
Assets:								
Trading assets:								
Debt instruments:								
Mortgage-backed securities:								
U.S. government agencies	$ 922	$ (28)	$ 327	$ (303)	$ (132)	$ (71)	$ 715	$ (27)
Residential – nonagency	663	130	253	(611)	(23)	(218)	194	4
Commercial – nonagency	306	(14)	246	(262)	(22)	(139)	115	(5)
Total mortgage-backed securities	1,891	88	826	(1,176)	(177)	(428)	1,024	(28)
Obligations of U.S. states and municipalities	1,273	14	352	(133)	(27)	(828)	651	(1)
Non-U.S. government debt securities	302	9	205	(123)	(64)	(255)	74	(16)
Corporate debt securities	2,989	(77)	1,171	(1,038)	(125)	(2,184)	736	2
Loans	13,287	(174)	3,532	(4,661)	(3,112)	(2,268)	6,604	(181)
Asset-backed securities	1,264	(41)	1,920	(1,229)	(35)	(47)	1,832	(32)
Total debt instruments	21,006	(181)	8,006	(8,360)	(3,540)	(6,010)	10,921	(256)
Equity securities	431	96	89	(193)	(26)	(132)	265	82
Physical commodities	2	(2)	–	–	–	–	–	–
Other	1,050	119	1,581	(1,313)	192	(885)	744	85
Total trading assets – debt and equity instruments	22,489	32 [c]	9,676	(9,866)	(3,374)	(7,027)	11,930	(89) [c]
Net derivative receivables:[a]								
Interest rate	626	962	513	(173)	(732)	(320)	876	263
Credit	189	118	129	(136)	165	84	549	260
Foreign exchange	(526)	657	19	(149)	(296)	(430)	(725)	49
Equity	(1,785)	731	890	(1,262)	(158)	70	(1,514)	5
Commodity	(565)	(856)	1	(24)	512	(3)	(935)	(41)
Total net derivative receivables	(2,061)	1,612 [c]	1,552	(1,744)	(509)	(599)	(1,749)	536 [c]
Available-for-sale securities:								
Asset-backed securities	908	(32)	51	(43)	(61)	–	823	(28)
Other	129	–	–	–	(29)	(99)	1	–
Total available-for-sale securities	1,037	(32) [d]	51	(43)	(90)	(99)	824	(28) [d]
Loans	2,541	(133) [c]	1,290	(92)	(1,241)	(847)	1,518	(32) [c]
Mortgage servicing rights	7,436	(405) [e]	985	(486)	(922)	–	6,608	(405) [e]
Other assets:								
Private equity investments	2,225	(120) [c]	281	(362)	(187)	(180)	1,657	(304) [c]
All other	959	91 [f]	65	(147)	(224)	–	744	15 [f]

Year ended December 31, 2015 (in millions)	Fair value measurements using significant unobservable inputs: Fair value at January 1, 2015	Total realized/ unrealized (gains)/ losses	Purchases[g]	Sales	Issuances	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2015	Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2015
Liabilities:[b]									
Deposits	$ 2,859	$ (39) [c]	$ –	$ –	$ 1,993	$ (850)	$ (1,013)	$ 2,950	$ (29) [c]
Other borrowed funds	1,453	(697) [c]	–	–	3,334	(2,963)	(488)	639	(57) [c]
Trading liabilities – debt and equity instruments	72	15 [c]	(163)	160	–	(17)	(4)	63	(4) [c]
Accounts payable and other liabilities	26	–	–	–	–	(7)	–	19	–
Beneficial interests issued by consolidated VIEs	1,146	(82) [c]	–	–	286	(574)	(227)	549	(63) [c]
Long-term debt	11,877	(480) [c]	(58)	–	9,359	(6,299)	(2,786)	11,613	385 [c]

Year ended December 31, 2014 (in millions)	Fair value measurements using significant unobservable inputs							Change in unrealized gains/(losses) related to financial instruments held at Dec. 31, 2014
	Fair value at January 1, 2014	Total realized/unrealized gains/(losses)	Purchases[g]	Sales	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2014	
Assets:								
Trading assets:								
Debt instruments:								
Mortgage-backed securities:								
U.S. government agencies	$ 1,005	$ (97)	$ 351	$ (186)	$ (121)	$ (30)	$ 922	$ (92)
Residential – nonagency	726	66	827	(761)	(41)	(154)	663	(15)
Commercial – nonagency	432	17	980	(914)	(60)	(149)	306	(12)
Total mortgage-backed securities	2,163	(14)	2,158	(1,861)	(222)	(333)	1,891	(119)
Obligations of U.S. states and municipalities	1,382	90	298	(358)	(139)	–	1,273	(27)
Non-U.S. government debt securities	143	24	719	(617)	(3)	36	302	10
Corporate debt securities	5,920	210	5,854	(3,372)	(4,531)	(1,092)	2,989	379
Loans	13,455	387	13,551	(7,917)	(4,623)	(1,566)	13,287	123
Asset-backed securities	1,272	19	2,240	(2,126)	(283)	142	1,264	(30)
Total debt instruments	24,335	716	24,820	(16,251)	(9,801)	(2,813)	21,006	336
Equity securities	867	113	248	(259)	(286)	(252)	431	46
Physical commodities	4	(1)	–	–	(1)	–	2	–
Other	2,000	239	1,426	(276)	(201)	(2,138)	1,050	329
Total trading assets – debt and equity instruments	27,206	1,067 (c)	26,494	(16,786)	(10,289)	(5,203)	22,489	711 (c)
Net derivative receivables:[a]								
Interest rate	2,379	184	198	(256)	(1,771)	(108)	626	(853)
Credit	95	(149)	272	(47)	92	(74)	189	(107)
Foreign exchange	(1,200)	(137)	139	(27)	668	31	(526)	(62)
Equity	(1,063)	154	2,044	(2,863)	10	(67)	(1,785)	583
Commodity	115	(465)	1	(113)	(109)	6	(565)	(186)
Total net derivative receivables	326	(413) (c)	2,654	(3,306)	(1,110)	(212)	(2,061)	(625) (c)
Available-for-sale securities:								
Asset-backed securities	1,088	(41)	275	(2)	(101)	(311)	908	(40)
Other	1,234	(19)	122	–	(223)	(985)	129	(2)
Total available-for-sale securities	2,322	(60) (d)	397	(2)	(324)	(1,296)	1,037	(42) (d)
Loans	1,931	(254) (c)	3,258	(845)	(1,549)	–	2,541	(234) (c)
Mortgage servicing rights	9,614	(1,826) (e)	768	(209)	(911)	–	7,436	(1,826) (e)
Other assets:								
Private equity investments	5,816	400 (c)	145	(1,967)	(197)	(1,972)	2,225	33 (c)
All other	1,382	83 (f)	10	(357)	(159)	–	959	59 (f)

Year ended December 31, 2014 (in millions)	Fair value measurements using significant unobservable inputs								Change in unrealized (gains)/losses related to financial instruments held at Dec. 31, 2014
	Fair value at January 1, 2014	Total realized/unrealized (gains)/losses	Purchases[g]	Sales	Issuances	Settlements[h]	Transfers into and/or out of level 3[i]	Fair value at Dec. 31, 2014	
Liabilities:[b]									
Deposits	$ 2,255	$ 149 (c)	$ –	$ –	$ 1,578	$ (197)	$ (926)	$ 2,859	$ 130 (c)
Other borrowed funds	2,074	(596) (c)	–	–	5,377	(6,127)	725	1,453	(415) (c)
Trading liabilities – debt and equity instruments	113	(5) (c)	(305)	323	–	(5)	(49)	72	2 (c)
Accounts payable and other liabilities	–	27 (c)	–	–	–	(1)	–	26	–
Beneficial interests issued by consolidated VIEs	1,240	(4) (c)	–	–	775	(763)	(102)	1,146	(22) (c)
Long-term debt	10,008	(40) (c)	–	–	7,421	(5,231)	(281)	11,877	(9) (c)

(a) All level 3 derivatives are presented on a net basis, irrespective of underlying counterparty.
(b) Level 3 liabilities as a percentage of total Firm liabilities accounted for at fair value (including liabilities measured at fair value on a nonrecurring basis) were 12%, 13% and 15% at December 31, 2016, 2015 and 2014, respectively.

(c) Predominantly reported in principal transactions revenue, except for changes in fair value for CCB mortgage loans, and lending-related commitments originated with the intent to sell, and mortgage loan purchase commitments, which are reported in mortgage fees and related income.
(d) Realized gains/(losses) on AFS securities, as well as other-than-temporary impairment ("OTTI") losses that are recorded in earnings, are reported in securities gains. Unrealized gains/(losses) are reported in OCI. Realized gains/(losses) and foreign exchange hedge accounting adjustments recorded in income on AFS securities were zero, $(7) million, and $(43) million for the years ended December 31, 2016, 2015 and 2014, respectively. Unrealized gains/(losses) recorded on AFS securities in OCI were $1 million, $(25) million and $(16) million for the years ended December 31, 2016, 2015 and 2014, respectively.
(e) Changes in fair value for CCB MSRs are reported in mortgage fees and related income.
(f) Predominantly reported in other income.
(g) Loan originations are included in purchases.
(h) Includes financial assets and liabilities that have matured, been partially or fully repaid, impacts of modifications, and deconsolidation associated with beneficial interests in VIEs.
(i) All transfers into and/or out of level 3 are assumed to occur at the beginning of the quarterly reporting period in which they occur.

Level 3 analysis

Consolidated balance sheets changes

Level 3 assets (including assets measured at fair value on a nonrecurring basis) were 1.0% of total Firm assets at December 31, 2016. The following describes significant changes to level 3 assets since December 31, 2015, for those items measured at fair value on a recurring basis. For further information on changes impacting items measured at fair value on a nonrecurring basis, see Assets and liabilities measured at fair value on a nonrecurring basis on page 165.

For the year ended December 31, 2016

Level 3 assets were $23.2 billion at December 31, 2016, reflecting a decrease of $8.0 billion from December 31, 2015. This decrease was driven by settlements (including repayments and restructurings) and transfers to Level 2 due to an increase in observability and a decrease in the significance of unobservable inputs. In particular:

- $4.0 billion decrease in trading assets — debt and equity instruments was predominantly driven by a decrease of $1.8 billion in trading loans largely due to settlements, and a $1.5 billion decrease in asset-backed securities due to settlements and transfers from level 3 to level 2 as a result of increased observability of certain valuation inputs
- $2.1 billion decrease in gross derivative receivables was driven by a decrease in credit and foreign exchange derivative receivables due to market movements and transfers from level 3 to level 2 as a result of increased observability of certain valuation inputs

Gains and losses

The following describes significant components of total realized/unrealized gains/(losses) for instruments measured at fair value on a recurring basis for the years ended December 31, 2016, 2015 and 2014. For further information on these instruments, see Changes in level 3 recurring fair value measurements rollforward tables on pages 160–164.

2016

- There were no individually significant movements for the year ended December 31, 2016.

2015

- $1.6 billion of net gains in interest rate, foreign exchange and equity derivative receivables largely due to market movements; partially offset by losses on commodity derivatives due to market movements
- $1.3 billion of net gains in liabilities due to market movements

2014

- $1.8 billion of losses on MSRs. For further discussion of the change, refer to Note 17
- $1.1 billion of net gains on trading assets — debt and equity instruments, largely driven by market movements and client-driven financing transactions

Credit and funding adjustments – derivatives

Derivatives are generally valued using models that use as their basis observable market parameters. These market parameters generally do not consider factors such as counterparty nonperformance risk, the Firm's own credit quality, and funding costs. Therefore, it is generally necessary to make adjustments to the base estimate of fair value to reflect these factors.

CVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect counterparty nonperformance risk. The Firm estimates CVA using a scenario analysis to estimate the expected credit exposure across all of the Firm's positions with each counterparty, and then estimates losses as a result of a counterparty credit event. The key inputs to this methodology are (i) the expected positive exposure to each counterparty based on a simulation that assumes the current population of existing derivatives with each counterparty remains unchanged and considers contractual factors designed to mitigate the Firm's credit exposure, such as collateral and legal rights of offset; (ii) the probability of a default event occurring for each counterparty, as derived from observed or estimated CDS spreads; and (iii) estimated recovery rates implied by CDS spreads, adjusted to consider the differences in recovery rates as a derivative creditor relative to those reflected in CDS spreads, which generally reflect senior unsecured creditor risk.

DVA represents the adjustment, relative to the relevant benchmark interest rate, necessary to reflect the credit quality of the Firm. The derivative DVA calculation methodology is generally consistent with the CVA methodology described above and incorporates JPMorgan Chase's credit spread as observed through the CDS market to estimate the PD and LGD as a result of a systemic event affecting the Firm.

FVA represents the adjustment to reflect the impact of funding and is recognized where there is evidence that a market participant in the principal market would incorporate it in a transfer of the instrument. The Firm's FVA framework, applied to uncollateralized (including partially collateralized) OTC derivatives, leverages its existing CVA and DVA calculation methodologies, and considers the fact that the Firm's own credit risk is a significant component of funding costs.

The key inputs to FVA are: (i) the expected funding requirements arising from the Firm's positions with each counterparty and collateral arrangements; (ii) for assets, the estimated market funding cost in the principal market; and (iii) for liabilities, the hypothetical market funding cost for a transfer to a market participant with a similar credit standing as the Firm. For collateralized derivatives, the fair value is estimated by discounting expected future cash flows at the relevant overnight indexed swap rate given the underlying collateral agreement with the counterparty, and therefore a separate FVA is not necessary.

The following table provides the impact of credit and funding adjustments on principal transactions revenue in the respective periods, excluding the effect of any associated hedging activities. The DVA and FVA reported below include the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality over time.

Year ended December 31, (in millions)	**2016**	2015	2014
Credit adjustments:			
Derivatives CVA	**$ (84)**	$ 620	$ (322)
Derivatives DVA and FVA	**7**	73	(58)

Valuation adjustments on fair value option elected liabilities

The valuation of the Firm's liabilities for which the fair value option has been elected requires consideration of the Firm's own credit risk. DVA on fair value option elected liabilities is measured using (i) the current fair value of the liability and (ii) changes (subsequent to the issuance of the liability) in the Firm's probability of default and LGD, which are estimated based on changes in the Firm's credit spread observed in the bond market. Effective January 1, 2016, the effect of DVA on fair value option elected liabilities is recognized in OCI. See Note 25 for further information.

Assets and liabilities measured at fair value on a nonrecurring basis

At December 31, 2016 and 2015, assets measured at fair value on a nonrecurring basis were $1.6 billion and $1.7 billion, respectively, consisting predominantly of loans that had fair value adjustments for the years ended December 31, 2016 and 2015. At December 31, 2016, $735 million and $822 million of these assets were classified in levels 2 and 3 of the fair value hierarchy, respectively. At December 31, 2015, $696 million and $959 million of these assets were classified in levels 2 and 3 of the fair value hierarchy, respectively. Liabilities measured at fair value on a nonrecurring basis were not significant at December 31, 2016 and 2015. For the years ended December 31, 2016, 2015 and 2014, there were no significant transfers between levels 1, 2 and 3 related to assets held at the balance sheet date.

Of the $822 million in level 3 assets measured at fair value on a nonrecurring basis as of December 31, 2016:

- $462 million related to residential real estate loans carried at the net realizable value of the underlying collateral (i.e., collateral-dependent loans and other loans charged off in accordance with regulatory guidance). These amounts are classified as level 3, as they are valued using a broker's price opinion and discounted based upon the Firm's experience with actual liquidation values. These discounts to the broker price opinions ranged from 12% to 47%, with a weighted average of 25%.

The total change in the recorded value of assets and liabilities for which a fair value adjustment has been included in the Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, related to financial instruments held at those dates, were losses of $172 million, $294 million and $992 million respectively; these reductions were predominantly associated with loans.

For further information about the measurement of impaired collateral-dependent loans, and other loans where the carrying value is based on the fair value of the underlying collateral (e.g., residential mortgage loans charged off in accordance with regulatory guidance), see Note 14.

Additional disclosures about the fair value of financial instruments that are not carried on the Consolidated balance sheets at fair value

U.S. GAAP requires disclosure of the estimated fair value of certain financial instruments, and the methods and significant assumptions used to estimate their fair value. Financial instruments within the scope of these disclosure requirements are included in the following table. However, certain financial instruments and all nonfinancial instruments are excluded from the scope of these disclosure requirements. Accordingly, the fair value disclosures provided in the following table include only a partial estimate of the fair value of JPMorgan Chase's assets and liabilities. For example, the Firm has developed long-term relationships with its customers through its deposit base and credit card accounts, commonly referred to as core deposit intangibles and credit card relationships. In the opinion of management, these items, in the aggregate, add significant value to JPMorgan Chase, but their fair value is not disclosed in this Note.

Financial instruments for which carrying value approximates fair value

Certain financial instruments that are not carried at fair value on the Consolidated balance sheets are carried at amounts that approximate fair value, due to their short-term nature and generally negligible credit risk. These instruments include cash and due from banks, deposits with banks, federal funds sold, securities purchased under resale agreements and securities borrowed, short-term receivables and accrued interest receivable, commercial paper, federal funds purchased, securities loaned and sold under repurchase agreements, other borrowed funds, accounts payable, and accrued liabilities. In addition, U.S. GAAP requires that the fair value of deposit liabilities with no stated maturity (i.e., demand, savings and certain money market deposits) be equal to their carrying value; recognition of the inherent funding value of these instruments is not permitted.

The following table presents by fair value hierarchy classification the carrying values and estimated fair values at December 31, 2016 and 2015, of financial assets and liabilities, excluding financial instruments that are carried at fair value on a recurring basis, and their classification within the fair value hierarchy. For additional information regarding the financial instruments within the scope of this disclosure, and the methods and significant assumptions used to estimate their fair value, see pages 150–153 of this Note.

	December 31, 2016					December 31, 2015				
		Estimated fair value hierarchy					Estimated fair value hierarchy			
(in billions)	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value	Level 1	Level 2	Level 3	Total estimated fair value
Financial assets										
Cash and due from banks	**$ 23.9**	**$ 23.9**	**$ –**	**$ –**	**$ 23.9**	$ 20.5	$ 20.5	$ –	$ –	$ 20.5
Deposits with banks	**365.8**	**362.0**	**3.8**	**–**	**365.8**	340.0	335.9	4.1	–	340.0
Accrued interest and accounts receivable	**52.3**	**–**	**52.2**	**0.1**	**52.3**	46.6	–	46.4	0.2	46.6
Federal funds sold and securities purchased under resale agreements	**208.5**	**–**	**208.3**	**0.2**	**208.5**	189.5	–	189.5	–	189.5
Securities borrowed	**96.4**	**–**	**96.4**	**–**	**96.4**	98.3	–	98.3	–	98.3
Securities, held-to-maturity	**50.2**	**–**	**50.9**	**–**	**50.9**	49.1	–	50.6	–	50.6
Loans, net of allowance for loan losses[(a)]	**878.8**	**–**	**24.1**	**851.0**	**875.1**	820.8	–	25.4	802.7	828.1
Other	**71.4**	**0.1**	**60.8**	**14.3**	**75.2**	66.0	0.1	56.3	14.3	70.7
Financial liabilities										
Deposits	**$ 1,361.3**	**$ –**	**$ 1,361.3**	**$ –**	**$ 1,361.3**	$ 1,267.2	$ –	$ 1,266.1	$ 1.2	$ 1,267.3
Federal funds purchased and securities loaned or sold under repurchase agreements	**165.0**	**–**	**165.0**	**–**	**165.0**	149.2	–	149.2	–	149.2
Commercial paper	**11.7**	**–**	**11.7**	**–**	**11.7**	15.6	–	15.6	–	15.6
Other borrowed funds	**13.6**	**–**	**13.6**	**–**	**13.6**	11.2	–	11.2	–	11.2
Accounts payable and other liabilities	**148.0**	**–**	**144.8**	**3.4**	**148.2**	144.6	–	141.7	2.8	144.5
Beneficial interests issued by consolidated VIEs	**38.9**	**–**	**38.9**	**–**	**38.9**	41.1	–	40.2	0.9	41.1
Long-term debt and junior subordinated deferrable interest debentures	**257.5**	**–**	**260.0**	**2.0**	**262.0**	255.6	–	257.4	4.3	261.7

(a) Fair value is typically estimated using a discounted cash flow model that incorporates the characteristics of the underlying loans (including principal, contractual interest rate and contractual fees) and other key inputs, including expected lifetime credit losses, interest rates, prepayment rates, and primary origination or secondary market spreads. For certain loans, the fair value is measured based on the value of the underlying collateral. The difference between the estimated fair value and carrying value of a financial asset or liability is the result of the different methodologies used to determine fair value as compared with carrying value. For example, credit losses are estimated for a financial asset's remaining life in a fair value calculation but are estimated for a loss emergence period in the allowance for loan loss calculation; future loan income (interest and fees) is incorporated in a fair value calculation but is generally not considered in the allowance for loan losses. For a further discussion of the Firm's methodologies for estimating the fair value of loans and lending-related commitments, see Valuation hierarchy on pages 150–153.

The majority of the Firm's lending-related commitments are not carried at fair value on a recurring basis on the Consolidated balance sheets, nor are they actively traded. The carrying value of the wholesale allowance for lending-related commitments and the estimated fair value of these wholesale lending-related commitments were as follows for the periods indicated.

	December 31, 2016					December 31, 2015				
		Estimated fair value hierarchy					Estimated fair value hierarchy			
(in billions)	Carrying value[(a)]	Level 1	Level 2	Level 3	Total estimated fair value	Carrying value[(a)]	Level 1	Level 2	Level 3	Total estimated fair value
Wholesale lending-related commitments	**$ 1.1**	**$ –**	**$ –**	**$ 2.1**	**$ 2.1**	$ 0.8	$ –	$ –	$ 3.0	$ 3.0

(a) Excludes the current carrying values of the guarantee liability and the offsetting asset, each of which is recognized at fair value at the inception of the guarantees.

The Firm does not estimate the fair value of consumer lending-related commitments. In many cases, the Firm can reduce or cancel these commitments by providing the borrower notice or, in some cases as permitted by law, without notice. For a further discussion of the valuation of lending-related commitments, see page 151 of this Note.

Note 4 – Fair value option

The fair value option provides an option to elect fair value as an alternative measurement for selected financial assets, financial liabilities, unrecognized firm commitments, and written loan commitments.

The Firm has elected to measure certain instruments at fair value for several reasons including to mitigate income statement volatility caused by the differences between the measurement basis of elected instruments (e.g. certain instruments elected were previously accounted for on an accrual basis) and the associated risk management arrangements that are accounted for on a fair value basis, as well as to better reflect those instruments that are managed on a fair value basis.

The Firm's election of fair value includes the following instruments:

- Loans purchased or originated as part of securitization warehousing activity, subject to bifurcation accounting, or managed on a fair value basis
- Certain securities financing arrangements with an embedded derivative and/or a maturity of greater than one year
- Owned beneficial interests in securitized financial assets that contain embedded credit derivatives, which would otherwise be required to be separately accounted for as a derivative instrument
- Structured notes, which are predominantly financial instruments that contain embedded derivatives, that are issued as part of CIB's client-driven activities
- Certain long-term beneficial interests issued by CIB's consolidated securitization trusts where the underlying assets are carried at fair value

Changes in fair value under the fair value option election

The following table presents the changes in fair value included in the Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, for items for which the fair value option was elected. The profit and loss information presented below only includes the financial instruments that were elected to be measured at fair value; related risk management instruments, which are required to be measured at fair value, are not included in the table.

December 31, (in millions)	2016			2015			2014		
	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded	Principal transactions	All other income	Total changes in fair value recorded
Federal funds sold and securities purchased under resale agreements	**$ (76)**	**$ –**	**$ (76)**	$ (38)	$ –	$ (38)	$ (15)	$ –	$ (15)
Securities borrowed	**1**	**–**	**1**	(6)	–	(6)	(10)	–	(10)
Trading assets:									
Debt and equity instruments, excluding loans	**120**	**(1)** (c)	**119**	756	(10) (c)	746	639	–	639
Loans reported as trading assets:									
Changes in instrument-specific credit risk	**461**	**43** (c)	**504**	138	41 (c)	179	885	29 (c)	914
Other changes in fair value	**79**	**684** (c)	**763**	232	818 (c)	1,050	352	1,353 (c)	1,705
Loans:									
Changes in instrument-specific credit risk	**13**	**–**	**13**	35	–	35	40	–	40
Other changes in fair value	**(7)**	**–**	**(7)**	4	–	4	34	–	34
Other assets	**20**	**62** (d)	**82**	79	(1) (d)	78	24	6 (d)	30
Deposits(a)	**(134)**	**–**	**(134)**	93	–	93	(287)	–	(287)
Federal funds purchased and securities loaned or sold under repurchase agreements(a)	**19**	**–**	**19**	8	–	8	(33)	–	(33)
Other borrowed funds(a)	**(236)**	**–**	**(236)**	1,996	–	1,996	(891)	–	(891)
Trading liabilities	**6**	**–**	**6**	(20)	–	(20)	(17)	–	(17)
Beneficial interests issued by consolidated VIEs	**23**	**–**	**23**	49	–	49	(233)	–	(233)
Other liabilities	**–**	**–**	**–**	–	–	–	(27)	–	(27)
Long-term debt:									
DVA on fair value option elected liabilities (a)	**–**	**–**	**–**	300	–	300	101	–	101
Other changes in fair value(b)	**(773)**	**–**	**(773)**	1,088	–	1,088	(615)	–	(615)

(a) Effective January 1, 2016, unrealized gains/(losses) due to instrument-specific credit risk (DVA) for liabilities for which the fair value option has been elected is recorded in OCI, while realized gains/(losses) are recorded in principal transactions revenue. DVA for 2015 and 2014 was included in principal transactions revenue, and includes the impact of the Firm's own credit quality on the inception value of liabilities as well as the impact of changes in the Firm's own credit quality subsequent to issuance. See Notes 3 and 25 for further information.

(b) Long-term debt measured at fair value predominantly relates to structured notes containing embedded derivatives. Although the risk associated with the structured notes is actively managed, the gains/(losses) reported in this table do not include the income statement impact of the risk management instruments used to manage such risk.

(c) Reported in mortgage fees and related income.

(d) Reported in other income.

Determination of instrument-specific credit risk for items for which a fair value election was made

The following describes how the gains and losses that are attributable to changes in instrument-specific credit risk, were determined.

- Loans and lending-related commitments: For floating-rate instruments, all changes in value are attributed to instrument-specific credit risk. For fixed-rate instruments, an allocation of the changes in value for the period is made between those changes in value that are interest rate-related and changes in value that are credit-related. Allocations are generally based on an analysis of borrower-specific credit spread and recovery information, where available, or benchmarking to similar entities or industries.
- Long-term debt: Changes in value attributable to instrument-specific credit risk were derived principally from observable changes in the Firm's credit spread.
- Resale and repurchase agreements, securities borrowed agreements and securities lending agreements: Generally, for these types of agreements, there is a requirement that collateral be maintained with a market value equal to or in excess of the principal amount loaned; as a result, there would be no adjustment or an immaterial adjustment for instrument-specific credit risk related to these agreements.

Difference between aggregate fair value and aggregate remaining contractual principal balance outstanding

The following table reflects the difference between the aggregate fair value and the aggregate remaining contractual principal balance outstanding as of December 31, 2016 and 2015, for loans, long-term debt and long-term beneficial interests for which the fair value option has been elected.

	2016			2015		
December 31, (in millions)	Contractual principal outstanding	Fair value	Fair value over/ (under) contractual principal outstanding	Contractual principal outstanding	Fair value	Fair value over/ (under) contractual principal outstanding
Loans[(a)]						
Nonaccrual loans						
Loans reported as trading assets	**$ 3,338**	**$ 748**	**$ (2,590)**	$ 3,484	$ 631	$ (2,853)
Loans	**—**	**—**	**—**	7	7	—
Subtotal	**3,338**	**748**	**(2,590)**	3,491	638	(2,853)
All other performing loans						
Loans reported as trading assets	**35,477**	**33,054**	**(2,423)**	30,780	28,184	(2,596)
Loans	**2,259**	**2,228**	**(31)**	2,771	2,752	(19)
Total loans	**$ 41,074**	**$ 36,030**	**$ (5,044)**	$ 37,042	$ 31,574	$ (5,468)
Long-term debt						
Principal-protected debt	**$ 21,602** (c)	**$ 19,195**	**$ (2,407)**	$ 17,910 (c)	$ 16,611	$ (1,299)
Nonprincipal-protected debt[(b)]	**NA**	**18,491**	**NA**	NA	16,454	NA
Total long-term debt	**NA**	**$ 37,686**	**NA**	NA	$ 33,065	NA
Long-term beneficial interests						
Nonprincipal-protected debt	**NA**	**$ 120**	**NA**	NA	$ 787	NA
Total long-term beneficial interests	**NA**	**$ 120**	**NA**	NA	$ 787	NA

(a) There were no performing loans that were ninety days or more past due as of December 31, 2016 and 2015, respectively.
(b) Remaining contractual principal is not applicable to nonprincipal-protected notes. Unlike principal-protected structured notes, for which the Firm is obligated to return a stated amount of principal at the maturity of the note, nonprincipal-protected structured notes do not obligate the Firm to return a stated amount of principal at maturity, but to return an amount based on the performance of an underlying variable or derivative feature embedded in the note. However, investors are exposed to the credit risk of the Firm as issuer for both nonprincipal-protected and principal protected notes.
(c) Where the Firm issues principal-protected zero-coupon or discount notes, the balance reflects the contractual principal payment at maturity or, if applicable, the contractual principal payment at the Firm's next call date.

At December 31, 2016 and 2015, the contractual amount of lending-related commitments for which the fair value option was elected was $4.6 billion for both years, with a corresponding fair value of $(118) million and $(94) million, respectively. For further information regarding off-balance sheet lending-related financial instruments, see Note 29.

Structured note products by balance sheet classification and risk component

The table below presents the fair value of the structured notes issued by the Firm, by balance sheet classification and the primary risk type.

	December 31, 2016				December 31, 2015			
(in millions)	Long-term debt	Other borrowed funds	Deposits	Total	Long-term debt	Other borrowed funds	Deposits	Total
Risk exposure								
Interest rate	**$ 16,296**	**$ 184**	**$ 4,296**	**$ 20,776**	$ 12,531	$ 58	$ 3,340	$ 15,929
Credit	**3,267**	**225**	**—**	**3,492**	3,195	547	—	3,742
Foreign exchange	**2,365**	**135**	**6**	**2,506**	1,765	77	11	1,853
Equity	**14,831**	**8,234**	**5,481**	**28,546**	14,293	8,447	4,993	27,733
Commodity	**488**	**37**	**1,811**	**2,336**	640	50	1,981	2,671
Total structured notes	**$ 37,247**	**$ 8,815**	**$ 11,594**	**$ 57,656**	$ 32,424	$ 9,179	$ 10,325	$ 51,928

Note 5 – Credit risk concentrations

Concentrations of credit risk arise when a number of customers are engaged in similar business activities or activities in the same geographic region, or when they have similar economic features that would cause their ability to meet contractual obligations to be similarly affected by changes in economic conditions.

JPMorgan Chase regularly monitors various segments of its credit portfolios to assess potential credit risk concentrations and to obtain collateral when deemed necessary. Senior management is significantly involved in the credit approval and review process, and risk levels are adjusted as needed to reflect the Firm's risk appetite.

In the Firm's consumer portfolio, concentrations are evaluated primarily by product and by U.S. geographic region, with a key focus on trends and concentrations at the portfolio level, where potential credit risk concentrations can be remedied through changes in underwriting policies and portfolio guidelines. In the wholesale portfolio, credit risk concentrations are evaluated primarily by industry and monitored regularly on both an aggregate portfolio level and on an individual customer basis. The Firm's wholesale exposure is managed through loan syndications and participations, loan sales, securitizations, credit derivatives, master netting agreements, and collateral and other risk-reduction techniques. For additional information on loans, see Note 14.

The Firm does not believe that its exposure to any particular loan product (e.g., option ARMs), or industry segment (e.g., commercial real estate), or its exposure to residential real estate loans with high LTV ratios, results in a significant concentration of credit risk.

Terms of loan products and collateral coverage are included in the Firm's assessment when extending credit and establishing its allowance for loan losses.

The table below presents both on–balance sheet and off–balance sheet consumer and wholesale-related credit exposure by the Firm's three credit portfolio segments as of December 31, 2016 and 2015.

	2016				2015			
		On-balance sheet				On-balance sheet		
December 31, (in millions)	Credit exposure	Loans	Derivatives	Off-balance sheet[g]	Credit exposure	Loans	Derivatives	Off-balance sheet[g]
Consumer, excluding credit card	**$ 419,441**	**$ 364,644**	**$ –**	**$ 54,797**	$ 403,299	$ 344,821	$ –	$ 58,478
Receivables from customers[a]	**120**	**–**	**–**	**–**	125	–	–	–
Total Consumer, excluding credit card	**419,561**	**364,644**	**–**	**54,797**	403,424	344,821	–	58,478
Credit Card	**695,707**	**141,816**	**–**	**553,891**	646,981	131,463	–	515,518
Total consumer-related	**1,115,268**	**506,460**	**–**	**608,688**	1,050,405	476,284	–	573,996
Wholesale-related[b]								
Real Estate	**135,041**	**106,315**	**222**	**28,504**	116,857	92,820	312	23,725
Consumer & Retail	**85,435**	**29,842**	**1,082**	**54,511**	85,460	27,175	1,573	56,712
Technology, Media & Telecommunications	**62,950**	**13,845**	**1,227**	**47,878**	57,382	11,079	1,032	45,271
Industrials	**55,449**	**17,150**	**1,615**	**36,684**	54,386	16,791	1,428	36,167
Healthcare	**47,866**	**15,120**	**2,277**	**30,469**	46,053	16,965	2,751	26,337
Banks & Finance Cos	**44,614**	**19,460**	**12,232**	**12,922**	43,398	20,401	10,218	12,779
Oil & Gas	**40,099**	**13,079**	**1,878**	**25,142**	42,077	13,343	1,902	26,832
Asset Managers	**31,886**	**10,539**	**10,819**	**10,528**	23,815	6,703	7,733	9,379
Utilities	**29,622**	**7,183**	**883**	**21,556**	30,853	5,294	1,689	23,870
State & Municipal Govt[c]	**28,263**	**12,416**	**2,096**	**13,751**	29,114	9,626	3,287	16,201
Central Govt	**20,408**	**3,964**	**14,235**	**2,209**	17,968	2,000	13,240	2,728
Transportation	**19,029**	**8,942**	**751**	**9,336**	19,227	9,157	1,575	8,495
Automotive	**16,635**	**4,943**	**1,190**	**10,502**	13,864	4,473	1,350	8,041
Chemicals & Plastics	**14,988**	**5,287**	**271**	**9,430**	15,232	4,033	369	10,830
Metals & Mining	**13,419**	**4,350**	**439**	**8,630**	14,049	4,622	607	8,820
Insurance	**13,151**	**947**	**3,382**	**8,822**	11,889	1,094	1,992	8,803
Financial Markets Infrastructure	**8,732**	**347**	**3,884**	**4,501**	7,973	724	2,602	4,647
Securities Firms	**3,867**	**794**	**1,913**	**1,160**	4,412	861	1,424	2,127
All other[d]	**144,428**	**109,267**	**3,682**	**31,479**	149,117	109,889	4,593	34,635
Subtotal	**815,882**	**383,790**	**64,078**	**368,014**	783,126	357,050	59,677	366,399
Loans held-for-sale and loans at fair value	**4,515**	**4,515**	**–**	**–**	3,965	3,965	–	–
Receivables from customers and other[a]	**17,440**	**–**	**–**	**–**	13,372	–	–	–
Total wholesale-related	**837,837**	**388,305**	**64,078**	**368,014**	800,463	361,015	59,677	366,399
Total exposure[e][f]	**$ 1,953,105**	**$ 894,765**	**$ 64,078**	**$ 976,702**	$ 1,850,868	$ 837,299	$ 59,677	$ 940,395

(a) Receivables from customers primarily represent margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.
(b) The industry rankings presented in the table as of December 31, 2015, are based on the industry rankings of the corresponding exposures at December 31, 2016, not actual rankings of such exposures at December 31, 2015.
(c) In addition to the credit risk exposure to states and municipal governments (both U.S. and non-U.S.) at December 31, 2016 and 2015, noted above, the Firm held: $9.1 billion and 7.6 billion, respectively, of trading securities; $31.6 billion and $33.6 billion, respectively, of AFS securities; and $14.5 billion and $12.8 billion, respectively, of HTM securities, issued by U.S. state and municipal governments. For further information, see Note 3 and Note 12.
(d) All other includes: individuals; SPEs; holding companies; and private education and civic organizations. For more information on exposures to SPEs, see Note 16.
(e) For further information regarding on–balance sheet credit concentrations by major product and/or geography, see Note 6 and Note 14. For information regarding concentrations of off–balance sheet lending-related financial instruments by major product, see Note 29.
(f) Excludes cash placed with banks of $380.2 billion and $351.0 billion, at December 31, 2016 and 2015, respectively, which is predominantly placed with various central banks, primarily Federal Reserve Banks
(g) Represents lending-related financial instruments.

Note 6 – Derivative instruments

Derivative contracts derive their value from underlying asset prices, indices, reference rates, other inputs or a combination of these factors and may expose counterparties to risks and rewards of an underlying asset or liability without having to initially invest in, own or exchange the asset or liability. JPMorgan Chase makes markets in derivatives for clients and also uses derivatives to hedge or manage its own risk exposures. Predominantly all of the Firm's derivatives are entered into for market-making or risk management purposes.

Market-making derivatives

The majority of the Firm's derivatives are entered into for market-making purposes. Clients use derivatives to mitigate or modify interest rate, credit, foreign exchange, equity and commodity risks. The Firm actively manages the risks from its exposure to these derivatives by entering into other derivative transactions or by purchasing or selling other financial instruments that partially or fully offset the exposure from client derivatives.

Risk management derivatives

The Firm manages certain market and credit risk exposures using derivative instruments, including derivatives in hedge accounting relationships and other derivatives that are used to manage risks associated with specified assets and liabilities.

Interest rate contracts are used to minimize fluctuations in earnings that are caused by changes in interest rates. Fixed-rate assets and liabilities appreciate or depreciate in market value as interest rates change. Similarly, interest income and expense increases or decreases as a result of variable-rate assets and liabilities resetting to current market rates, and as a result of the repayment and subsequent origination or issuance of fixed-rate assets and liabilities at current market rates. Gains or losses on the derivative instruments that are related to such assets and liabilities are expected to substantially offset this variability in earnings. The Firm generally uses interest rate swaps, forwards and futures to manage the impact of interest rate fluctuations on earnings.

Foreign currency forward contracts are used to manage the foreign exchange risk associated with certain foreign currency–denominated (i.e., non-U.S. dollar) assets and liabilities and forecasted transactions, as well as the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. As a result of fluctuations in foreign currencies, the U.S. dollar–equivalent values of the foreign currency–denominated assets and liabilities or the forecasted revenues or expenses increase or decrease. Gains or losses on the derivative instruments related to these foreign currency–denominated assets or liabilities, or forecasted transactions, are expected to substantially offset this variability.

Commodities contracts are used to manage the price risk of certain commodities inventories. Gains or losses on these derivative instruments are expected to substantially offset the depreciation or appreciation of the related inventory.

Credit derivatives are used to manage the counterparty credit risk associated with loans and lending-related commitments. Credit derivatives compensate the purchaser when the entity referenced in the contract experiences a credit event, such as bankruptcy or a failure to pay an obligation when due. Credit derivatives primarily consist of CDS. For a further discussion of credit derivatives, see the discussion in the Credit derivatives section on pages 184–186 of this Note.

For more information about risk management derivatives, see the risk management derivatives gains and losses table on page 184 of this Note, and the hedge accounting gains and losses tables on pages 182–184 of this Note.

Derivative counterparties and settlement types

The Firm enters into OTC derivatives, which are negotiated and settled bilaterally with the derivative counterparty. The Firm also enters into, as principal, certain ETD such as futures and options, and OTC-cleared derivative contracts with CCPs. ETD contracts are generally standardized contracts traded on an exchange and cleared by the CCP, which is the Firm's counterparty from the inception of the transactions. OTC-cleared derivatives are traded on a bilateral basis and then novated to the CCP for clearing.

Derivative clearing services

The Firm provides clearing services for clients where the Firm acts as a clearing member with respect to certain derivative exchanges and clearing houses. The Firm does not reflect the clients' derivative contracts in its Consolidated Financial Statements. For further information on the Firm's clearing services, see Note 29.

Accounting for derivatives

All free-standing derivatives that the Firm executes for its own account are required to be recorded on the Consolidated balance sheets at fair value.

As permitted under U.S. GAAP, the Firm nets derivative assets and liabilities, and the related cash collateral receivables and payables, when a legally enforceable master netting agreement exists between the Firm and the derivative counterparty. For further discussion of the offsetting of assets and liabilities, see Note 1. The accounting for changes in value of a derivative depends on whether or not the transaction has been designated and qualifies for hedge accounting. Derivatives that are not designated as hedges are reported and measured at fair value through earnings. The tabular disclosures on pages 178–184 of this Note provide additional information on the amount of, and reporting for, derivative assets, liabilities, gains and losses. For further discussion of derivatives embedded in structured notes, see Notes 3 and 4.

Derivatives designated as hedges

The Firm applies hedge accounting to certain derivatives executed for risk management purposes – generally interest rate, foreign exchange and commodity derivatives. However, JPMorgan Chase does not seek to apply hedge accounting to all of the derivatives involved in the Firm's risk management activities. For example, the Firm does not apply hedge accounting to purchased CDS used to manage the credit risk of loans and lending-related commitments, because of the difficulties in qualifying such contracts as hedges. For the same reason, the Firm does not apply hedge accounting to certain interest rate, foreign exchange, and commodity derivatives used for risk management purposes.

To qualify for hedge accounting, a derivative must be highly effective at reducing the risk associated with the exposure being hedged. In addition, for a derivative to be designated as a hedge, the risk management objective and strategy must be documented. Hedge documentation must identify the derivative hedging instrument, the asset or liability or forecasted transaction and type of risk to be hedged, and how the effectiveness of the derivative is assessed prospectively and retrospectively. To assess effectiveness, the Firm uses statistical methods such as regression analysis, as well as nonstatistical methods including dollar-value comparisons of the change in the fair value of the derivative to the change in the fair value or cash flows of the hedged item. The extent to which a derivative has been, and is expected to continue to be, effective at offsetting changes in the fair value or cash flows of the hedged item must be assessed and documented at least quarterly. Any hedge ineffectiveness (i.e., the amount by which the gain or loss on the designated derivative instrument does not exactly offset the change in the hedged item attributable to the hedged risk) must be reported in current-period earnings. If it is determined that a derivative is not highly effective at hedging the designated exposure, hedge accounting is discontinued.

There are three types of hedge accounting designations: fair value hedges, cash flow hedges and net investment hedges. JPMorgan Chase uses fair value hedges primarily to hedge fixed-rate long-term debt, AFS securities and certain commodities inventories. For qualifying fair value hedges, the changes in the fair value of the derivative, and in the value of the hedged item for the risk being hedged, are recognized in earnings. If the hedge relationship is terminated, then the adjustment to the hedged item continues to be reported as part of the basis of the hedged item, and for benchmark interest rate hedges, is amortized to earnings as a yield adjustment. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily net interest income and principal transactions revenue.

JPMorgan Chase uses cash flow hedges primarily to hedge the exposure to variability in forecasted cash flows from floating-rate assets and liabilities and foreign currency–denominated revenue and expense. For qualifying cash flow hedges, the effective portion of the change in the fair value of the derivative is recorded in OCI and recognized in the Consolidated statements of income when the hedged cash flows affect earnings. Derivative amounts affecting earnings are recognized consistent with the classification of the hedged item – primarily interest income, interest expense, noninterest revenue and compensation expense. The ineffective portions of cash flow hedges are immediately recognized in earnings. If the hedge relationship is terminated, then the value of the derivative recorded in AOCI is recognized in earnings when the cash flows that were hedged affect earnings. For hedge relationships that are discontinued because a forecasted transaction is not expected to occur according to the original hedge forecast, any related derivative values recorded in AOCI are immediately recognized in earnings.

JPMorgan Chase uses net investment hedges to protect the value of the Firm's net investments in certain non-U.S. subsidiaries or branches whose functional currencies are not the U.S. dollar. For foreign currency qualifying net investment hedges, changes in the fair value of the derivatives are recorded in the translation adjustments account within AOCI.

The following table outlines the Firm's primary uses of derivatives and the related hedge accounting designation or disclosure category.

Type of Derivative	Use of Derivative	Designation and disclosure	Affected segment or unit	Page reference
Manage specifically identified risk exposures in qualifying hedge accounting relationships:				
◦ Interest rate	Hedge fixed rate assets and liabilities	Fair value hedge	Corporate	182
◦ Interest rate	Hedge floating-rate assets and liabilities	Cash flow hedge	Corporate	183
◦ Foreign exchange	Hedge foreign currency-denominated assets and liabilities	Fair value hedge	Corporate	182
◦ Foreign exchange	Hedge forecasted revenue and expense	Cash flow hedge	Corporate	183
◦ Foreign exchange	Hedge the value of the Firm's investments in non-U.S. dollar functional currency entities	Net investment hedge	Corporate	184
◦ Commodity	Hedge commodity inventory	Fair value hedge	CIB	182
Manage specifically identified risk exposures not designated in qualifying hedge accounting relationships:				
◦ Interest rate	Manage the risk of the mortgage pipeline, warehouse loans and MSRs	Specified risk management	CCB	184
◦ Credit	Manage the credit risk of wholesale lending exposures	Specified risk management	CIB	184
◦ Commodity	Manage the risk of certain commodities-related contracts and investments	Specified risk management	CIB	184
◦ Interest rate and foreign exchange	Manage the risk of certain other specified assets and liabilities	Specified risk management	Corporate	184
Market-making derivatives and other activities:				
◦ Various	Market-making and related risk management	Market-making and other	CIB	184
◦ Various	Other derivatives	Market-making and other	CIB, Corporate	184

Notional amount of derivative contracts

The following table summarizes the notional amount of derivative contracts outstanding as of December 31, 2016 and 2015.

	Notional amounts[b]	
December 31, (in billions)	**2016**	2015
Interest rate contracts		
Swaps	**$ 22,000**	$ 24,162
Futures and forwards	**5,289**	5,167
Written options	**3,091**	3,506
Purchased options	**3,482**	3,896
Total interest rate contracts	**33,862**	36,731
Credit derivatives[a]	**2,032**	2,900
Foreign exchange contracts		
Cross-currency swaps	**3,359**	3,199
Spot, futures and forwards	**5,341**	5,028
Written options	**734**	690
Purchased options	**721**	706
Total foreign exchange contracts	**10,155**	9,623
Equity contracts		
Swaps	**258**	232
Futures and forwards	**59**	43
Written options	**417**	395
Purchased options	**345**	326
Total equity contracts	**1,079**	996
Commodity contracts		
Swaps	**102**	83
Spot, futures and forwards	**130**	99
Written options	**83**	115
Purchased options	**94**	112
Total commodity contracts	**409**	409
Total derivative notional amounts	**$ 47,537**	$ 50,659

(a) For more information on volumes and types of credit derivative contracts, see the Credit derivatives discussion on pages 184–186.
(b) Represents the sum of gross long and gross short third-party notional derivative contracts.

While the notional amounts disclosed above give an indication of the volume of the Firm's derivatives activity, the notional amounts significantly exceed, in the Firm's view, the possible losses that could arise from such transactions. For most derivative transactions, the notional amount is not exchanged; it is used simply as a reference to calculate payments.

Impact of derivatives on the Consolidated balance sheets

The following table summarizes information on derivative receivables and payables (before and after netting adjustments) that are reflected on the Firm's Consolidated balance sheets as of December 31, 2016 and 2015, by accounting designation (e.g., whether the derivatives were designated in qualifying hedge accounting relationships or not) and contract type.

Free-standing derivative receivables and payables[(a)]

	Gross derivative receivables				Gross derivative payables			
December 31, 2016 (in millions)	Not designated as hedges	Designated as hedges	Total derivative receivables	Net derivative receivables[(b)]	Not designated as hedges	Designated as hedges	Total derivative payables	Net derivative payables[(b)]
Trading assets and liabilities								
Interest rate	**$ 601,557**	**$ 4,406**	**$ 605,963**	**$ 28,302**	**$ 567,894**	**$ 2,884**	**$ 570,778**	**$ 10,815**
Credit	**29,645**	**–**	**29,645**	**1,294**	**28,666**	**–**	**28,666**	**1,411**
Foreign exchange	**232,137**	**1,289**	**233,426**	**23,271**	**233,823**	**1,148**	**234,971**	**20,508**
Equity	**34,940**	**–**	**34,940**	**4,939**	**38,362**	**–**	**38,362**	**8,140**
Commodity	**18,505**	**137**	**18,642**	**6,272**	**20,283**	**179**	**20,462**	**8,357**
Total fair value of trading assets and liabilities	**$ 916,784**	**$ 5,832**	**$ 922,616**	**$ 64,078**	**$ 889,028**	**$ 4,211**	**$ 893,239**	**$ 49,231**

	Gross derivative receivables				Gross derivative payables			
December 31, 2015 (in millions)	Not designated as hedges	Designated as hedges	Total derivative receivables	Net derivative receivables[(b)]	Not designated as hedges	Designated as hedges	Total derivative payables	Net derivative payables[(b)]
Trading assets and liabilities								
Interest rate	$ 665,531	$ 4,080	$ 669,611	$ 26,363	$ 632,928	$ 2,238	$ 635,166	$ 10,221
Credit	51,468	–	51,468	1,423	50,529	–	50,529	1,541
Foreign exchange	179,072	803	179,875	17,177	189,397	1,503	190,900	19,769
Equity	35,859	–	35,859	5,529	38,663	–	38,663	9,183
Commodity	23,713	1,352	25,065	9,185	27,653	1	27,654	12,076
Total fair value of trading assets and liabilities	$ 955,643	$ 6,235	$ 961,878	$ 59,677	$ 939,170	$ 3,742	$ 942,912	$ 52,790

(a) Balances exclude structured notes for which the fair value option has been elected. See Note 4 for further information.

(b) As permitted under U.S. GAAP, the Firm has elected to net derivative receivables and derivative payables and the related cash collateral receivables and payables when a legally enforceable master netting agreement exists.

Derivatives netting

The following tables present, as of December 31, 2016 and 2015, gross and net derivative receivables and payables by contract and settlement type. Derivative receivables and payables, as well as the related cash collateral from the same counterparty, have been netted on the Consolidated balance sheets where the Firm has obtained an appropriate legal opinion with respect to the master netting agreement. Where such a legal opinion has not been either sought or obtained, amounts are not eligible for netting on the Consolidated balance sheets, and those derivative receivables and payables are shown separately in the tables below.

In addition to the cash collateral received and transferred that is presented on a net basis with derivative receivables and payables, the Firm receives and transfers additional collateral (financial instruments and cash). These amounts mitigate counterparty credit risk associated with the Firm's derivative instruments, but are not eligible for net presentation:

- collateral that consists of non-cash financial instruments (generally U.S. government and agency securities and other G7 government bonds) and cash collateral held at third party custodians, which are shown separately as "Collateral not nettable on the Consolidated balance sheets" in the tables below, up to the fair value exposure amount.
- the amount of collateral held or transferred that exceeds the fair value exposure at the individual counterparty level, as of the date presented, which is excluded from the tables below; and
- collateral held or transferred that relates to derivative receivables or payables where an appropriate legal opinion has not been either sought or obtained with respect to the master netting agreement, which is excluded from the tables below.

	2016			2015		
December 31, (in millions)	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables	Gross derivative receivables	Amounts netted on the Consolidated balance sheets	Net derivative receivables
U.S. GAAP nettable derivative receivables						
Interest rate contracts:						
OTC	**$ 365,227**	**$ (342,173)**	**$ 23,054**	$ 417,386	$ (396,506)	$ 20,880
OTC-cleared	**235,399**	**(235,261)**	**138**	246,750	(246,742)	8
Exchange-traded[(a)]	**241**	**(227)**	**14**	–	–	–
Total interest rate contracts	**600,867**	**(577,661)**	**23,206**	664,136	(643,248)	20,888
Credit contracts:						
OTC	**23,130**	**(22,612)**	**518**	44,082	(43,182)	900
OTC-cleared	**5,746**	**(5,739)**	**7**	6,866	(6,863)	3
Total credit contracts	**28,876**	**(28,351)**	**525**	50,948	(50,045)	903
Foreign exchange contracts:						
OTC	**226,271**	**(208,962)**	**17,309**	175,060	(162,377)	12,683
OTC-cleared	**1,238**	**(1,165)**	**73**	323	(321)	2
Exchange-traded[(a)]	**104**	**(27)**	**77**	–	–	–
Total foreign exchange contracts	**227,613**	**(210,154)**	**17,459**	175,383	(162,698)	12,685
Equity contracts:						
OTC	**20,868**	**(20,570)**	**298**	20,690	(20,439)	251
OTC-cleared	**–**	**–**	**–**	–	–	–
Exchange-traded[(a)]	**11,439**	**(9,431)**	**2,008**	12,285	(9,891)	2,394
Total equity contracts	**32,307**	**(30,001)**	**2,306**	32,975	(30,330)	2,645
Commodity contracts:						
OTC	**11,571**	**(5,605)**	**5,966**	15,001	(6,772)	8,229
OTC-cleared	**–**	**–**	**–**	–	–	–
Exchange-traded[(a)]	**6,794**	**(6,766)**	**28**	9,199	(9,108)	91
Total commodity contracts	**18,365**	**(12,371)**	**5,994**	24,200	(15,880)	8,320
Derivative receivables with appropriate legal opinions	**908,028**	**(858,538)** [(b)]	**49,490**	947,642	(902,201) [(b)]	45,441
Derivative receivables where an appropriate legal opinion has not been either sought or obtained	**14,588**		**14,588**	14,236		14,236
Total derivative receivables recognized on the Consolidated balance sheets	**$ 922,616**		**$ 64,078**	$ 961,878		$ 59,677
Collateral not nettable on the Consolidated balance sheets[(c)(d)]			**(18,638)**			(13,543)
Net amounts			**$ 45,440**			$ 46,134

December 31, (in millions)	2016 Gross derivative payables	2016 Amounts netted on the Consolidated balance sheets	2016 Net derivative payables	2015 Gross derivative payables	2015 Amounts netted on the Consolidated balance sheets	2015 Net derivative payables
U.S. GAAP nettable derivative payables						
Interest rate contracts:						
OTC	**$ 338,502**	**$ (329,325)**	**$ 9,177**	$ 393,709	$ (384,576)	$ 9,133
OTC-cleared	**230,464**	**(230,463)**	**1**	240,398	(240,369)	29
Exchange-traded[(a)]	**196**	**(175)**	**21**	–	–	–
Total interest rate contracts	**569,162**	**(559,963)**	**9,199**	634,107	(624,945)	9,162
Credit contracts:						
OTC	**22,366**	**(21,614)**	**752**	44,379	(43,019)	1,360
OTC-cleared	**5,641**	**(5,641)**	**–**	5,969	(5,969)	–
Total credit contracts	**28,007**	**(27,255)**	**752**	50,348	(48,988)	1,360
Foreign exchange contracts:						
OTC	**228,300**	**(213,296)**	**15,004**	185,178	(170,830)	14,348
OTC-cleared	**1,158**	**(1,158)**	**–**	301	(301)	–
Exchange-traded[(a)]	**328**	**(9)**	**319**	–	–	–
Total foreign exchange contracts	**229,786**	**(214,463)**	**15,323**	185,479	(171,131)	14,348
Equity contracts:						
OTC	**24,688**	**(20,808)**	**3,880**	23,458	(19,589)	3,869
OTC-cleared	**–**	**–**	**–**	–	–	–
Exchange-traded[(a)]	**10,004**	**(9,414)**	**590**	10,998	(9,891)	1,107
Total equity contracts	**34,692**	**(30,222)**	**4,470**	34,456	(29,480)	4,976
Commodity contracts:						
OTC	**12,885**	**(5,252)**	**7,633**	16,953	(6,256)	10,697
OTC-cleared	**–**	**–**	**–**	–	–	–
Exchange-traded[(a)]	**7,099**	**(6,853)**	**246**	9,374	(9,322)	52
Total commodity contracts	**19,984**	**(12,105)**	**7,879**	26,327	(15,578)	10,749
Derivative payables with appropriate legal opinions	**881,631**	**(844,008)** [(b)]	**37,623**	930,717	(890,122) [(b)]	40,595
Derivative payables where an appropriate legal opinion has not been either sought or obtained	**11,608**		**11,608**	12,195		12,195
Total derivative payables recognized on the Consolidated balance sheets	**$ 893,239**		**$ 49,231**	$ 942,912		$ 52,790
Collateral not nettable on the Consolidated balance sheets[(c)(d)(e)]			**(8,925)**			(7,957)
Net amounts			**$ 40,306**			$ 44,833

(a) Exchange-traded derivative balances that relate to futures contracts are settled daily.
(b) Net derivatives receivable included cash collateral netted of $71.9 billion and $73.7 billion at December 31, 2016 and 2015, respectively. Net derivatives payable included cash collateral netted of $57.3 billion and $61.6 billion related to OTC and OTC-cleared derivatives at December 31, 2016 and 2015, respectively.
(c) Excludes all collateral related to derivative instruments where an appropriate legal opinion has not been either sought or obtained.
(d) Represents liquid security collateral as well as cash collateral held at third-party custodians related to derivative instruments where an appropriate legal opinion has been obtained. For some counterparties, the collateral amounts of financial instruments may exceed the derivative receivables and derivative payables balances. Where this is the case, the total amount reported is limited to the net derivative receivables and net derivative payables balances with that counterparty.
(e) Derivative payables collateral relates only to OTC and OTC-cleared derivative instruments. Amounts exclude collateral transferred related to exchange-traded derivative instruments.

Liquidity risk and credit-related contingent features

In addition to the specific market risks introduced by each derivative contract type, derivatives expose JPMorgan Chase to credit risk — the risk that derivative counterparties may fail to meet their payment obligations under the derivative contracts and the collateral, if any, held by the Firm proves to be of insufficient value to cover the payment obligation. It is the policy of JPMorgan Chase to actively pursue, where possible, the use of legally enforceable master netting arrangements and collateral agreements to mitigate derivative counterparty credit risk. The amount of derivative receivables reported on the Consolidated balance sheets is the fair value of the derivative contracts after giving effect to legally enforceable master netting agreements and cash collateral held by the Firm.

While derivative receivables expose the Firm to credit risk, derivative payables expose the Firm to liquidity risk, as the derivative contracts typically require the Firm to post cash or securities collateral with counterparties as the fair value of the contracts moves in the counterparties' favor or upon specified downgrades in the Firm's and its subsidiaries' respective credit ratings. Certain derivative contracts also provide for termination of the contract, generally upon a downgrade of either the Firm or the counterparty, at the fair value of the derivative contracts. The following table shows the aggregate fair value of net derivative payables related to OTC and OTC-cleared derivatives that contain contingent collateral or termination features that may be triggered upon a ratings downgrade, and the associated collateral the Firm has posted in the normal course of business, at December 31, 2016 and 2015.

OTC and OTC-cleared derivative payables containing downgrade triggers

December 31, (in millions)	**2016**	2015
Aggregate fair value of net derivative payables	**$ 21,550**	$ 22,328
Collateral posted	**19,383**	18,942

The following table shows the impact of a single-notch and two-notch downgrade of the long-term issuer ratings of JPMorgan Chase & Co. and its subsidiaries, predominantly JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A."), at December 31, 2016 and 2015, related to OTC and OTC-cleared derivative contracts with contingent collateral or termination features that may be triggered upon a ratings downgrade. Derivatives contracts generally require additional collateral to be posted or terminations to be triggered when the predefined threshold rating is breached. A downgrade by a single rating agency that does not result in a rating lower than a preexisting corresponding rating provided by another major rating agency will generally not result in additional collateral (except in certain instances in which additional initial margin may be required upon a ratings downgrade), nor in termination payments requirements. The liquidity impact in the table is calculated based upon a downgrade below the lowest current rating of the rating agencies referred to in the derivative contract.

Liquidity impact of downgrade triggers on OTC and OTC-cleared derivatives

	2016		2015	
December 31, (in millions)	Single-notch downgrade	Two-notch downgrade	Single-notch downgrade	Two-notch downgrade
Amount of additional collateral to be posted upon downgrade[(a)]	**$ 560**	**$ 2,497**	$ 807	$ 3,028
Amount required to settle contracts with termination triggers upon downgrade[(b)]	**606**	**1,049**	271	1,093

(a) Includes the additional collateral to be posted for initial margin.
(b) Amounts represent fair values of derivative payables, and do not reflect collateral posted.

Derivatives executed in contemplation of a sale of the underlying financial asset

In certain instances the Firm enters into transactions in which it transfers financial assets but maintains the economic exposure to the transferred assets by entering into a derivative with the same counterparty in contemplation of the initial transfer. The Firm generally accounts for such transfers as collateralized financing transactions as described in Note 13, but in limited circumstances they may qualify to be accounted for as a sale and a derivative under U.S. GAAP. The amount of such transfers accounted for as a sale where the associated derivative was outstanding at December 31, 2016 was not material.

Impact of derivatives on the Consolidated statements of income

The following tables provide information related to gains and losses recorded on derivatives based on their hedge accounting designation or purpose.

Fair value hedge gains and losses

The following tables present derivative instruments, by contract type, used in fair value hedge accounting relationships, as well as pre-tax gains/(losses) recorded on such derivatives and the related hedged items for the years ended December 31, 2016, 2015 and 2014, respectively. The Firm includes gains/(losses) on the hedging derivative and the related hedged item in the same line item in the Consolidated statements of income.

	Gains/(losses) recorded in income			Income statement impact due to:	
Year ended December 31, 2016 (in millions)	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness[e]	Excluded components[f]
Contract type					
Interest rate[a][b]	**$ (482)**	**$ 1,338**	**$ 856**	**$ 6**	**$ 850**
Foreign exchange[c]	**2,435**	**(2,261)**	**174**	**—**	**174**
Commodity[d]	**(536)**	**586**	**50**	**(9)**	**59**
Total	**$ 1,417**	**$ (337)**	**$ 1,080**	**$ (3)**	**$ 1,083**

	Gains/(losses) recorded in income			Income statement impact due to:	
Year ended December 31, 2015 (in millions)	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness[e]	Excluded components[f]
Contract type					
Interest rate[a][b]	$ 38	$ 911	$ 949	$ 3	$ 946
Foreign exchange[c]	6,030	(6,006)	24	—	24
Commodity[d]	1,153	(1,142)	11	(13)	24
Total	$ 7,221	$ (6,237)	$ 984	$ (10)	$ 994

	Gains/(losses) recorded in income			Income statement impact due to:	
Year ended December 31, 2014 (in millions)	Derivatives	Hedged items	Total income statement impact	Hedge ineffectiveness[e]	Excluded components[f]
Contract type					
Interest rate[a][b]	$ 2,106	$ (801)	$ 1,305	$ 131	$ 1,174
Foreign exchange[c]	8,279	(8,532)	(253)	—	(253)
Commodity[d]	49	145	194	42	152
Total	$ 10,434	$ (9,188)	$ 1,246	$ 173	$ 1,073

(a) Primarily consists of hedges of the benchmark (e.g., London Interbank Offered Rate ("LIBOR")) interest rate risk of fixed-rate long-term debt and AFS securities. Gains and losses were recorded in net interest income.

(b) Excludes the amortization expense associated with the inception hedge accounting adjustment applied to the hedged item. This expense is recorded in net interest income and substantially offsets the income statement impact of the excluded components.

(c) Primarily consists of hedges of the foreign currency risk of long-term debt and AFS securities for changes in spot foreign currency rates. Gains and losses related to the derivatives and the hedged items, due to changes in foreign currency rates, were recorded primarily in principal transactions revenue and net interest income.

(d) Consists of overall fair value hedges of physical commodities inventories that are generally carried at the lower of cost or market (market approximates fair value). Gains and losses were recorded in principal transactions revenue.

(e) Hedge ineffectiveness is the amount by which the gain or loss on the designated derivative instrument does not exactly offset the gain or loss on the hedged item attributable to the hedged risk.

(f) The assessment of hedge effectiveness excludes certain components of the changes in fair values of the derivatives and hedged items such as forward points on foreign exchange forward contracts and time values.

Cash flow hedge gains and losses

The following tables present derivative instruments, by contract type, used in cash flow hedge accounting relationships, and the pre-tax gains/(losses) recorded on such derivatives, for the years ended December 31, 2016, 2015 and 2014, respectively. The Firm includes the gain/(loss) on the hedging derivative and the change in cash flows on the hedged item in the same line item in the Consolidated statements of income.

	Gains/(losses) recorded in income and other comprehensive income/(loss)				
Year ended December 31, 2016 (in millions)	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income[c]	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate[a]	**$ (74)**	**$ –**	**$ (74)**	**$ (55)**	**$ 19**
Foreign exchange[b]	**(286)**	**–**	**(286)**	**(395)**	**(109)**
Total	**$ (360)**	**$ –**	**$ (360)**	**$ (450)**	**$ (90)**

	Gains/(losses) recorded in income and other comprehensive income/(loss)				
Year ended December 31, 2015 (in millions)	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income[c]	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate[a]	$ (99)	$ –	$ (99)	$ (44)	$ 55
Foreign exchange[b]	(81)	–	(81)	(53)	28
Total	$ (180)	$ –	$ (180)	$ (97)	$ 83

	Gains/(losses) recorded in income and other comprehensive income/(loss)				
Year ended December 31, 2014 (in millions)	Derivatives – effective portion reclassified from AOCI to income	Hedge ineffectiveness recorded directly in income[c]	Total income statement impact	Derivatives – effective portion recorded in OCI	Total change in OCI for period
Contract type					
Interest rate[a]	$ (54)	$ –	$ (54)	$ 189	$ 243
Foreign exchange[b]	78	–	78	(91)	(169)
Total	$ 24	$ –	$ 24	$ 98	$ 74

(a) Primarily consists of benchmark interest rate hedges of LIBOR-indexed floating-rate assets and floating-rate liabilities. Gains and losses were recorded in net interest income, and for the forecasted transactions that the Firm determined during the year ended December 31, 2015, were probable of not occurring, in other income.

(b) Primarily consists of hedges of the foreign currency risk of non-U.S. dollar-denominated revenue and expense. The income statement classification of gains and losses follows the hedged item – primarily noninterest revenue and compensation expense.

(c) Hedge ineffectiveness is the amount by which the cumulative gain or loss on the designated derivative instrument exceeds the present value of the cumulative expected change in cash flows on the hedged item attributable to the hedged risk.

The Firm did not experience any forecasted transactions that failed to occur for the years ended 2016 and 2014. In 2015, the Firm reclassified approximately $150 million of net losses from AOCI to other income because the Firm determined that it was probable that the forecasted interest payment cash flows would not occur as a result of the planned reduction in wholesale non-operating deposits.

Over the next 12 months, the Firm expects that approximately $151 million (after-tax) of net losses recorded in AOCI at December 31, 2016, related to cash flow hedges will be recognized in income. For terminated cash flow hedges, the maximum length of time over which forecasted transactions are remaining is approximately six years. For open cash flow hedges, the maximum length of time over which forecasted transactions are hedged is approximately one year. The Firm's longer-dated forecasted transactions relate to core lending and borrowing activities.

Net investment hedge gains and losses

The following table presents hedging instruments, by contract type, that were used in net investment hedge accounting relationships, and the pre-tax gains/(losses) recorded on such instruments for the years ended December 31, 2016, 2015 and 2014.

	Gains/(losses) recorded in income and other comprehensive income/(loss)					
	2016		2015		2014	
Year ended December 31, (in millions)	Excluded components recorded directly in income[(a)]	Effective portion recorded in OCI	Excluded components recorded directly in income[(a)]	Effective portion recorded in OCI	Excluded components recorded directly in income[(a)]	Effective portion recorded in OCI
Foreign exchange derivatives	**$(282)**	**$262**	$(379)	$1,885	$(448)	$1,698

(a) Certain components of hedging derivatives are permitted to be excluded from the assessment of hedge effectiveness, such as forward points on foreign exchange forward contracts. Amounts related to excluded components are recorded in other income. The Firm measures the ineffectiveness of net investment hedge accounting relationships based on changes in spot foreign currency rates and, therefore, there was no significant ineffectiveness for net investment hedge accounting relationships during 2016, 2015 and 2014.

Gains and losses on derivatives used for specified risk management purposes

The following table presents pre-tax gains/(losses) recorded on a limited number of derivatives, not designated in hedge accounting relationships, that are used to manage risks associated with certain specified assets and liabilities, including certain risks arising from the mortgage pipeline, warehouse loans, MSRs, wholesale lending exposures, foreign currency denominated assets and liabilities, and commodities-related contracts and investments.

	Derivatives gains/(losses) recorded in income		
Year ended December 31, (in millions)	**2016**	2015	2014
Contract type			
Interest rate[(a)]	**$ 1,174**	$ 853	$ 2,308
Credit[(b)]	**(282)**	70	(58)
Foreign exchange[(c)]	**27**	25	(7)
Commodity[(d)]	**–**	(12)	156
Total	**$ 919**	$ 936	$ 2,399

(a) Primarily represents interest rate derivatives used to hedge the interest rate risk inherent in the mortgage pipeline, warehouse loans and MSRs, as well as written commitments to originate warehouse loans. Gains and losses were recorded predominantly in mortgage fees and related income.

(b) Relates to credit derivatives used to mitigate credit risk associated with lending exposures in the Firm's wholesale businesses. These derivatives do not include credit derivatives used to mitigate counterparty credit risk arising from derivative receivables, which is included in gains and losses on derivatives related to market-making activities and other derivatives. Gains and losses were recorded in principal transactions revenue.

(c) Primarily relates to derivatives used to mitigate foreign exchange risk of specified foreign currency-denominated assets and liabilities. Gains and losses were recorded in principal transactions revenue.

(d) Primarily relates to commodity derivatives used to mitigate energy price risk associated with energy-related contracts and investments. Gains and losses were recorded in principal transactions revenue.

Gains and losses on derivatives related to market-making activities and other derivatives

The Firm makes markets in derivatives in order to meet the needs of customers and uses derivatives to manage certain risks associated with net open risk positions from its market-making activities, including the counterparty credit risk arising from derivative receivables. All derivatives not included in the hedge accounting or specified risk management categories above are included in this category. Gains and losses on these derivatives are primarily recorded in principal transactions revenue. See Note 7 for information on principal transactions revenue.

Credit derivatives

Credit derivatives are financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) and which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Credit derivatives expose the protection purchaser to the creditworthiness of the protection seller, as the protection seller is required to make payments under the contract when the reference entity experiences a credit event, such as a bankruptcy, a failure to pay its obligation or a restructuring. The seller of credit protection receives a premium for providing protection but has the risk that the underlying instrument referenced in the contract will be subject to a credit event.

The Firm is both a purchaser and seller of protection in the credit derivatives market and uses these derivatives for two primary purposes. First, in its capacity as a market-maker, the Firm actively manages a portfolio of credit derivatives by purchasing and selling credit protection, predominantly on corporate debt obligations, to meet the needs of customers. Second, as an end-user, the Firm uses credit derivatives to manage credit risk associated with lending exposures (loans and unfunded commitments) and derivatives counterparty exposures in the Firm's wholesale businesses, and to manage the credit risk arising from certain financial instruments in the Firm's market-making businesses. Following is a summary of various types of credit derivatives.

Credit default swaps

Credit derivatives may reference the credit of either a single reference entity ("single-name") or a broad-based index. The Firm purchases and sells protection on both single-name and index-reference obligations. Single-name CDS and index CDS contracts are either OTC or OTC-cleared derivative contracts. Single-name CDS are used to manage the default risk of a single reference entity, while index CDS contracts are used to manage the credit risk associated with the broader credit markets or credit market segments. Like the S&P 500 and other market indices, a CDS index consists of a portfolio of CDS across many reference entities. New series of CDS indices are periodically established with a new underlying portfolio of reference entities to reflect changes in the credit markets. If one of the reference entities in the index experiences a credit event, then the reference entity that defaulted is removed from the index. CDS can also be referenced against specific portfolios of reference names or against customized exposure levels based on specific client demands: for example, to provide protection against the first $1 million of realized credit losses in a $10 million portfolio of exposure. Such structures are commonly known as tranche CDS.

For both single-name CDS contracts and index CDS contracts, upon the occurrence of a credit event, under the terms of a CDS contract neither party to the CDS contract has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value of the reference obligation at settlement of the credit derivative contract, also known as the recovery value. The protection purchaser does not need to hold the debt instrument of the underlying reference entity in order to receive amounts due under the CDS contract when a credit event occurs.

Credit-related notes

A credit-related note is a funded credit derivative where the issuer of the credit-related note purchases from the note investor credit protection on a reference entity or an index. Under the contract, the investor pays the issuer the par value of the note at the inception of the transaction, and in return, the issuer pays periodic payments to the investor, based on the credit risk of the referenced entity. The issuer also repays the investor the par value of the note at maturity unless the reference entity (or one of the entities that makes up a reference index) experiences a specified credit event. If a credit event occurs, the issuer is not obligated to repay the par value of the note, but rather, the issuer pays the investor the difference between the par value of the note and the fair value of the defaulted reference obligation at the time of settlement. Neither party to the credit-related note has recourse to the defaulting reference entity.

The following tables present a summary of the notional amounts of credit derivatives and credit-related notes the Firm sold and purchased as of December 31, 2016 and 2015. Upon a credit event, the Firm as a seller of protection would typically pay out only a percentage of the full notional amount of net protection sold, as the amount actually required to be paid on the contracts takes into account the recovery value of the reference obligation at the time of settlement. The Firm manages the credit risk on contracts to sell protection by purchasing protection with identical or similar underlying reference entities. Other purchased protection referenced in the following tables includes credit derivatives bought on related, but not identical, reference positions (including indices, portfolio coverage and other reference points) as well as protection purchased through credit-related notes.

The Firm does not use notional amounts of credit derivatives as the primary measure of risk management for such derivatives, because the notional amount does not take into account the probability of the occurrence of a credit event, the recovery value of the reference obligation, or related cash instruments and economic hedges, each of which reduces, in the Firm's view, the risks associated with such derivatives.

Total credit derivatives and credit-related notes

	Maximum payout/Notional amount			
December 31, 2016 (in millions)	Protection sold	Protection purchased with identical underlyings[b]	Net protection (sold)/ purchased[c]	Other protection purchased[d]
Credit derivatives				
Credit default swaps	**$ (961,003)**	**$ 974,252**	**$ 13,249**	**$ 7,935**
Other credit derivatives[a]	**(36,829)**	**31,859**	**(4,970)**	**19,991**
Total credit derivatives	**(997,832)**	**1,006,111**	**8,279**	**27,926**
Credit-related notes	**(41)**	**–**	**(41)**	**4,505**
Total	**$ (997,873)**	**$ 1,006,111**	**$ 8,238**	**$ 32,431**

	Maximum payout/Notional amount			
December 31, 2015 (in millions)	Protection sold	Protection purchased with identical underlyings[b]	Net protection (sold)/ purchased[c]	Other protection purchased[d]
Credit derivatives				
Credit default swaps	$ (1,386,071)	$ 1,402,201	$ 16,130	$ 12,011
Other credit derivatives[a]	(42,738)	38,158	(4,580)	18,792
Total credit derivatives	(1,428,809)	1,440,359	11,550	30,803
Credit-related notes	(30)	–	(30)	4,715
Total	$ (1,428,839)	$ 1,440,359	$ 11,520	$ 35,518

(a) Other credit derivatives largely consists of credit swap options.
(b) Represents the total notional amount of protection purchased where the underlying reference instrument is identical to the reference instrument on protection sold; the notional amount of protection purchased for each individual identical underlying reference instrument may be greater or lower than the notional amount of protection sold.
(c) Does not take into account the fair value of the reference obligation at the time of settlement, which would generally reduce the amount the seller of protection pays to the buyer of protection in determining settlement value.
(d) Represents protection purchased by the Firm on referenced instruments (single-name, portfolio or index) where the Firm has not sold any protection on the identical reference instrument.

The following tables summarize the notional amounts by the ratings, maturity profile, and total fair value, of credit derivatives and credit-related notes as of December 31, 2016 and 2015, where JPMorgan Chase is the seller of protection. The maturity profile is based on the remaining contractual maturity of the credit derivative contracts. The ratings profile is based on the rating of the reference entity on which the credit derivative contract is based. The ratings and maturity profile of credit derivatives and credit-related notes where JPMorgan Chase is the purchaser of protection are comparable to the profile reflected below.

Protection sold – credit derivatives and credit-related notes ratings[a]/maturity profile

December 31, 2016 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables[b]	Fair value of payables[b]	Net fair value
Risk rating of reference entity							
Investment-grade	**$ (273,688)**	**$ (383,586)**	**$ (39,281)**	**$ (696,555)**	**$ 7,841**	**$ (3,055)**	**$ 4,786**
Noninvestment-grade	**(107,955)**	**(170,046)**	**(23,317)**	**(301,318)**	**8,184**	**(8,570)**	**(386)**
Total	**$ (381,643)**	**$ (553,632)**	**$ (62,598)**	**$ (997,873)**	**$ 16,025**	**$ (11,625)**	**$ 4,400**

December 31, 2015 (in millions)	<1 year	1–5 years	>5 years	Total notional amount	Fair value of receivables[b]	Fair value of payables[b]	Net fair value
Risk rating of reference entity							
Investment-grade	$ (307,211)	$ (699,227)	$ (46,970)	$ (1,053,408)	$ 13,539	$ (6,836)	$ 6,703
Noninvestment-grade	(109,195)	(245,151)	(21,085)	(375,431)	10,823	(18,891)	(8,068)
Total	$ (416,406)	$ (944,378)	$ (68,055)	$ (1,428,839)	$ 24,362	$ (25,727)	$ (1,365)

(a) The ratings scale is primarily based on external credit ratings defined by S&P and Moody's.
(b) Amounts are shown on a gross basis, before the benefit of legally enforceable master netting agreements and cash collateral received by the Firm.

Note 7 – Noninterest revenue

Investment banking fees

The following table presents the components of investment banking fees.

Year ended December 31, (in millions)	2016	2015	2014
Underwriting			
Equity	**$ 1,146**	$ 1,408	$ 1,571
Debt	**3,207**	3,232	3,340
Total underwriting	**4,353**	4,640	4,911
Advisory	**2,095**	2,111	1,631
Total investment banking fees	**$ 6,448**	$ 6,751	$ 6,542

Underwriting fees are recognized as revenue when the Firm has rendered all services to, and is entitled to collect the fee from, the issuer, and there are no other contingencies associated with the fee. Underwriting fees are net of syndicate expense; the Firm recognizes credit arrangement and syndication fees as revenue after satisfying certain retention, timing and yield criteria. Advisory fees are recognized as revenue when the related services have been performed and the fee has been earned.

Principal transactions

Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of the realized (as a result of closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a) certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives. For further information on the income statement classification of gains and losses from derivatives activities, see Note 6.

In the financial commodity markets, the Firm transacts in OTC derivatives (e.g., swaps, forwards, options) and ETD that reference a wide range of underlying commodities. In the physical commodity markets, the Firm primarily purchases and sells precious and base metals and may hold other commodities inventories under financing and other arrangements with clients.

The following table presents all realized and unrealized gains and losses recorded in principal transactions revenue. This table excludes interest income and interest expense on trading assets and liabilities, which are an integral part of the overall performance of the Firm's client-driven market-making activities. See Note 8 for further information on interest income and interest expense. Trading revenue is presented primarily by instrument type. The Firm's client-driven market-making businesses generally utilize a variety of instrument types in connection with their market-making and related risk-management activities; accordingly, the trading revenue presented in the table below is not representative of the total revenue of any individual line of business.

Year ended December 31, (in millions)	2016	2015	2014
Trading revenue by instrument type			
Interest rate	**$ 2,325**	$ 1,933	$ 1,362
Credit	**2,096**	1,735	1,880
Foreign exchange	**2,827**	2,557	1,556
Equity	**2,994**	2,990	2,563
Commodity	**1,067**	842	1,663
Total trading revenue	**11,309**	10,057	9,024
Private equity gains[(a)]	**257**	351	1,507
Principal transactions	**$ 11,566**	$ 10,408	$ 10,531

(a) Includes revenue on private equity investments held in the Private Equity business within Corporate, as well as those held in other business segments.

Lending- and deposit-related fees

The following table presents the components of lending- and deposit-related fees.

Year ended December 31, (in millions)	2016	2015	2014
Lending-related fees	**$ 1,114**	$ 1,148	$ 1,307
Deposit-related fees	**4,660**	4,546	4,494
Total lending- and deposit-related fees	**$ 5,774**	$ 5,694	$ 5,801

Lending-related fees include fees earned from loan commitments, standby letters of credit, financial guarantees, and other loan-servicing activities. Deposit-related fees include fees earned in lieu of compensating balances, and fees earned from performing cash management activities and other deposit account services. Lending- and deposit-related fees in this revenue category are recognized over the period in which the related service is provided.

Asset management, administration and commissions
The following table presents Firmwide asset management, administration and commissions income:

Year ended December 31, (in millions)	2016	2015	2014
Asset management fees			
Investment management fees[(a)]	**$ 8,865**	$ 9,403	$ 9,169
All other asset management fees[(b)]	**336**	352	477
Total asset management fees	**9,201**	9,755	9,646
Total administration fees[(c)]	**1,915**	2,015	2,179
Commissions and other fees			
Brokerage commissions	**2,151**	2,304	2,270
All other commissions and fees	**1,324**	1,435	1,836
Total commissions and fees	**3,475**	3,739	4,106
Total asset management, administration and commissions	**$ 14,591**	$ 15,509	$ 15,931

(a) Represents fees earned from managing assets on behalf of the Firm's clients, including investors in Firm-sponsored funds and owners of separately managed investment accounts.
(b) Represents fees for services that are ancillary to investment management services, such as commissions earned on the sales or distribution of mutual funds to clients.
(c) Predominantly includes fees for custody, securities lending, funds services and securities clearance.

This revenue category includes fees from investment management and related services, custody and brokerage services, insurance premiums and commissions, and fees from other products and services. These fees are recognized over the period in which the related product or service is provided. Performance-based fees, which are earned based on exceeding certain benchmarks or other performance targets, are accrued and recognized at the end of the performance period in which the target is met. The Firm has contractual arrangements with third parties to provide certain services in connection with its asset management activities. Amounts paid to third-party service providers are predominantly expensed, such that asset management fees are recorded gross of payments made to third parties.

Mortgage fees and related income
This revenue category primarily reflects CCB's Mortgage Banking production and servicing revenue, including fees and income derived from mortgages originated with the intent to sell; mortgage sales and servicing including losses related to the repurchase of previously sold loans; the impact of risk-management activities associated with the mortgage pipeline, warehouse loans and MSRs; and revenue related to any residual interests held from mortgage securitizations. This revenue category also includes gains and losses on sales and lower of cost or fair value adjustments for mortgage loans held-for-sale, as well as changes in fair value for mortgage loans originated with the intent to sell and measured at fair value under the fair value option. Changes in the fair value of MSRs are reported in mortgage fees and related income. For a further discussion of MSRs, see Note 17. Net interest income from mortgage loans is recorded in interest income.

Card income
This revenue category includes interchange income from credit and debit cards and net fees earned from processing card transactions for merchants. Card income is recognized as earned. Costs related to rewards programs are recorded when the rewards are earned by the customer and presented as a reduction to interchange income. Annual fees and direct loan origination costs are deferred and recognized on a straight-line basis over a 12-month period.

Credit card revenue sharing agreements
The Firm has contractual agreements with numerous co-brand partners which grant the Firm exclusive rights to market to the customers or members of such partners. These partners endorse the credit card programs and provide their customer or member lists to the Firm, and they may also conduct marketing activities and provide awards under the various credit card programs. The terms of these agreements generally range from five to ten years.

The Firm typically makes incentive payments to the partners based on new account originations, sales volumes and the cost of the partners' marketing activities and awards. Payments based on new account originations are accounted for as direct loan origination costs. Payments to partners based on sales volumes are deducted from interchange income as the related revenue is earned. Payments based on marketing efforts undertaken by the partners are expensed by the Firm as incurred and reported as noninterest expense.

Other income
Other income on the Firm's Consolidated statements of income included the following:

Year ended December 31, (in millions)	2016	2015	2014
Operating lease income	**$ 2,724**	$ 2,081	$ 1,699

Operating lease income is recognized on a straight-line basis over the lease term.

Note 8 – Interest income and Interest expense

Interest income and interest expense are recorded in the Consolidated statements of income and classified based on the nature of the underlying asset or liability.

The following table presents the components of interest income and interest expense:

Year ended December 31, (in millions)	2016	2015	2014
Interest income			
Loans[(a)]	$ 36,634	$ 33,134	$ 32,218
Taxable securities	5,538	6,550	7,617
Non taxable securities[(b)]	1,766	1,706	1,423
Total securities	7,304	8,256	9,040
Trading assets	7,292	6,621	7,312
Federal funds sold and securities purchased under resale agreements	2,265	1,592	1,642
Securities borrowed[(c)]	(332)	(532)	(501)
Deposits with banks	1,863	1,250	1,157
Other assets[(d)]	875	652	663
Total interest income	$ 55,901	$ 50,973	$ 51,531
Interest expense			
Interest bearing deposits	$ 1,356	$ 1,252	$ 1,633
Federal funds purchased and securities loaned or sold under repurchase agreements	1,089	609	604
Commercial paper	135	110	134
Trading liabilities - debt, short-term and other liabilities[(e)]	1,170	622	712
Long-term debt	5,564	4,435	4,409
Beneficial interest issued by consolidated VIEs	504	435	405
Total interest expense	$ 9,818	$ 7,463	$ 7,897
Net interest income	$ 46,083	$ 43,510	$ 43,634
Provision for credit losses	5,361	3,827	3,139
Net interest income after provision for credit losses	$ 40,722	$ 39,683	$ 40,495

(a) Includes the amortization of purchase price discounts or premiums, as well as net deferred loan fees or costs.
(b) Represents securities that are tax exempt for U.S. federal income tax purposes.
(c) Securities borrowed's negative interest income, for the years ended December 31, 2016, 2015 and 2014, is a result of client-driven demand for certain securities combined with the impact of low interest rates; this is matched book activity and the negative interest expense on the corresponding securities loaned is recognized in interest expense.
(d) Largely margin loans.
(e) Includes brokerage customer payables.

Interest income and interest expense includes the current-period interest accruals for financial instruments measured at fair value, except for derivatives and financial instruments containing embedded derivatives that would be separately accounted for in accordance with U.S. GAAP, absent the fair value option election; for those instruments, all changes in fair value including any interest elements, are reported in principal transactions revenue. For financial instruments that are not measured at fair value, the related interest is included within interest income or interest expense, as applicable.

Note 9 – Pension and other postretirement employee benefit plans

The Firm has various defined benefit pension plans and OPEB plans that provide benefits to its employees. These plans are discussed below.

Defined benefit pension plans

The Firm has a qualified noncontributory U.S. defined benefit pension plan that provides benefits to substantially all U.S. employees. The U.S. plan employs a cash balance formula in the form of pay and interest credits to determine the benefits to be provided at retirement, based on years of service and eligible compensation (generally base salary/regular pay and variable cash incentive compensation capped at $100,000 annually). Employees begin to accrue plan benefits after completing one year of service, and benefits generally vest after three years of service. The Firm also offers benefits through defined benefit pension plans to qualifying employees in certain non-U.S. locations based on factors such as eligible compensation, age and/or years of service.

It is the Firm's policy to fund the pension plans in amounts sufficient to meet the requirements under applicable laws. The Firm does not anticipate at this time any contribution to the U.S. defined benefit pension plan in 2017. The 2017 contributions to the non-U.S. defined benefit pension plans are expected to be $44 million of which $28 million are contractually required.

JPMorgan Chase also has a number of defined benefit pension plans that are not subject to Title IV of the Employee Retirement Income Security Act. The most significant of these plans is the Excess Retirement Plan, pursuant to which certain employees previously earned pay credits on compensation amounts above the maximum stipulated by law under a qualified plan; no further pay credits are allocated under this plan. The Excess Retirement Plan had an unfunded projected benefit obligation ("PBO") in the amount of $215 million and $237 million, at December 31, 2016 and 2015, respectively.

Defined contribution plans

JPMorgan Chase currently provides two qualified defined contribution plans in the U.S. and other similar arrangements in certain non-U.S. locations, all of which are administered in accordance with applicable local laws and regulations. The most significant of these plans is the JPMorgan Chase 401(k) Savings Plan (the "401(k) Savings Plan"), which covers substantially all U.S. employees. Employees can contribute to the 401(k) Savings Plan on a pretax and/or Roth 401(k) after-tax basis. The JPMorgan Chase Common Stock Fund, which is an investment option under the 401(k) Savings Plan, is a nonleveraged employee stock ownership plan.

The Firm matches eligible employee contributions up to 5% of eligible compensation (generally base salary/regular pay and variable cash incentive compensation) on an annual basis. Employees begin to receive matching contributions after completing a one-year-of-service requirement. Employees with total annual cash compensation of $250,000 or more are not eligible for matching contributions. Matching contributions vest after three years of service. The 401(k) Savings Plan also permits discretionary profit-sharing contributions by participating companies for certain employees, subject to a specified vesting schedule.

OPEB plans

JPMorgan Chase offers postretirement medical and life insurance benefits to certain retirees and postretirement medical benefits to qualifying U.S. employees. These benefits vary with the length of service and the date of hire and provide for limits on the Firm's share of covered medical benefits. The medical and life insurance benefits are both contributory. Effective January 1, 2015, there was a transition of certain Medicare eligible retirees from JPMorgan Chase group sponsored coverage to Medicare exchanges. As a result of this change, eligible retirees will receive a Healthcare Reimbursement Account amount each year if they enroll through the Medicare exchange. The impact of this change was not material. Postretirement medical benefits also are offered to qualifying U.K. employees.

JPMorgan Chase's U.S. OPEB obligation is funded with corporate-owned life insurance ("COLI") purchased on the lives of eligible employees and retirees. While the Firm owns the COLI policies, COLI proceeds (death benefits, withdrawals and other distributions) may be used only to reimburse the Firm for its net postretirement benefit claim payments and related administrative expense. The U.K. OPEB plan is unfunded.

The following table presents the changes in benefit obligations, plan assets and funded status amounts reported on the Consolidated balance sheets for the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans.

As of or for the year ended December 31,	Defined benefit pension plans					
	U.S.		Non-U.S.		OPEB plans[(d)]	
(in millions)	**2016**	2015	**2016**	2015	**2016**	2015
Change in benefit obligation						
Benefit obligation, beginning of year	**$ (11,912)**	$(12,536)	**$ (3,347)**	$ (3,640)	**$ (744)**	$ (842)
Benefits earned during the year	**(296)**	(340)	**(36)**	(37)	**—**	(1)
Interest cost on benefit obligations	**(530)**	(498)	**(99)**	(112)	**(31)**	(31)
Special termination benefits	**—**	—	**—**	(1)	**—**	—
Employee contributions	**NA**	NA	**(7)**	(7)	**(19)**	(25)
Net gain/(loss)	**(203)**	702	**(540)**	146	**4**	71
Benefits paid	**725**	760	**126**	120	**76**	88
Plan settlements	**—**	—	**21**	—	**—**	—
Expected Medicare Part D subsidy receipts	**NA**	NA	**NA**	NA	**—**	(6)
Foreign exchange impact and other	**—**	—	**504**	184	**6**	2
Benefit obligation, end of year	**$ (12,216)**	$(11,912)	**$ (3,378)**	$ (3,347)	**$ (708)**	$ (744)
Change in plan assets						
Fair value of plan assets, beginning of year	**$ 14,125**	$ 14,623	**$ 3,511**	$ 3,718	**$ 1,855**	$ 1,903
Actual return on plan assets	**838**	231	**537**	52	**131**	13
Firm contributions	**34**	31	**52**	45	**2**	2
Employee contributions	**—**	—	**7**	7	**—**	—
Benefits paid	**(725)**	(760)	**(126)**	(120)	**(32)**	(63)
Plan settlements	**—**	—	**(21)**	—	**—**	—
Foreign exchange impact and other	**—**	—	**(529)**	(191)	**—**	—
Fair value of plan assets, end of year	**$ 14,272**	$ 14,125 [(b)(c)]	**$ 3,431**	$ 3,511	**$ 1,956**	$ 1,855
Net funded status[(a)]	**$ 2,056**	$ 2,213	**$ 53**	$ 164	**$ 1,248**	$ 1,111
Accumulated benefit obligation, end of year	**$ (12,062)**	$(11,774)	**$ (3,359)**	$ (3,322)	**NA**	NA

(a) Represents plans with an aggregate overfunded balance of $4.0 billion and $4.1 billion at December 31, 2016 and 2015, respectively, and plans with an aggregate underfunded balance of $639 million and $636 million at December 31, 2016 and 2015, respectively.
(b) At December 31, 2016 and 2015, approximately $390 million and $533 million, respectively, of U.S. plan assets included participation rights under participating annuity contracts.
(c) At December 31, 2016 and 2015, defined benefit pension plan amounts that were not measured at fair value included $130 million and $74 million, respectively, of accrued receivables, and $224 million and $123 million, respectively, of accrued liabilities, for U.S. plans.
(d) Includes an unfunded accumulated postretirement benefit obligation of $35 million and $32 million at December 31, 2016 and 2015, respectively, for the U.K. plan.

Gains and losses

For the Firm's defined benefit pension plans, fair value is used to determine the expected return on plan assets. Amortization of net gains and losses is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the PBO or the fair value of the plan assets. Any excess is amortized over the average future service period of defined benefit pension plan participants, which for the U.S. defined benefit pension plan is currently seven years and for the non-U.S. defined benefit pension plans is the period appropriate for the affected plan. In addition, prior service costs are amortized over the average remaining service period of active employees expected to receive benefits under the plan when the prior service cost is first recognized. The average remaining amortization period for the U.S. defined benefit pension plan for current prior service costs is three years.

For the Firm's OPEB plans, a calculated value that recognizes changes in fair value over a five-year period is used to determine the expected return on plan assets. This value is referred to as the market related value of assets. Amortization of net gains and losses, adjusted for gains and losses not yet recognized, is included in annual net periodic benefit cost if, as of the beginning of the year, the net gain or loss exceeds 10% of the greater of the accumulated postretirement benefit obligation or the market related value of assets. Any excess net gain or loss is amortized over the average expected lifetime of retired participants, which is currently twelve years; however, prior service costs resulting from plan changes are amortized over the average years of service remaining to full eligibility age, which is currently two years.

The following table presents pretax pension and OPEB amounts recorded in AOCI.

December 31, (in millions)	Defined benefit pension plans U.S. 2016	U.S. 2015	Non-U.S. 2016	Non-U.S. 2015	OPEB plans 2016	OPEB plans 2015
Net gain/(loss)	**$ (3,116)**	$ (3,096)	**$ (551)**	$ (513)	**$ 138**	$ 109
Prior service credit/(cost)	**34**	68	**8**	9	**–**	–
Accumulated other comprehensive income/(loss), pretax, end of year	**$ (3,082)**	$ (3,028)	**$ (543)**	$ (504)	**$ 138**	$ 109

The following table presents the components of net periodic benefit costs reported in the Consolidated statements of income and other comprehensive income for the Firm's U.S. and non-U.S. defined benefit pension, defined contribution and OPEB plans.

Year ended December 31, (in millions)	Pension plans U.S. 2016	U.S. 2015	U.S. 2014	Non-U.S. 2016	Non-U.S. 2015	Non-U.S. 2014	OPEB plans 2016	OPEB plans 2015	OPEB plans 2014
Components of net periodic benefit cost									
Benefits earned during the year	**$ 296**	$ 340	$ 281	**$ 36**	$ 37	$ 33	**$ –**	$ 1	$ –
Interest cost on benefit obligations	**530**	498	534	**99**	112	137	**31**	31	38
Expected return on plan assets	**(891)**	(929)	(985)	**(139)**	(150)	(172)	**(105)**	(106)	(101)
Amortization:									
Net (gain)/loss	**235**	247	25	**22**	35	47	**–**	–	–
Prior service cost/(credit)	**(34)**	(34)	(41)	**(2)**	(2)	(2)	**–**	–	(1)
Special termination benefits	**–**	–	–	**–**	1	–	**–**	–	–
Settlement loss	**–**	–	–	**4**	–	–	**–**	–	–
Net periodic defined benefit cost	**136**	122	(186)	**20**	33	43	**(74)**	(74)	(64)
Other defined benefit pension plans[a]	**14**	14	14	**11**	10	6	**NA**	NA	NA
Total defined benefit plans	**150**	136	(172)	**31**	43	49	**(74)**	(74)	(64)
Total defined contribution plans	**473**	449	438	**316**	320	329	**NA**	NA	NA
Total pension and OPEB cost included in compensation expense	**$ 623**	$ 585	$ 266	**$ 347**	$ 363	$ 378	**$ (74)**	$ (74)	$ (64)
Changes in plan assets and benefit obligations recognized in other comprehensive income									
Net (gain)/loss arising during the year	**$ 255**	$ (3)	$ 1,645	**$ 140**	$ (47)	$ 57	**$ (29)**	$ 21	$ (5)
Prior service credit arising during the year	**–**	–	53	**–**	–	–	**–**	–	–
Amortization of net loss	**(235)**	(247)	(25)	**(22)**	(35)	(47)	**–**	–	–
Amortization of prior service (cost)/credit	**34**	34	41	**2**	2	2	**–**	–	1
Settlement loss	**–**	–	–	**(4)**	–	–	**–**	–	–
Foreign exchange impact and other	**–**	–	–	**(77)** [a]	(33) [a]	(39) [a]	**–**	–	–
Total recognized in other comprehensive income	**$ 54**	$ (216)	$ 1,714	**$ 39**	$ (113)	$ (27)	**$ (29)**	$ 21	$ (4)
Total recognized in net periodic benefit cost and other comprehensive income	**$ 190**	$ (94)	$ 1,528	**$ 59**	$ (80)	$ 16	**$ (103)**	$ (53)	$ (68)

(a) Includes various defined benefit pension plans which are individually immaterial.

The estimated pretax amounts that will be amortized from AOCI into net periodic benefit cost in 2017 are as follows.

	Defined benefit pension plans		OPEB plans	
(in millions)	U.S.	Non-U.S.	U.S.	Non-U.S.
Net loss/(gain)	$ 216	$ 28	$ –	$ –
Prior service cost/(credit)	(34)	(2)	–	–
Total	$ 182	$ 26	$ –	$ –

The following table presents the actual rate of return on plan assets for the U.S. and non-U.S. defined benefit pension and OPEB plans.

	U.S.			Non-U.S.		
Year ended December 31,	**2016**	2015	2014	**2016**	2015	2014
Actual rate of return:						
Defined benefit pension plans	**6.12%**	0.88%	7.29%	**1.07 - 20.60%**	(0.48) - 4.92%	5.62 - 17.69%
OPEB plans	**7.29**	1.16	9.84	**NA**	NA	NA

Plan assumptions

JPMorgan Chase's expected long-term rate of return for U.S. defined benefit pension and OPEB plan assets is a blended average of the investment advisor's projected long-term (10 or more years) returns for the various asset classes, weighted by the asset allocation. Returns on asset classes are developed using a forward-looking approach and are not strictly based on historical returns. Equity returns are generally developed as the sum of inflation, expected real earnings growth and expected long-term dividend yield. Bond returns are generally developed as the sum of inflation, real bond yield and risk spread (as appropriate), adjusted for the expected effect on returns from changing yields. Other asset-class returns are derived from their relationship to the equity and bond markets. Consideration is also given to current market conditions and the short-term portfolio mix of each plan.

For the U.K. defined benefit pension plans, which represent the most significant of the non-U.S. defined benefit pension plans, procedures similar to those in the U.S. are used to develop the expected long-term rate of return on plan assets, taking into consideration local market conditions and the specific allocation of plan assets. The expected long-term rate of return on U.K. plan assets is an average of projected long-term returns for each asset class. The return on equities has been selected by reference to the yield on long-term U.K. government bonds plus an equity risk premium above the risk-free rate. The expected return on "AA" rated long-term corporate bonds is based on an implied yield for similar bonds.

The discount rate used in determining the benefit obligation under the U.S. defined benefit pension and OPEB plans was provided by the Firm's actuaries. This rate was selected by reference to the yields on portfolios of bonds with maturity dates and coupons that closely match each of the plan's projected cash flows; such portfolios are derived from a broad-based universe of high-quality corporate bonds as of the measurement date. In years in which these hypothetical bond portfolios generate excess cash, such excess is assumed to be reinvested at the one-year forward rates implied by the Mercer Yield Curve published as of the measurement date. The discount rate for the U.K. defined benefit pension plan represents a rate of appropriate duration from the analysis of yield curves provided by the Firm's actuaries.

At December 31, 2016, the Firm decreased the discount rates used to determine its benefit obligations for the U.S. defined benefit pension and OPEB plans in light of current market interest rates, which will increase expense by approximately $45 million in 2017. The 2017 expected long-term rate of return on U.S. defined benefit pension plan assets and U.S. OPEB plan assets are 6.00% and 5.00%, respectively. For 2017, the initial health care benefit obligation trend assumption has been set at 5.00%, while the ultimate health care trend assumption and the year to reach the ultimate rate remain at 5.00% and 2017, respectively, unchanged from 2016. As of December 31, 2016, the interest crediting rate assumption remained at 5.00% and the assumed rate of compensation increase was reduced to 2.30%.

The following tables present the weighted-average annualized actuarial assumptions for the projected and accumulated postretirement benefit obligations, and the components of net periodic benefit costs, for the Firm's significant U.S. and non-U.S. defined benefit pension and OPEB plans, as of and for the periods indicated.

Weighted-average assumptions used to determine benefit obligations

	U.S.		Non-U.S.	
December 31,	**2016**	2015	**2016**	2015
Discount rate:				
Defined benefit pension plans	**4.30%**	4.50%	**0.60 – 2.60%**	0.80 – 3.70%
OPEB plans	**4.20**	4.40	**—**	—
Rate of compensation increase	**2.30**	3.50	**2.25 – 3.00**	2.25 – 4.30
Health care cost trend rate:				
Assumed for next year	**5.00**	5.50	**—**	—
Ultimate	**5.00**	5.00	**—**	—
Year when rate will reach ultimate	**2017**	2017	**—**	—

Weighted-average assumptions used to determine net periodic benefit costs

	U.S.			Non-U.S.		
Year ended December 31,	**2016**	2015	2014	**2016**	2015	2014
Discount rate:						
Defined benefit pension plans	**4.50%**	4.00%	5.00%	**0.90 – 3.70%**	1.00 – 3.60%	1.10 – 4.40%
OPEB plans	**4.40**	4.10	4.90	**—**	—	—
Expected long-term rate of return on plan assets:						
Defined benefit pension plans	**6.50**	6.50	7.00	**0.80 – 4.60**	0.90 – 4.80	1.20 – 5.30
OPEB plans	**5.75**	6.00	6.25	**NA**	NA	NA
Rate of compensation increase	**3.50**	3.50	3.50	**2.25 – 4.30**	2.75 – 4.20	2.75 – 4.60
Health care cost trend rate:						
Assumed for next year	**5.50**	6.00	6.50	**—**	—	—
Ultimate	**5.00**	5.00	5.00	**—**	—	—
Year when rate will reach ultimate	**2017**	2017	2017	**—**	—	—

The following table presents the effect of a one-percentage-point change in the assumed health care cost trend rate on JPMorgan Chase's accumulated postretirement benefit obligation. As of December 31, 2016, there was no material effect on total service and interest cost.

Year ended December 31, 2016 (in millions)	1-Percentage point increase	1-Percentage point decrease
Effect on accumulated postretirement benefit obligation	$ 8	$ (7)

JPMorgan Chase's U.S. defined benefit pension and OPEB plan expense is sensitive to the expected long-term rate of return on plan assets and the discount rate. With all other assumptions held constant, a 25-basis point decline in the expected long-term rate of return on U.S. plan assets would result in an aggregate increase of approximately $40 million in 2017 U.S. defined benefit pension and OPEB plan expense. A 25-basis point decline in the discount rate for the U.S. plans would result in an increase in 2017 U.S. defined benefit pension and OPEB plan expense of approximately an aggregate $31 million and an increase in the related benefit obligations of approximately an aggregate $316 million. A 25-basis point decrease in the interest crediting rate for the U.S. defined benefit pension plan would result in a decrease in 2017 U.S. defined benefit pension expense of approximately $36 million and a decrease in the related PBO of approximately $160 million. A 25-basis point decline in the discount rates for the non-U.S. plans would result in an increase in the 2017 non-U.S. defined benefit pension plan expense of approximately $12 million.

Investment strategy and asset allocation

The Firm's U.S. defined benefit pension plan assets are held in trust and are invested in a well-diversified portfolio of equity and fixed income securities, cash and cash equivalents, and alternative investments (e.g., hedge funds, private equity, real estate and real assets). Non-U.S. defined benefit pension plan assets are held in various trusts and are also invested in well-diversified portfolios of equity, fixed income and other securities. Assets of the Firm's COLI policies, which are used to partially fund the U.S. OPEB plan, are held in separate accounts of an insurance company and are allocated to investments intended to replicate equity and fixed income indices.

The investment policy for the Firm's U.S. defined benefit pension plan assets is to optimize the risk-return relationship as appropriate to the needs and goals of the plan using a global portfolio of various asset classes diversified by market segment, economic sector, and issuer. Assets are managed by a combination of internal and external investment managers. Periodically the Firm performs a comprehensive analysis on the U.S. defined benefit pension plan asset allocations, incorporating projected asset and liability data, which focuses on the short- and long-term impact of the asset allocation on cumulative pension expense, economic cost, present value of contributions and funded status. Currently, approved asset allocation ranges are: U.S. equity 0% to 45%, international equity 0% to 40%, debt securities 0% to 80%, hedge funds 0% to 5%, real estate 0% to 10%, real assets 0% to 10% and private equity 0% to 20%. Asset allocations are not managed to a specific target but seek to shift asset class allocations within these stated ranges. Investment strategies incorporate the economic outlook and the anticipated implications of the macroeconomic environment on the various asset classes while maintaining an appropriate level of liquidity for the plan. The Firm regularly reviews the asset allocations and asset managers, as well as other factors that impact the portfolio, which is rebalanced when deemed necessary.

For the U.K. defined benefit pension plans, which represent the most significant of the non-U.S. defined benefit pension plans, the assets are invested to maximize returns subject to an appropriate level of risk relative to the plans' liabilities. To reduce the volatility in returns relative to the plans' liability profiles, the U.K. defined benefit pension plans' largest asset allocations are to debt securities of appropriate durations. Other assets, mainly equity securities, are then invested for capital appreciation, to provide long-term investment growth. Similar to the U.S. defined benefit pension plan, asset allocations and asset managers for the U.K. plans are reviewed regularly and the portfolios are rebalanced when deemed necessary.

Investments held by the U.S. and non-U.S. defined benefit pension and OPEB plans include financial instruments that are exposed to various risks such as market, credit, liquidity and country risks. Exposure to a concentration of credit risk is mitigated by the broad diversification of both U.S. and non-U.S. investment instruments. Additionally, the investments in each of the common/collective trust funds and registered investment companies are further diversified into various financial instruments. As of December 31, 2016, assets held by the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans do not include JPMorgan Chase common stock, except through indirect exposures through investments in third-party stock-index funds. The plans hold investments in funds that are sponsored or managed by affiliates of JPMorgan Chase in the amount of $3.4 billion and $3.2 billion for U.S. plans and $1.2 billion and $1.2 billion for non-U.S. plans, as of December 31, 2016 and 2015, respectively.

The following table presents the weighted-average asset allocation of the fair values of total plan assets at December 31 for the years indicated, as well as the respective approved range/target allocation by asset category, for the Firm's U.S. and non-U.S. defined benefit pension and OPEB plans.

	Defined benefit pension plans								
	U.S.			Non-U.S.			OPEB plans[(c)]		
	Target	% of plan assets		Target	% of plan assets		Target	% of plan assets	
December 31,	Allocation	**2016**	2015	Allocation	**2016**	2015	Allocation	**2016**	2015
Asset category									
Debt securities[(a)]	0-80%	**35%**	32%	59%	**60%**	60%	30-70%	**50%**	50%
Equity securities	0-85	**47**	48	40	**39**	38	30-70	**50**	50
Real estate	0-10	**4**	4	–	**–**	1	–	**–**	–
Alternatives[(b)]	0-35	**14**	16	1	**1**	1	–	**–**	–
Total	100%	**100%**	100%	100%	**100%**	100%	100%	**100%**	100%

(a) Debt securities primarily include corporate debt, U.S. federal, state, local and non-U.S. government, and mortgage-backed securities.
(b) Alternatives primarily include limited partnerships.
(c) Represents the U.S. OPEB plan only, as the U.K. OPEB plan is unfunded.

Fair value measurement of the plans' assets and liabilities

For information on fair value measurements, including descriptions of level 1, 2, and 3 of the fair value hierarchy and the valuation methods employed by the Firm, see Note 3.

Pension and OPEB plan assets and liabilities measured at fair value

December 31, 2016 (in millions)	U.S. defined benefit pension plans Level 1	Level 2	Level 3	Total fair value	Non-U.S. defined benefit pension plans[h] Level 1	Level 2	Total fair value
Cash and cash equivalents	**$ 74**	**$ –**	**$ –**	**$ 74**	**$ 122**	**$ 2**	**$ 124**
Equity securities	**5,178**	**12**	**2**	**5,192**	**980**	**154**	**1,134**
Common/collective trust funds[a]	**266**	**–**	**–**	**266**	**118**	**–**	**118**
Limited partnerships[b]	**62**	**–**	**–**	**62**	**–**	**–**	**–**
Corporate debt securities[c]	**–**	**1,791**	**4**	**1,795**	**–**	**715**	**715**
U.S. federal, state, local and non-U.S. government debt securities	**926**	**234**	**–**	**1,160**	**213**	**570**	**783**
Mortgage-backed securities	**39**	**65**	**–**	**104**	**3**	**10**	**13**
Derivative receivables	**–**	**24**	**–**	**24**	**–**	**219**	**219**
Other[d]	**1,274**	**–**	**390**	**1,664**	**223**	**53**	**276**
Total assets measured at fair value[e]	**$ 7,819**	**$ 2,126**	**$ 396**	**$ 10,341** [f]	**$ 1,659**	**$ 1,723**	**$ 3,382**
Derivative payables	**$ –**	**$ (14)**	**$ –**	**$ (14)**	**$ –**	**$ (194)**	**$ (194)**
Total liabilities measured at fair value	**$ –**	**$ (14)**	**$ –**	**$ (14)** [g]	**$ –**	**$ (194)**	**$ (194)**

December 31, 2015 (in millions)	U.S. defined benefit pension plans Level 1	Level 2	Level 3	Total fair value	Non-U.S. defined benefit pension plans[h] Level 1	Level 2	Total fair value
Cash and cash equivalents	$ 112	$ –	$ –	$ 112	$ 114	$ 1	$ 115
Equity securities	4,826	5	2	4,833	1,002	157	1,159
Common/collective trust funds[a]	339	–	–	339	135	–	135
Limited partnerships[b]	53	–	–	53	–	–	–
Corporate debt securities[c]	–	1,619	2	1,621	–	758	758
U.S. federal, state, local and non-U.S. government debt securities	580	108	–	688	212	504	716
Mortgage-backed securities	–	67	1	68	2	26	28
Derivative receivables	–	104	–	104	–	209	209
Other[d]	1,760	27	534	2,321	257	53	310
Total assets measured at fair value[e]	$ 7,670	$ 1,930	$ 539	$ 10,139 [f]	$ 1,722	$ 1,708	$ 3,430
Derivative payables	$ –	$ (35)	$ –	$ (35)	$ –	$ (153)	$ (153)
Total liabilities measured at fair value	$ –	$ (35)	$ –	$ (35) [g]	$ –	$ (153)	$ (153)

(a) At December 31, 2016 and 2015, common/collective trust funds primarily included a mix of short-term investment funds, domestic and international equity investments (including index) and real estate funds.
(b) Unfunded commitments to purchase limited partnership investments for the plans were $735 million and $895 million for 2016 and 2015, respectively.
(c) Corporate debt securities include debt securities of U.S. and non-U.S. corporations.
(d) Other consists primarily of money market funds and participating and non-participating annuity contracts. Money market funds are primarily classified within level 1 of the fair value hierarchy given they are valued using market observable prices. Participating and non-participating annuity contracts are classified within level 3 of the fair value hierarchy due to a lack of market mechanisms for transferring each policy and surrender restrictions.
(e) Certain investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not required to be classified in the fair value hierarchy. At December 31, 2016 and 2015, the fair values of these investments, which include certain limited partnerships and common/collective trust funds, were $4.0 billion and $4.1 billion, respectively, of U.S. defined benefit pension plan investments, and $243 million and $234 million, respectively, of non-U.S. defined benefit pension plan investments.
(f) At December 31, 2016 and 2015, excluded U.S. defined benefit pension plan receivables for investments sold and dividends and interest receivables of $130 million and $74 million, respectively.
(g) At December 31, 2016 and 2015, excluded $203 million and $106 million, respectively, of U.S. defined benefit pension plan payables for investments purchased; and $21 million and $17 million, respectively, of other liabilities.
(h) There were zero assets or liabilities classified as level 3 for the non-U.S. defined benefit pension plans as of December 31, 2016 and 2015.

The Firm's U.S. OPEB plan was partially funded with COLI policies of $2.0 billion and $1.9 billion at December 31, 2016 and 2015, which were classified in level 3 of the valuation hierarchy.

Changes in level 3 fair value measurements using significant unobservable inputs

Year ended December 31, 2016 (in millions)	Fair value, January 1, 2016	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2016
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	**$ 2**	**$ —**	**$ —**	**$ —**	**$ —**	**$ 2**
Corporate debt securities	**2**	**—**	**—**	**1**	**1**	**4**
Mortgage-backed securities	**1**	**—**	**—**	**(1)**	**—**	**—**
Other	**534**	**—**	**(157)**	**—**	**13**	**390**
Total U.S. defined benefit pension plans	**$ 539**	**$ —**	**$ (157)**	**$ —**	**$ 14**	**$ 396**
OPEB plans						
COLI	**$ 1,855**	**$ —**	**$ 102**	**$ —**	**$ —**	**$ 1,957**
Total OPEB plans	**$ 1,855**	**$ —**	**$ 102**	**$ —**	**$ —**	**$ 1,957**

Year ended December 31, 2015 (in millions)	Fair value, January 1, 2015	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2015
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	$ 4	$ —	$ (2)	$ —	$ —	$ 2
Corporate debt securities	9	—	—	(7)	—	2
Mortgage-backed securities	1	—	—	—	—	1
Other	337	—	197	—	—	534
Total U.S. defined benefit pension plans	$ 351	$ —	$ 195	$ (7)	$ —	$ 539
OPEB plans						
COLI	$ 1,903	$ —	$ (48)	$ —	$ —	$ 1,855
Total OPEB plans	$ 1,903	$ —	$ (48)	$ —	$ —	$ 1,855

Year ended December 31, 2014 (in millions)	Fair value, January 1, 2014	Actual return on plan assets		Purchases, sales and settlements, net	Transfers in and/or out of level 3	Fair value, December 31, 2014
		Realized gains/(losses)	Unrealized gains/(losses)			
U.S. defined benefit pension plans						
Equity securities	$ 4	$ —	$ —	$ —	$ —	$ 4
Corporate debt securities	7	(2)	2	4	(2)	9
Mortgage-backed securities	—	—	—	1	—	1
Other	430	—	(93)	—	—	337
Total U.S. defined benefit pension plans	$ 441	$ (2)	$ (91)	$ 5	$ (2)	$ 351
OPEB plans						
COLI	$ 1,749	$ —	$ 154	$ —	$ —	$ 1,903
Total OPEB plans	$ 1,749	$ —	$ 154	$ —	$ —	$ 1,903

Estimated future benefit payments

The following table presents benefit payments expected to be paid, which include the effect of expected future service, for the years indicated. The OPEB medical and life insurance payments are net of expected retiree contributions.

Year ended December 31, (in millions)	U.S. defined benefit pension plans	Non-U.S. defined benefit pension plans	OPEB before Medicare Part D subsidy	Medicare Part D subsidy
2017	$ 766	$ 103	$ 68	$ 1
2018	768	104	65	1
2019	758	107	63	1
2020	765	113	60	1
2021	775	117	58	1
Years 2022–2026	3,961	646	250	2

Note 10 – Employee stock-based incentives

Employee stock-based awards

In 2016, 2015 and 2014, JPMorgan Chase granted long-term stock-based awards to certain employees under its LTIP, as amended and restated effective May 19, 2015. Under the terms of the LTIP, as of December 31, 2016, 78 million shares of common stock were available for issuance through May 2019. The LTIP is the only active plan under which the Firm is currently granting stock-based incentive awards. In the following discussion, the LTIP, plus prior Firm plans and plans assumed as the result of acquisitions, are referred to collectively as the "LTI Plans," and such plans constitute the Firm's stock-based incentive plans.

RSUs are awarded at no cost to the recipient upon their grant. Generally, RSUs are granted annually and vest at a rate of 50% after two years and 50% after three years and are converted into shares of common stock as of the vesting date. In addition, RSUs typically include full-career eligibility provisions, which allow employees to continue to vest upon voluntary termination, subject to post-employment and other restrictions based on age or service-related requirements. All RSU awards are subject to forfeiture until vested and contain clawback provisions that may result in cancellation under certain specified circumstances. RSUs entitle the recipient to receive cash payments equivalent to any dividends paid on the underlying common stock during the period the RSUs are outstanding and, as such, are considered participating securities as discussed in Note 24.

In January 2016, the Firm's Board of Directors approved the grant of performance share units ("PSUs") to members of the Firm's Operating Committee under the variable compensation program for performance year 2015. PSUs are subject to the Firm's achievement of specified performance criteria over a three-year period. The number of awards that vest can range from zero to 150% of the grant amount. The awards vest and are converted into shares of common stock in the quarter after the end of the three-year performance period. In addition, dividends are notionally reinvested in the Firm's common stock and will be delivered only in respect of any earned shares.

Once the PSUs have vested, the shares of common stock that are delivered, after applicable tax withholding, must be held for an additional two-year period, for a total combined vesting and holding period of five years from the grant date.

Under the LTI Plans, stock options and stock appreciation rights ("SARs") have generally been granted with an exercise price equal to the fair value of JPMorgan Chase's common stock on the grant date. The Firm periodically grants employee stock options to individual employees. There were no material grants of stock options or SARs in 2016, 2015 and 2014. SARs generally expire ten years after the grant date.

The Firm separately recognizes compensation expense for each tranche of each award, net of estimated forfeitures, as if it were a separate award with its own vesting date. Generally, for each tranche granted, compensation expense is recognized on a straight-line basis from the grant date until the vesting date of the respective tranche, provided that the employees will not become full-career eligible during the vesting period. For awards with full-career eligibility provisions and awards granted with no future substantive service requirement, the Firm accrues the estimated value of awards expected to be awarded to employees as of the grant date without giving consideration to the impact of post-employment restrictions. For each tranche granted to employees who will become full-career eligible during the vesting period, compensation expense is recognized on a straight-line basis from the grant date until the earlier of the employee's full-career eligibility date or the vesting date of the respective tranche.

The Firm's policy for issuing shares upon settlement of employee stock-based incentive awards is to issue either new shares of common stock or treasury shares. During 2016, 2015 and 2014, the Firm settled all of its employee stock-based awards by issuing treasury shares.

In January 2008, the Firm awarded to its Chairman and Chief Executive Officer up to 2 million SARs. The terms of this award are distinct from, and more restrictive than, other equity grants regularly awarded by the Firm. On July 15, 2014, the Compensation & Management Development Committee and Board of Directors determined that all requirements for the vesting of the 2 million SAR awards had been met and thus, the awards became exercisable. The SARs, which will expire in January 2018, have an exercise price of $39.83 (the price of JPMorgan Chase common stock on the date of grant). The expense related to this award was dependent on changes in fair value of the SARs through July 15, 2014 (the date when the vested number of SARs were determined), and the cumulative expense was recognized ratably over the service period, which was initially assumed to be five years but, effective in the first quarter of 2013, was extended to six and one-half years. The Firm recognized $3 million in compensation expense in 2014 for this award.

RSUs, PSUs, employee stock options and SARs activity

Compensation expense for RSUs and PSUs is measured based on the number of units granted multiplied by the stock price at the grant date, and for employee stock options and SARs, is measured at the grant date using the Black-Scholes valuation model. Compensation expense for these awards is recognized in net income as described previously. The following table summarizes JPMorgan Chase's RSUs, PSUs, employee stock options and SARs activity for 2016.

Year ended December 31, 2016 (in thousands, except weighted-average data, and where otherwise stated)	RSUs/PSUs Number of units	RSUs/PSUs Weighted-average grant date fair value	Options/SARs Number of awards	Options/SARs Weighted-average exercise price	Options/SARs Weighted-average remaining contractual life (in years)	Options/SARs Aggregate intrinsic value
Outstanding, January 1	**85,307**	**$ 54.60**	**43,466**	**$ 43.51**		
Granted	**36,775**	**57.80**	**77**	**72.63**		
Exercised or vested	**(37,121)**	**52.09**	**(12,836)**	**41.55**		
Forfeited	**(3,254)**	**56.45**	**(240)**	**44.28**		
Canceled	**NA**	**NA**	**(200)**	**612.18**		
Outstanding, December 31	**81,707**	**$ 57.15**	**30,267**	**$ 40.65**	**3.9**	**$ 1,378,254**
Exercisable, December 31	**NA**	**NA**	**24,815**	**40.08**	**3.6**	**1,144,937**

The total fair value of RSUs that vested during the years ended December 31, 2016, 2015 and 2014, was $2.2 billion, $2.8 billion and $3.2 billion, respectively. The total intrinsic value of options exercised during the years ended December 31, 2016, 2015 and 2014, was $338 million, $335 million and $539 million, respectively.

Compensation expense

The Firm recognized the following noncash compensation expense related to its various employee stock-based incentive plans in its Consolidated statements of income.

Year ended December 31, (in millions)	2016	2015	2014
Cost of prior grants of RSUs, PSUs and SARs that are amortized over their applicable vesting periods	**$ 1,046**	$ 1,109	$ 1,371
Accrual of estimated costs of stock-based awards to be granted in future periods including those to full-career eligible employees	**894**	878	819
Total noncash compensation expense related to employee stock-based incentive plans	**$ 1,940**	$ 1,987	$ 2,190

At December 31, 2016, approximately $700 million (pretax) of compensation expense related to unvested awards had not yet been charged to net income. That cost is expected to be amortized into compensation expense over a weighted-average period of 1.0 year. The Firm does not capitalize any compensation expense related to share-based compensation awards to employees.

Cash flows and tax benefits

Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital. Income tax benefits related to stock-based incentive arrangements recognized in the Firm's Consolidated statements of income for the years ended December 31, 2016, 2015 and 2014, were $916 million, $746 million and $854 million, respectively.

The following table sets forth the cash received from the exercise of stock options under all stock-based incentive arrangements, and the actual income tax benefit related to tax deductions from the exercise of the stock options.

Year ended December 31, (in millions)	2016	2015	2014
Cash received for options exercised	**$ 26**	$ 20	$ 63
Tax benefit	**70**	64	104

Note 11 – Noninterest expense

For details on noninterest expense, see Consolidated statements of income on page 141. Included within other expense are the following:

Year ended December 31, (in millions)	2016	2015	2014
Legal (benefit)/expense	$ (317)	$ 2,969	$ 2,883
FDIC-related expense	1,296	1,227	1,037

Note 12 – Securities

Securities are classified as trading, AFS or HTM. Securities classified as trading assets are discussed in Note 3. Predominantly all of the Firm's AFS and HTM investment securities (the "investment securities portfolio") are held by Treasury and CIO in connection with its asset-liability management objectives. At December 31, 2016, the investment securities portfolio consisted of debt securities with an average credit rating of AA+ (based upon external ratings where available, and where not available, based primarily upon internal ratings which correspond to ratings as defined by S&P and Moody's). AFS securities are carried at fair value on the Consolidated balance sheets. Unrealized gains and losses, after any applicable hedge accounting adjustments, are reported as net increases or decreases to AOCI. The specific identification method is used to determine realized gains and losses on AFS securities, which are included in securities gains/(losses) on the Consolidated statements of income. HTM debt securities, which management has the intent and ability to hold until maturity, are carried at amortized cost on the Consolidated balance sheets. For both AFS and HTM debt securities, purchase discounts or premiums are generally amortized into interest income over the contractual life of the security.

During 2016, the Firm transferred commercial MBS and obligations of U.S. states and municipalities with a fair value of $7.5 billion from AFS to HTM. These securities were transferred at fair value. AOCI included net pretax unrealized gains of $78 million on the securities at the date of transfer. The transfers reflect the Firm's intent to hold the securities to maturity in order to reduce the impact of price volatility on AOCI. This transfer was a non-cash transaction.

The amortized costs and estimated fair values of the investment securities portfolio were as follows for the dates indicated.

	2016				2015			
December 31, (in millions)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
Available-for-sale debt securities								
Mortgage-backed securities:								
U.S. government agencies[a]	**$ 63,367**	**$ 1,112**	**$ 474**	**$ 64,005**	$ 53,689	$ 1,483	$ 106	$ 55,066
Residential:								
Prime and Alt-A[b]	**4,256**	**38**	**22**	**4,272**	6,594	38	49	6,583
Subprime[b]	**3,915**	**62**	**6**	**3,971**	1,078	9	8	1,079
Non-U.S.	**6,049**	**158**	**7**	**6,200**	19,629	341	13	19,957
Commercial	**9,002**	**122**	**20**	**9,104**	22,990	150	243	22,897
Total mortgage-backed securities	**86,589**	**1,492**	**529**	**87,552**	103,980	2,021	419	105,582
U.S. Treasury and government agencies[a]	**44,822**	**75**	**796**	**44,101**	11,202	–	166	11,036
Obligations of U.S. states and municipalities	**30,284**	**1,492**	**184**	**31,592**	31,328	2,245	23	33,550
Certificates of deposit	**106**	**–**	**–**	**106**	282	1	–	283
Non-U.S. government debt securities	**34,497**	**836**	**45**	**35,288**	35,864	853	41	36,676
Corporate debt securities	**4,916**	**64**	**22**	**4,958**	12,464	142	170	12,436
Asset-backed securities:								
Collateralized loan obligations	**27,352**	**75**	**26**	**27,401**	31,146	52	191	31,007
Other	**6,950**	**62**	**45**	**6,967**	9,125	72	100	9,097
Total available-for-sale debt securities	**235,516**	**4,096**	**1,647**	**237,965**	235,391	5,386	1,110	239,667
Available-for-sale equity securities	**914**	**12**	**–**	**926**	2,067	20	–	2,087
Total available-for-sale securities	**236,430**	**4,108**	**1,647**	**238,891**	237,458	5,406	1,110	241,754
Held-to-maturity debt securities								
Mortgage-backed securities								
U.S. government agencies[c]	**29,910**	**638**	**37**	**30,511**	36,271	852	42	37,081
Commercial	**5,783**	**–**	**129**	**5,654**	–	–	–	–
Total mortgage-backed securities	**35,693**	**638**	**166**	**36,165**	**36,271**	**852**	**42**	**37,081**
Obligations of U.S. states and municipalities	**14,475**	**374**	**125**	**14,724**	12,802	708	4	13,506
Total held-to-maturity debt securities	**50,168**	**1,012**	**291**	**50,889**	**49,073**	**1,560**	**46**	**50,587**
Total securities	**$ 286,598**	**$ 5,120**	**$ 1,938**	**$ 289,780**	**$ 286,531**	**$ 6,966**	**$ 1,156**	**$ 292,341**

(a) Includes total U.S. government-sponsored enterprise obligations with fair values of $45.8 billion and $42.3 billion at December 31, 2016 and 2015, respectively, which were predominantly mortgage-related.

(b) Prior period amounts have been revised to conform with current period presentation.

(c) Included total U.S. government-sponsored enterprise obligations with amortized cost of $25.6 billion and $30.8 billion at December 31, 2016 and 2015, respectively, which were mortgage-related.

Securities impairment

The following tables present the fair value and gross unrealized losses for the investment securities portfolio by aging category at December 31, 2016 and 2015.

	Securities with gross unrealized losses					
	Less than 12 months		12 months or more			
December 31, 2016 (in millions)	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses	Total fair value	Total gross unrealized losses
Available-for-sale debt securities						
Mortgage-backed securities:						
U.S. government agencies	$ 29,856	$ 463	$ 506	$ 11	$ 30,362	$ 474
Residential:						
Prime and Alt-A	977	2	1,018	20	1,995	22
Subprime	396	4	55	2	451	6
Non-U.S.	–	–	886	7	886	7
Commercial	2,328	17	1,078	3	3,406	20
Total mortgage-backed securities	33,557	486	3,543	43	37,100	529
U.S. Treasury and government agencies	23,543	796	–	–	23,543	796
Obligations of U.S. states and municipalities	7,215	181	55	3	7,270	184
Certificates of deposit	–	–	–	–	–	–
Non-U.S. government debt securities	4,436	36	421	9	4,857	45
Corporate debt securities	797	2	829	20	1,626	22
Asset-backed securities:						
Collateralized loan obligations	766	2	5,263	24	6,029	26
Other	739	6	1,992	39	2,731	45
Total available-for-sale debt securities	71,053	1,509	12,103	138	83,156	1,647
Available-for-sale equity securities	–	–	–	–	–	–
Held-to-maturity securities						
Mortgage-backed securities						
U.S. government securities	3,129	37	–	–	3,129	37
Commercial	5,163	114	441	15	5,604	129
Total mortgage-backed securities	8,292	151	441	15	8,733	166
Obligations of U.S. states and municipalities	4,702	125	–	–	4,702	125
Total held-to-maturity securities	12,994	276	441	15	13,435	291
Total securities with gross unrealized losses	$ 84,047	$ 1,785	$ 12,544	$ 153	$ 96,591	$ 1,938

December 31, 2015 (in millions)	Securities with gross unrealized losses					
	Less than 12 months		12 months or more			
	Fair value	Gross unrealized losses	Fair value	Gross unrealized losses	Total fair value	Total gross unrealized losses
Available-for-sale debt securities						
Mortgage-backed securities:						
U.S. government agencies	$ 13,002	$ 95	$ 697	$ 11	$ 13,699	$ 106
Residential:						
Prime and Alt-A[(a)]	4,455	43	238	6	4,693	49
Subprime[(a)]	692	8	–	–	692	8
Non-U.S.	2,021	12	167	1	2,188	13
Commercial	13,779	239	658	4	14,437	243
Total mortgage-backed securities	33,949	397	1,760	22	35,709	419
U.S. Treasury and government agencies	10,998	166	–	–	10,998	166
Obligations of U.S. states and municipalities	1,676	18	205	5	1,881	23
Certificates of deposit	–	–	–	–	–	–
Non-U.S. government debt securities	3,267	26	367	15	3,634	41
Corporate debt securities	3,198	125	848	45	4,046	170
Asset-backed securities:						
Collateralized loan obligations	15,340	67	10,692	124	26,032	191
Other	4,284	60	1,005	40	5,289	100
Total available-for-sale debt securities	72,712	859	14,877	251	87,589	1,110
Available-for-sale equity securities	–	–	–	–	–	–
Held-to-maturity debt securities						
Mortgage-backed securities						
U.S. government agencies	3,294	42	–	–	3,294	42
Commercial	–	–	–	–	–	–
Total mortgage-backed securities	3,294	42	–	–	3,294	42
Obligations of U.S. states and municipalities	469	4	–	–	469	4
Total held-to-maturity securities	3,763	46	–	–	3,763	46
Total securities with gross unrealized losses	$ 76,475	$ 905	$ 14,877	$ 251	$ 91,352	$ 1,156

(a) Prior period amounts have been revised to conform with current period presentation.

Gross unrealized losses

The Firm has recognized unrealized losses on securities it intends to sell as OTTI. The Firm does not intend to sell any of the remaining securities with an unrealized loss in AOCI as of December 31, 2016, and it is not likely that the Firm will be required to sell these securities before recovery of their amortized cost basis. Except for the securities for which credit losses have been recognized in income, the Firm believes that the securities with an unrealized loss in AOCI are not other-than-temporarily impaired as of December 31, 2016.

Other-than-temporary impairment

AFS debt and equity securities and HTM debt securities in unrealized loss positions are analyzed as part of the Firm's ongoing assessment of OTTI. For most types of debt securities, the Firm considers a decline in fair value to be other-than-temporary when the Firm does not expect to recover the entire amortized cost basis of the security. For beneficial interests in securitizations that are rated below "AA" at their acquisition, or that can be contractually prepaid or otherwise settled in such a way that the Firm would not recover substantially all of its recorded investment, the Firm considers an impairment to be other-than-temporary when there is an adverse change in expected cash flows. For AFS equity securities, the Firm considers a decline in fair value to be other-than-temporary if it is probable that the Firm will not recover its cost basis.

Potential OTTI is considered using a variety of factors, including the length of time and extent to which the market value has been less than cost; adverse conditions specifically related to the industry, geographic area or financial condition of the issuer or underlying collateral of a security; payment structure of the security; changes to the rating of the security by a rating agency; the volatility of the fair value changes; and the Firm's intent and ability to hold the security until recovery.

For AFS debt securities, the Firm recognizes OTTI losses in earnings if the Firm has the intent to sell the debt security, or if it is more likely than not that the Firm will be required to sell the debt security before recovery of its amortized cost basis. In these circumstances the impairment loss is equal to the full difference between the amortized cost basis and the fair value of the securities. For debt securities in an unrealized loss position that the Firm has the intent and ability to hold, the expected cash flows to be received from the securities are evaluated to determine if a credit loss exists. In the event of a credit loss, only the amount of impairment associated with the credit loss is recognized in income. Amounts relating to factors other than credit losses are recorded in OCI.

The Firm's cash flow evaluations take into account the factors noted above and expectations of relevant market and economic data as of the end of the reporting period. For securities issued in a securitization, the Firm estimates cash flows considering underlying loan-level data and structural features of the securitization, such as subordination, excess spread, overcollateralization or other forms of credit enhancement, and compares the losses projected for the underlying collateral ("pool losses") against the level of credit enhancement in the securitization structure to determine whether these features are sufficient to absorb the pool losses, or whether a credit loss exists. The Firm also performs other analyses to support its cash flow projections, such as first-loss analyses or stress scenarios.

For equity securities, OTTI losses are recognized in earnings if the Firm intends to sell the security. In other cases the Firm considers the relevant factors noted above, as well as the Firm's intent and ability to retain its investment for a period of time sufficient to allow for any anticipated recovery in market value, and whether evidence exists to support a realizable value equal to or greater than the cost basis. Any impairment loss on an equity security is equal to the full difference between the cost basis and the fair value of the security.

Securities gains and losses

The following table presents realized gains and losses and OTTI from AFS securities that were recognized in income.

Year ended December 31, (in millions)	**2016**	2015	2014
Realized gains	$ 401	$ 351	$ 314
Realized losses	(232)	(127)	(233)
OTTI losses	(28)	(22)	(4)
Net securities gains	141	202	77
OTTI losses			
Credit losses recognized in income	(1)	(1)	(2)
Securities the Firm intends to sell[(a)]	(27)	(21)	(2)
Total OTTI losses recognized in income	$ (28)	$ (22)	$ (4)

(a) Excludes realized losses on securities sold of $24 million, $5 million and $3 million for the years ended December 31, 2016, 2015 and 2014, respectively that had been previously reported as an OTTI loss due to the intention to sell the securities.

Changes in the credit loss component of credit-impaired debt securities

The cumulative credit loss component, including any changes therein, of OTTI losses that have been recognized in income related to AFS debt securities was not material as of and during the years ended December 31, 2016, 2015 and 2014.

Contractual maturities and yields

The following table presents the amortized cost and estimated fair value at December 31, 2016, of JPMorgan Chase's investment securities portfolio by contractual maturity.

By remaining maturity December 31, 2016 (in millions)	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years[c]	Total
Available-for-sale debt securities					
Mortgage-backed securities[a]					
Amortized cost	$ 2,012	$ 2,393	$ 7,574	$ 74,610	$ 86,589
Fair value	2,022	2,449	7,756	75,325	87,552
Average yield[b]	2.04%	2.36%	3.03%	3.26%	3.19%
U.S. Treasury and government agencies[a]					
Amortized cost	$ 132	$ 4,573	$ 38,976	$ 1,141	$ 44,822
Fair value	132	4,561	38,317	1,091	44,101
Average yield[b]	0.42%	0.86%	1.27%	1.13%	1.22%
Obligations of U.S. states and municipalities					
Amortized cost	$ 134	$ 752	$ 1,096	$ 28,302	$ 30,284
Fair value	135	767	1,148	29,542	31,592
Average yield[b]	5.85%	3.58%	6.29%	6.63%	6.54%
Certificates of deposit					
Amortized cost	$ 106	$ —	$ —	$ —	$ 106
Fair value	106	—	—	—	106
Average yield[b]	1.78%	—%	—%	—%	1.78%
Non-U.S. government debt securities					
Amortized cost	$ 5,831	$ 14,109	$ 13,503	$ 1,054	$ 34,497
Fair value	5,838	14,444	13,944	1,062	35,288
Average yield[b]	2.92%	1.55%	0.93%	0.58%	1.51%
Corporate debt securities					
Amortized cost	$ 2,059	$ 1,312	$ 1,424	$ 121	$ 4,916
Fair value	2,070	1,332	1,433	123	4,958
Average yield[b]	2.88%	3.11%	3.24%	3.52%	3.06%
Asset-backed securities					
Amortized cost	$ —	$ 444	$ 21,551	$ 12,307	$ 34,302
Fair value	—	446	21,577	12,345	34,368
Average yield[b]	—%	0.49%	2.33%	2.21%	2.26%
Total available-for-sale debt securities					
Amortized cost	$ 10,274	$ 23,583	$ 84,124	$ 117,535	$ 235,516
Fair value	10,303	23,999	84,175	119,488	237,965
Average yield[b]	2.73%	1.63%	1.74%	3.92%	2.86%
Available-for-sale equity securities					
Amortized cost	$ —	$ —	$ —	$ 914	$ 914
Fair value	—	—	—	926	926
Average yield[b]	—%	—%	—%	0.58%	0.58%
Total available-for-sale securities					
Amortized cost	$ 10,274	$ 23,583	$ 84,124	$ 118,449	$ 236,430
Fair value	10,303	23,999	84,175	120,414	238,891
Average yield[b]	2.73%	1.63%	1.74%	3.89%	2.85%
Held-to-maturity debt securities					
Mortgage-backed securities[a]					
Amortized Cost	$ —	$ —	$ —	$ 35,693	$ 35,693
Fair value	—	—	—	36,165	36,165
Average yield[b]	—%	—%	—%	3.30%	3.30%
Obligations of U.S. states and municipalities					
Amortized cost	$ —	$ 29	$ 1,439	$ 13,007	$ 14,475
Fair value	—	29	1,467	13,228	14,724
Average yield[b]	—%	6.61%	5.11%	5.68%	5.63%
Total held-to-maturity securities					
Amortized cost	$ —	$ 29	$ 1,439	$ 48,700	$ 50,168
Fair value	—	29	1,467	49,393	50,889
Average yield[b]	—%	6.61%	5.11%	3.94%	3.97%

(a) U.S. government-sponsored enterprises were the only issuers whose securities exceeded 10% of JPMorgan Chase's total stockholders' equity at December 31, 2016.

(b) Average yield is computed using the effective yield of each security owned at the end of the period, weighted based on the amortized cost of each security. The effective yield considers the contractual coupon, amortization of premiums and accretion of discounts, and the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable. The effective yield excludes unscheduled principal prepayments; and accordingly, actual maturities of securities may differ from their contractual or expected maturities as certain securities may be prepaid.

(c) Includes securities with no stated maturity. Substantially all of the Firm's residential MBS and collateralized mortgage obligations are due in 10 years or more, based on contractual maturity. The estimated weighted-average life, which reflects anticipated future prepayments, is approximately seven years for agency residential MBS, three years for agency residential collateralized mortgage obligations and three years for nonagency residential collateralized mortgage obligations.

Note 13 – Securities financing activities

JPMorgan Chase enters into resale agreements, repurchase agreements, securities borrowed transactions and securities loaned transactions (collectively, "securities financing agreements") primarily to finance the Firm's inventory positions, acquire securities to cover short positions, accommodate customers' financing needs, and settle other securities obligations.

Securities financing agreements are treated as collateralized financings on the Firm's Consolidated balance sheets. Resale and repurchase agreements are generally carried at the amounts at which the securities will be subsequently sold or repurchased. Securities borrowed and securities loaned transactions are generally carried at the amount of cash collateral advanced or received. Where appropriate under applicable accounting guidance, resale and repurchase agreements with the same counterparty are reported on a net basis. For further discussion of the offsetting of assets and liabilities, see Note 1. Fees received and paid in connection with securities financing agreements are recorded in interest income and interest expense on the Consolidated statements of income.

The Firm has elected the fair value option for certain securities financing agreements. For further information regarding the fair value option, see Note 4. The securities financing agreements for which the fair value option has been elected are reported within securities purchased under resale agreements, securities loaned or sold under repurchase agreements, and securities borrowed on the Consolidated balance sheets. Generally, for agreements carried at fair value, current-period interest accruals are recorded within interest income and interest expense, with changes in fair value reported in principal transactions revenue. However, for financial instruments containing embedded derivatives that would be separately accounted for in accordance with accounting guidance for hybrid instruments, all changes in fair value, including any interest elements, are reported in principal transactions revenue.

Securities financing transactions expose the Firm to credit and liquidity risk. To manage these risks, the Firm monitors the value of the underlying securities (predominantly high-quality securities collateral, including government-issued debt and agency MBS) that it has received from or provided to its counterparties compared to the value of cash proceeds and exchanged collateral, and either requests additional collateral or returns securities or collateral when appropriate. Margin levels are initially established based upon the counterparty, the type of underlying securities, and the permissible collateral, and are monitored on an ongoing basis.

In resale agreements and securities borrowed transactions, the Firm is exposed to credit risk to the extent that the value of the securities received is less than initial cash principal advanced and any collateral amounts exchanged. In repurchase agreements and securities loaned transactions, credit risk exposure arises to the extent that the value of underlying securities exceeds the value of the initial cash principal advanced, and any collateral amounts exchanged.

Additionally, the Firm typically enters into master netting agreements and other similar arrangements with its counterparties, which provide for the right to liquidate the underlying securities and any collateral amounts exchanged in the event of a counterparty default. It is also the Firm's policy to take possession, where possible, of the securities underlying resale agreements and securities borrowed transactions. For further information regarding assets pledged and collateral received in securities financing agreements, see Note 30.

As a result of the Firm's credit risk mitigation practices with respect to resale and securities borrowed agreements as described above, the Firm did not hold any reserves for credit impairment with respect to these agreements as of December 31, 2016 and 2015.

The table below summarizes the gross and net amounts of the Firm's securities financing agreements, as of December 31, 2016, and 2015. When the Firm has obtained an appropriate legal opinion with respect to the master netting agreement with a counterparty and where other relevant netting criteria under U.S. GAAP are met, the Firm nets, on the Consolidated balance sheets, the balances outstanding under its securities financing agreements with the same counterparty. In addition, the Firm exchanges securities and/or cash collateral with its counterparties; this collateral also reduces, in the Firm's view, the economic exposure with the counterparty. Such collateral, along with securities financing balances that do not meet all these relevant netting criteria under U.S. GAAP, is presented as "Amounts not nettable on the Consolidated balance sheets," and reduces the "Net amounts" presented below, if the Firm has an appropriate legal opinion with respect to the master netting agreement with the counterparty. Where a legal opinion has not been either sought or obtained, the securities financing balances are presented gross in the "Net amounts" below, and related collateral does not reduce the amounts presented.

	2016				
December 31, (in millions)	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets[b]	Amounts not nettable on the Consolidated balance sheets[c]	Net amounts[d]
Assets					
Securities purchased under resale agreements	**$ 480,735**	**$ (250,832)**	**$ 229,903**	**$ (222,413)**	**$ 7,490**
Securities borrowed	**96,409**	**—**	**96,409**	**(66,822)**	**29,587**
Liabilities					
Securities sold under repurchase agreements	**$ 402,465**	**$ (250,832)**	**$ 151,633**	**$ (133,300)**	**$ 18,333**
Securities loaned and other[a]	**22,451**	**—**	**22,451**	**(22,177)**	**274**

	2015				
December 31, (in millions)	Gross amounts	Amounts netted on the Consolidated balance sheets	Amounts presented on the Consolidated balance sheets[b]	Amounts not nettable on the Consolidated balance sheets[c]	Net amounts[d]
Assets					
Securities purchased under resale agreements	$ 368,148	$ (156,258)	$ 211,890	$ (207,958)	$ 3,932 [e]
Securities borrowed	98,721	—	98,721	(65,081)	33,640
Liabilities					
Securities sold under repurchase agreements	$ 290,044	$ (156,258)	$ 133,786	$ (119,332)	$ 14,454 [e]
Securities loaned and other[a]	22,556	—	22,556	(22,245)	311

(a) Includes securities-for-securities lending transactions of $9.1 billion and $4.4 billion at December 31, 2016 and 2015, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within other liabilities in the Consolidated balance sheets.
(b) Includes securities financing agreements accounted for at fair value. At December 31, 2016 and 2015, included securities purchased under resale agreements of $21.5 billion and $23.1 billion, respectively, and securities sold under agreements to repurchase of $687 million and $3.5 billion, respectively. There were no securities borrowed at December 31, 2016 and $395 million at December 31, 2015. There were no securities loaned accounted for at fair value in either period.
(c) In some cases, collateral exchanged with a counterparty exceeds the net asset or liability balance with that counterparty. In such cases, the amounts reported in this column are limited to the related asset or liability with that counterparty.
(d) Includes securities financing agreements that provide collateral rights, but where an appropriate legal opinion with respect to the master netting agreement has not been either sought or obtained. At December 31, 2016 and 2015, included $4.8 billion and $2.3 billion, respectively, of securities purchased under resale agreements; $27.1 billion and $31.3 billion, respectively, of securities borrowed; $15.9 billion and $12.6 billion, respectively, of securities sold under agreements to repurchase; and $90 million and $45 million, respectively, of securities loaned and other.
(e) Prior period amounts have been revised to conform with the current presentation.

The tables below present as of December 31, 2016 and 2015 the types of financial assets pledged in securities financing agreements and the remaining contractual maturity of the securities financing agreements.

	Gross liability balance			
	2016		2015	
December 31, (in millions)	Securities sold under repurchase agreements	Securities loaned and other[(a)]	Securities sold under repurchase agreements	Securities loaned and other[(a)]
Mortgage-backed securities	**$ 10,546**	**$ –**	$ 12,790	$ –
U.S. Treasury and government agencies	**199,030**	**–**	154,377	5
Obligations of U.S. states and municipalities	**2,491**	**–**	1,316	–
Non-U.S. government debt	**149,008**	**1,279**	80,162	4,426
Corporate debt securities	**18,140**	**108**	21,286	78
Asset-backed securities	**7,721**	**–**	4,394	–
Equity securities	**15,529**	**21,064**	15,719	18,047
Total	**$ 402,465**	**$ 22,451**	$ 290,044	$ 22,556

	Remaining contractual maturity of the agreements				
2016 (in millions)	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	**$ 140,318**	**$ 157,860**	**$ 55,621**	**$ 48,666**	**$ 402,465**
Total securities loaned and other[(a)]	**13,586**	**1,371**	**2,877**	**4,617**	**22,451**

	Remaining contractual maturity of the agreements				
2015 (in millions)	Overnight and continuous	Up to 30 days	30 – 90 days	Greater than 90 days	Total
Total securities sold under repurchase agreements	$ 114,595	$ 100,082	$ 29,955	$ 45,412	$ 290,044
Total securities loaned and other[(a)]	8,320	708	793	12,735	22,556

(a) Includes securities-for-securities lending transactions of $9.1 billion and $4.4 billion at December 31, 2016 and 2015, respectively, accounted for at fair value, where the Firm is acting as lender. These amounts are presented within other liabilities on the Consolidated balance sheets.

Transfers not qualifying for sale accounting

At December 31, 2016 and 2015, the Firm held $5.9 billion and $7.5 billion, respectively, of financial assets for which the rights have been transferred to third parties; however, the transfers did not qualify as a sale in accordance with U.S. GAAP. These transfers have been recognized as collateralized financing transactions. The transferred assets are recorded in trading assets and loans, and the corresponding liabilities are recorded predominantly in other borrowed funds on the Consolidated balance sheets.

Note 14 – Loans

Loan accounting framework

The accounting for a loan depends on management's strategy for the loan, and on whether the loan was credit-impaired at the date of acquisition. The Firm accounts for loans based on the following categories:

- Originated or purchased loans held-for-investment (i.e., "retained"), other than PCI loans
- Loans held-for-sale
- Loans at fair value
- PCI loans held-for-investment

The following provides a detailed accounting discussion of these loan categories:

Loans held-for-investment (other than PCI loans)
Originated or purchased loans held-for-investment, other than PCI loans, are recorded at the principal amount outstanding, net of the following: charge-offs; interest applied to principal (for loans accounted for on the cost recovery method); unamortized discounts and premiums; and net deferred loan fees or costs. Credit card loans also include billed finance charges and fees net of an allowance for uncollectible amounts.

Interest income
Interest income on performing loans held-for-investment, other than PCI loans, is accrued and recognized as interest income at the contractual rate of interest. Purchase price discounts or premiums, as well as net deferred loan fees or costs, are amortized into interest income over the contractual life of the loan to produce a level rate of return.

Nonaccrual loans
Nonaccrual loans are those on which the accrual of interest has been suspended. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status and considered nonperforming when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest has been in default for a period of 90 days or more, unless the loan is both well-secured and in the process of collection. A loan is determined to be past due when the minimum payment is not received from the borrower by the contractually specified due date or for certain loans (e.g., residential real estate loans), when a monthly payment is due and unpaid for 30 days or more. Finally, collateral-dependent loans are typically maintained on nonaccrual status.

On the date a loan is placed on nonaccrual status, all interest accrued but not collected is reversed against interest income. In addition, the amortization of deferred amounts is suspended. Interest income on nonaccrual loans may be recognized as cash interest payments are received (i.e., on a cash basis) if the recorded loan balance is deemed fully collectible; however, if there is doubt regarding the ultimate collectibility of the recorded loan balance, all interest cash receipts are applied to reduce the carrying value of the loan (the cost recovery method). For consumer loans, application of this policy typically results in the Firm recognizing interest income on nonaccrual consumer loans on a cash basis.

A loan may be returned to accrual status when repayment is reasonably assured and there has been demonstrated performance under the terms of the loan or, if applicable, the terms of the restructured loan.

As permitted by regulatory guidance, credit card loans are generally exempt from being placed on nonaccrual status; accordingly, interest and fees related to credit card loans continue to accrue until the loan is charged off or paid in full. However, the Firm separately establishes an allowance, which is offset against loans and charged to interest income, for the estimated uncollectible portion of accrued and billed interest and fee income on credit card loans. The allowance is established with a charge to interest income and is reported as an offset to loans.

Allowance for loan losses
The allowance for loan losses represents the estimated probable credit losses inherent in the held-for-investment loan portfolio at the balance sheet date and is recognized on the balance sheet as a contra asset, which brings the recorded investment to the net carrying value. Changes in the allowance for loan losses are recorded in the provision for credit losses on the Firm's Consolidated statements of income. See Note 15 for further information on the Firm's accounting policies for the allowance for loan losses.

Charge-offs
Consumer loans, other than risk-rated business banking, risk-rated auto and PCI loans, are generally charged off or charged down to the net realizable value of the underlying collateral (i.e., fair value less costs to sell), with an offset to the allowance for loan losses, upon reaching specified stages of delinquency in accordance with standards established by the FFIEC. Residential real estate loans, non-modified credit card loans and scored business banking loans are generally charged off no later than 180 days past due. Auto, student and modified credit card loans are charged off no later than 120 days past due.

Certain consumer loans will be charged off earlier than the FFIEC charge-off standards in certain circumstances as follows:

- A charge-off is recognized when a loan is modified in a TDR if the loan is determined to be collateral-dependent.
- Loans to borrowers who have experienced an event (e.g., bankruptcy) that suggests a loss is either known or highly certain are subject to accelerated charge-off standards. Residential real estate and auto loans are charged off when the loan becomes 60 days past due, or sooner if the loan is determined to be collateral-dependent. Credit card, student and scored business banking loans are charged off within 60 days of

receiving notification of the bankruptcy filing or other event.

- Auto loans are written down to net realizable value upon repossession of the automobile and after a redemption period (i.e., the period during which a borrower may cure the loan) has passed.

Other than in certain limited circumstances, the Firm typically does not recognize charge-offs on government-guaranteed loans.

Wholesale loans, risk-rated business banking loans and risk-rated auto loans are charged off when it is highly certain that a loss has been realized, including situations where a loan is determined to be both impaired and collateral-dependent. The determination of whether to recognize a charge-off includes many factors, including the prioritization of the Firm's claim in bankruptcy, expectations of the workout/restructuring of the loan and valuation of the borrower's equity or the loan collateral.

When a loan is charged down to the estimated net realizable value, the determination of the fair value of the collateral depends on the type of collateral (e.g., securities, real estate). In cases where the collateral is in the form of liquid securities, the fair value is based on quoted market prices or broker quotes. For illiquid securities or other financial assets, the fair value of the collateral is estimated using a discounted cash flow model.

For residential real estate loans, collateral values are based upon external valuation sources. When it becomes likely that a borrower is either unable or unwilling to pay, the Firm obtains a broker's price opinion of the home based on an exterior-only valuation ("exterior opinions"), which is then updated at least every six months thereafter. As soon as practicable after the Firm receives the property in satisfaction of a debt (e.g., by taking legal title or physical possession), generally, either through foreclosure or upon the execution of a deed in lieu of foreclosure transaction with the borrower, the Firm obtains an appraisal based on an inspection that includes the interior of the home ("interior appraisals"). Exterior opinions and interior appraisals are discounted based upon the Firm's experience with actual liquidation values as compared with the estimated values provided by exterior opinions and interior appraisals, considering state- and product-specific factors.

For commercial real estate loans, collateral values are generally based on appraisals from internal and external valuation sources. Collateral values are typically updated every six to twelve months, either by obtaining a new appraisal or by performing an internal analysis, in accordance with the Firm's policies. The Firm also considers both borrower- and market-specific factors, which may result in obtaining appraisal updates or broker price opinions at more frequent intervals.

Loans held-for-sale

Held-for-sale loans are measured at the lower of cost or fair value, with valuation changes recorded in noninterest revenue. For consumer loans, the valuation is performed on a portfolio basis. For wholesale loans, the valuation is performed on an individual loan basis.

Interest income on loans held-for-sale is accrued and recognized based on the contractual rate of interest.

Loan origination fees or costs and purchase price discounts or premiums are deferred in a contra loan account until the related loan is sold. The deferred fees and discounts or premiums are an adjustment to the basis of the loan and therefore are included in the periodic determination of the lower of cost or fair value adjustments and/or the gain or loss recognized at the time of sale.

Held-for-sale loans are subject to the nonaccrual policies described above.

Because held-for-sale loans are recognized at the lower of cost or fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

Loans at fair value

Loans used in a market-making strategy or risk managed on a fair value basis are measured at fair value, with changes in fair value recorded in noninterest revenue.

Interest income on loans is accrued and recognized based on the contractual rate of interest. Changes in fair value are recognized in noninterest revenue. Loan origination fees are recognized upfront in noninterest revenue. Loan origination costs are recognized in the associated expense category as incurred.

Because these loans are recognized at fair value, the Firm's allowance for loan losses and charge-off policies do not apply to these loans.

See Note 4 for further information on the Firm's elections of fair value accounting under the fair value option. See Note 3 and Note 4 for further information on loans carried at fair value and classified as trading assets.

PCI loans

PCI loans held-for-investment are initially measured at fair value. PCI loans have evidence of credit deterioration since the loan's origination date and therefore it is probable, at acquisition, that all contractually required payments will not be collected. Because PCI loans are initially measured at fair value, which includes an estimate of future credit losses, no allowance for loan losses related to PCI loans is recorded at the acquisition date. See page 219 of this Note for information on accounting for PCI loans subsequent to their acquisition.

Loan classification changes

Loans in the held-for-investment portfolio that management decides to sell are transferred to the held-for-sale portfolio at the lower of cost or fair value on the date of transfer. Credit-related losses are charged against the allowance for loan losses; non-credit related losses such as those due to changes in interest rates or foreign currency exchange rates are recognized in noninterest revenue.

In the event that management decides to retain a loan in the held-for-sale portfolio, the loan is transferred to the held-for-investment portfolio at the lower of cost or fair value on the date of transfer. These loans are subsequently assessed for impairment based on the Firm's allowance methodology. For a further discussion of the methodologies used in establishing the Firm's allowance for loan losses, see Note 15.

Loan modifications

The Firm seeks to modify certain loans in conjunction with its loss-mitigation activities. Through the modification, JPMorgan Chase grants one or more concessions to a borrower who is experiencing financial difficulty in order to minimize the Firm's economic loss, avoid foreclosure or repossession of the collateral, and to ultimately maximize payments received by the Firm from the borrower. The concessions granted vary by program and by borrower-specific characteristics, and may include interest rate reductions, term extensions, payment deferrals, principal forgiveness, or the acceptance of equity or other assets in lieu of payments.

Such modifications are accounted for and reported as TDRs. A loan that has been modified in a TDR is generally considered to be impaired until it matures, is repaid, or is otherwise liquidated, regardless of whether the borrower performs under the modified terms. In certain limited cases, the effective interest rate applicable to the modified loan is at or above the current market rate at the time of the restructuring. In such circumstances, and assuming that the loan subsequently performs under its modified terms and the Firm expects to collect all contractual principal and interest cash flows, the loan is disclosed as impaired and as a TDR only during the year of the modification; in subsequent years, the loan is not disclosed as an impaired loan or as a TDR so long as repayment of the restructured loan under its modified terms is reasonably assured.

Loans, except for credit card loans, modified in a TDR are generally placed on nonaccrual status, although in many cases such loans were already on nonaccrual status prior to modification. These loans may be returned to performing status (the accrual of interest is resumed) if the following criteria are met: (i) the borrower has performed under the modified terms for a minimum of six months and/or six payments, and (ii) the Firm has an expectation that repayment of the modified loan is reasonably assured based on, for example, the borrower's debt capacity and level of future earnings, collateral values, LTV ratios, and other current market considerations. In certain limited and well-defined circumstances in which the loan is current at the modification date, such loans are not placed on nonaccrual status at the time of modification.

Because loans modified in TDRs are considered to be impaired, these loans are measured for impairment using the Firm's established asset-specific allowance methodology, which considers the expected re-default rates for the modified loans. A loan modified in a TDR generally remains subject to the asset-specific allowance methodology throughout its remaining life, regardless of whether the loan is performing and has been returned to accrual status and/or the loan has been removed from the impaired loans disclosures (i.e., loans restructured at market rates). For further discussion of the methodology used to estimate the Firm's asset-specific allowance, see Note 15.

Foreclosed property

The Firm acquires property from borrowers through loan restructurings, workouts, and foreclosures. Property acquired may include real property (e.g., residential real estate, land, and buildings) and commercial and personal property (e.g., automobiles, aircraft, railcars, and ships).

The Firm recognizes foreclosed property upon receiving assets in satisfaction of a loan (e.g., by taking legal title or physical possession). For loans collateralized by real property, the Firm generally recognizes the asset received at foreclosure sale or upon the execution of a deed in lieu of foreclosure transaction with the borrower. Foreclosed assets are reported in other assets on the Consolidated balance sheets and initially recognized at fair value less costs to sell. Each quarter the fair value of the acquired property is reviewed and adjusted, if necessary, to the lower of cost or fair value. Subsequent adjustments to fair value are charged/credited to noninterest revenue. Operating expense, such as real estate taxes and maintenance, are charged to other expense.

Loan portfolio

The Firm's loan portfolio is divided into three portfolio segments, which are the same segments used by the Firm to determine the allowance for loan losses: Consumer, excluding credit card; Credit card; and Wholesale. Within each portfolio segment the Firm monitors and assesses the credit risk in the following classes of loans, based on the risk characteristics of each loan class.

Consumer, excluding credit card[(a)]	Credit card	Wholesale[(f)]
Residential real estate – excluding PCI • Home equity[(b)] • Residential mortgage[(c)] Other consumer loans • Auto[(d)] • Business banking[(d)(e)] • Student and other Residential real estate – PCI • Home equity • Prime mortgage • Subprime mortgage • Option ARMs	• Credit card loans	• Commercial and industrial • Real estate • Financial institutions • Government agencies • Other[(g)]

(a) Includes loans held in CCB, prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate.
(b) Includes senior and junior lien home equity loans.
(c) Includes prime (including option ARMs) and subprime loans.
(d) Includes certain business banking and auto dealer risk-rated loans that apply the wholesale methodology for determining the allowance for loan losses; these loans are managed by CCB, and therefore, for consistency in presentation, are included with the other consumer loan classes.
(e) Predominantly includes Business Banking loans as well as deposit overdrafts.
(f) Includes loans held in CIB, CB, AWM and Corporate. Excludes prime mortgage and home equity loans held in AWM and prime mortgage loans held in Corporate. Classes are internally defined and may not align with regulatory definitions.
(g) Includes loans to: individuals; SPEs; holding companies; and private education and civic organizations. For more information on exposures to SPEs, see Note 16.

The following tables summarize the Firm's loan balances by portfolio segment.

December 31, 2016 (in millions)	Consumer, excluding credit card	Credit card[(a)]	Wholesale	Total	
Retained	**$ 364,406**	**$ 141,711**	**$ 383,790**	**$ 889,907**	(b)
Held-for-sale	**238**	**105**	**2,285**	**2,628**	
At fair value	**–**	**–**	**2,230**	**2,230**	
Total	**$ 364,644**	**$ 141,816**	**$ 388,305**	**$ 894,765**	

December 31, 2015 (in millions)	Consumer, excluding credit card	Credit card[(a)]	Wholesale	Total	
Retained	$ 344,355	$ 131,387	$ 357,050	$ 832,792	(b)
Held-for-sale	466	76	1,104	1,646	
At fair value	–	–	2,861	2,861	
Total	$ 344,821	$ 131,463	$ 361,015	$ 837,299	

(a) Includes billed interest and fees net of an allowance for uncollectible interest and fees.
(b) Loans (other than PCI loans and those for which the fair value option has been elected) are presented net of unearned income, unamortized discounts and premiums, and net deferred loan costs. These amounts were not material as of December 31, 2016 and 2015.

The following tables provide information about the carrying value of retained loans purchased, sold and reclassified to held-for-sale during the periods indicated. These tables exclude loans recorded at fair value. The Firm manages its exposure to credit risk on an ongoing basis. Selling loans is one way that the Firm reduces its credit exposures.

Year ended December 31, (in millions)	2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	**$ 4,116** [a][b]	**$ –**	**$ 1,448**	**$ 5,564**
Sales	**6,368**	**–**	**8,739**	**15,107**
Retained loans reclassified to held-for-sale	**321**	**–**	**2,381**	**2,702**

Year ended December 31, (in millions)	2015			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	$ 5,279 [a][b]	$ –	$ 2,154	$ 7,433
Sales	5,099	–	9,188	14,287
Retained loans reclassified to held-for-sale	1,514	79	642	2,235

Year ended December 31, (in millions)	2014			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Purchases	$ 7,434 [a][b]	$ –	$ 885	$ 8,319
Sales	6,655	–	7,381	14,036
Retained loans reclassified to held-for-sale	1,190	3,039	581	4,810

(a) Purchases predominantly represent the Firm's voluntary repurchase of certain delinquent loans from loan pools as permitted by Government National Mortgage Association ("Ginnie Mae") guidelines. The Firm typically elects to repurchase these delinquent loans as it continues to service them and/or manage the foreclosure process in accordance with applicable requirements of Ginnie Mae, FHA, RHS, and/or VA.
(b) Excludes purchases of retained loans sourced through the correspondent origination channel and underwritten in accordance with the Firm's standards. Such purchases were $30.4 billion, $50.3 billion and $15.1 billion for the years ended December 31, 2016, 2015 and 2014, respectively.

The following table provides information about gains and losses, including lower of cost or fair value adjustments, on loan sales by portfolio segment.

Year ended December 31, (in millions)	2016	2015	2014
Net gains/(losses) on sales of loans (including lower of cost or fair value adjustments)[a]			
Consumer, excluding credit card	**$ 231**	$ 305	$ 341
Credit card	**(12)**	1	(241)
Wholesale	**26**	34	101
Total net gains on sales of loans (including lower of cost or fair value adjustments)	**$ 245**	$ 340	$ 201

(a) Excludes sales related to loans accounted for at fair value.

Consumer, excluding credit card, loan portfolio

Consumer loans, excluding credit card loans, consist primarily of residential mortgages, home equity loans and lines of credit, auto loans, business banking loans, and student and other loans, with a focus on serving the prime consumer credit market. The portfolio also includes home equity loans secured by junior liens, prime mortgage loans with an interest-only payment period, and certain payment-option loans that may result in negative amortization.

The table below provides information about retained consumer loans, excluding credit card, by class.

December 31, (in millions)	2016	2015
Residential real estate – excluding PCI		
Home equity	$ 39,063	$ 45,559
Residential mortgage	192,163	166,239
Other consumer loans		
Auto	65,814	60,255
Business banking	22,698	21,208
Student and other	8,989	10,096
Residential real estate – PCI		
Home equity	12,902	14,989
Prime mortgage	7,602	8,893
Subprime mortgage	2,941	3,263
Option ARMs	12,234	13,853
Total retained loans	$ 364,406	$ 344,355

Delinquency rates are a primary credit quality indicator for consumer loans. Loans that are more than 30 days past due provide an early warning of borrowers who may be experiencing financial difficulties and/or who may be unable or unwilling to repay the loan. As the loan continues to age, it becomes more clear that the borrower is likely either unable or unwilling to pay. In the case of residential real estate loans, late-stage delinquencies (greater than 150 days past due) are a strong indicator of loans that will ultimately result in a foreclosure or similar liquidation transaction. In addition to delinquency rates, other credit quality indicators for consumer loans vary based on the class of loan, as follows:

- For residential real estate loans, including both non-PCI and PCI portfolios, the current estimated LTV ratio, or the combined LTV ratio in the case of junior lien loans, is an indicator of the potential loss severity in the event of default. Additionally, LTV or combined LTV ratios can provide insight into a borrower's continued willingness to pay, as the delinquency rate of high-LTV loans tends to be greater than that for loans where the borrower has equity in the collateral. The geographic distribution of the loan collateral also provides insight as to the credit quality of the portfolio, as factors such as the regional economy, home price changes and specific events such as natural disasters, will affect credit quality. The borrower's current or "refreshed" FICO score is a secondary credit-quality indicator for certain loans, as FICO scores are an indication of the borrower's credit payment history. Thus, a loan to a borrower with a low FICO score (660 or below) is considered to be of higher risk than a loan to a borrower with a high FICO score. Further, a loan to a borrower with a high LTV ratio and a low FICO score is at greater risk of default than a loan to a borrower that has both a high LTV ratio and a high FICO score.
- For scored auto, scored business banking and student loans, geographic distribution is an indicator of the credit performance of the portfolio. Similar to residential real estate loans, geographic distribution provides insights into the portfolio performance based on regional economic activity and events.
- Risk-rated business banking and auto loans are similar to wholesale loans in that the primary credit quality indicators are the risk rating that is assigned to the loan and whether the loans are considered to be criticized and/or nonaccrual. Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information about borrowers' ability to fulfill their obligations. For further information about risk-rated wholesale loan credit quality indicators, see pages 224–225 of this Note.

Residential real estate — excluding PCI loans

The following table provides information by class for residential real estate — excluding retained PCI loans in the consumer, excluding credit card, portfolio segment.

The following factors should be considered in analyzing certain credit statistics applicable to the Firm's residential real estate — excluding PCI loans portfolio: (i) junior lien home equity loans may be fully charged off when the loan becomes 180 days past due, and the value of the collateral does not support the repayment of the loan, resulting in relatively high charge-off rates for this product class; and (ii) the lengthening of loss-mitigation timelines may result in higher delinquency rates for loans carried at the net realizable value of the collateral that remain on the Firm's Consolidated balance sheets.

Residential real estate – excluding PCI loans

December 31, (in millions, except ratios)	Home equity[g] 2016	Home equity[g] 2015	Residential mortgage[g] 2016	Residential mortgage[g] 2015	Total residential real estate – excluding PCI 2016	Total residential real estate – excluding PCI 2015
Loan delinquency[a]						
Current	**$ 37,941**	$ 44,299	**$ 183,819**	$ 156,463	**$ 221,760**	$ 200,762
30–149 days past due	**646**	708	**3,824**	4,042	**4,470**	4,750
150 or more days past due	**476**	552	**4,520**	5,734	**4,996**	6,286
Total retained loans	**$ 39,063**	$ 45,559	**$ 192,163**	$ 166,239	**$ 231,226**	$ 211,798
% of 30+ days past due to total retained loans[b]	**2.87%**	2.77%	**0.75%**	1.03%	**1.11%**	1.40%
90 or more days past due and government guaranteed[c]	**$ —**	$ —	**$ 4,858**	$ 6,056	**$ 4,858**	$ 6,056
Nonaccrual loans	**1,845**	2,191	**2,247**	2,503	**4,092**	4,694
Current estimated LTV ratios[d][e]						
Greater than 125% and refreshed FICO scores:						
Equal to or greater than 660	**$ 70**	$ 165	**$ 30**	$ 58	**$ 100**	$ 223
Less than 660	**15**	32	**48**	77	**63**	109
101% to 125% and refreshed FICO scores:						
Equal to or greater than 660	**668**	1,344	**135**	274	**803**	1,618
Less than 660	**221**	434	**177**	291	**398**	725
80% to 100% and refreshed FICO scores:						
Equal to or greater than 660	**2,961**	4,537	**4,026**	3,159	**6,987**	7,696
Less than 660	**945**	1,409	**718**	996	**1,663**	2,405
Less than 80% and refreshed FICO scores:						
Equal to or greater than 660	**27,317**	29,648	**169,579**	142,241	**196,896**	171,889
Less than 660	**4,380**	4,934	**6,759**	6,797	**11,139**	11,731
No FICO/LTV available	**2,486**	3,056	**1,327**	1,658	**3,813**	4,714
U.S. government-guaranteed	**—**	—	**9,364**	10,688	**9,364**	10,688
Total retained loans	**$ 39,063**	$ 45,559	**$ 192,163**	$ 166,239	**$ 231,226**	$ 211,798
Geographic region						
California	**$ 7,644**	$ 8,945	**$ 59,785**	$ 47,263	**$ 67,429**	$ 56,208
New York	**7,978**	9,147	**24,813**	21,462	**32,791**	30,609
Illinois	**2,947**	3,420	**13,115**	11,524	**16,062**	14,944
Texas	**2,225**	2,532	**10,717**	9,128	**12,942**	11,660
Florida	**2,133**	2,409	**8,387**	7,177	**10,520**	9,586
New Jersey	**2,253**	2,590	**6,371**	5,567	**8,624**	8,157
Colorado	**677**	807	**6,304**	5,409	**6,981**	6,216
Washington	**1,229**	1,451	**5,443**	4,176	**6,672**	5,627
Massachusetts	**371**	459	**5,833**	5,340	**6,204**	5,799
Arizona	**1,772**	2,143	**3,577**	3,155	**5,349**	5,298
All other[f]	**9,834**	11,656	**47,818**	46,038	**57,652**	57,694
Total retained loans	**$ 39,063**	$ 45,559	**$ 192,163**	$ 166,239	**$ 231,226**	$ 211,798

(a) Individual delinquency classifications include mortgage loans insured by U.S. government agencies as follows: current included $2.5 billion and $2.6 billion; 30-149 days past due included $3.1 billion and $3.2 billion; and 150 or more days past due included $3.8 billion and $4.9 billion at December 31, 2016 and 2015, respectively.

(b) At December 31, 2016 and 2015, residential mortgage loans excluded mortgage loans insured by U.S. government agencies of $6.9 billion and $8.1 billion, respectively, that are 30 or more days past due. These amounts have been excluded based upon the government guarantee.

(c) These balances, which are 90 days or more past due, were excluded from nonaccrual loans as the loans are guaranteed by U.S government agencies. Typically the principal balance of the loans is insured and interest is guaranteed at a specified reimbursement rate subject to meeting agreed-upon servicing guidelines. At December 31, 2016 and 2015, these balances included $2.2 billion and $3.4 billion, respectively, of loans that are no longer accruing interest based on the agreed-upon servicing guidelines. For the remaining balance, interest is being accrued at the guaranteed reimbursement rate. There were no loans that were not guaranteed by U.S. government agencies that are 90 or more days past due and still accruing interest at December 31, 2016 and 2015.

(d) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.

(e) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.

(f) At December 31, 2016 and 2015, included mortgage loans insured by U.S. government agencies of $9.4 billion and $10.7 billion, respectively.

(g) Includes residential real estate loans to private banking clients in AWM, for which the primary credit quality indicators are the borrower's financial position and LTV.

The following table represents the Firm's delinquency statistics for junior lien home equity loans and lines as of December 31, 2016 and 2015.

December 31, (in millions except ratios)	Total loans		Total 30+ day delinquency rate	
	2016	2015	**2016**	2015
HELOCs:[(a)]				
Within the revolving period[(b)]	**$ 10,304**	$ 17,050	**1.27%**	1.57%
Beyond the revolving period	**13,272**	11,252	**3.05**	3.10
HELOANs	**1,861**	2,409	**2.85**	3.03
Total	**$ 25,437**	$ 30,711	**2.32%**	2.25%

(a) These HELOCs are predominantly revolving loans for a 10-year period, after which time the HELOC converts to a loan with a 20-year amortization period, but also include HELOCs that allow interest-only payments beyond the revolving period.
(b) The Firm manages the risk of HELOCs during their revolving period by closing or reducing the undrawn line to the extent permitted by law when borrowers are experiencing financial difficulty or when the collateral does not support the loan amount.

HELOCs beyond the revolving period and HELOANs have higher delinquency rates than HELOCs within the revolving period. That is primarily because the fully-amortizing payment that is generally required for those products is higher than the minimum payment options available for HELOCs within the revolving period. The higher delinquency rates associated with amortizing HELOCs and HELOANs are factored into the Firm's allowance for loan losses.

Impaired loans

The table below sets forth information about the Firm's residential real estate impaired loans, excluding PCI loans. These loans are considered to be impaired as they have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 15.

December 31, (in millions)	Home equity		Residential mortgage		Total residential real estate – excluding PCI	
	2016	2015	**2016**	2015	**2016**	2015
Impaired loans						
With an allowance	**$ 1,266**	$ 1,293	**$ 4,689**	$ 5,243	**$ 5,955**	$ 6,536
Without an allowance[(a)]	**998**	1,065	**1,343**	1,447	**2,341**	2,512
Total impaired loans[(b)(c)]	**$ 2,264**	$ 2,358	**$ 6,032**	$ 6,690	**$ 8,296**	$ 9,048
Allowance for loan losses related to impaired loans	**$ 121**	$ 138	**$ 68**	$ 108	**$ 189**	$ 246
Unpaid principal balance of impaired loans[(d)]	**3,847**	3,960	**8,285**	9,082	**12,132**	13,042
Impaired loans on nonaccrual status[(e)]	**1,116**	1,220	**1,755**	1,957	**2,871**	3,177

(a) Represents collateral-dependent residential real estate loans that are charged off to the fair value of the underlying collateral less cost to sell. The Firm reports, in accordance with regulatory guidance, residential real estate loans that have been discharged under Chapter 7 bankruptcy and not reaffirmed by the borrower ("Chapter 7 loans") as collateral-dependent nonaccrual TDRs, regardless of their delinquency status. At December 31, 2016, Chapter 7 residential real estate loans included approximately 12% home equity and 16% of residential mortgages that were 30 days or more past due.
(b) At December 31, 2016 and 2015, $3.4 billion and $3.8 billion, respectively, of loans modified subsequent to repurchase from Ginnie Mae in accordance with the standards of the appropriate government agency (i.e., FHA, VA, RHS) are not included in the table above. When such loans perform subsequent to modification in accordance with Ginnie Mae guidelines, they are generally sold back into Ginnie Mae loan pools. Modified loans that do not re-perform become subject to foreclosure.
(c) Predominantly all residential real estate impaired loans, excluding PCI loans, are in the U.S.
(d) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors including charge-offs, net deferred loan fees or costs, and unamortized discounts or premiums on purchased loans.
(e) As of December 31, 2016 and 2015, nonaccrual loans included $2.3 billion and $2.5 billion, respectively, of TDRs for which the borrowers were less than 90 days past due. For additional information about loans modified in a TDR that are on nonaccrual status refer, to the Loan accounting framework on pages 208–210 of this Note.

The following table presents average impaired loans and the related interest income reported by the Firm.

Year ended December 31,	Average impaired loans			Interest income on impaired loans[(a)]			Interest income on impaired loans on a cash basis[(a)]		
(in millions)	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Home equity	**$ 2,311**	$ 2,369	$ 2,435	**$ 125**	$ 128	$ 137	**$ 80**	$ 85	$ 90
Residential mortgage	**6,376**	7,697	10,174	**305**	348	444	**77**	87	105
Total residential real estate – excluding PCI	**$ 8,687**	$ 10,066	$ 12,609	**$ 430**	$ 476	$ 581	**$ 157**	$ 172	$ 195

(a) Generally, interest income on loans modified in TDRs is recognized on a cash basis until such time as the borrower has made a minimum of six payments under the new terms, unless the loan is deemed to be collateral-dependent.

Loan modifications

Modifications of residential real estate loans, excluding PCI loans, are generally accounted for and reported as TDRs. There were no additional commitments to lend to borrowers whose residential real estate loans, excluding PCI loans, have been modified in TDRs.

The following table presents new TDRs reported by the Firm.

Year ended December 31, (in millions)	**2016**	2015	2014
Home equity	**$ 385**	$ 401	$ 321
Residential mortgage	**254**	267	411
Total residential real estate – excluding PCI	**$ 639**	$ 668	$ 732

Nature and extent of modifications

The U.S. Treasury's Making Home Affordable programs, as well as the Firm's proprietary modification programs, generally provide various concessions to financially troubled borrowers including, but not limited to, interest rate reductions, term or payment extensions and deferral of principal and/or interest payments that would otherwise have been required under the terms of the original agreement.

The following table provides information about how residential real estate loans, excluding PCI loans, were modified under the Firm's loss mitigation programs described above during the periods presented. This table excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

	Home equity			Residential mortgage			Total residential real estate – excluding PCI		
Year ended December 31,	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Number of loans approved for a trial modification	**3,760**	3,933	1,565	**1,945**	2,711	3,108	**5,705**	6,644	4,673
Number of loans permanently modified	**4,824**	4,296	3,984	**3,338**	3,145	5,648	**8,162**	7,441	9,632
Concession granted:[(a)]									
Interest rate reduction	**75%**	66%	75%	**76%**	71%	45%	**76%**	68%	58%
Term or payment extension	**83**	89	78	**90**	81	52	**86**	86	63
Principal and/or interest deferred	**19**	23	21	**16**	27	15	**18**	24	18
Principal forgiveness	**9**	7	26	**26**	28	52	**16**	16	41
Other[(b)]	**6**	–	–	**25**	11	10	**14**	5	6

(a) Represents concessions granted in permanent modifications as a percentage of the number of loans permanently modified. The sum of the percentages exceeds 100% because predominantly all of the modifications include more than one type of concession. A significant portion of trial modifications include interest rate reductions and/or term or payment extensions.

(b) Represents variable interest rate to fixed interest rate modifications.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the various concessions granted in modifications of residential real estate loans, excluding PCI, under the loss mitigation programs described above and about redefaults of certain loans modified in TDRs for the periods presented. Because the specific types and amounts of concessions offered to borrowers frequently change between the trial modification and the permanent modification, the following table presents only the financial effects of permanent modifications. This table also excludes Chapter 7 loans where the sole concession granted is the discharge of debt.

Year ended December 31, (in millions, except weighted-average data and number of loans)	Home equity			Residential mortgage			Total residential real estate – excluding PCI		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Weighted-average interest rate of loans with interest rate reductions – before TDR	**4.99%**	5.20%	5.27%	**5.59%**	5.67%	5.74%	**5.36%**	5.51%	5.61%
Weighted-average interest rate of loans with interest rate reductions – after TDR	**2.34**	2.35	2.30	**2.93**	2.79	2.96	**2.70**	2.64	2.78
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – before TDR	**18**	18	19	**24**	25	24	**22**	22	23
Weighted-average remaining contractual term (in years) of loans with term or payment extensions – after TDR	**38**	35	33	**38**	37	36	**38**	36	36
Charge-offs recognized upon permanent modification	**$ 1**	$ 4	$ 27	**$ 4**	$ 11	$ 12	**$ 5**	$ 15	$ 39
Principal deferred	**23**	27	16	**30**	58	58	**53**	85	74
Principal forgiven	**7**	6	35	**44**	66	172	**51**	72	207
Balance of loans that redefaulted within one year of permanent modification(a)	**$ 40**	$ 21	$ 29	**$ 98**	$ 133	$ 214	**$ 138**	$ 154	$ 243

(a) Represents loans permanently modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The dollar amounts presented represent the balance of such loans at the end of the reporting period in which such loans defaulted. For residential real estate loans modified in TDRs, payment default is deemed to occur when the loan becomes two contractual payments past due. In the event that a modified loan redefaults, it is probable that the loan will ultimately be liquidated through foreclosure or another similar type of liquidation transaction. Redefaults of loans modified within the last 12 months may not be representative of ultimate redefault levels.

At December 31, 2016, the weighted-average estimated remaining lives of residential real estate loans, excluding PCI loans, permanently modified in TDRs were 9 years for home equity and 10 years for residential mortgage. The estimated remaining lives of these loans reflect estimated prepayments, both voluntary and involuntary (i.e., foreclosures and other forced liquidations).

Active and suspended foreclosure

At December 31, 2016 and 2015, the Firm had non-PCI residential real estate loans, excluding those insured by U.S. government agencies, with a carrying value of $932 million and $1.2 billion, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Other consumer loans

The table below provides information for other consumer retained loan classes, including auto, business banking and student loans.

December 31, (in millions, except ratios)	Auto		Business banking		Student and other		Total other consumer	
	2016	2015	**2016**	2015	**2016**	2015	**2016**	2015
Loan delinquency[(a)]								
Current	**$65,029**	$ 59,442	**$ 22,312**	$ 20,887	**$ 8,397**	$ 9,405	**$95,738**	$ 89,734
30–119 days past due	**773**	804	**247**	215	**374**	445	**1,394**	1,464
120 or more days past due	**12**	9	**139**	106	**218**	246	**369**	361
Total retained loans	**$65,814**	$ 60,255	**$ 22,698**	$ 21,208	**$ 8,989**	$ 10,096	**$97,501**	$ 91,559
% of 30+ days past due to total retained loans	**1.19%**	1.35%	**1.70%**	1.51%	**1.38%** (d)	1.63% (d)	**1.33%** (d)	1.42% (d)
90 or more days past due and still accruing[(b)]	**$ —**	$ —	**$ —**	$ —	**$ 263**	$ 290	**$ 263**	$ 290
Nonaccrual loans	**214**	116	**286**	263	**175**	242	**675**	621
Geographic region								
California	**$ 7,975**	$ 7,186	**$ 4,158**	$ 3,530	**$ 935**	$ 1,051	**$13,068**	$ 11,767
Texas	**7,041**	6,457	**2,769**	2,622	**739**	839	**10,549**	9,918
New York	**4,078**	3,874	**3,510**	3,359	**1,187**	1,224	**8,775**	8,457
Illinois	**3,984**	3,678	**1,627**	1,459	**582**	679	**6,193**	5,816
Florida	**3,374**	2,843	**1,068**	941	**475**	516	**4,917**	4,300
Ohio	**2,194**	2,340	**1,366**	1,363	**490**	559	**4,050**	4,262
Arizona	**2,209**	2,033	**1,270**	1,205	**202**	236	**3,681**	3,474
Michigan	**1,567**	1,550	**1,308**	1,361	**355**	415	**3,230**	3,326
New Jersey	**2,031**	1,998	**546**	500	**320**	366	**2,897**	2,864
Louisiana	**1,814**	1,713	**961**	997	**120**	134	**2,895**	2,844
All other	**29,547**	26,583	**4,115**	3,871	**3,584**	4,077	**37,246**	34,531
Total retained loans	**$65,814**	$ 60,255	**$ 22,698**	$ 21,208	**$ 8,989**	$ 10,096	**$97,501**	$ 91,559
Loans by risk ratings[(c)]								
Noncriticized	**$13,899**	$ 11,277	**$ 16,858**	$ 15,505	**NA**	NA	**$30,757**	$ 26,782
Criticized performing	**201**	76	**816**	815	**NA**	NA	**1,017**	891
Criticized nonaccrual	**94**	—	**217**	210	**NA**	NA	**311**	210

(a) Student loan delinquency classifications included loans insured by U.S. government agencies under the FFELP as follows: current included $3.3 billion and $3.8 billion; 30-119 days past due included $257 million and $299 million; and 120 or more days past due included $211 million and $227 million at December 31, 2016 and 2015, respectively.
(b) These amounts represent student loans, insured by U.S. government agencies under the FFELP. These amounts were accruing as reimbursement of insured amounts is proceeding normally.
(c) For risk-rated business banking and auto loans, the primary credit quality indicator is the risk rating of the loan, including whether the loans are considered to be criticized and/or nonaccrual.
(d) December 31, 2016 and 2015, excluded loans 30 days or more past due and still accruing, that are insured by U.S. government agencies under the FFELP, of $468 million and $526 million, respectively. These amounts were excluded as reimbursement of insured amounts is proceeding normally.

Other consumer impaired loans and loan modifications

The following table sets forth information about the Firm's other consumer impaired loans, including risk-rated business banking and auto loans that have been placed on nonaccrual status, and loans that have been modified in TDRs.

December 31, (in millions)	**2016**	2015
Impaired loans		
With an allowance	**$ 614**	$ 527
Without an allowance[(a)]	**30**	31
Total impaired loans[(b)(c)]	**$ 644**	$ 558
Allowance for loan losses related to impaired loans	**$ 119**	$ 118
Unpaid principal balance of impaired loans[(d)]	**753**	668
Impaired loans on nonaccrual status	**508**	449

(a) When discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged off and/or there have been interest payments received and applied to the loan balance.
(b) Predominantly all other consumer impaired loans are in the U.S.
(c) Other consumer average impaired loans were $635 million, $566 million and $599 million for the years ended December 31, 2016, 2015 and 2014, respectively. The related interest income on impaired loans, including those on a cash basis, was not material for the years ended December 31, 2016, 2015 and 2014.
(d) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs, interest payments received and applied to the principal balance, net deferred loan fees or costs and unamortized discounts or premiums on purchased loans.

Loan modifications

Certain other consumer loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All of these TDRs are reported as impaired loans in the table above.The following table provides information about the Firm's other consumer loans modified in TDRs. New TDRs were not material for the years ended December 31, 2016 and 2015.

December 31, (in millions)	2016	2015
Loans modified in TDRs[(a)(b)]	$ 362	$ 384
TDRs on nonaccrual status	226	275

(a) The impact of these modifications was not material to the Firm for the years ended December 31, 2016 and 2015.
(b) Additional commitments to lend to borrowers whose loans have been modified in TDRs as of December 31, 2016 and 2015 were immaterial.

Purchased credit-impaired loans

PCI loans are initially recorded at fair value at acquisition. PCI loans acquired in the same fiscal quarter may be aggregated into one or more pools, provided that the loans have common risk characteristics. A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows. With respect to the Washington Mutual transaction, all of the consumer PCI loans were aggregated into pools of loans with common risk characteristics.

On a quarterly basis, the Firm estimates the total cash flows (both principal and interest) expected to be collected over the remaining life of each pool. These estimates incorporate assumptions regarding default rates, loss severities, the amounts and timing of prepayments and other factors that reflect then-current market conditions. Probable decreases in expected cash flows (i.e., increased credit losses) trigger the recognition of impairment, which is then measured as the present value of the expected principal loss plus any related forgone interest cash flows, discounted at the pool's effective interest rate. Impairments are recognized through the provision for credit losses and an increase in the allowance for loan losses. Probable and significant increases in expected cash flows (e.g., decreased credit losses, the net benefit of modifications) would first reverse any previously recorded allowance for loan losses with any remaining increases recognized prospectively as a yield adjustment over the remaining estimated lives of the underlying loans. The impacts of (i) prepayments, (ii) changes in variable interest rates, and (iii) any other changes in the timing of expected cash flows are recognized prospectively as adjustments to interest income.

The Firm continues to modify certain PCI loans. The impact of these modifications is incorporated into the Firm's quarterly assessment of whether a probable and significant change in expected cash flows has occurred, and the loans continue to be accounted for and reported as PCI loans. In evaluating the effect of modifications on expected cash flows, the Firm incorporates the effect of any forgone interest and also considers the potential for redefault. The Firm develops product-specific probability of default estimates, which are used to compute expected credit losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment based upon industry-wide data. The Firm also considers its own historical loss experience to-date based on actual redefaulted modified PCI loans.

The excess of cash flows expected to be collected over the carrying value of the underlying loans is referred to as the accretable yield. This amount is not reported on the Firm's Consolidated balance sheets but is accreted into interest income at a level rate of return over the remaining estimated lives of the underlying pools of loans.

If the timing and/or amounts of expected cash flows on PCI loan pools were determined not to be reasonably estimable, no interest would be accreted and the loan pools would be reported as nonaccrual loans; however, since the timing and amounts of expected cash flows for the Firm's PCI consumer loan pools are reasonably estimable, interest is being accreted and the loan pools are being reported as performing loans.

The liquidation of PCI loans, which may include sales of loans, receipt of payment in full from the borrower, or foreclosure, results in removal of the loans from the underlying PCI pool. When the amount of the liquidation proceeds (e.g., cash, real estate), if any, is less than the unpaid principal balance of the loan, the difference is first applied against the PCI pool's nonaccretable difference for principal losses (i.e., the lifetime credit loss estimate established as a purchase accounting adjustment at the acquisition date). When the nonaccretable difference for a particular loan pool has been fully depleted, any excess of the unpaid principal balance of the loan over the liquidation proceeds is written off against the PCI pool's allowance for loan losses. Beginning in 2014, write-offs of PCI loans also include other adjustments, primarily related to interest forgiveness modifications. Because the Firm's PCI loans are accounted for at a pool level, the Firm does not recognize charge-offs of PCI loans when they reach specified stages of delinquency (i.e., unlike non-PCI consumer loans, these loans are not charged off based on FFIEC standards).

The PCI portfolio affects the Firm's results of operations primarily through: (i) contribution to net interest margin; (ii) expense related to defaults and servicing resulting from the liquidation of the loans; and (iii) any provision for loan losses. The PCI loans acquired in the Washington Mutual transaction were funded based on the interest rate characteristics of the loans. For example, variable-rate loans were funded with variable-rate liabilities and fixed-rate loans were funded with fixed-rate liabilities with a similar maturity profile. A net spread will be earned on the declining balance of the portfolio, which is estimated as of December 31, 2016, to have a remaining weighted-average life of 8 years.

Residential real estate – PCI loans

The table below sets forth information about the Firm's consumer, excluding credit card, PCI loans.

December 31, (in millions, except ratios)	Home equity 2016	Home equity 2015	Prime mortgage 2016	Prime mortgage 2015	Subprime mortgage 2016	Subprime mortgage 2015	Option ARMs 2016	Option ARMs 2015	Total PCI 2016	Total PCI 2015
Carrying value[(a)]	**$12,902**	$14,989	**$ 7,602**	$ 8,893	**$ 2,941**	$ 3,263	**$12,234**	$13,853	**$35,679**	$40,998
Related allowance for loan losses[(b)]	**1,433**	1,708	**829**	985	**—**	—	**49**	49	**2,311**	2,742
Loan delinquency (based on unpaid principal balance)										
Current	**$12,423**	$14,387	**$ 6,840**	$ 7,894	**$ 3,005**	$ 3,232	**$11,074**	$12,370	**$33,342**	$37,883
30–149 days past due	**291**	322	**336**	424	**361**	439	**555**	711	**1,543**	1,896
150 or more days past due	**478**	633	**451**	601	**240**	380	**917**	1,272	**2,086**	2,886
Total loans	**$13,192**	$15,342	**$ 7,627**	$ 8,919	**$ 3,606**	$ 4,051	**$12,546**	$14,353	**$36,971**	$42,665
% of 30+ days past due to total loans	**5.83%**	6.22%	**10.32%**	11.49%	**16.67%**	20.22%	**11.73%**	13.82%	**9.82%**	11.21%
Current estimated LTV ratios (based on unpaid principal balance)[(c)(d)]										
Greater than 125% and refreshed FICO scores:										
Equal to or greater than 660	**$ 69**	$ 153	**$ 6**	$ 10	**$ 7**	$ 10	**$ 12**	$ 19	**$ 94**	$ 192
Less than 660	**39**	80	**17**	28	**31**	55	**18**	36	**105**	199
101% to 125% and refreshed FICO scores:										
Equal to or greater than 660	**555**	942	**52**	120	**39**	77	**83**	166	**729**	1,305
Less than 660	**256**	444	**84**	152	**135**	220	**144**	239	**619**	1,055
80% to 100% and refreshed FICO scores:										
Equal to or greater than 660	**1,860**	2,709	**442**	816	**214**	331	**558**	977	**3,074**	4,833
Less than 660	**804**	1,136	**381**	614	**439**	643	**609**	1,050	**2,233**	3,443
Lower than 80% and refreshed FICO scores:										
Equal to or greater than 660	**6,676**	6,724	**3,967**	4,243	**919**	863	**6,754**	7,073	**18,316**	18,903
Less than 660	**2,183**	2,265	**2,287**	2,438	**1,645**	1,642	**3,783**	4,065	**9,898**	10,410
No FICO/LTV available	**750**	889	**391**	498	**177**	210	**585**	728	**1,903**	2,325
Total unpaid principal balance	**$13,192**	$15,342	**$ 7,627**	$ 8,919	**$ 3,606**	$ 4,051	**$12,546**	$14,353	**$36,971**	$42,665
Geographic region (based on unpaid principal balance)										
California	**$ 7,899**	$ 9,205	**$ 4,396**	$ 5,172	**$ 899**	$ 1,005	**$ 7,128**	$ 8,108	**$20,322**	$23,490
Florida	**1,306**	1,479	**501**	586	**332**	373	**1,026**	1,183	**3,165**	3,621
New York	**697**	788	**515**	580	**363**	400	**711**	813	**2,286**	2,581
Washington	**673**	819	**167**	194	**68**	81	**290**	339	**1,198**	1,433
New Jersey	**280**	310	**210**	238	**125**	139	**401**	470	**1,016**	1,157
Illinois	**314**	358	**226**	263	**178**	196	**282**	333	**1,000**	1,150
Massachusetts	**94**	112	**173**	199	**110**	125	**346**	398	**723**	834
Maryland	**64**	73	**144**	159	**145**	161	**267**	297	**620**	690
Arizona	**241**	281	**124**	143	**68**	76	**181**	203	**614**	703
Virginia	**77**	88	**142**	170	**56**	62	**314**	354	**589**	674
All other	**1,547**	1,829	**1,029**	1,215	**1,262**	1,433	**1,600**	1,855	**5,438**	6,332
Total unpaid principal balance	**$13,192**	$15,342	**$ 7,627**	$ 8,919	**$ 3,606**	$ 4,051	**$12,546**	$14,353	**$36,971**	$42,665

(a) Carrying value includes the effect of fair value adjustments that were applied to the consumer PCI portfolio at the date of acquisition.
(b) Management concluded as part of the Firm's regular assessment of the PCI loan pools that it was probable that higher expected credit losses would result in a decrease in expected cash flows. As a result, an allowance for loan losses for impairment of these pools has been recognized.
(c) Represents the aggregate unpaid principal balance of loans divided by the estimated current property value. Current property values are estimated, at a minimum, quarterly, based on home valuation models using nationally recognized home price index valuation estimates incorporating actual data to the extent available and forecasted data where actual data is not available. These property values do not represent actual appraised loan level collateral values; as such, the resulting ratios are necessarily imprecise and should be viewed as estimates. Current estimated combined LTV for junior lien home equity loans considers all available lien positions, as well as unused lines, related to the property.
(d) Refreshed FICO scores represent each borrower's most recent credit score, which is obtained by the Firm on at least a quarterly basis.

Approximately 24% of the PCI home equity portfolio are senior lien loans; the remaining balance are junior lien HELOANs or HELOCs. The following table sets forth delinquency statistics for PCI junior lien home equity loans and lines of credit based on the unpaid principal balance as of December 31, 2016 and 2015.

December 31,	Total loans		Total 30+ day delinquency rate	
	2016	2015	**2016**	2015
(in millions, except ratios)				
HELOCs:[a]				
Within the revolving period[b]	**$ 2,126**	$ 5,000	**3.67%**	4.10%
Beyond the revolving period[c]	**7,452**	6,252	**4.03**	4.46
HELOANs	**465**	582	**5.38**	5.33
Total	**$ 10,043**	$ 11,834	**4.01%**	4.35%

(a) In general, these HELOCs are revolving loans for a 10-year period, after which time the HELOC converts to an interest-only loan with a balloon payment at the end of the loan's term.
(b) Substantially all undrawn HELOCs within the revolving period have been closed.
(c) Includes loans modified into fixed rate amortizing loans.

The table below sets forth the accretable yield activity for the Firm's PCI consumer loans for the years ended December 31, 2016, 2015 and 2014, and represents the Firm's estimate of gross interest income expected to be earned over the remaining life of the PCI loan portfolios. The table excludes the cost to fund the PCI portfolios, and therefore the accretable yield does not represent net interest income expected to be earned on these portfolios.

Year ended December 31, (in millions, except ratios)	Total PCI		
	2016	2015	2014
Beginning balance	**$ 13,491**	$ 14,592	$ 16,167
Accretion into interest income	**(1,555)**	(1,700)	(1,934)
Changes in interest rates on variable-rate loans	**260**	279	(174)
Other changes in expected cash flows[a]	**(428)**	230	533
Reclassification from nonaccretable difference[b]	**—**	90	—
Balance at December 31	**$ 11,768**	$ 13,491	$ 14,592
Accretable yield percentage	**4.35%**	4.20%	4.19%

(a) Other changes in expected cash flows may vary from period to period as the Firm continues to refine its cash flow model, for example cash flows expected to be collected due to the impact of modifications and changes in prepayment assumptions.
(b) Reclassifications from the nonaccretable difference in the year ended December 31, 2015 were driven by continued improvement in home prices and delinquencies, as well as increased granularity in the impairment estimates.

Active and suspended foreclosure

At December 31, 2016 and 2015, the Firm had PCI residential real estate loans with an unpaid principal balance of $1.7 billion and $2.3 billion, respectively, that were not included in REO, but were in the process of active or suspended foreclosure.

Credit card loan portfolio

The credit card portfolio segment includes credit card loans originated and purchased by the Firm. Delinquency rates are the primary credit quality indicator for credit card loans as they provide an early warning that borrowers may be experiencing difficulties (30 days past due); information on those borrowers that have been delinquent for a longer period of time (90 days past due) is also considered. In addition to delinquency rates, the geographic distribution of the loans provides insight as to the credit quality of the portfolio based on the regional economy.

While the borrower's credit score is another general indicator of credit quality, the Firm does not view credit scores as a primary indicator of credit quality because the borrower's credit score tends to be a lagging indicator. However, the distribution of such scores provides a general indicator of credit quality trends within the portfolio. Refreshed FICO score information, which is obtained at least quarterly, for a statistically significant random sample of the credit card portfolio is indicated in the following table; FICO is considered to be the industry benchmark for credit scores.

The Firm generally originates new card accounts to prime consumer borrowers. However, certain cardholders' FICO scores may decrease over time, depending on the performance of the cardholder and changes in credit score technology.

The table below sets forth information about the Firm's credit card loans.

As of or for the year ended December 31, (in millions, except ratios)	2016	2015
Net charge-offs	$ 3,442	$ 3,122
% of net charge-offs to retained loans	2.63%	2.51%
Loan delinquency		
Current and less than 30 days past due and still accruing	$ 139,434	$ 129,502
30–89 days past due and still accruing	1,134	941
90 or more days past due and still accruing	1,143	944
Total retained credit card loans	$ 141,711	$ 131,387
Loan delinquency ratios		
% of 30+ days past due to total retained loans	1.61%	1.43%
% of 90+ days past due to total retained loans	0.81	0.72
Credit card loans by geographic region		
California	$ 20,571	$ 18,802
Texas	13,220	11,847
New York	12,249	11,360
Florida	8,585	7,806
Illinois	8,189	7,655
New Jersey	6,271	5,879
Ohio	4,906	4,700
Pennsylvania	4,787	4,533
Michigan	3,741	3,562
Colorado	3,699	3,399
All other	55,493	51,844
Total retained credit card loans	$ 141,711	$ 131,387
Percentage of portfolio based on carrying value with estimated refreshed FICO scores[a]		
Equal to or greater than 660	84.4%	84.4%
Less than 660	14.2	13.1
No FICO available	1.4	2.5

(a) The current period percentage of portfolio based on carrying value with estimated refreshed FICO scores disclosures have been updated to reflect where the FICO score is unavailable. The prior period amounts have been revised to conform with the current presentation.

Credit card impaired loans and loan modifications

The table below sets forth information about the Firm's impaired credit card loans. All of these loans are considered to be impaired as they have been modified in TDRs.

December 31, (in millions)	2016	2015
Impaired credit card loans with an allowance[(a)(b)]		
Credit card loans with modified payment terms[(c)]	**$ 1,098**	$ 1,286
Modified credit card loans that have reverted to pre-modification payment terms[(d)]	**142**	179
Total impaired credit card loans[(e)]	**$ 1,240**	$ 1,465
Allowance for loan losses related to impaired credit card loans	**$ 358**	$ 460

(a) The carrying value and the unpaid principal balance are the same for credit card impaired loans.
(b) There were no impaired loans without an allowance.
(c) Represents credit card loans outstanding to borrowers enrolled in a credit card modification program as of the date presented.
(d) Represents credit card loans that were modified in TDRs but that have subsequently reverted back to the loans' pre-modification payment terms. At December 31, 2016 and 2015, $94 million and $113 million, respectively, of loans have reverted back to the pre-modification payment terms of the loans due to noncompliance with the terms of the modified loans. The remaining $48 million and $66 million at December 31, 2016 and 2015, respectively, of these loans are to borrowers who have successfully completed a short-term modification program. The Firm continues to report these loans as TDRs since the borrowers' credit lines remain closed.
(e) Predominantly all impaired credit card loans are in the U.S.

The following table presents average balances of impaired credit card loans and interest income recognized on those loans.

Year ended December 31, (in millions)	2016	2015	2014
Average impaired credit card loans	**$ 1,325**	$ 1,710	$ 2,503
Interest income on impaired credit card loans	**63**	82	123

Loan modifications

JPMorgan Chase may offer one of a number of loan modification programs to credit card borrowers who are experiencing financial difficulty. Most of the credit card loans have been modified under long-term programs for borrowers who are experiencing financial difficulties. Modifications under long-term programs involve placing the customer on a fixed payment plan, generally for 60 months. The Firm may also offer short-term programs for borrowers who may be in need of temporary relief; however, none are currently being offered. Modifications under all short- and long-term programs typically include reducing the interest rate on the credit card. Substantially all modifications are considered to be TDRs.

If the cardholder does not comply with the modified payment terms, then the credit card loan agreement reverts back to its pre-modification payment terms. Assuming that the cardholder does not begin to perform in accordance with those payment terms, the loan continues to age and will ultimately be charged-off in accordance with the Firm's standard charge-off policy. In addition, if a borrower successfully completes a short-term modification program, then the loan reverts back to its pre-modification payment terms. However, in most cases, the Firm does not reinstate the borrower's line of credit.

New enrollments in these loan modification programs for the years ended December 31, 2016, 2015 and 2014, were $636 million, $638 million and $807 million, respectively.

Financial effects of modifications and redefaults

The following table provides information about the financial effects of the concessions granted on credit card loans modified in TDRs and redefaults for the periods presented.

Year ended December 31, (in millions, except weighted-average data)	2016	2015	2014
Weighted-average interest rate of loans – before TDR	**15.56%**	15.08%	14.96%
Weighted-average interest rate of loans – after TDR	**4.76**	4.40	4.40
Loans that redefaulted within one year of modification[(a)]	**$ 79**	$ 85	$ 119

(a) Represents loans modified in TDRs that experienced a payment default in the periods presented, and for which the payment default occurred within one year of the modification. The amounts presented represent the balance of such loans as of the end of the quarter in which they defaulted.

For credit card loans modified in TDRs, payment default is deemed to have occurred when the loans become two payments past due. A substantial portion of these loans is expected to be charged-off in accordance with the Firm's standard charge-off policy. Based on historical experience, the estimated weighted-average default rate for modified credit card loans was expected to be 28.87%, 25.61% and 27.91% as of December 31, 2016, 2015 and 2014, respectively.

Wholesale loan portfolio

Wholesale loans include loans made to a variety of customers, ranging from large corporate and institutional clients to high-net-worth individuals.

The primary credit quality indicator for wholesale loans is the risk rating assigned to each loan. Risk ratings are used to identify the credit quality of loans and differentiate risk within the portfolio. Risk ratings on loans consider the PD and the LGD. The PD is the likelihood that a loan will default. The LGD is the estimated loss on the loan that would be realized upon the default of the borrower and takes into consideration collateral and structural support for each credit facility.

Management considers several factors to determine an appropriate risk rating, including the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. The Firm's definition of criticized aligns with the banking regulatory definition of criticized exposures, which consist of special mention, substandard and doubtful categories. Risk ratings generally represent ratings profiles similar to those defined by S&P and Moody's. Investment-grade ratings range from "AAA/Aaa" to "BBB-/Baa3." Noninvestment-grade ratings are classified as noncriticized ("BB+/Ba1 and B-/B3") and criticized ("CCC+"/"Caa1 and below"), and the criticized portion is further subdivided into performing and nonaccrual loans, representing management's assessment of the collectibility of principal and interest. Criticized loans have a higher probability of default than noncriticized loans.

Risk ratings are reviewed on a regular and ongoing basis by Credit Risk Management and are adjusted as necessary for updated information affecting the obligor's ability to fulfill its obligations.

As noted above, the risk rating of a loan considers the industry in which the obligor conducts its operations. As part of the overall credit risk management framework, the Firm focuses on the management and diversification of its industry and client exposures, with particular attention paid to industries with actual or potential credit concern. See Note 5 for further detail on industry concentrations.

The table below provides information by class of receivable for the retained loans in the Wholesale portfolio segment.

As of or for the year ended December 31, (in millions, except ratios)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other[d]		Total retained loans	
	2016	2015	**2016**	2015	**2016**	2015	**2016**	2015	**2016**	2015	**2016**	2015
Loans by risk ratings												
Investment grade	**$ 64,949**	$ 62,150	**$ 88,434**	$ 74,330	**$ 23,562**	$21,786	**$15,935**	$ 11,363	**$ 97,043**	$ 98,107	**$ 289,923**	$ 267,736
Noninvestment grade:												
Noncriticized	**47,149**	45,632	**16,883**	17,008	**8,317**	7,667	**439**	256	**11,772**	11,390	**84,560**	81,953
Criticized performing	**6,161**	4,542	**798**	1,251	**200**	320	**6**	7	**188**	253	**7,353**	6,373
Criticized nonaccrual	**1,482**	608	**200**	231	**9**	10	**—**	—	**263**	139	**1,954**	988
Total noninvestment grade	**54,792**	50,782	**17,881**	18,490	**8,526**	7,997	**445**	263	**12,223**	11,782	**93,867**	89,314
Total retained loans	**$119,741**	$112,932	**$106,315**	$ 92,820	**$ 32,088**	$29,783	**$16,380**	$ 11,626	**$109,266**	$109,889	**$ 383,790**	$ 357,050
% of total criticized to total retained loans	**6.38%**	4.56%	**0.94%**	1.60%	**0.65%**	1.11%	**0.04%**	0.06%	**0.41%**	0.36%	**2.43%**	2.06%
% of nonaccrual loans to total retained loans	**1.24**	0.54	**0.19**	0.25	**0.03**	0.03	**—**	—	**0.24**	0.13	**0.51**	0.28
Loans by geographic distribution[a]												
Total non-U.S.	**$ 30,259**	$ 30,063	**$ 3,292**	$ 3,003	**$ 14,741**	$17,166	**$ 3,726**	$ 1,788	**$ 39,496**	$ 42,031	**$ 91,514**	$ 94,051
Total U.S.	**89,482**	82,869	**103,023**	89,817	**17,347**	12,617	**12,654**	9,838	**69,770**	67,858	**292,276**	262,999
Total retained loans	**$119,741**	$112,932	**$106,315**	$ 92,820	**$ 32,088**	$29,783	**$16,380**	$ 11,626	**$109,266**	$109,889	**$ 383,790**	$ 357,050
Net charge-offs/(recoveries)	**$ 335**	$ 26	**$ (7)**	$ (14)	**$ (2)**	$ (5)	**$ (1)**	$ (8)	**$ 16**	$ 11	**$ 341**	$ 10
% of net charge-offs/(recoveries) to end-of-period retained loans	**0.28%**	0.02%	**(0.01)%**	(0.02)%	**(0.01)%**	(0.02)%	**(0.01)%**	(0.07)%	**0.01%**	0.01%	**0.09%**	—%
Loan delinquency[b]												
Current and less than 30 days past due and still accruing	**$117,905**	$112,058	**$105,958**	$ 92,381	**$ 32,036**	$29,713	**$16,269**	$ 11,565	**$108,350**	$108,734	**$ 380,518**	$ 354,451
30–89 days past due and still accruing	**268**	259	**155**	193	**22**	49	**107**	55	**634**	988	**1,186**	1,544
90 or more days past due and still accruing[c]	**86**	7	**2**	15	**21**	11	**4**	6	**19**	28	**132**	67
Criticized nonaccrual	**1,482**	608	**200**	231	**9**	10	**—**	—	**263**	139	**1,954**	988
Total retained loans	**$119,741**	$112,932	**$106,315**	$ 92,820	**$ 32,088**	$29,783	**$16,380**	$ 11,626	**$109,266**	$109,889	**$ 383,790**	$ 357,050

(a) The U.S. and non-U.S. distribution is determined based predominantly on the domicile of the borrower.
(b) The credit quality of wholesale loans is assessed primarily through ongoing review and monitoring of an obligor's ability to meet contractual obligations rather than relying on the past due status, which is generally a lagging indicator of credit quality.
(c) Represents loans that are considered well-collateralized and therefore still accruing interest.
(d) Other includes individuals, SPEs, holding companies, and private education and civic organizations. For more information on exposures to SPEs, see Note 16.

The following table presents additional information on the real estate class of loans within the Wholesale portfolio for the periods indicated. Exposure consists primarily of secured commercial loans, of which multifamily is the largest segment. Multifamily lending finances acquisition, leasing and construction of apartment buildings, and includes exposure to real estate investment trusts ("REITs"). Other commercial lending largely includes financing for acquisition, leasing and construction, largely for office, retail and industrial real estate, and includes exposure to REITs. Included in real estate loans is $9.2 billion and $7.3 billion as of December 31, 2016 and 2015, respectively, of construction and development exposure consisting of loans originally purposed for construction and development, general purpose loans for builders, as well as loans for land subdivision and pre-development.

December 31, (in millions, except ratios)	Multifamily		Other Commercial		Total real estate loans	
	2016	2015	**2016**	2015	**2016**	2015
Real estate retained loans	**$ 71,978**	$ 64,271	**$ 34,337**	$ 28,549	**$ 106,315**	$ 92,820
Criticized	**539**	562	**459**	920	**998**	1,482
% of criticized to total real estate retained loans	**0.75%**	0.87%	**1.34%**	3.22%	**0.94%**	1.60%
Criticized nonaccrual	**$ 57**	$ 85	**$ 143**	$ 146	**$ 200**	$ 231
% of criticized nonaccrual to total real estate retained loans	**0.08%**	0.13%	**0.42%**	0.51%	**0.19%**	0.25%

Wholesale impaired loans and loan modifications

Wholesale impaired loans consist of loans that have been placed on nonaccrual status and/or that have been modified in a TDR. All impaired loans are evaluated for an asset-specific allowance as described in Note 15.

The table below sets forth information about the Firm's wholesale impaired loans.

December 31, (in millions)	Commercial and industrial		Real estate		Financial institutions		Government agencies		Other		Total retained loans	
	2016	2015	**2016**	2015	**2016**	2015	**2016**	2015	**2016**	2015	**2016**	2015
Impaired loans												
With an allowance	**$ 1,119**	$ 522	**$ 125**	$ 148	**$ 9**	$ 10	**$ –**	$ –	**$ 187**	$ 46	**$ 1,440**	$ 726
Without an allowance[a]	**414**	98	**87**	106	**–**	–	**–**	–	**76**	94	**577**	298
Total impaired loans	**$ 1,533**	$ 620	**$ 212**	$ 254	**$ 9**	$ 10	**$ –**	$ –	**$ 263**	$ 140	**$ 2,017** [c]	$ 1,024 [c]
Allowance for loan losses related to impaired loans	**$ 258**	$ 220	**$ 18**	$ 27	**$ 3**	$ 3	**$ –**	$ –	**$ 63**	$ 24	**$ 342**	$ 274
Unpaid principal balance of impaired loans[b]	**1,754**	669	**295**	363	**12**	13	**–**	–	**284**	164	**2,345**	1,209

(a) When the discounted cash flows, collateral value or market price equals or exceeds the recorded investment in the loan, the loan does not require an allowance. This typically occurs when the impaired loans have been partially charged-off and/or there have been interest payments received and applied to the loan balance.
(b) Represents the contractual amount of principal owed at December 31, 2016 and 2015. The unpaid principal balance differs from the impaired loan balances due to various factors, including charge-offs; interest payments received and applied to the carrying value; net deferred loan fees or costs; and unamortized discount or premiums on purchased loans.
(c) Based upon the domicile of the borrower, largely consists of loans in the U.S.

The following table presents the Firm's average impaired loans for the years ended 2016, 2015 and 2014.

Year ended December 31, (in millions)	**2016**	2015	2014
Commercial and industrial	**$ 1,480**	$ 453	$ 243
Real estate	**217**	250	297
Financial institutions	**13**	13	20
Government agencies	**–**	–	–
Other	**213**	129	155
Total[a]	**$ 1,923**	$ 845	$ 715

(a) The related interest income on accruing impaired loans and interest income recognized on a cash basis were not material for the years ended December 31, 2016, 2015 and 2014.

Certain loan modifications are considered to be TDRs as they provide various concessions to borrowers who are experiencing financial difficulty. All TDRs are reported as impaired loans in the tables above. TDRs were $733 million and $208 million as of December 31, 2016 and 2015.

Note 15 – Allowance for credit losses

JPMorgan Chase's allowance for loan losses covers the consumer, including credit card, portfolio segments (primarily scored) and wholesale (risk-rated) portfolio, and represents management's estimate of probable credit losses inherent in the Firm's retained loan portfolio. The allowance for loan losses includes a formula-based component, an asset-specific component, and a component related to PCI loans, as described below. Management also estimates an allowance for wholesale and certain consumer lending-related commitments using methodologies similar to those used to estimate the allowance on the underlying loans. During 2016, the Firm did not make any significant changes to the methodologies or policies used to determine its allowance for credit losses; such policies are described in the following paragraphs.

Determining the appropriateness of the allowance is complex and requires judgment by management about the effect of matters that are inherently uncertain. Subsequent evaluations of the loan portfolio, in light of the factors then prevailing, may result in significant changes in the allowances for loan losses and lending-related commitments in future periods. At least quarterly, the allowance for credit losses is reviewed by the CRO, the CFO and the Controller of the Firm and discussed with the DRPC and the Audit Committee. As of December 31, 2016, JPMorgan Chase deemed the allowance for credit losses to be appropriate (i.e., sufficient to absorb probable credit losses inherent in the portfolio).

Formula-based component

The formula-based component is based on a statistical calculation to provide for incurred credit losses in all consumer loans and performing risk-rated loans, except for any loans restructured in TDRs and PCI loans, which are calculated as a part of the asset-specific and PCI components, respectively, and are discussed later in this Note. See Note 14 for more information on TDRs and PCI loans.

Formula-based component - Consumer loans and certain lending-related commitments

The formula-based allowance for credit losses for the consumer portfolio segments is calculated by applying statistical credit loss factors (estimated PD and loss severities) to the recorded investment balances or loan-equivalent amounts of pools of loan exposures with similar risk characteristics over a loss emergence period to arrive at an estimate of incurred credit losses. Estimated loss emergence periods may vary by product and may change over time; management applies judgment in estimating loss emergence periods, using available credit information and trends. In addition, management applies judgment to the statistical loss estimates for each loan portfolio category, using delinquency trends and other risk characteristics to estimate the total incurred credit losses in the portfolio. Management uses additional statistical methods and considers actual portfolio performance, including actual losses recognized on defaulted loans and collateral valuation trends, to review the appropriateness of the primary statistical loss estimate. The economic impact of potential modifications of residential real estate loans is not included in the statistical calculation because of the uncertainty regarding the type and results of such modifications.

The statistical calculation is then adjusted to take into consideration model imprecision, external factors and current economic events that have occurred but that are not yet reflected in the factors used to derive the statistical calculation; these adjustments are accomplished in part by analyzing the historical loss experience for each major product segment. However, it is difficult to predict whether historical loss experience is indicative of future loss levels. Management applies judgment in making this adjustment, taking into account uncertainties associated with current macroeconomic and political conditions, quality of underwriting standards, borrower behavior, the potential impact of payment recasts within the HELOC portfolio, and other relevant internal and external factors affecting the credit quality of the portfolio. In certain instances, the interrelationships between these factors create further uncertainties. For example, the performance of a HELOC that experiences a payment recast may be affected by both the quality of underwriting standards applied in originating the loan and the general economic conditions in effect at the time of the payment recast. For junior lien products, management considers the delinquency and/or modification status of any senior liens in determining the adjustment. The application of different inputs into the statistical calculation, and the assumptions used by management to adjust the statistical calculation, are subject to management judgment, and emphasizing one input or assumption over another, or considering other inputs or assumptions, could affect the estimate of the allowance for credit losses for the consumer credit portfolio.

Overall, the allowance for credit losses for the consumer portfolio, including credit card, is sensitive to changes in the economic environment (e.g., unemployment rates), delinquency rates, the realizable value of collateral (e.g., housing prices), FICO scores, borrower behavior and other risk factors. While all of these factors are important determinants of overall allowance levels, changes in the various factors may not occur at the same time or at the same rate, or changes may be directionally inconsistent such that improvement in one factor may offset deterioration in the other. In addition, changes in these factors would not necessarily be consistent across all geographies or product types. Finally, it is difficult to predict the extent to which changes in these factors would ultimately affect the frequency of losses, the severity of losses or both.

Formula-based component - Wholesale loans and lending-related commitments
The Firm's methodology for determining the allowance for loan losses and the allowance for lending-related commitments involves the early identification of credits that are deteriorating. The formula-based component of the allowance for wholesale loans and lending-related commitments is calculated by applying statistical credit loss factors (estimated PD and LGD) to the recorded investment balances or loan-equivalent amount over a loss emergence period to arrive at an estimate of incurred credit losses.

The Firm assesses the credit quality of its borrower or counterparty and assigns a risk rating. Risk ratings are assigned at origination or acquisition, and if necessary, adjusted for changes in credit quality over the life of the exposure. In assessing the risk rating of a particular loan or lending-related commitment, among the factors considered are the obligor's debt capacity and financial flexibility, the level of the obligor's earnings, the amount and sources for repayment, the level and nature of contingencies, management strength, and the industry and geography in which the obligor operates. These factors are based on an evaluation of historical and current information and involve subjective assessment and interpretation. Determining risk ratings involves significant judgment; emphasizing one factor over another or considering additional factors could affect the risk rating assigned by the Firm.

PD estimates are based on observable external through-the-cycle data, using credit rating agency default statistics.

An LGD estimate is assigned to each loan or lending-related commitment. The estimate represents the amount of economic loss if the obligor were to default. The type of obligor, quality of collateral, and the seniority of the Firm's lending exposure in the obligor's capital structure affect LGD. LGD estimates are based on the Firm's history of actual credit losses over more than one credit cycle. Changes to the time period used for PD and LGD estimates (for example, point-in-time loss versus longer-term views of the credit cycle) could also affect the allowance for credit losses.

The Firm applies judgment in estimating PD, LGD, loss emergence period and loan-equivalent amounts used in calculating the allowance for credit losses. Wherever possible, the Firm uses independent, verifiable data or the Firm's own historical loss experience in its models for estimating the allowances, but differences in characteristics between the Firm's specific loans or lending-related commitments and those reflected in external and Firm-specific historical data could affect loss estimates. Estimates of PD, LGD, loss emergence period and loan-equivalent used are subject to periodic refinement based on any changes to underlying external or Firm-specific historical data. The use of different inputs, estimates or methodologies could change the amount of the allowance for credit losses determined appropriate by the Firm.

In addition to the modeled loss estimates applied to wholesale loans and lending-related commitments, management applies its judgment to adjust the modeled loss estimates for wholesale loans, taking into consideration model imprecision, external factors and economic events that have occurred but are not yet reflected in the loss factors. Historical experience of both LGD and PD are considered when estimating these adjustments. Factors related to concentrated and deteriorating industries also are incorporated where relevant. These estimates are based on management's view of uncertainties that relate to current macroeconomic, quality of underwriting standards and other relevant internal and external factors affecting the credit quality of the current portfolio.

Asset-specific component

The asset-specific component of the allowance relates to loans considered to be impaired, which includes loans that have been modified in TDRs as well as risk-rated loans that have been placed on nonaccrual status. To determine the asset-specific component of the allowance, larger loans are evaluated individually, while smaller loans are evaluated as pools using historical loss experience for the respective class of assets. Scored loans (i.e., consumer loans) are pooled by product type, while risk-rated loans (primarily wholesale loans) are segmented by risk rating.

The Firm generally measures the asset-specific allowance as the difference between the recorded investment in the loan and the present value of the cash flows expected to be collected, discounted at the loan's original effective interest rate. Subsequent changes in impairment are reported as an adjustment to the allowance for loan losses. In certain cases, the asset-specific allowance is determined using an observable market price, and the allowance is measured as the difference between the recorded investment in the loan and the loan's fair value. Impaired collateral-dependent loans are charged down to the fair value of collateral less costs to sell. For any of these impaired loans, the amount of the asset-specific allowance required to be recorded, if any, is dependent upon the recorded investment in the loan (including prior charge-offs), expected cash flows and/or fair value of assets. See Note 14 for more information about charge-offs and collateral-dependent loans.

The asset-specific component of the allowance for impaired loans that have been modified in TDRs incorporates the effects of forgone interest, if any, in the present value calculation and also incorporates the effect of the modification on the loan's expected cash flows, which considers the potential for redefault. For residential real estate loans modified in TDRs, the Firm develops product-specific probability of default estimates, which are applied at a loan level to compute expected losses. In developing these probabilities of default, the Firm considers the relationship between the credit quality characteristics of the underlying loans and certain assumptions about home prices and unemployment, based upon industry-wide data. The Firm also considers its own historical loss experience to date based on actual redefaulted modified loans. For credit card loans modified in TDRs, expected losses incorporate projected redefaults based on the Firm's historical experience by type of modification program. For wholesale loans modified in TDRs, expected losses incorporate management's expectation of the borrower's ability to repay under the modified terms.

Estimating the timing and amounts of future cash flows is highly judgmental as these cash flow projections rely upon estimates such as loss severities, asset valuations, default rates (including redefault rates on modified loans), the amounts and timing of interest or principal payments (including any expected prepayments) or other factors that are reflective of current and expected market conditions. These estimates are, in turn, dependent on factors such as the duration of current overall economic conditions, industry-, portfolio-, or borrower-specific factors, the expected outcome of insolvency proceedings as well as, in certain circumstances, other economic factors, including the level of future home prices. All of these estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

PCI loans

In connection with the Washington Mutual transaction, JPMorgan Chase acquired certain PCI loans, which are accounted for as described in Note 14. The allowance for loan losses for the PCI portfolio is based on quarterly estimates of the amount of principal and interest cash flows expected to be collected over the estimated remaining lives of the loans.

These cash flow projections are based on estimates regarding default rates (including redefault rates on modified loans), loss severities, the amounts and timing of prepayments and other factors that are reflective of current and expected future market conditions. These estimates are dependent on assumptions regarding the level of future home prices, and the duration of current overall economic conditions, among other factors. These estimates and assumptions require significant management judgment and certain assumptions are highly subjective.

Allowance for credit losses and related information

The table below summarizes information about the allowances for loan losses, and lending-relating commitments, and includes a breakdown of loans and lending-related commitments by impairment methodology.

Year ended December 31, (in millions)	2016			
	Consumer, excluding credit card	Credit card	Wholesale	Total
Allowance for loan losses				
Beginning balance at January 1,	$ 5,806	$ 3,434	$ 4,315	$ 13,555
Gross charge-offs	1,500	3,799	398	5,697
Gross recoveries	(591)	(357)	(57)	(1,005)
Net charge-offs/(recoveries)	909	3,442	341	4,692
Write-offs of PCI loans[a]	156	–	–	156
Provision for loan losses	467	4,042	571	5,080
Other	(10)	–	(1)	(11)
Ending balance at December 31,	$ 5,198	$ 4,034	$ 4,544	$ 13,776
Allowance for loan losses by impairment methodology				
Asset-specific[b]	$ 308	$ 358 [c]	$ 342	$ 1,008
Formula-based	2,579	3,676	4,202	10,457
PCI	2,311	–	–	2,311
Total allowance for loan losses	$ 5,198	$ 4,034	$ 4,544	$ 13,776
Loans by impairment methodology				
Asset-specific	$ 8,940	$ 1,240	$ 2,017	$ 12,197
Formula-based	319,787	140,471	381,770	842,028
PCI	35,679	–	3	35,682
Total retained loans	$ 364,406	$ 141,711	$ 383,790	$ 889,907
Impaired collateral-dependent loans				
Net charge-offs	$ 98	$ –	$ 7	$ 105
Loans measured at fair value of collateral less cost to sell	2,391	–	300	2,691
Allowance for lending-related commitments				
Beginning balance at January 1,	$ 14	$ –	$ 772	$ 786
Provision for lending-related commitments	–	–	281	281
Other	12	–	(1)	11
Ending balance at December 31,	$ 26	$ –	$ 1,052	$ 1,078
Allowance for lending-related commitments by impairment methodology				
Asset-specific	$ –	$ –	$ 169	$ 169
Formula-based	26	–	883	909
Total allowance for lending-related commitments	$ 26	$ –	$ 1,052	$ 1,078
Lending-related commitments by impairment methodology				
Asset-specific	$ –	$ –	$ 506	$ 506
Formula-based	54,797	553,891	367,508	976,196
Total lending-related commitments	$ 54,797	$ 553,891	$ 368,014	$ 976,702

(a) Write-offs of PCI loans are recorded against the allowance for loan losses when actual losses for a pool exceed estimated losses that were recorded as purchase accounting adjustments at the time of acquisition. A write-off of a PCI loan is recognized when the underlying loan is removed from a pool (e.g., upon liquidation). During the fourth quarter of 2014, the Firm recorded a $291 million adjustment to reduce the PCI allowance and the recorded investment in the Firm's PCI loan portfolio, primarily reflecting the cumulative effect of interest forgiveness modifications. This adjustment had no impact to the Firm's Consolidated statements of income.

(b) Includes risk-rated loans that have been placed on nonaccrual status and loans that have been modified in a TDR.

(c) The asset-specific credit card allowance for loan losses is related to loans that have been modified in a TDR; such allowance is calculated based on the loans' original contractual interest rates and does not consider any incremental penalty rates.

(d) Effective January 1, 2015, the Firm no longer includes within its disclosure of wholesale lending-related commitments the unused amount of advised uncommitted lines of credit as it is within the Firm's discretion whether or not to make a loan under these lines, and the Firm's approval is generally required prior to funding. Prior period amounts have been revised to conform with the current period presentation.

(table continued from previous page)

2015				2014			
Consumer, excluding credit card	Credit card	Wholesale	Total	Consumer, excluding credit card	Credit card	Wholesale	Total
$ 7,050	$ 3,439	$ 3,696	$ 14,185	$ 8,456	$ 3,795	$ 4,013	$ 16,264
1,658	3,488	95	5,241	2,132	3,831	151	6,114
(704)	(366)	(85)	(1,155)	(814)	(402)	(139)	(1,355)
954	3,122	10	4,086	1,318	3,429	12	4,759
208	–	–	208	533	–	–	533
(82)	3,122	623	3,663	414	3,079	(269)	3,224
–	(5)	6	1	31	(6)	(36)	(11)
$ 5,806	$ 3,434	$ 4,315	$ 13,555	$ 7,050	$ 3,439	$ 3,696	$ 14,185
$ 364	$ 460 (c)	$ 274	$ 1,098	$ 539	$ 500 (c)	$ 87	$ 1,126
2,700	2,974	4,041	9,715	3,186	2,939	3,609	9,734
2,742	–	–	2,742	3,325	–	–	3,325
$ 5,806	$ 3,434	$ 4,315	$ 13,555	$ 7,050	$ 3,439	$ 3,696	$ 14,185
$ 9,606	$ 1,465	$ 1,024	$ 12,095	$ 12,020	$ 2,029	$ 637	$ 14,686
293,751	129,922	356,022	779,695	236,263	125,998	323,861	686,122
40,998	–	4	41,002	46,696	–	4	46,700
$ 344,355	$ 131,387	$ 357,050	$ 832,792	$ 294,979	$ 128,027	$ 324,502	$ 747,508
$ 104	$ –	$ 16	$ 120	$ 133	$ –	$ 21	$ 154
2,566	–	283	2,849	3,025	–	326	3,351
$ 13	$ –	$ 609	$ 622	$ 8	$ –	$ 697	$ 705
1	–	163	164	5	–	(90)	(85)
–	–	–	–	–	–	2	2
$ 14	$ –	$ 772	$ 786	$ 13	$ –	$ 609	$ 622
$ –	$ –	$ 73	$ 73	$ –	$ –	$ 60	$ 60
14	–	699	713	13	–	549	562
$ 14	$ –	$ 772	$ 786	$ 13	$ –	$ 609	$ 622
$ –	$ –	$ 193	$ 193	$ –	$ –	$ 103	$ 103
58,478	515,518	366,206 (d)	940,202	58,153	525,963	366,778 (d)	950,894
$ 58,478	$ 515,518	$ 366,399	$ 940,395	$ 58,153	$ 525,963	$ 366,881	$ 950,997

Note 16 – Variable interest entities

For a further description of JPMorgan Chase's accounting policies regarding consolidation of VIEs, see Note 1.

The following table summarizes the most significant types of Firm-sponsored VIEs by business segment. The Firm considers a "sponsored" VIE to include any entity where: (1) JPMorgan Chase is the primary beneficiary of the structure; (2) the VIE is used by JPMorgan Chase to securitize Firm assets; (3) the VIE issues financial instruments with the JPMorgan Chase name; or (4) the entity is a JPMorgan Chase–administered asset-backed commercial paper conduit.

Line of Business	*Transaction Type*	*Activity*	*Annual Report page references*
CCB	Credit card securitization trusts	Securitization of both originated and purchased credit card receivables	232
	Mortgage securitization trusts	Servicing and securitization of both originated and purchased residential mortgages	233–235
CIB	Mortgage and other securitization trusts	Securitization of both originated and purchased residential and commercial mortgages and student loans	233–235
	Multi-seller conduits Investor intermediation activities:	Assist clients in accessing the financial markets in a cost-efficient manner and structures transactions to meet investor needs	235–237
	Municipal bond vehicles		235–236

The Firm's other business segments are also involved with VIEs, but to a lesser extent, as follows:

- Asset & Wealth Management: AWM sponsors and manages certain funds that are deemed VIEs. As asset manager of the funds, AWM earns a fee based on assets managed; the fee varies with each fund's investment objective and is competitively priced. For fund entities that qualify as VIEs, AWM's interests are, in certain cases, considered to be significant variable interests that result in consolidation of the financial results of these entities.
- Commercial Banking: CB makes investments in and provides lending to community development entities that may meet the definition of a VIE. In addition, CB provides financing and lending-related services to certain client-sponsored VIEs. In general, CB does not control the activities of these entities and does not consolidate these entities.
- Corporate: Corporate is involved with entities that may meet the definition of VIEs; however these entities are generally subject to specialized investment company accounting, which does not require the consolidation of investments, including VIEs.

The Firm also invests in and provides financing and other services to VIEs sponsored by third parties, as described on page 237 of this Note.

Significant Firm-sponsored variable interest entities

Credit card securitizations

The Card business securitizes both originated and purchased credit card loans, primarily through the Chase Issuance Trust (the "Trust"). The Firm's continuing involvement in credit card securitizations includes servicing the receivables, retaining an undivided seller's interest in the receivables, retaining certain senior and subordinated securities and maintaining escrow accounts.

The Firm is considered to be the primary beneficiary of these Firm-sponsored credit card securitization trusts based on the Firm's ability to direct the activities of these VIEs through its servicing responsibilities and other duties, including making decisions as to the receivables that are transferred into those trusts and as to any related modifications and workouts. Additionally, the nature and extent of the Firm's other continuing involvement with the trusts, as indicated above, obligates the Firm to absorb losses and gives the Firm the right to receive certain benefits from these VIEs that could potentially be significant.

The underlying securitized credit card receivables and other assets of the securitization trusts are available only for payment of the beneficial interests issued by the securitization trusts; they are not available to pay the Firm's other obligations or the claims of the Firm's creditors.

The agreements with the credit card securitization trusts require the Firm to maintain a minimum undivided interest in the credit card trusts (generally 5%). As of December 31, 2016 and 2015, the Firm held undivided interests in Firm-sponsored credit card securitization trusts of $8.9 billion and $13.6 billion, respectively. The Firm maintained an average undivided interest in principal receivables owned by those trusts of approximately 16% and 22% for the years ended December 31, 2016 and 2015. As of both December 31, 2016 and 2015, the Firm did not retain any senior securities and retained $5.3 billion of subordinated securities in certain of its credit card securitization trusts. The Firm's undivided interests in the credit card trusts and securities retained are eliminated in consolidation.

Firm-sponsored mortgage and other securitization trusts

The Firm securitizes (or has securitized) originated and purchased residential mortgages, commercial mortgages and other consumer loans (including student loans) primarily in its CCB and CIB businesses. Depending on the particular transaction, as well as the respective business involved, the Firm may act as the servicer of the loans and/or retain certain beneficial interests in the securitization trusts.

The following table presents the total unpaid principal amount of assets held in Firm-sponsored private-label securitization entities, including those in which the Firm has continuing involvement, and those that are consolidated by the Firm. Continuing involvement includes servicing the loans, holding senior interests or subordinated interests, recourse or guarantee arrangements, and derivative transactions. In certain instances, the Firm's only continuing involvement is servicing the loans. See Securitization activity on page 238 of this Note for further information regarding the Firm's cash flows with and interests retained in nonconsolidated VIEs, and pages 238-239 of this Note for information on the Firm's loan sales to U.S. government agencies.

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs[c][d][e]		
December 31, 2016 (in millions)	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	AFS securities	Total interests held by JPMorgan Chase
Securitization-related[a]						
Residential mortgage:						
Prime/Alt-A and option ARMs	**$ 76,789**	**$ 4,209**	**$ 57,543**	**$ 226**	**$ 1,334**	**$ 1,560**
Subprime	**21,542**	**—**	**19,903**	**76**	**—**	**76**
Commercial and other[b]	**101,265**	**107**	**71,464**	**509**	**2,064**	**2,573**
Total	**$ 199,596**	**$ 4,316**	**$ 148,910**	**$ 811**	**$ 3,398**	**$ 4,209**

	Principal amount outstanding			JPMorgan Chase interest in securitized assets in nonconsolidated VIEs[c][d][e]		
December 31, 2015 (in millions)	Total assets held by securitization VIEs	Assets held in consolidated securitization VIEs	Assets held in nonconsolidated securitization VIEs with continuing involvement	Trading assets	AFS securities	Total interests held by JPMorgan Chase
Securitization-related[a]						
Residential mortgage:						
Prime/Alt-A and option ARMs	$ 85,687	$ 1,400	$ 66,708	$ 394	$ 1,619	$ 2,013
Subprime	24,389	64	22,549	109	—	109
Commercial and other[b]	123,474	107	80,319	447	3,451	3,898
Total	$ 233,550	$ 1,571	$ 169,576	$ 950	$ 5,070	$ 6,020

(a) Excludes U.S. government agency securitizations and re-securitizations, which are not Firm-sponsored. See pages 238-239 of this Note for information on the Firm's loan sales to U.S. government agencies.
(b) Consists of securities backed by commercial loans (predominantly real estate) and non-mortgage-related consumer receivables purchased from third parties.
(c) Excludes the following: retained servicing (see Note 17 for a discussion of MSRs); securities retained from loan sales to U.S. government agencies; interest rate and foreign exchange derivatives primarily used to manage interest rate and foreign exchange risks of securitization entities (See Note 6 for further information on derivatives); senior and subordinated securities of $180 million and $49 million, respectively, at December 31, 2016, and $163 million and $73 million, respectively, at December 31, 2015, which the Firm purchased in connection with CIB's secondary market-making activities.
(d) Includes interests held in re-securitization transactions.
(e) As of December 31, 2016 and 2015, 61% and 76%, respectively, of the Firm's retained securitization interests, which are carried at fair value, were risk-rated "A" or better, on an S&P-equivalent basis. The retained interests in prime residential mortgages consisted of $1.5 billion and $1.9 billion of investment-grade and $77 million and $93 million of noninvestment-grade retained interests at December 31, 2016 and 2015, respectively. The retained interests in commercial and other securitizations trusts consisted of $2.4 billion and $3.7 billion of investment-grade and $210 million and $198 million of noninvestment-grade retained interests at December 31, 2016 and 2015, respectively.

Residential mortgage
The Firm securitizes residential mortgage loans originated by CCB, as well as residential mortgage loans purchased from third parties by either CCB or CIB. CCB generally retains servicing for all residential mortgage loans it originated or purchased, and for certain mortgage loans purchased by CIB. For securitizations of loans serviced by CCB, the Firm has the power to direct the significant activities of the VIE because it is responsible for decisions related to loan modifications and workouts. CCB may also retain an interest upon securitization.

In addition, CIB engages in underwriting and trading activities involving securities issued by Firm-sponsored securitization trusts. As a result, CIB at times retains senior and/or subordinated interests (including residual interests) in residential mortgage securitizations at the time of securitization, and/or reacquires positions in the secondary market in the normal course of business. In certain instances, as a result of the positions retained or reacquired by CIB or held by CCB, when considered together with the servicing arrangements entered into by CCB, the Firm is deemed to be the primary beneficiary of certain securitization trusts. See the table on page 237 of this Note for more information on consolidated residential mortgage securitizations.

The Firm does not consolidate a residential mortgage securitization (Firm-sponsored or third-party-sponsored) when it is not the servicer (and therefore does not have the power to direct the most significant activities of the trust) or does not hold a beneficial interest in the trust that could potentially be significant to the trust. At December 31, 2016 and 2015, the Firm did not consolidate the assets of certain Firm-sponsored residential mortgage securitization VIEs, in which the Firm had continuing involvement, primarily due to the fact that the Firm did not hold an interest in these trusts that could potentially be significant to the trusts. See the table on page 237 of this Note for more information on the consolidated residential mortgage securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated residential mortgage securitizations.

Commercial mortgages and other consumer securitizations
CIB originates and securitizes commercial mortgage loans, and engages in underwriting and trading activities involving the securities issued by securitization trusts. CIB may retain unsold senior and/or subordinated interests in commercial mortgage securitizations at the time of securitization but, generally, the Firm does not service commercial loan securitizations. For commercial mortgage securitizations the power to direct the significant activities of the VIE generally is held by the servicer or investors in a specified class of securities ("controlling class"). The Firm generally does not retain an interest in the controlling class in its sponsored commercial mortgage securitization transactions. See the table on page 237 of this Note for more information on the consolidated commercial mortgage securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated securitizations.

The Firm retains servicing responsibilities for certain student loan securitizations. The Firm has the power to direct the activities of these VIEs through these servicing responsibilities. See the table on page 237 of this Note for more information on the consolidated student loan securitizations, and the table on the previous page of this Note for further information on interests held in nonconsolidated securitizations.

Re-securitizations
The Firm engages in certain re-securitization transactions in which debt securities are transferred to a VIE in exchange for new beneficial interests. These transfers occur in connection with both agency (Federal National Mortgage Association ("Fannie Mae"), Federal Home Loan Mortgage Corporation ("Freddie Mac") and Government National Mortgage Association ("Ginnie Mae")) and nonagency (private-label) sponsored VIEs, which may be backed by either residential or commercial mortgages. The Firm's consolidation analysis is largely dependent on the Firm's role and interest in the re-securitization trusts. During the years ended December 31, 2016, 2015 and 2014, the Firm transferred $11.2 billion, $21.9 billion and $22.7 billion, respectively, of securities to agency VIEs, and $647 million, $777 million and $1.1 billion, respectively, of securities to private-label VIEs.

Most re-securitizations with which the Firm is involved are client-driven transactions in which a specific client or group of clients is seeking a specific return or risk profile. For these transactions, the Firm has concluded that the decision-making power of the entity is shared between the Firm and its clients, considering the joint effort and decisions in establishing the re-securitization trust and its assets, as well as the significant economic interest the client holds in the re-securitization trust; therefore the Firm does not consolidate the re-securitization VIE.

In more limited circumstances, the Firm creates a nonagency re-securitization trust independently and not in conjunction with specific clients. In these circumstances, the Firm is deemed to have the unilateral ability to direct the most significant activities of the re-securitization trust because of the decisions made during the establishment and design of the trust; therefore, the Firm consolidates the re-securitization VIE if the Firm holds an interest that could potentially be significant.

Additionally, the Firm may invest in beneficial interests of third-party re-securitizations and generally purchases these interests in the secondary market. In these circumstances, the Firm does not have the unilateral ability to direct the most significant activities of the re-securitization trust, either because it was not involved in the initial design of the trust, or the Firm is involved with an independent third-party sponsor and demonstrates shared power over the creation of the trust; therefore, the Firm does not consolidate the re-securitization VIE.

As of December 31, 2016 and 2015, total assets (including the notional amount of interest-only securities) of nonconsolidated Firm-sponsored private-label re-securitization entities in which the Firm has continuing involvement were $875 million and $2.2 billion, respectively. At December 31, 2016 and 2015, the Firm held $2.0 billion and $4.6 billion, respectively, of interests in nonconsolidated agency re-securitization entities. The Firm's exposure to non-consolidated private-label re-securitization entities as of December 31, 2016 and 2015 was not material. As of December 31, 2016 and 2015, the Firm did not consolidate any agency re-securitizations. As of December 31, 2016 and 2015, the Firm consolidated an insignificant amount of assets and liabilities of Firm-sponsored private-label re-securitizations.

Multi-seller conduits

Multi-seller conduit entities are separate bankruptcy remote entities that provide secured financing, collateralized by pools of receivables and other financial assets, to customers of the Firm. The conduits fund their financing facilities through the issuance of highly rated commercial paper. The primary source of repayment of the commercial paper is the cash flows from the pools of assets. In most instances, the assets are structured with deal-specific credit enhancements provided to the conduits by the customers (i.e., sellers) or other third parties. Deal-specific credit enhancements are generally structured to cover a multiple of historical losses expected on the pool of assets, and are typically in the form of overcollateralization provided by the seller. The deal-specific credit enhancements mitigate the Firm's potential losses on its agreements with the conduits.

To ensure timely repayment of the commercial paper, and to provide the conduits with funding to provide financing to customers in the event that the conduits do not obtain funding in the commercial paper market, each asset pool financed by the conduits has a minimum 100% deal-specific liquidity facility associated with it provided by JPMorgan Chase Bank, N.A. JPMorgan Chase Bank, N.A. also provides the multi-seller conduit vehicles with uncommitted program-wide liquidity facilities and program-wide credit enhancement in the form of standby letters of credit. The amount of program-wide credit enhancement required is based upon commercial paper issuance and approximates 10% of the outstanding balance of commercial paper.

The Firm consolidates its Firm-administered multi-seller conduits, as the Firm has both the power to direct the significant activities of the conduits and a potentially significant economic interest in the conduits. As administrative agent and in its role in structuring transactions, the Firm makes decisions regarding asset types and credit quality, and manages the commercial paper funding needs of the conduits. The Firm's interests that could potentially be significant to the VIEs include the fees received as administrative agent and liquidity and program-wide credit enhancement provider, as well as the potential exposure created by the liquidity and credit enhancement facilities provided to the conduits. See page 237 of this Note for further information on consolidated VIE assets and liabilities.

In the normal course of business, JPMorgan Chase makes markets in and invests in commercial paper issued by the Firm-administered multi-seller conduits. The Firm held $21.2 billion and $15.7 billion of the commercial paper issued by the Firm-administered multi-seller conduits at December 31, 2016 and 2015, respectively. The Firm's investments reflect the Firm's funding needs and capacity and were not driven by market illiquidity. The Firm is not obligated under any agreement to purchase the commercial paper issued by the Firm-administered multi-seller conduits.

Deal-specific liquidity facilities, program-wide liquidity and credit enhancement provided by the Firm have been eliminated in consolidation. The Firm or the Firm-administered multi-seller conduits provide lending-related commitments to certain clients of the Firm-administered multi-seller conduits. The unfunded commitments were $7.4 billion and $5.6 billion at December 31, 2016 and 2015, respectively, and are reported as off-balance sheet lending-related commitments. For more information on off-balance sheet lending-related commitments, see Note 29.

VIEs associated with investor intermediation activities

As a financial intermediary, the Firm creates certain types of VIEs and also structures transactions with these VIEs, typically using derivatives, to meet investor needs. The Firm may also provide liquidity and other support. The risks inherent in the derivative instruments or liquidity commitments are managed similarly to other credit, market or liquidity risks to which the Firm is exposed. The principal types of VIEs for which the Firm is engaged in on behalf of clients are municipal bond vehicles.

Municipal bond vehicles

Municipal bond vehicles or tender option bond ("TOB") trusts allow investors to finance their municipal bond investments at short-term rates. In a typical TOB transaction, the trust purchases highly rated municipal bond(s) of a single issuer and funds the purchase by issuing two types of securities: (1) puttable floating-rate certificates ("Floaters") and (2) inverse floating-rate residual interests ("Residuals"). The Floaters are typically purchased by money market funds or other short-term investors and may be tendered, with requisite notice, to the TOB trust. The Residuals are retained by the investor seeking to finance its municipal bond investment. TOB transactions where the Residual is held by a third party investor are typically known as Customer TOB trusts, and Non-Customer TOB trusts are transactions where the Residual is retained by the Firm. The Firm serves as sponsor for all Non-Customer TOB transactions and certain Customer TOB transactions established prior to 2014. The Firm may provide various services to a TOB trust, including remarketing agent, liquidity or tender option provider, and/or sponsor.

J.P. Morgan Securities LLC may serve as a remarketing agent on the Floaters for TOB trusts. The remarketing agent is responsible for establishing the periodic variable rate on the Floaters, conducting the initial placement and remarketing tendered Floaters. The remarketing agent may, but is not obligated to, make markets in Floaters. At December 31, 2016 and 2015, the Firm held an insignificant amount of Floaters on its Consolidated balance sheets and did not hold any significant amounts during 2016 and 2015.

JPMorgan Chase Bank, N.A. or J.P. Morgan Securities LLC often serves as the sole liquidity or tender option provider for the TOB trusts. The liquidity provider's obligation to perform is conditional and is limited by certain events ("Termination Events"), which include bankruptcy or failure to pay by the municipal bond issuer or credit enhancement provider, an event of taxability on the municipal bonds or the immediate downgrade of the municipal bond to below investment grade. In addition, the liquidity provider's exposure is typically further limited by the high credit quality of the underlying municipal bonds, the excess collateralization in the vehicle, or, in certain transactions, the reimbursement agreements with the Residual holders.

Holders of the Floaters may "put," or tender, their Floaters to the TOB trust. If the remarketing agent cannot successfully remarket the Floaters to another investor, the liquidity provider either provides a loan to the TOB trust for the TOB trust's purchase of the Floaters, or it directly purchases the tendered Floaters. In certain Customer TOB transactions, the Firm, as liquidity provider, has entered into a reimbursement agreement with the Residual holder. In those transactions, upon the termination of the vehicle, if the proceeds from the sale of the underlying municipal bonds are not sufficient to repay amounts owed to the Firm, as liquidity or tender option provider, the Firm has recourse to the third party Residual holders for any shortfall. Residual holders with reimbursement agreements are required to post collateral with the Firm to support such reimbursement obligations should the market value of the underlying municipal bonds decline. The Firm does not have any intent to protect Residual holders from potential losses on any of the underlying municipal bonds.

TOB trusts are considered to be variable interest entities. The Firm consolidates Non-Customer TOB trusts because as the Residual holder, the Firm has the right to make decisions that significantly impact the economic performance of the municipal bond vehicle, and it has the right to receive benefits and bear losses that could potentially be significant to the municipal bond vehicle. The Firm does not consolidate Customer TOB trusts, since the Firm does not have the power to make decisions that significantly impact the economic performance of the municipal bond vehicle. Certain non-consolidated Customer TOB trusts are sponsored by a third party, and not the Firm. See page 237 of this Note for further information on consolidated municipal bond vehicles.

The Firm's exposure to nonconsolidated municipal bond VIEs at December 31, 2016 and 2015, including the ratings profile of the VIEs' assets, was as follows.

December 31, (in millions)	Fair value of assets held by VIEs	Liquidity facilities	Excess/(deficit)[(a)]	Maximum exposure
Nonconsolidated municipal bond vehicles				
2016	**$ 1,096**	**$ 662**	**$ 434**	**$ 662**
2015	6,937	3,794	3,143	3,794

	Ratings profile of VIE assets[(b)]						
	Investment-grade						
December 31, (in millions, except where otherwise noted)	AAA to AAA-	AA+ to AA-	A+ to A-	BBB+ to BBB-	Unrated[(c)]	Fair value of assets held by VIEs	Wt. avg. expected life of assets (years)
2016	**$ 264**	**$ 700**	**$ 43**	**$ 24**	**$ 65**	**$ 1,096**	**1.6**
2015	1,743	4,631	448	24	91	$ 6,937	4.0

(a) Represents the excess/(deficit) of the fair values of municipal bond assets available to repay the liquidity facilities, if drawn.
(b) The ratings scale is presented on an S&P-equivalent basis.
(c) These security positions have been defeased by the municipality and no longer carry credit ratings, but are backed by high-quality assets such as U.S. treasuries and cash.

VIEs sponsored by third parties

The Firm enters into transactions with VIEs structured by other parties. These include, for example, acting as a derivative counterparty, liquidity provider, investor, underwriter, placement agent, remarketing agent, trustee or custodian. These transactions are conducted at arm's-length, and individual credit decisions are based on the analysis of the specific VIE, taking into consideration the quality of the underlying assets. Where the Firm does not have the power to direct the activities of the VIE that most significantly impact the VIE's economic performance, or a variable interest that could potentially be significant, the Firm records and reports these positions on its Consolidated balance sheets in the same manner it would record and report positions in respect of any other third-party transaction.

Consolidated VIE assets and liabilities

The following table presents information on assets and liabilities related to VIEs consolidated by the Firm as of December 31, 2016 and 2015.

	Assets				Liabilities		
December 31, 2016 (in millions)	Trading assets	Loans	Other[(c)]	Total assets[(d)]	Beneficial interests in VIE assets[(e)]	Other[(f)]	Total liabilities
VIE program type[(a)]							
Firm-sponsored credit card trusts	**$ –**	**$ 45,919**	**$ 790**	**$ 46,709**	**$ 31,181**	**$ 18**	**$ 31,199**
Firm-administered multi-seller conduits	**–**	**23,760**	**43**	**23,803**	**2,719**	**33**	**2,752**
Municipal bond vehicles	**2,897**	**–**	**8**	**2,905**	**2,969**	**2**	**2,971**
Mortgage securitization entities[(b)]	**143**	**4,246**	**103**	**4,492**	**468**	**313**	**781**
Student loan securitization entities	**–**	**1,689**	**59**	**1,748**	**1,527**	**4**	**1,531**
Other	**145**	**–**	**2,318**	**2,463**	**183**	**120**	**303**
Total	**$ 3,185**	**$ 75,614**	**$ 3,321**	**$ 82,120**	**$ 39,047**	**$ 490**	**$ 39,537**

	Assets				Liabilities		
December 31, 2015 (in millions)	Trading assets	Loans	Other[(c)]	Total assets[(d)]	Beneficial interests in VIE assets[(e)]	Other[(f)]	Total liabilities
VIE program type[(a)]							
Firm-sponsored credit card trusts	$ –	$ 47,358	$ 718	$ 48,076	$ 27,906	$ 15	$ 27,921
Firm-administered multi-seller conduits	–	24,388	37	24,425	8,724	19	8,743
Municipal bond vehicles	2,686	–	5	2,691	2,597	1	2,598
Mortgage securitization entities[(b)]	840	1,433	27	2,300	777	643	1,420
Student loan securitization entities	–	1,925	62	1,987	1,760	5	1,765
Other	210	–	1,916	2,126	115	126	241
Total	$ 3,736	$ 75,104	$ 2,765	$ 81,605	$ 41,879	$ 809	$ 42,688

(a) Excludes intercompany transactions, which are eliminated in consolidation.
(b) Includes residential and commercial mortgage securitizations as well as re-securitizations.
(c) Includes assets classified as cash, AFS securities, and other assets on the Consolidated balance sheets.
(d) The assets of the consolidated VIEs included in the program types above are used to settle the liabilities of those entities. The difference between total assets and total liabilities recognized for consolidated VIEs represents the Firm's interest in the consolidated VIEs for each program type.
(e) The interest-bearing beneficial interest liabilities issued by consolidated VIEs are classified in the line item on the Consolidated balance sheets titled, "Beneficial interests issued by consolidated variable interest entities." The holders of these beneficial interests do not have recourse to the general credit of JPMorgan Chase. Included in beneficial interests in VIE assets are long-term beneficial interests of $33.4 billion and $30.6 billion at December 31, 2016 and 2015, respectively. The maturities of the long-term beneficial interests as of December 31, 2016, were as follows: $11.6 billion under one year, $19.1 billion between one and five years, and $2.7 billion over five years.
(f) Includes liabilities classified as accounts payable and other liabilities on the Consolidated balance sheets.

Loan securitizations

The Firm has securitized and sold a variety of loans, including residential mortgage, credit card, student and commercial (primarily related to real estate) loans, as well as debt securities. The purposes of these securitization transactions were to satisfy investor demand and to generate liquidity for the Firm.

For loan securitizations in which the Firm is not required to consolidate the trust, the Firm records the transfer of the loan receivable to the trust as a sale when all of the following accounting criteria for a sale are met: (1) the transferred financial assets are legally isolated from the Firm's creditors; (2) the transferee or beneficial interest holder can pledge or exchange the transferred financial assets; and (3) the Firm does not maintain effective control over the transferred financial assets (e.g., the Firm cannot repurchase the transferred assets before their maturity and it does not have the ability to unilaterally cause the holder to return the transferred assets).

For loan securitizations accounted for as a sale, the Firm recognizes a gain or loss based on the difference between the value of proceeds received (including cash, beneficial interests, or servicing assets received) and the carrying value of the assets sold. Gains and losses on securitizations are reported in noninterest revenue.

Securitization activity

The following table provides information related to the Firm's securitization activities for the years ended December 31, 2016, 2015 and 2014, related to assets held in Firm-sponsored securitization entities that were not consolidated by the Firm, and where sale accounting was achieved based on the accounting rules in effect at the time of the securitization.

	2016		2015		2014	
Year ended December 31, (in millions, except rates)	Residential mortgage(c)(d)	Commercial and other(d)(e)	Residential mortgage(c)(d)	Commercial and other(d)(e)	Residential mortgage(c)(d)	Commercial and other(d)(e)
Principal securitized	**$ 1,817**	**$ 8,964**	$ 3,008	$ 11,933	$ 2,558	$ 11,911
All cash flows during the period:(a)						
Proceeds received from loan sales as cash	**$ –**	**$ –**	$ –	$ –	$ –	$ 568
Proceeds received from loan sales as securities						
Level 2	**1,831**	**9,092**	2,963	11,968	2,384	11,381
Level 3	**–**	**2**	59	43	185	130
Total proceeds received from loan sales	**$ 1,831**	**$ 9,094**	$ 3,022	$ 12,011	$ 2,569	$ 12,079
Servicing fees collected	**477**	**3**	528	3	557	4
Purchases of previously transferred financial assets (or the underlying collateral)(b)	**37**	**–**	3	–	121	–
Cash flows received on interests	**482**	**1,441**	407	597	179	578

(a) Excludes re-securitization transactions.
(b) Includes cash paid by the Firm to reacquire assets from off-balance sheet, nonconsolidated entities – for example, loan repurchases due to representation and warranties and servicer "clean-up" calls.
(c) Includes prime/Alt-A, subprime, and option ARMs. Excludes certain loan securitization transactions entered into with Ginnie Mae, Fannie Mae and Freddie Mac.
(d) Key assumptions used to measure residential mortgage retained interests originated during the year included weighted-average life (in years) of 4.5, 4.2 and 5.9 for the years ended December 31, 2016, 2015 and 2014, respectively, and weighted-average discount rate of 4.2%, 2.9% and 3.4% for the years ended December 31, 2016, 2015 and 2014, respectively. Key assumptions used to measure commercial and other retained interests originated during the year included weighted-average life (in years) of 6.2, 6.2 and 6.5 for the years ended December 31, 2016, 2015 and 2014, respectively, and weighted-average discount rate of 5.8%, 4.1% and 4.8% for the years ended December 31, 2016, 2015 and 2014, respectively.
(e) Includes commercial mortgage and student loan securitizations.

Loans and excess MSRs sold to U.S. government-sponsored enterprises, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities

In addition to the amounts reported in the securitization activity tables above, the Firm, in the normal course of business, sells originated and purchased mortgage loans and certain originated excess MSRs on a nonrecourse basis, predominantly to U.S. government sponsored enterprises ("U.S. GSEs"). These loans and excess MSRs are sold primarily for the purpose of securitization by the U.S. GSEs, who provide certain guarantee provisions (e.g., credit enhancement of the loans). The Firm also sells loans into securitization transactions pursuant to Ginnie Mae guidelines; these loans are typically insured or guaranteed by another U.S. government agency. The Firm does not consolidate the securitization vehicles underlying these transactions as it is not the primary beneficiary. For a limited number of loan sales, the Firm is obligated to share a portion of the credit risk associated with the sold loans with the purchaser. See Note 29 for additional information about the Firm's loan sales- and securitization-related indemnifications.

See Note 17 for additional information about the impact of the Firm's sale of certain excess MSRs.

The following table summarizes the activities related to loans sold to the U.S. GSEs, loans in securitization transactions pursuant to Ginnie Mae guidelines, and other third-party-sponsored securitization entities.

Year ended December 31, (in millions)	2016	2015	2014
Carrying value of loans sold	$ 52,869	$ 42,161	$ 55,802
Proceeds received from loan sales as cash	$ 592	$ 313	$ 260
Proceeds from loans sales as securities(a)	51,852	41,615	55,117
Total proceeds received from loan sales(b)	$ 52,444	$ 41,928	$ 55,377
Gains on loan sales(c)(d)	$ 222	$ 299	$ 316

(a) Predominantly includes securities from U.S. GSEs and Ginnie Mae that are generally sold shortly after receipt.
(b) Excludes the value of MSRs retained upon the sale of loans.
(c) Gains on loan sales include the value of MSRs.
(d) The carrying value of the loans accounted for at fair value approximated the proceeds received upon loan sale.

Options to repurchase delinquent loans
In addition to the Firm's obligation to repurchase certain loans due to material breaches of representations and warranties as discussed in Note 29, the Firm also has the option to repurchase delinquent loans that it services for Ginnie Mae loan pools, as well as for other U.S. government agencies under certain arrangements. The Firm typically elects to repurchase delinquent loans from Ginnie Mae loan pools as it continues to service them and/or manage the foreclosure process in accordance with the applicable requirements, and such loans continue to be insured or guaranteed. When the Firm's repurchase option becomes exercisable, such loans must be reported on the Consolidated balance sheets as a loan with a corresponding liability. As of December 31, 2016 and 2015, the Firm had recorded on its Consolidated balance sheets $9.6 billion and $11.1 billion, respectively, of loans that either had been repurchased or for which the Firm had an option to repurchase. Predominantly all of these amounts relate to loans that have been repurchased from Ginnie Mae loan pools. Additionally, at December 31, 2016 and 2015, the Firm had real estate owned of $142 million and $343 million, respectively, and certain foreclosed government-guaranteed residential mortgage loans included in accrued interest and accounts receivable of $1.0 billion and $1.1 billion, respectively, resulting from voluntary repurchases of loans. Substantially all of these loans and real estate are insured or guaranteed by U.S. government agencies. For additional information, refer to Note 14.

Loan delinquencies and liquidation losses

The table below includes information about components of nonconsolidated securitized financial assets held in Firm-sponsored private-label securitization entities, in which the Firm has continuing involvement, and delinquencies as of December 31, 2016 and 2015.

	Securitized assets		90 days past due		Liquidation losses	
As of or for the year ended December 31, (in millions)	**2016**	2015	**2016**	2015	**2016**	2015
Securitized loans(a)						
Residential mortgage:						
Prime/ Alt-A & option ARMs	**$ 57,543**	$ 66,708	**$ 6,169**	$ 8,325	**$ 1,160**	$ 1,946
Subprime	**19,903**	22,549	**4,186**	5,448	**1,087**	1,431
Commercial and other	**71,464**	80,319	**1,755**	1,808	**643**	375
Total loans securitized	**$ 148,910**	$ 169,576	**$ 12,110**	$ 15,581	**$ 2,890**	$ 3,752

(a) Total assets held in securitization-related SPEs were $199.6 billion and $233.6 billion, respectively, at December 31, 2016 and 2015. The $148.9 billion and $169.6 billion, respectively, of loans securitized at December 31, 2016 and 2015, excludes: $46.4 billion and $62.4 billion, respectively, of securitized loans in which the Firm has no continuing involvement, and $4.3 billion and $1.6 billion, respectively, of loan securitizations consolidated on the Firm's Consolidated balance sheets at December 31, 2016 and 2015.

Note 17 – Goodwill and Mortgage servicing rights

Goodwill

Goodwill is recorded upon completion of a business combination as the difference between the purchase price and the fair value of the net assets acquired. Subsequent to initial recognition, goodwill is not amortized but is tested for impairment during the fourth quarter of each fiscal year, or more often if events or circumstances, such as adverse changes in the business climate, indicate there may be impairment.

The goodwill associated with each business combination is allocated to the related reporting units, which are determined based on how the Firm's businesses are managed and how they are reviewed by the Firm's Operating Committee. The following table presents goodwill attributed to the business segments.

December 31, (in millions)	2016	2015	2014
Consumer & Community Banking	**$ 30,797**	$ 30,769	$ 30,941
Corporate & Investment Bank	**6,772**	6,772	6,780
Commercial Banking	**2,861**	2,861	2,861
Asset & Wealth Management	**6,858**	6,923	6,964
Corporate	**–**	–	101
Total goodwill	**$ 47,288**	$ 47,325	$ 47,647

The following table presents changes in the carrying amount of goodwill.

Year ended December 31, (in millions)	2016	2015	2014
Balance at beginning of period	**$ 47,325**	$ 47,647	$ 48,081
Changes during the period from:			
Business combinations	**–**	28	43
Dispositions[(a)]	**(72)**	(160)	(80)
Other[(b)]	**35**	(190)	(397)
Balance at December 31,	**$ 47,288**	$ 47,325	$ 47,647

(a) For 2016, represents AWM goodwill, which was disposed of as part of AWM sales completed in March 2016. For 2015 includes $101 million of Private Equity goodwill, which was disposed of as part of the Private Equity sale completed in January 2015.

(b) Includes foreign currency translation adjustments, other tax-related adjustments, and, for 2014, goodwill impairment associated with the Firm's Private Equity business of $276 million.

Impairment testing

The Firm's goodwill was not impaired at December 31, 2016 and 2015. Further, except for goodwill related to its heritage Private Equity business of $276 million, the Firm's goodwill was not impaired at December 31, 2014.

The goodwill impairment test is performed in two steps. In the first step, the current fair value of each reporting unit is compared with its carrying value, including goodwill. If the fair value is in excess of the carrying value (including goodwill), then the reporting unit's goodwill is considered not to be impaired. If the fair value is less than the carrying value (including goodwill), then a second step is performed. In the second step, the implied current fair value of the reporting unit's goodwill is determined by comparing the fair value of the reporting unit (as determined in step one) to the fair value of the net assets of the reporting unit, as if the reporting unit were being acquired in a business combination. The resulting implied current fair value of goodwill is then compared with the carrying value of the reporting unit's goodwill. If the carrying value of the goodwill exceeds its implied current fair value, then an impairment charge is recognized for the excess. If the carrying value of goodwill is less than its implied current fair value, then no goodwill impairment is recognized.

The Firm uses the reporting units' allocated equity plus goodwill capital as a proxy for the carrying amounts of equity for the reporting units in the goodwill impairment testing. Reporting unit equity is determined on a similar basis as the allocation of equity to the Firm's lines of business, which takes into consideration the capital the business segment would require if it were operating independently, incorporating sufficient capital to address regulatory capital requirements (including Basel III) and capital levels for similarly rated peers. Proposed line of business equity levels are incorporated into the Firm's annual budget process, which is reviewed by the Firm's Board of Directors. Allocated equity is further reviewed on a periodic basis and updated as needed.

The primary method the Firm uses to estimate the fair value of its reporting units is the income approach. This approach projects cash flows for the forecast period and uses the perpetuity growth method to calculate terminal values. These cash flows and terminal values are then discounted using an appropriate discount rate. Projections of cash flows are based on the reporting units' earnings forecasts, which include the estimated effects of regulatory and legislative changes, and which are reviewed with the senior management of the Firm. The discount rate used for each reporting unit represents an estimate of the cost of equity for that reporting unit and is determined considering the Firm's overall estimated cost of equity (estimated using the Capital Asset Pricing Model), as adjusted for the risk characteristics specific to each reporting unit (for example, for higher levels of risk or uncertainty associated with the business or management's forecasts and assumptions). To assess the reasonableness of the discount rates used for each reporting unit management compares the discount rate to the estimated cost of equity for publicly traded institutions with similar businesses and risk characteristics. In addition, the weighted average cost of equity (aggregating the various reporting units) is compared with the Firms' overall estimated cost of equity to ensure reasonableness.

The valuations derived from the discounted cash flow analysis are then compared with market-based trading and transaction multiples for relevant competitors. Trading and transaction comparables are used as general indicators to assess the general reasonableness of the estimated fair values, although precise conclusions generally cannot be drawn due to the differences that naturally exist between the Firm's businesses and competitor institutions. Management also takes into consideration a comparison between the aggregate fair values of the Firm's reporting units and JPMorgan Chase's market capitalization. In evaluating this comparison, management considers several factors, including (i) a control premium that would exist in a market transaction, (ii) factors related to the level of execution risk that would exist at the firmwide level that do not exist at the reporting unit level and (iii) short-term market volatility and other factors that do not directly affect the value of individual reporting units.

Declines in business performance, increases in credit losses, increases in equity capital requirements, as well as deterioration in economic or market conditions, estimates of adverse regulatory or legislative changes or increases in the estimated market cost of equity, could cause the estimated fair values of the Firm's reporting units or their associated goodwill to decline in the future, which could result in a material impairment charge to earnings in a future period related to some portion of the associated goodwill.

Mortgage servicing rights

MSRs represent the fair value of expected future cash flows for performing servicing activities for others. The fair value considers estimated future servicing fees and ancillary revenue, offset by estimated costs to service the loans, and generally declines over time as net servicing cash flows are received, effectively amortizing the MSR asset against contractual servicing and ancillary fee income. MSRs are either purchased from third parties or recognized upon sale or securitization of mortgage loans if servicing is retained.

As permitted by U.S. GAAP, the Firm has elected to account for its MSRs at fair value. The Firm treats its MSRs as a single class of servicing assets based on the availability of market inputs used to measure the fair value of its MSR asset and its treatment of MSRs as one aggregate pool for risk management purposes. The Firm estimates the fair value of MSRs using an option-adjusted spread ("OAS") model, which projects MSR cash flows over multiple interest rate scenarios in conjunction with the Firm's prepayment model, and then discounts these cash flows at risk-adjusted rates. The model considers portfolio characteristics, contractually specified servicing fees, prepayment assumptions, delinquency rates, costs to service, late charges and other ancillary revenue, and other economic factors. The Firm compares fair value estimates and assumptions to observable market data where available, and also considers recent market activity and actual portfolio experience.

The fair value of MSRs is sensitive to changes in interest rates, including their effect on prepayment speeds. MSRs typically decrease in value when interest rates decline because declining interest rates tend to increase prepayments and therefore reduce the expected life of the net servicing cash flows that comprise the MSR asset. Conversely, securities (e.g., mortgage-backed securities), principal-only certificates and certain derivatives (i.e., those for which the Firm receives fixed-rate interest payments) increase in value when interest rates decline. JPMorgan Chase uses combinations of derivatives and securities to manage the risk of changes in the fair value of MSRs. The intent is to offset any interest-rate related changes in the fair value of MSRs with changes in the fair value of the related risk management instruments.

The following table summarizes MSR activity for the years ended December 31, 2016, 2015 and 2014.

As of or for the year ended December 31, (in millions, except where otherwise noted)	2016	2015	2014
Fair value at beginning of period	**$ 6,608**	$ 7,436	$ 9,614
MSR activity:			
Originations of MSRs	**679**	550	757
Purchase of MSRs	**—**	435	11
Disposition of MSRs[(a)]	**(109)**	(486)	(209)
Net additions	**570**	499	559
Changes due to collection/realization of expected cash flows	**(919)**	(922)	(911)
Changes in valuation due to inputs and assumptions:			
Changes due to market interest rates and other[(b)]	**(72)**	(160)	(1,608)
Changes in valuation due to other inputs and assumptions:			
Projected cash flows (e.g., cost to service)	**(35)**	(112)	133
Discount rates	**7**	(10)	(459) [(e)]
Prepayment model changes and other[(c)]	**(63)**	(123)	108
Total changes in valuation due to other inputs and assumptions	**(91)**	(245)	(218)
Total changes in valuation due to inputs and assumptions	**(163)**	(405)	(1,826)
Fair value at December 31,	**$ 6,096**	$ 6,608	$ 7,436
Change in unrealized gains/(losses) included in income related to MSRs held at December 31,	**$ (163)**	$ (405)	$ (1,826)
Contractual service fees, late fees and other ancillary fees included in income	**2,124**	2,533	2,884
Third-party mortgage loans serviced at December 31, (in billions)	**593.3**	677.0	756.1
Servicer advances, net of an allowance for uncollectible amounts, at December 31, (in billions)[(d)]	**4.7**	6.5	8.5

(a) Includes excess MSRs transferred to agency-sponsored trusts in exchange for stripped mortgage backed securities ("SMBS"). In each transaction, a portion of the SMBS was acquired by third parties at the transaction date; the Firm acquired the remaining balance of those SMBS as trading securities.
(b) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.
(c) Represents changes in prepayments other than those attributable to changes in market interest rates.
(d) Represents amounts the Firm pays as the servicer (e.g., scheduled principal and interest, taxes and insurance), which will generally be reimbursed within a short period of time after the advance from future cash flows from the trust or the underlying loans. The Firm's credit risk associated with these servicer advances is minimal because reimbursement of the advances is typically senior to all cash payments to investors. In addition, the Firm maintains the right to stop payment to investors if the collateral is insufficient to cover the advance. However, certain of these servicer advances may not be recoverable if they were not made in accordance with applicable rules and agreements.
(e) For the year ending December 31, 2014, the negative impact was primarily related to higher capital allocated to the Mortgage Servicing business, which, in turn, resulted in an increase in the OAS. The resulting OAS assumption was consistent with capital and return requirements the Firm believed a market participant would consider, taking into account factors such as the operating risk environment and regulatory and economic capital requirements.

The following table presents the components of mortgage fees and related income (including the impact of MSR risk management activities) for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	2016	2015	2014
CCB mortgage fees and related income			
Net production revenue	**$ 853**	$ 769	$1,190
Net mortgage servicing revenue:			
Operating revenue:			
Loan servicing revenue	**2,336**	2,776	3,303
Changes in MSR asset fair value due to collection/realization of expected cash flows	**(916)**	(917)	(905)
Total operating revenue	**1,420**	1,859	2,398
Risk management:			
Changes in MSR asset fair value due to market interest rates and other[(a)]	**(72)**	(160)	(1,606)
Other changes in MSR asset fair value due to other inputs and assumptions in model[(b)]	**(91)**	(245)	(218)
Change in derivative fair value and other	**380**	288	1,796
Total risk management	**217**	(117)	(28)
Total net mortgage servicing revenue	**1,637**	1,742	2,370
Total CCB mortgage fees and related income	**2,490**	2,511	3,560
All other	**1**	2	3
Mortgage fees and related income	**$2,491**	$ 2,513	$3,563

(a) Represents both the impact of changes in estimated future prepayments due to changes in market interest rates, and the difference between actual and expected prepayments.
(b) Represents the aggregate impact of changes in model inputs and assumptions such as projected cash flows (e.g., cost to service), discount rates and changes in prepayments other than those attributable to changes in market interest rates (e.g., changes in prepayments due to changes in home prices).

The table below outlines the key economic assumptions used to determine the fair value of the Firm's MSRs at December 31, 2016 and 2015, and outlines the sensitivities of those fair values to immediate adverse changes in those assumptions, as defined below.

December 31, (in millions, except rates)	2016	2015
Weighted-average prepayment speed assumption ("CPR")	**9.41%**	9.81%
Impact on fair value of 10% adverse change	**$ (231)**	$ (275)
Impact on fair value of 20% adverse change	**(445)**	(529)
Weighted-average option adjusted spread	**8.55%**	9.54%
Impact on fair value of 100 basis points adverse change	**$ (248)**	$ (258)
Impact on fair value of 200 basis points adverse change	**(477)**	(498)

CPR: Constant prepayment rate.

The sensitivity analysis in the preceding table is hypothetical and should be used with caution. Changes in fair value based on variation in assumptions generally cannot be easily extrapolated, because the relationship of the change in the assumptions to the change in fair value are often highly interrelated and may not be linear. In this table, the effect that a change in a particular assumption may have on the fair value is calculated without changing any other assumption. In reality, changes in one factor may result in changes in another, which would either magnify or counteract the impact of the initial change.

Note 18 – Premises and equipment

Premises and equipment, including leasehold improvements, are carried at cost less accumulated depreciation and amortization. JPMorgan Chase computes depreciation using the straight-line method over the estimated useful life of an asset. For leasehold improvements, the Firm uses the straight-line method computed over the lesser of the remaining term of the leased facility or the estimated useful life of the leased asset.

JPMorgan Chase capitalizes certain costs associated with the acquisition or development of internal-use software. Once the software is ready for its intended use, these costs are amortized on a straight-line basis over the software's expected useful life and reviewed for impairment on an ongoing basis.

Note 19 – Deposits

At December 31, 2016 and 2015, noninterest-bearing and interest-bearing deposits were as follows.

December 31, (in millions)	2016	2015
U.S. offices		
Noninterest-bearing	**$ 400,831**	$ 392,721
Interest-bearing (included **$12,245** and $10,916 at fair value)(a)	**737,949**	663,004
Total deposits in U.S. offices	**1,138,780**	1,055,725
Non-U.S. offices		
Noninterest-bearing	**14,764**	14,489 (b)
Interest-bearing (included **$1,667** and $1,600 at fair value)(a)	**221,635**	209,501 (b)
Total deposits in non-U.S. offices	**236,399**	223,990
Total deposits	**$ 1,375,179**	$1,279,715

(a) Includes structured notes classified as deposits for which the fair value option has been elected. For further discussion, see Note 4.
(b) Prior periods have been revised to conform with current period presentation.

At December 31, 2016 and 2015, time deposits in denominations of $250,000 or more were as follows.

December 31, (in millions)	2016	2015
U.S. offices	**$ 26,180**	$ 64,519
Non-U.S. offices	**55,249**	48,091
Total	**$ 81,429**	$ 112,610

At December 31, 2016, the maturities of interest-bearing time deposits were as follows.

December 31, 2016 (in millions)	U.S.	Non-U.S.	Total
2017	$ 31,531	$ 54,846	$ 86,377
2018	4,433	176	4,609
2019	2,066	68	2,134
2020	2,005	39	2,044
2021	3,988	188	4,176
After 5 years	3,889	–	3,889
Total	$ 47,912	$ 55,317	$ 103,229

Note 20 – Accounts payable and other liabilities

Accounts payable and other liabilities consist of brokerage payables, which includes payables to customers, dealers and clearing organizations, and payables from security purchases that did not settle; income taxes payables; accrued expense, including interest-bearing liabilities; and all other liabilities, including litigation reserves and obligations to return securities received as collateral.

The following table details the components of accounts payable and other liabilities.

December 31, (in millions)	2016	2015
Brokerage payables	**$ 109,842**	$ 107,632
Accounts payable and other liabilities	**80,701**	70,006
Total	**$ 190,543**	$ 177,638

Note 21 – Long-term debt

JPMorgan Chase issues long-term debt denominated in various currencies, predominantly U.S. dollars, with both fixed and variable interest rates. Included in senior and subordinated debt below are various equity-linked or other indexed instruments, which the Firm has elected to measure at fair value. Changes in fair value are recorded in principal transactions revenue in the Consolidated statements of income. The following table is a summary of long-term debt carrying values (including unamortized premiums and discounts, issuance costs, valuation adjustments and fair value adjustments, where applicable) by remaining contractual maturity as of December 31, 2016.

By remaining maturity at December 31, (in millions, except rates)		2016					2015
		Under 1 year	1-5 years	After 5 years	Total		Total
Parent company							
Senior debt:	Fixed rate	**$ 12,109**	**$ 57,938**	**$ 58,920**	**$ 128,967**		$ 117,758
	Variable rate	**11,870**	**15,497**	**7,399**	**34,766**		44,178
	Interest rates[(a)]	**0.09-6.40%**	**0.17-7.25%**	**0.45-6.40%**	**0.09-7.25%**		0.16-7.25%
Subordinated debt:	Fixed rate	**$ 2,096**	**$ 152**	**$ 14,563**	**$ 16,811**		$ 16,250
	Variable rate	**864**	**372**	**9**	**1,245**		1,047
	Interest rates[(a)]	**0.82-6.13%**	**1.93-8.53%**	**3.38-8.00%**	**0.82-8.53%**		1.06-8.53%
	Subtotal	**$ 26,939**	**$ 73,959**	**$ 80,891**	**$ 181,789**		$ 179,233
Subsidiaries							
Federal Home Loan Banks advances:	Fixed rate	**$ 5**	**$ 31**	**$ 143**	**$ 179**		$ 191
	Variable rate	**11,340**	**57,000**	**11,000**	**79,340**		71,390
	Interest rates[(a)]	**0.84-1.01%**	**0.83-1.21%**	**0.41-0.67%**	**0.41-1.21%**		0.17-0.72%
Senior debt:	Fixed rate	**$ 339**	**$ 3,100**	**$ 4,890**	**$ 8,329**		$ 5,550
	Variable rate	**4,520**	**11,860**	**2,999**	**19,379**		20,588
	Interest rates[(a)]	**1.29-1.49%**	**0.00-7.50%**	**1.30-7.50%**	**0.00-7.50%**		0.47-7.28%
Subordinated debt:	Fixed rate	**$ 3,562**	**$ —**	**$ 322**	**$ 3,884**		$ 6,580
	Variable rate	**—**	**—**	**—**	**—**		1,150
	Interest rates[(a)]	**6.00%**	**—%**	**8.25%**	**6.00-8.25%**		0.83-8.25%
	Subtotal	**$ 19,766**	**$ 71,991**	**$ 19,354**	**$ 111,111**		$ 105,449
Junior subordinated debt:	Fixed rate	**$ —**	**$ —**	**$ 706**	**$ 706**		$ 717
	Variable rate	**—**	**—**	**1,639**	**1,639**		3,252
	Interest rates[(a)]	**—%**	**—%**	**1.39-8.75%**	**1.39-8.75%**		0.83-8.75%
	Subtotal	**$ —**	**$ —**	**$ 2,345**	**$ 2,345**		$ 3,969
Total long-term debt[(b)(c)(d)]		**$ 46,705**	**$ 145,950**	**$ 102,590**	**$ 295,245**	(f)(g)	$ 288,651
Long-term beneficial interests:	Fixed rate	**$ 5,164**	**$ 12,766**	**$ 748**	**$ 18,678**		$ 14,199
	Variable rate	**6,438**	**6,281**	**1,962**	**14,681**		16,358
	Interest rates	**0.74-5.23%**	**0.98-7.87%**	**0.39-5.94%**	**0.39-7.87%**		0.00-15.94%
Total long-term beneficial interests[(e)]		**$ 11,602**	**$ 19,047**	**$ 2,710**	**$ 33,359**		$ 30,557

(a) The interest rates shown are the range of contractual rates in effect at December 31, 2016 and 2015, respectively, including non-U.S. dollar fixed- and variable-rate issuances, which excludes the effects of the associated derivative instruments used in hedge accounting relationships, if applicable. The use of these derivative instruments modifies the Firm's exposure to the contractual interest rates disclosed in the table above. Including the effects of the hedge accounting derivatives, the range of modified rates in effect at December 31, 2016, for total long-term debt was (0.18)% to 8.88%, versus the contractual range of 0.00% to 8.75% presented in the table above. The interest rate ranges shown exclude structured notes accounted for at fair value.

(b) Included long-term debt of $82.2 billion and $76.6 billion secured by assets totaling $205.6 billion and $171.6 billion at December 31, 2016 and 2015, respectively. The amount of long-term debt secured by assets does not include amounts related to hybrid instruments.

(c) Included $37.7 billion and $33.1 billion of long-term debt accounted for at fair value at December 31, 2016 and 2015, respectively.

(d) Included $7.5 billion and $5.5 billion of outstanding zero-coupon notes at December 31, 2016 and 2015, respectively. The aggregate principal amount of these notes at their respective maturities is $25.1 billion and $16.2 billion, respectively. The aggregate principal amount reflects the contractual principal payment at maturity, which may exceed the contractual principal payment at the Firm's next call date, if applicable.

(e) Included on the Consolidated balance sheets in beneficial interests issued by consolidated VIEs. Also included $120 million and $787 million accounted for at fair value at December 31, 2016 and 2015, respectively. Excluded short-term commercial paper and other short-term beneficial interests of $5.7 billion and $11.3 billion at December 31, 2016 and 2015, respectively.

(f) At December 31, 2016, long-term debt in the aggregate of $81.8 billion was redeemable at the option of JPMorgan Chase, in whole or in part, prior to maturity, based on the terms specified in the respective instruments.

(g) The aggregate carrying values of debt that matures in each of the five years subsequent to 2016 is $46.7 billion in 2017, $49.4 billion in 2018, $32.2 billion in 2019, $33.8 billion in 2020 and $30.6 billion in 2021.

The weighted-average contractual interest rates for total long-term debt excluding structured notes accounted for at fair value were 2.49% and 2.34% as of December 31, 2016 and 2015, respectively. In order to modify exposure to interest rate and currency exchange rate movements, JPMorgan Chase utilizes derivative instruments, primarily interest rate and cross-currency interest rate swaps, in conjunction with some of its debt issues. The use of these instruments modifies the Firm's interest expense on the associated debt. The modified weighted-average interest rates for total long-term debt, including the effects of related derivative instruments, were 2.01% and 1.64% as of December 31, 2016 and 2015, respectively.

JPMorgan Chase & Co. has guaranteed certain long-term debt of its subsidiaries, including both long-term debt and structured notes. These guarantees rank on parity with the Firm's other unsecured and unsubordinated indebtedness. The amount of such guaranteed long-term debt and structured notes was $3.9 billion and $152 million at December 31, 2016 and 2015, respectively.

The Firm's unsecured debt does not contain requirements that would call for an acceleration of payments, maturities or changes in the structure of the existing debt, provide any limitations on future borrowings or require additional collateral, based on unfavorable changes in the Firm's credit ratings, financial ratios, earnings or stock price.

Junior subordinated deferrable interest debentures held by trusts that issued guaranteed capital debt securities

At December 31, 2016, the Firm had outstanding eight wholly-owned Delaware statutory business trusts ("issuer trusts") that had issued trust preferred securities.

The junior subordinated deferrable interest debentures issued by the Firm to the issuer trusts, totaling $2.3 billion and $4.0 billion at December 31, 2016 and 2015, respectively, were reflected on the Firm's Consolidated balance sheets in long-term debt, and in the table on the preceding page under the caption "Junior subordinated debt." The Firm also records the common capital securities issued by the issuer trusts in other assets in its Consolidated balance sheets at December 31, 2016 and 2015. Beginning in 2014, the debentures issued to the issuer trusts by the Firm, less the common capital securities of the issuer trusts, began being phased out from inclusion as Tier 1 capital under Basel III and they were fully phased out as of December 31, 2016. As of December 31, 2015, $992 million of these debentures qualified as Tier 1 capital. As of December 31, 2016 and 2015, $1.4 billion and $3.0 billion, respectively, qualified as Tier 2 capital.

The Firm redeemed $1.6 billion and $1.5 billion of trust preferred securities in the years ended December 31, 2016 and 2015, respectively.

Note 22 – Preferred stock

At December 31, 2016 and 2015, JPMorgan Chase was authorized to issue 200 million shares of preferred stock, in one or more series, with a par value of $1 per share.

In the event of a liquidation or dissolution of the Firm, JPMorgan Chase's preferred stock then outstanding takes precedence over the Firm's common stock with respect to the payment of dividends and the distribution of assets.

The following is a summary of JPMorgan Chase's non-cumulative preferred stock outstanding as of December 31, 2016 and 2015.

	Shares at December 31, 2016 and 2015[a]	Carrying value at December 31, 2016 and 2015 (in millions)	Issue date	Contractual rate in effect at December 31, 2016	Earliest redemption date	Date at which dividend rate becomes floating	Floating annual rate of three-month LIBOR plus:
Fixed-rate:							
Series O	**125,750**	$ **1,258**	8/27/2012	**5.500%**	9/1/2017	NA	NA
Series P	**90,000**	**900**	2/5/2013	**5.450**	3/1/2018	NA	NA
Series T	**92,500**	**925**	1/30/2014	**6.700**	3/1/2019	NA	NA
Series W	**88,000**	**880**	6/23/2014	**6.300**	9/1/2019	NA	NA
Series Y	**143,000**	**1,430**	2/12/2015	**6.125**	3/1/2020	NA	NA
Series AA	**142,500**	**1,425**	6/4/2015	**6.100**	9/1/2020	NA	NA
Series BB	**115,000**	**1,150**	7/29/2015	**6.150**	9/1/2020	NA	NA
Fixed-to-floating-rate:							
Series I	**600,000**	**6,000**	4/23/2008	**7.900%**	4/30/2018	4/30/2018	LIBOR + 3.47%
Series Q	**150,000**	**1,500**	4/23/2013	**5.150**	5/1/2023	5/1/2023	LIBOR + 3.25
Series R	**150,000**	**1,500**	7/29/2013	**6.000**	8/1/2023	8/1/2023	LIBOR + 3.30
Series S	**200,000**	**2,000**	1/22/2014	**6.750**	2/1/2024	2/1/2024	LIBOR + 3.78
Series U	**100,000**	**1,000**	3/10/2014	**6.125**	4/30/2024	4/30/2024	LIBOR + 3.33
Series V	**250,000**	**2,500**	6/9/2014	**5.000**	7/1/2019	7/1/2019	LIBOR + 3.32
Series X	**160,000**	**1,600**	9/23/2014	**6.100**	10/1/2024	10/1/2024	LIBOR + 3.33
Series Z	**200,000**	**2,000**	4/21/2015	**5.300**	5/1/2020	5/1/2020	LIBOR + 3.80
Total preferred stock	**2,606,750**	$ **26,068**					

(a) Represented by depositary shares.

Each series of preferred stock has a liquidation value and redemption price per share of $10,000, plus accrued but unpaid dividends.

Dividends on fixed-rate preferred stock are payable quarterly. Dividends on fixed-to-floating-rate preferred stock are payable semiannually while at a fixed rate, and become payable quarterly after converting to a floating rate.

Redemption rights

Each series of the Firm's preferred stock may be redeemed on any dividend payment date on or after the earliest redemption date for that series. All outstanding preferred stock series except Series I may also be redeemed following a "capital treatment event", as described in the terms of each series. Any redemption of the Firm's preferred stock is subject to non-objection from the Board of Governors of the Federal Reserve System (the "Federal Reserve").

Note 23 – Common stock

At December 31, 2016 and 2015, JPMorgan Chase was authorized to issue 9.0 billion shares of common stock with a par value of $1 per share.

Common shares issued (newly issued or distributed from treasury) by JPMorgan Chase during the years ended December 31, 2016, 2015 and 2014 were as follows.

Year ended December 31, (in millions)	**2016**	2015	2014
Total issued – balance at January 1	**4,104.9**	4,104.9	4,104.9
Treasury – balance at January 1	**(441.4)**	(390.1)	(348.8)
Purchase of treasury stock	**(140.4)**	(89.8)	(82.3)
Issued from treasury:			
Employee benefits and compensation plans	**26.0**	32.8	39.8
Warrant exercise	**11.1**	4.7	–
Employee stock purchase plans	**1.0**	1.0	1.2
Total issued from treasury	**38.1**	38.5	41.0
Total treasury – balance at December 31	**(543.7)**	(441.4)	(390.1)
Outstanding at December 31	**3,561.2**	3,663.5	3,714.8

At December 31, 2016, 2015, and 2014, respectively, the Firm had 24.9 million, 47.4 million and 59.8 million warrants outstanding to purchase shares of common stock (the "Warrants"). The Warrants are currently traded on the New York Stock Exchange, and they are exercisable, in whole or in part, at any time and from time to time until October 28, 2018. The original warrant exercise price was $42.42 per share. The number of shares issuable upon the exercise of each warrant and the warrant exercise price is subject to adjustment upon the occurrence of certain events, including, but not limited to, the extent to which regular quarterly cash dividends exceed $0.38 per share. As a result of the Firm's quarterly common stock dividend exceeding $0.38 per share commencing with the second quarter of 2014, the exercise price of the Warrants has been adjusted each subsequent quarter. As of December 31, 2016 the exercise price was $42.073 and the Warrant share number was 1.01.

On June 29, 2016, in conjunction with the Federal Reserve's release of its 2016 CCAR results, the Firm's Board of Directors authorized a $10.6 billion common equity (i.e., common stock and warrants) repurchase program. As of December 31, 2016, $6.1 billion (on a settlement-date basis) of authorized repurchase capacity remained under the program. This authorization includes shares repurchased to offset issuances under the Firm's equity-based compensation plans.

The following table sets forth the Firm's repurchases of common equity for the years ended December 31, 2016, 2015 and 2014, on a settlement-date basis. There were no warrants repurchased during the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	**2016**	2015	2014
Total number of shares of common stock repurchased	**140.4**	89.8	82.3
Aggregate purchase price of common stock repurchases	**$ 9,082**	$ 5,616	$ 4,760

The Firm may, from time to time, enter into written trading plans under Rule 10b5-1 of the Securities Exchange Act of 1934 to facilitate repurchases in accordance with the common equity repurchase program. A Rule 10b5-1 repurchase plan allows the Firm to repurchase its equity during periods when it would not otherwise be repurchasing common equity – for example, during internal trading "blackout periods." All purchases under a Rule 10b5-1 plan must be made according to a predefined plan established when the Firm is not aware of material nonpublic information. For additional information regarding repurchases of the Firm's equity securities, see Part II, Item 5: Market for registrant's common equity, related stockholder matters and issuer purchases of equity securities, on page 22.

As of December 31, 2016, approximately 154 million shares of common stock were reserved for issuance under various employee incentive, compensation, option and stock purchase plans, director compensation plans, and the Warrants.

Note 24 – Earnings per share

Earnings per share ("EPS") is calculated under the two-class method under which all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities based on their respective rights to receive dividends. JPMorgan Chase grants restricted stock and RSUs to certain employees under its stock-based compensation programs, which entitle recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock; these unvested awards meet the definition of participating securities.

The following table presents the calculation of basic and diluted EPS for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions, except per share amounts)	**2016**	2015	2014
Basic earnings per share			
Net income	**$ 24,733**	$ 24,442	$ 21,745
Less: Preferred stock dividends	**1,647**	1,515	1,125
Net income applicable to common equity	**23,086**	22,927	20,620
Less: Dividends and undistributed earnings allocated to participating securities	**503**	521	543
Net income applicable to common stockholders	**$ 22,583**	$ 22,406	$ 20,077
Total weighted-average basic shares outstanding	**3,618.5**	3,700.4	3,763.5
Net income per share	**$ 6.24**	$ 6.05	$ 5.33
Diluted earnings per share			
Net income applicable to common stockholders	**$ 22,583**	$ 22,406	$ 20,077
Total weighted-average basic shares outstanding	**3,618.5**	3,700.4	3,763.5
Add: Employee stock options, SARs, warrants and PSUs[(a)]	**31.3**	32.4	34.0
Total weighted-average diluted shares outstanding[(b)]	**3,649.8**	3,732.8	3,797.5
Net income per share	**$ 6.19**	$ 6.00	$ 5.29

(a) Excluded from the computation of diluted EPS (due to the antidilutive effect) were certain options issued under employee benefit plans. The aggregate number of shares issuable upon the exercise of such options was not material for the years ended December 31, 2016 and 2015 and were 1 million for the year ended December 31, 2014.

(b) Participating securities were included in the calculation of diluted EPS using the two-class method, as this computation was more dilutive than the calculation using the treasury stock method.

Note 25 – Accumulated other comprehensive income/(loss)

AOCI includes the after-tax change in unrealized gains and losses on investment securities, foreign currency translation adjustments (including the impact of related derivatives), cash flow hedging activities, and net loss and prior service costs/(credit) related to the Firm's defined benefit pension and OPEB plans.

Effective January 1, 2016, the Firm adopted new accounting guidance related to the recognition and measurement of financial liabilities where the fair value option has been elected. This guidance requires the portion of the total change in fair value caused by changes in the Firm's own credit risk ("DVA") to be presented separately in OCI; previously these amounts were recognized in net income. The guidance was required to be applied as of the beginning of the fiscal year of adoption by means of a cumulative effect adjustment to the Consolidated balance sheets, which resulted in a reclassification from retained earnings to AOCI.

Year ended December 31, (in millions)	Unrealized gains/(losses) on investment securities[a]	Translation adjustments, net of hedges	Cash flow hedges	Defined benefit pension and OPEB plans	DVA on fair value option elected liabilities	Accumulated other comprehensive income/(loss)
Balance at December 31, 2013	$ 2,798	$ (136)	$ (139)	$ (1,324)	NA	$ 1,199
Net change	1,975	(11)	44	(1,018)	NA	990
Balance at December 31, 2014	$ 4,773	$ (147)	$ (95)	$ (2,342)	NA	$ 2,189
Net change	(2,144)	(15)	51	111	NA	(1,997)
Balance at December 31, 2015	$ 2,629	$ (162)	$ (44)	$ (2,231)	NA	$ 192
Cumulative effect of change in accounting principle	–	–	–	–	**154**	**154**
Net change	**(1,105)**	**(2)**	**(56)**	**(28)**	**(330)**	**(1,521)**
Balance at December 31, 2016	**$ 1,524**	**$ (164)**	**$ (100)**	**$ (2,259)**	**(176)**	**$ (1,175)**

(a) Represents the after-tax difference between the fair value and amortized cost of securities accounted for as AFS, including net unamortized unrealized gains and losses related to AFS securities transferred to HTM.

The following table presents the pre-tax and after-tax changes in the components of OCI.

	2016			2015			2014		
Year ended December 31, (in millions)	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax	Pre-tax	Tax effect	After-tax
Unrealized gains/(losses) on investment securities:									
Net unrealized gains/(losses) arising during the period	**$ (1,628)**	**$ 611**	**$ (1,017)**	$ (3,315)	$ 1,297	$ (2,018)	$ 3,193	$ (1,170)	$ 2,023
Reclassification adjustment for realized (gains)/losses included in net income[a]	**(141)**	**53**	**(88)**	(202)	76	(126)	(77)	29	(48)
Net change	**(1,769)**	**664**	**(1,105)**	(3,517)	1,373	(2,144)	3,116	(1,141)	1,975
Translation adjustments:									
Translation[b]	**(261)**	**99**	**(162)**	(1,876)	682	(1,194)	(1,638)	588	(1,050)
Hedges[b]	**262**	**(102)**	**160**	1,885	(706)	1,179	1,698	(659)	1,039
Net change	**1**	**(3)**	**(2)**	9	(24)	(15)	60	(71)	(11)
Cash flow hedges:									
Net unrealized gains/(losses) arising during the period	**(450)**	**168**	**(282)**	(97)	35	(62)	98	(39)	59
Reclassification adjustment for realized (gains)/losses included in net income[c][d]	**360**	**(134)**	**226**	180	(67)	113	(24)	9	(15)
Net change	**(90)**	**34**	**(56)**	83	(32)	51	74	(30)	44
Defined benefit pension and OPEB plans:									
Prior service credits arising during the period	**–**	**–**	**–**	–	–	–	(53)	21	(32)
Net gains/(losses) arising during the period	**(366)**	**145**	**(221)**	29	(47)	(18)	(1,697)	688	(1,009)
Reclassification adjustments included in net income[e]:									
Amortization of net loss	**257**	**(97)**	**160**	282	(106)	176	72	(29)	43
Prior service costs/(credits)	**(36)**	**14**	**(22)**	(36)	14	(22)	(44)	17	(27)
Settlement loss/(gain)	**4**	**(1)**	**3**	–	–	–	–	–	–
Foreign exchange and other	**77**	**(25)**	**52**	33	(58)	(25)	39	(32)	7
Net change	**(64)**	**36**	**(28)**	308	(197)	111	(1,683)	665	(1,018)
DVA on fair value option elected liabilities, net change:	**$ (529)**	**$ 199**	**$ (330)**	$ –	$ –	$ –	$ –	$ –	$ –
Total other comprehensive income/(loss)	**$ (2,451)**	**$ 930**	**$ (1,521)**	$ (3,117)	$ 1,120	$ (1,997)	$ 1,567	$ (577)	$ 990

(a) The pre-tax amount is reported in securities gains in the Consolidated statements of income.
(b) Reclassifications of pre-tax realized gains/(losses) on translation adjustments and related hedges are reported in other income/expense in the Consolidated statements of income. The amounts were not material for the periods presented.
(c) The pre-tax amounts are predominantly recorded in net interest income in the Consolidated statements of income.
(d) In 2015, the Firm reclassified approximately $150 million of net losses from AOCI to other income because the Firm determined that it is probable that the forecasted interest payment cash flows will not occur. For additional information, see Note 6.
(e) The pre-tax amount is reported in compensation expense in the Consolidated statements of income.

Note 26 – Income taxes

JPMorgan Chase and its eligible subsidiaries file a consolidated U.S. federal income tax return. JPMorgan Chase uses the asset and liability method to provide income taxes on all transactions recorded in the Consolidated Financial Statements. This method requires that income taxes reflect the expected future tax consequences of temporary differences between the carrying amounts of assets or liabilities for book and tax purposes. Accordingly, a deferred tax asset or liability for each temporary difference is determined based on the tax rates that the Firm expects to be in effect when the underlying items of income and expense are realized. JPMorgan Chase's expense for income taxes includes the current and deferred portions of that expense. A valuation allowance is established to reduce deferred tax assets to the amount the Firm expects to realize.

Due to the inherent complexities arising from the nature of the Firm's businesses, and from conducting business and being taxed in a substantial number of jurisdictions, significant judgments and estimates are required to be made. Agreement of tax liabilities between JPMorgan Chase and the many tax jurisdictions in which the Firm files tax returns may not be finalized for several years. Thus, the Firm's final tax-related assets and liabilities may ultimately be different from those currently reported.

Effective tax rate and expense

A reconciliation of the applicable statutory U.S. income tax rate to the effective tax rate for each of the years ended December 31, 2016, 2015 and 2014, is presented in the following table.

Effective tax rate

Year ended December 31,	**2016**	2015	2014
Statutory U.S. federal tax rate	**35.0%**	35.0%	35.0%
Increase/(decrease) in tax rate resulting from:			
U.S. state and local income taxes, net of U.S. federal income tax benefit	**2.4**	1.5	2.7
Tax-exempt income	**(3.1)**	(3.3)	(3.1)
Non-U.S. subsidiary earnings[(a)]	**(1.7)**	(3.9)	(2.0)
Business tax credits	**(3.9)**	(3.7)	(3.3)
Nondeductible legal expense	**0.3**	0.8	2.3
Tax audit resolutions	**–**	(5.7)	(1.4)
Other, net	**(0.6)**	(0.3)	(1.0)
Effective tax rate	**28.4%**	20.4%	29.2%

(a) Predominantly includes earnings of U.K. subsidiaries that are deemed to be reinvested indefinitely.

The components of income tax expense/(benefit) included in the Consolidated statements of income were as follows for each of the years ended December 31, 2016, 2015, and 2014.

Income tax expense/(benefit)

Year ended December 31, (in millions)	**2016**	2015	2014
Current income tax expense/(benefit)			
U.S. federal	**$ 2,488**	$ 3,160	$ 2,382
Non-U.S.	**1,760**	1,220	1,353
U.S. state and local	**904**	547	857
Total current income tax expense/(benefit)	**5,152**	4,927	4,592
Deferred income tax expense/(benefit)			
U.S. federal	**4,364**	1,213	3,890
Non-U.S.	**(73)**	(95)	71
U.S. state and local	**360**	215	401
Total deferred income tax expense/(benefit)	**4,651**	1,333	4,362
Total income tax expense	**$ 9,803**	$ 6,260	$ 8,954

Total income tax expense includes $55 million, $2.4 billion and $451 million of tax benefits recorded in 2016, 2015, and 2014, respectively, as a result of tax audit resolutions.

Tax effect of items recorded in stockholders' equity

The preceding table does not reflect the tax effect of certain items that are recorded each period directly in stockholders' equity. The tax effect of all items recorded directly to stockholders' equity resulted in an increase of $925 million in 2016, an increase of $1.5 billion in 2015, and a decrease of $140 million in 2014. Effective January 1, 2016, the Firm adopted new accounting guidance related to employee share-based payments. As a result of the adoption of this new guidance, all excess tax benefits (including tax benefits from dividends or dividend equivalents) on share-based payment awards are recognized within income tax expense in the Consolidated statements of income. In prior years these tax benefits were recorded as increases to additional paid-in capital.

Results from Non-U.S. earnings

The following table presents the U.S. and non-U.S. components of income before income tax expense for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	**2016**	2015	2014
U.S.	**$ 26,651**	$ 23,191	$ 23,422
Non-U.S.[(a)]	**7,885**	7,511	7,277
Income before income tax expense	**$ 34,536**	$ 30,702	$ 30,699

(a) For purposes of this table, non-U.S. income is defined as income generated from operations located outside the U.S.

U.S. federal income taxes have not been provided on the undistributed earnings of certain non-U.S. subsidiaries, to the extent that such earnings have been reinvested abroad for an indefinite period of time. Based on JPMorgan Chase's ongoing review of the business requirements and capital needs of its non-U.S. subsidiaries, combined with the formation of specific strategies and steps taken to fulfill these requirements and needs, the Firm has determined that the undistributed earnings of certain of its subsidiaries would be indefinitely reinvested to fund current and future growth of the related businesses. As management does not intend to use the earnings of these subsidiaries as a source of funding for its U.S. operations, such earnings will not be distributed to the U.S. in the foreseeable future. For 2016, pretax earnings of $3.8 billion were generated and will be indefinitely reinvested in these subsidiaries. At December 31, 2016, the cumulative amount of undistributed pretax earnings in these subsidiaries were $38.4 billion. If the Firm were to record a deferred tax liability associated with these undistributed earnings, the amount would be $8.8 billion at December 31, 2016.

These undistributed earnings are related to subsidiaries located predominantly in the U.K. where the 2016 tax rate was 28%.

Affordable housing tax credits

The Firm recognized $1.7 billion, $1.6 billion and $1.6 billion of tax credits and other tax benefits associated with investments in affordable housing projects within income tax expense for the years 2016, 2015 and 2014, respectively. The amount of amortization of such investments reported in income tax expense under the current period presentation during these years was $1.2 billion, $1.1 billion and $1.1 billion, respectively. The carrying value of these investments, which are reported in other assets on the Firm's Consolidated balance sheets, was $8.8 billion and $7.7 billion at December 31, 2016 and 2015, respectively. The amount of commitments related to these investments, which are reported in accounts payable and other liabilities on the Firm's Consolidated balance sheets, was $2.8 billion and $2.0 billion at December 31, 2016 and 2015, respectively.

Deferred taxes

Deferred income tax expense/(benefit) results from differences between assets and liabilities measured for financial reporting purposes versus income tax return purposes. Deferred tax assets are recognized if, in management's judgment, their realizability is determined to be more likely than not. If a deferred tax asset is determined to be unrealizable, a valuation allowance is established. The significant components of deferred tax assets and liabilities are reflected in the following table as of December 31, 2016 and 2015.

December 31, (in millions)	2016	2015
Deferred tax assets		
Allowance for loan losses	**$ 5,534**	$ 5,343
Employee benefits	**2,911**	2,972
Accrued expenses and other	**6,831**	7,299
Non-U.S. operations	**5,368**	5,365
Tax attribute carryforwards	**2,155**	2,602
Gross deferred tax assets	**22,799**	23,581
Valuation allowance	**(785)**	(735)
Deferred tax assets, net of valuation allowance	**$ 22,014**	$ 22,846
Deferred tax liabilities		
Depreciation and amortization	**$ 3,294**	$ 3,167
Mortgage servicing rights, net of hedges	**4,807**	4,968
Leasing transactions	**4,053**	3,042
Non-U.S. operations	**4,572**	4,285
Other, net	**5,493**	4,419
Gross deferred tax liabilities	**22,219**	19,881
Net deferred tax (liabilities)/assets	**$ (205)**	$ 2,965

JPMorgan Chase has recorded deferred tax assets of $2.2 billion at December 31, 2016, in connection with U.S. federal and non-U.S. NOL carryforwards and foreign tax credit carryforwards. At December 31, 2016, total U.S. federal NOL carryforwards were approximately $3.8 billion and non-U.S. NOL carryforwards were $142 million. If not utilized, the U.S. federal NOL carryforwards will expire between 2025 and 2036 and the non-U.S. NOL carryforwards will expire in 2017. Foreign tax credit carryforwards were $776 million and will expire between 2022 and 2026.

The valuation allowance at December 31, 2016, was due to losses associated with non-U.S. subsidiaries.

Unrecognized tax benefits

At December 31, 2016, 2015 and 2014, JPMorgan Chase's unrecognized tax benefits, excluding related interest expense and penalties, were $3.5 billion, $3.5 billion and $4.9 billion, respectively, of which $2.6 billion, $2.1 billion and $3.5 billion, respectively, if recognized, would reduce the annual effective tax rate. Included in the amount of unrecognized tax benefits are certain items that would not affect the effective tax rate if they were recognized in the Consolidated statements of income. These unrecognized items include the tax effect of certain temporary differences, the portion of gross state and local unrecognized tax benefits that would be offset by the benefit from associated U.S. federal income tax deductions, and the portion of gross non-U.S. unrecognized tax benefits that would have offsets in other jurisdictions. JPMorgan Chase is presently under audit by a number of taxing authorities, most notably by the Internal Revenue Service as summarized in the Tax examination status table below. As JPMorgan Chase is presently under audit by a number of taxing authorities, it is reasonably possible that over the next 12 months the resolution of these examinations may increase or decrease the gross balance of unrecognized tax benefits by as much as $800 million. Upon settlement of an audit, the change in the unrecognized tax benefit would result from payment or income statement recognition.

The following table presents a reconciliation of the beginning and ending amount of unrecognized tax benefits for the years ended December 31, 2016, 2015 and 2014.

Year ended December 31, (in millions)	**2016**	2015	2014
Balance at January 1,	**$ 3,497**	$ 4,911	$ 5,535
Increases based on tax positions related to the current period	**262**	408	810
Increases based on tax positions related to prior periods	**583**	1,028	477
Decreases based on tax positions related to prior periods	**(785)**	(2,646)	(1,902)
Decreases related to cash settlements with taxing authorities	**(56)**	(204)	(9)
Decreases related to a lapse of applicable statute of limitations	**(51)**	–	–
Balance at December 31,	**$ 3,450**	$ 3,497	$ 4,911

After-tax interest expense/(benefit) and penalties related to income tax liabilities recognized in income tax expense were $86 million, $(156) million and $17 million in 2016, 2015 and 2014, respectively.

At December 31, 2016 and 2015, in addition to the liability for unrecognized tax benefits, the Firm had accrued $687 million and $578 million, respectively, for income tax-related interest and penalties.

Tax examination status

JPMorgan Chase is continually under examination by the Internal Revenue Service, by taxing authorities throughout the world, and by many state and local jurisdictions throughout the U.S. The following table summarizes the status of significant income tax examinations of JPMorgan Chase and its consolidated subsidiaries as of December 31, 2016.

December 31, 2016	Periods under examination	Status
JPMorgan Chase – U.S.	2003 – 2005	At Appellate level
JPMorgan Chase – U.S.	2006 – 2010	Field examination of amended returns; certain matters at Appellate level
JPMorgan Chase – U.S.	2011 – 2013	Field Examination
JPMorgan Chase – New York State	2008 – 2011	Field Examination
JPMorgan Chase – New York City	2008 – 2011	Field Examination
JPMorgan Chase – California	2011 – 2012	Field Examination
JPMorgan Chase – U.K.	2006 – 2014	Field examination of certain select entities

Note 27 – Restrictions on cash and intercompany funds transfers

The business of JPMorgan Chase Bank, National Association ("JPMorgan Chase Bank, N.A.") is subject to examination and regulation by the OCC. The Bank is a member of the U.S. Federal Reserve System, and its deposits in the U.S. are insured by the FDIC, subject to applicable limits.

The Federal Reserve requires depository institutions to maintain cash reserves with a Federal Reserve Bank. The average required amount of reserve balances deposited by the Firm's bank subsidiaries with various Federal Reserve Banks was approximately $19.3 billion and $14.4 billion in 2016 and 2015, respectively.

Restrictions imposed by U.S. federal law prohibit JPMorgan Chase & Co. ("Parent Company") and certain of its affiliates from borrowing from banking subsidiaries unless the loans are secured in specified amounts. Such secured loans provided by any banking subsidiary to the Parent Company or to any particular affiliate, together with certain other transactions with such affiliate, (collectively referred to as "covered transactions"), are generally limited to 10% of the banking subsidiary's total capital, as determined by the risk-based capital guidelines; the aggregate amount of covered transactions between any banking subsidiary and all of its affiliates is limited to 20% of the banking subsidiary's total capital.

Prior to the establishment of the IHC in the fourth quarter of 2016, the principal sources of the Parent Company's income were dividends and interest from the various bank and non-bank subsidiaries of the Firm; the principal source of the Parent Company's income, commencing with the fourth quarter, will be dividends from the IHC and JPMorgan Chase Bank, N.A., the two principal subsidiaries of the Parent Company. In addition to dividend restrictions set forth in statutes and regulations, the Federal Reserve, the OCC and the FDIC have authority under the Financial Institutions Supervisory Act to prohibit or to limit the payment of dividends by the banking organizations they supervise, including JPMorgan Chase and its subsidiaries that are banks or bank holding companies, if, in the banking regulator's opinion, payment of a dividend would constitute an unsafe or unsound practice in light of the financial condition of the banking organization.

At January 1, 2017, JPMorgan Chase's banking subsidiaries could pay, in the aggregate, approximately $20 billion in dividends to their respective bank holding companies without the prior approval of their relevant banking regulators. The capacity to pay dividends in 2017 will be supplemented by the banking subsidiaries' earnings during the year.

In compliance with rules and regulations established by U.S. and non-U.S. regulators, as of December 31, 2016 and 2015, cash in the amount of $13.4 billion and $13.2 billion, respectively, were segregated in special bank accounts for the benefit of securities and futures brokerage customers. Also, as of December 31, 2016 and 2015, the Firm had receivables within other assets of $16.1 billion and $15.6 billion, respectively, consisting of cash deposited with clearing organizations for the benefit of customers. Securities with a fair value of $19.3 billion and $20.0 billion, respectively, were also restricted in relation to customer activity. In addition, as of December 31, 2016 and 2015, the Firm had other restricted cash of $3.6 billion and $3.1 billion, respectively, primarily representing cash reserves held at non-U.S. central banks and held for other general purposes. Prior period amounts for segregated cash, receivables within other assets, and other restricted cash have been revised to conform with the current period presentation.

Note 28 – Regulatory capital

The Federal Reserve establishes capital requirements, including well-capitalized standards, for the consolidated financial holding company. The OCC establishes similar minimum capital requirements and standards for the Firm's national banks, including JPMorgan Chase Bank, N.A. and Chase Bank USA, N.A.

Capital rules under Basel III establish minimum capital ratios and overall capital adequacy standards for large and internationally active U.S. bank holding companies and banks, including the Firm and its IDI subsidiaries. Basel III presents two comprehensive methodologies for calculating RWA: a general (standardized) approach ("Basel III Standardized") and an advanced approach ("Basel III Advanced"). Certain of the requirements of Basel III are subject to phase-in periods that began on January 1, 2014 and continue through the end of 2018 ("transitional period").

There are three categories of risk-based capital under the Basel III Transitional rules: CET1 capital, as well as Tier 1 capital and Tier 2 capital. CET1 capital predominantly includes common stockholders' equity (including capital for AOCI related to debt and equity securities classified as AFS as well as for defined-benefit pension and OPEB plans), less certain deductions for goodwill, MSRs and deferred tax assets that arise from NOL and tax credit carryforwards. Tier 1 capital predominantly consists of CET1 capital as well as perpetual preferred stock. Tier 2 capital includes long-term debt qualifying as Tier 2 and qualifying allowance for credit losses. Total capital is Tier 1 capital plus Tier 2 capital.

The following tables present the regulatory capital, assets and risk-based capital ratios for JPMorgan Chase and its significant national bank subsidiaries under both Basel III Standardized Transitional and Basel III Advanced Transitional at December 31, 2016 and 2015.

	JPMorgan Chase & Co.			
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	**Dec 31, 2016**	Dec 31, 2015	**Dec 31, 2016**	Dec 31, 2015
Regulatory capital				
CET1 capital	**$ 182,967**	$ 175,398	**$ 182,967**	$ 175,398
Tier 1 capital[(a)]	**208,112**	200,482	**208,112**	200,482
Total capital	**239,553**	234,413	**228,592**	224,616
Assets				
Risk-weighted	**1,464,981**	1,465,262	**1,476,915**	1,485,336
Adjusted average[(b)]	**2,484,631**	2,358,471	**2,484,631**	2,358,471
Capital ratios[(c)]				
CET1	**12.5%**	12.0%	**12.4%**	11.8%
Tier 1[(a)]	**14.2**	13.7	**14.1**	13.5
Total	**16.4**	16.0	**15.5**	15.1
Tier 1 leverage[(d)]	**8.4**	8.5	**8.4**	8.5

	JPMorgan Chase Bank, N.A.			
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	**Dec 31, 2016**	Dec 31, 2015	**Dec 31, 2016**	Dec 31, 2015
Regulatory capital				
CET1 capital	**$ 179,319**	$ 168,857	**$ 179,319**	$ 168,857
Tier 1 capital[(a)]	**179,341**	169,222	**179,341**	169,222
Total capital	**191,662**	183,262	**184,637**	176,423
Assets				
Risk-weighted	**1,293,203**	1,264,056	**1,262,613**	1,249,607
Adjusted average[(b)]	**2,088,851**	1,910,934	**2,088,851**	1,910,934
Capital ratios[(c)]				
CET1	**13.9%**	13.4%	**14.2%**	13.5%
Tier 1[(a)]	**13.9**	13.4	**14.2**	13.5
Total	**14.8**	14.5	**14.6**	14.1
Tier 1 leverage[(d)]	**8.6**	8.9	**8.6**	8.9

	Chase Bank USA, N.A.			
	Basel III Standardized Transitional		Basel III Advanced Transitional	
(in millions, except ratios)	**Dec 31, 2016**	Dec 31, 2015	**Dec 31, 2016**	Dec 31, 2015
Regulatory capital				
CET1 capital	$ 16,784	$ 15,419	$ 16,784	$ 15,419
Tier 1 capital[(a)]	16,784	15,419	16,784	15,419
Total capital	22,862	21,418	21,434	20,069
Assets				
Risk-weighted	112,297	105,807	186,378	181,775
Adjusted average[(b)]	120,304	134,152	120,304	134,152
Capital ratios[(c)]				
CET1	14.9%	14.6%	9.0%	8.5%
Tier 1[(a)]	14.9	14.6	9.0	8.5
Total	20.4	20.2	11.5	11.0
Tier 1 leverage[(d)]	14.0	11.5	14.0	11.5

(a) Includes the deduction associated with the permissible holdings of covered funds (as defined by the Volcker Rule) acquired after December 31, 2013. The deduction was not material as of December 31, 2016.
(b) Adjusted average assets, for purposes of calculating the Tier 1 leverage ratio, includes total quarterly average assets adjusted for unrealized gains/(losses) on AFS securities, less deductions for goodwill and other intangible assets, defined benefit pension plan assets, and deferred tax assets related to NOL and tax credit carryforwards.
(c) For each of the risk-based capital ratios, the capital adequacy of the Firm and its national bank subsidiaries are evaluated against the Basel III approach, Standardized or Advanced, resulting in the lower ratio (the "Collins Floor"), as required by the Collins Amendment of the Dodd-Frank Act.
(d) The Tier 1 leverage ratio is not a risk-based measure of capital. This ratio is calculated by dividing Tier 1 capital by adjusted average assets.
Note: Rating agencies allow measures of capital to be adjusted upward for deferred tax liabilities, which have resulted from both non-taxable business combinations and from tax-deductible goodwill. The Firm had deferred tax liabilities resulting from non-taxable business combinations of $83 million and $105 million at December 31, 2016, and 2015, respectively; and deferred tax liabilities resulting from tax-deductible goodwill of $3.1 billion and $3.0 billion at December 31, 2016, and 2015, respectively.

Under the risk-based capital guidelines of the Federal Reserve, JPMorgan Chase is required to maintain minimum ratios of CET1, Tier 1 and Total capital to RWA, as well as a minimum leverage ratio (which is defined as Tier 1 capital divided by adjusted quarterly average assets). Failure to meet these minimum requirements could cause the Federal Reserve to take action. National bank subsidiaries also are subject to these capital requirements by their respective primary regulators.

The following table presents the minimum ratios to which the Firm and its national bank subsidiaries are subject as of December 31, 2016.

	Minimum capital ratios		Well-capitalized ratios	
	BHC[(a)]	IDI[(b)]	BHC[(c)]	IDI[(d)]
Capital ratios				
CET1	6.25%	5.125%	–%	6.5%
Tier 1	7.75	6.625	6.0	8.0
Total	9.75	8.625	10.0	10.0
Tier 1 leverage	4.0	4.0	–	5.0

Note: The ratios presented in the table above are as defined by the regulations issued by the Federal Reserve, OCC and FDIC and to which the Firm and its national bank subsidiaries are subject.

(a) Represents the transitional minimum capital ratios applicable to the Firm under Basel III at December 31, 2016. Commencing in the first quarter of 2016, the CET1 minimum capital ratio includes 0.625% resulting from the phase in of the Firm's 2.5% capital conservation buffer, and 1.125% resulting from the phase in of the Firm's 4.5% GSIB surcharge.

(b) Represents requirements for JPMorgan Chase's banking subsidiaries. The CET1 minimum capital ratio includes 0.625% resulting from the phase in of the 2.5% capital conservation buffer that is applicable to the banking subsidiaries. The banking subsidiaries are not subject to the GSIB surcharge.

(c) Represents requirements for bank holding companies pursuant to regulations issued by the Federal Reserve.

(d) Represents requirements for bank subsidiaries pursuant to regulations issued under the FDIC Improvement Act.

As of December 31, 2016 and 2015, JPMorgan Chase and all of its banking subsidiaries were well-capitalized and met all capital requirements to which each was subject.

Note 29 – Off-balance sheet lending-related financial instruments, guarantees, and other commitments

JPMorgan Chase provides lending-related financial instruments (e.g., commitments and guarantees) to meet the financing needs of its customers. The contractual amount of these financial instruments represents the maximum possible credit risk to the Firm should the counterparty draw upon the commitment or the Firm be required to fulfill its obligation under the guarantee, and should the counterparty subsequently fail to perform according to the terms of the contract. Most of these commitments and guarantees are refinanced, extended, cancelled, or expire without being drawn or a default occurring. As a result, the total contractual amount of these instruments is not, in the Firm's view, representative of its actual future credit exposure or funding requirements.

To provide for probable credit losses inherent in wholesale and certain consumer lending-commitments, an allowance for credit losses on lending-related commitments is maintained. See Note 15 for further information regarding the allowance for credit losses on lending-related commitments. The following table summarizes the contractual amounts and carrying values of off-balance sheet lending-related financial instruments, guarantees and other commitments at December 31, 2016 and 2015. The amounts in the table below for credit card and home equity lending-related commitments represent the total available credit for these products. The Firm has not experienced, and does not anticipate, that all available lines of credit for these products will be utilized at the same time. The Firm can reduce or cancel credit card lines of credit by providing the borrower notice or, in some cases as permitted by law, without notice. In addition, the Firm typically closes credit card lines when the borrower is 60 days or more past due. The Firm may reduce or close HELOCs when there are significant decreases in the value of the underlying property, or when there has been a demonstrable decline in the creditworthiness of the borrower.

Off–balance sheet lending-related financial instruments, guarantees and other commitments

By remaining maturity at December 31, (in millions)	Contractual amount 2016: Expires in 1 year or less	Expires after 1 year through 3 years	Expires after 3 years through 5 years	Expires after 5 years	Total	2015 Total	Carrying value(g) 2016	Carrying value(g) 2015
Lending-related								
Consumer, excluding credit card:								
Home equity	**$ 4,247**	**$ 3,578**	**$ 1,035**	**$ 12,854**	**$ 21,714**	$ 22,756	**$ 12**	$ –
Residential mortgage(a)	**11,745**	**–**	**–**	**–**	**11,745**	12,992	**–**	–
Auto	**7,807**	**461**	**173**	**27**	**8,468**	10,237	**2**	2
Business banking	**11,485**	**673**	**122**	**453**	**12,733**	12,351	**12**	12
Student and other	**107**	**1**	**–**	**29**	**137**	142	**–**	–
Total consumer, excluding credit card	**35,391**	**4,713**	**1,330**	**13,363**	**54,797**	58,478	**26**	14
Credit card	**553,891**	**–**	**–**	**–**	**553,891**	515,518	**–**	–
Total consumer(b)	**589,282**	**4,713**	**1,330**	**13,363**	**608,688**	573,996	**26**	14
Wholesale:								
Other unfunded commitments to extend credit(c)	**69,307**	**116,716**	**135,663**	**6,811**	**328,497**	323,325	**905**	649
Standby letters of credit and other financial guarantees(c)	**15,738**	**12,654**	**6,577**	**978**	**35,947**	39,133	**586**	548
Other letters of credit(c)	**3,354**	**86**	**129**	**1**	**3,570**	3,941	**2**	2
Total wholesale(d)	**88,399**	**129,456**	**142,369**	**7,790**	**368,014**	366,399	**1,493**	1,199
Total lending-related	**$ 677,681**	**$ 134,169**	**$ 143,699**	**$ 21,153**	**$ 976,702**	$ 940,395	**$ 1,519**	$ 1,213
Other guarantees and commitments								
Securities lending indemnification agreements and guarantees(e)	**$ 137,209**	**$ –**	**$ –**	**$ –**	**$ 137,209**	$ 183,329	**$ –**	$ –
Derivatives qualifying as guarantees	**1,061**	**450**	**10,930**	**39,525**	**51,966**	53,784	**80**	222
Unsettled reverse repurchase and securities borrowing agreements	**50,722**	**–**	**–**	**–**	**50,722**	42,482	**–**	–
Unsettled repurchase and securities lending agreements	**26,948**	–	–	–	**26,948**	21,798	**–**	–
Loan sale and securitization-related indemnifications:								
Mortgage repurchase liability	**NA**	**NA**	**NA**	**NA**	**NA**	NA	**133**	148
Loans sold with recourse	**NA**	**NA**	**NA**	**NA**	**2,730**	4,274	**64**	82
Other guarantees and commitments(f)	**383**	**2,662**	**1,017**	**1,653**	**5,715**	5,580	**(118)**	(94)

(a) Includes certain commitments to purchase loans from correspondents.
(b) Predominantly all consumer lending-related commitments are in the U.S.
(c) At December 31, 2016 and 2015, reflected the contractual amount net of risk participations totaling $328 million and $385 million, respectively, for other unfunded commitments to extend credit; $11.1 billion and $11.2 billion, respectively, for standby letters of credit and other financial guarantees; and $265 million and $341 million, respectively, for other letters of credit. In regulatory filings with the Federal Reserve these commitments are shown gross of risk participations.
(d) At December 31, 2016 and 2015, the U.S. portion of the contractual amount of total wholesale lending-related commitments was 79% and 77%, respectively.
(e) At December 31, 2016 and 2015, collateral held by the Firm in support of securities lending indemnification agreements was $143.2 billion and $190.6 billion, respectively. Securities lending collateral consist of primarily cash and securities issued by governments that are members of the Organisation for Economic Co-operation and Development ("OECD") and U.S. government agencies.
(f) At December 31, 2016 and 2015, included unfunded commitments of $48 million and $50 million, respectively, to third-party private equity funds; and $1.0 billion and $871 million, respectively, to other equity investments. These commitments included $34 million and $73 million, respectively, related to investments that are generally fair valued at net asset value as discussed in Note 3. In addition, at December 31, 2016 and 2015, included letters of credit hedged by derivative transactions and managed on a market risk basis of $4.6 billion and $4.6 billion, respectively.
(g) For lending-related products, the carrying value represents the allowance for lending-related commitments and the guarantee liability; for derivative-related products, the carrying value represents the fair value.

Other unfunded commitments to extend credit

Other unfunded commitments to extend credit generally consist of commitments for working capital and general corporate purposes, extensions of credit to support commercial paper facilities and bond financings in the event that those obligations cannot be remarketed to new investors, as well as committed liquidity facilities to clearing organizations. The Firm also issues commitments under multipurpose facilities which could be drawn upon in several forms, including the issuance of a standby letter of credit.

The Firm acts as a settlement and custody bank in the U.S. tri-party repurchase transaction market. In its role as settlement and custody bank, the Firm is exposed to the intra-day credit risk of its cash borrower clients, usually broker-dealers. This exposure arises under secured clearance advance facilities that the Firm extends to its clients (i.e. cash borrowers); these facilities contractually limit the Firm's intra-day credit risk to the facility amount and must be repaid by the end of the day. As of December 31, 2016 and 2015, the secured clearance advance facility maximum outstanding commitment amount was $2.4 billion and $2.9 billion, respectively.

Guarantees

U.S. GAAP requires that a guarantor recognize, at the inception of a guarantee, a liability in an amount equal to the fair value of the obligation undertaken in issuing the guarantee. U.S. GAAP defines a guarantee as a contract that contingently requires the guarantor to pay a guaranteed party based upon: (a) changes in an underlying asset, liability or equity security of the guaranteed party; or (b) a third party's failure to perform under a specified agreement. The Firm considers the following off–balance sheet lending-related arrangements to be guarantees under U.S. GAAP: standby letters of credit and other financial guarantees, securities lending indemnifications, certain indemnification agreements included within third-party contractual arrangements and certain derivative contracts.

As required by U.S. GAAP, the Firm initially records guarantees at the inception date fair value of the obligation assumed (e.g., the amount of consideration received or the net present value of the premium receivable). For certain types of guarantees, the Firm records this fair value amount in other liabilities with an offsetting entry recorded in cash (for premiums received), or other assets (for premiums receivable). Any premium receivable recorded in other assets is reduced as cash is received under the contract, and the fair value of the liability recorded at inception is amortized into income as lending and deposit-related fees over the life of the guarantee contract. For indemnifications provided in sales agreements, a portion of the sale proceeds is allocated to the guarantee, which adjusts the gain or loss that would otherwise result from the transaction. For these indemnifications, the initial liability is amortized to income as the Firm's risk is reduced (i.e., over time or when the indemnification expires). Any contingent liability that exists as a result of issuing the guarantee or indemnification is recognized when it becomes probable and reasonably estimable. The contingent portion of the liability is not recognized if the estimated amount is less than the carrying amount of the liability recognized at inception (adjusted for any amortization). The recorded amounts of the liabilities related to guarantees and indemnifications at December 31, 2016 and 2015, excluding the allowance for credit losses on lending-related commitments, are discussed below.

Standby letters of credit and other financial guarantees

Standby letters of credit and other financial guarantees are conditional lending commitments issued by the Firm to guarantee the performance of a customer to a third party under certain arrangements, such as commercial paper facilities, bond financings, acquisition financings, trade and similar transactions. The carrying values of standby and other letters of credit were $588 million and $550 million at December 31, 2016 and 2015, respectively, which were classified in accounts payable and other liabilities on the Consolidated balance sheets; these carrying values included $147 million and $123 million, respectively, for the allowance for lending-related commitments, and $441 million and $427 million, respectively, for the guarantee liability and corresponding asset.

The following table summarizes the types of facilities under which standby letters of credit and other letters of credit arrangements are outstanding by the ratings profiles of the Firm's customers, as of December 31, 2016 and 2015.

Standby letters of credit, other financial guarantees and other letters of credit

	2016		2015	
December 31, (in millions)	Standby letters of credit and other financial guarantees	Other letters of credit	Standby letters of credit and other financial guarantees	Other letters of credit
Investment-grade[(a)]	**$ 28,245**	**$ 2,781**	$ 31,751	$ 3,290
Noninvestment-grade[(a)]	**7,702**	**789**	7,382	651
Total contractual amount	**$ 35,947**	**$ 3,570**	$ 39,133	$ 3,941
Allowance for lending-related commitments	**$ 145**	**$ 2**	$ 121	$ 2
Guarantee liability	**441**	**–**	427	–
Total carrying value	**$ 586**	**$ 2**	$ 548	$ 2
Commitments with collateral	**$ 19,346**	**$ 940**	$ 18,825	$ 996

(a) The ratings scale is based on the Firm's internal ratings, which generally correspond to ratings as defined by S&P and Moody's.

Securities lending indemnifications
Through the Firm's securities lending program, customers' securities, via custodial and non-custodial arrangements, may be lent to third parties. As part of this program, the Firm provides an indemnification in the lending agreements which protects the lender against the failure of the borrower to return the lent securities. To minimize its liability under these indemnification agreements, the Firm obtains cash or other highly liquid collateral with a market value exceeding 100% of the value of the securities on loan from the borrower. Collateral is marked to market daily to help assure that collateralization is adequate. Additional collateral is called from the borrower if a shortfall exists, or collateral may be released to the borrower in the event of overcollateralization. If a borrower defaults, the Firm would use the collateral held to purchase replacement securities in the market or to credit the lending customer with the cash equivalent thereof.

Derivatives qualifying as guarantees
The Firm transacts certain derivative contracts that have the characteristics of a guarantee under U.S. GAAP. These contracts include written put options that require the Firm to purchase assets upon exercise by the option holder at a specified price by a specified date in the future. The Firm may enter into written put option contracts in order to meet client needs, or for other trading purposes. The terms of written put options are typically five years or less. Derivatives deemed to be guarantees also include contracts such as stable value derivatives that require the Firm to make a payment of the difference between the market value and the book value of a counterparty's reference portfolio of assets in the event that market value is less than book value and certain other conditions have been met. Stable value derivatives, commonly referred to as "stable value wraps," are transacted in order to allow investors to realize investment returns with less volatility than an unprotected portfolio and are typically longer-term or may have no stated maturity, but allow the Firm to elect to terminate the contract under certain conditions.

Derivatives deemed to be guarantees are recorded on the Consolidated balance sheets at fair value in trading assets and trading liabilities. The total notional value of the derivatives that the Firm deems to be guarantees was $52.0 billion and $53.8 billion at December 31, 2016 and 2015, respectively. The notional amount generally represents the Firm's maximum exposure to derivatives qualifying as guarantees. However, exposure to certain stable value contracts is contractually limited to a substantially lower percentage of the notional amount; the notional amount on these stable value contracts was $28.7 billion and $28.4 billion at December 31, 2016 and 2015, respectively, and the maximum exposure to loss was $3.0 billion at both December 31, 2016 and 2015. The fair values of the contracts reflect the probability of whether the Firm will be required to perform under the contract. The fair value related to derivatives that the Firm deems to be guarantees were derivative payables of $96 million and $236 million and derivative receivables of $16 million and $14 million at December 31, 2016 and 2015, respectively. The Firm reduces exposures to these contracts by entering into offsetting transactions, or by entering into contracts that hedge the market risk related to the derivative guarantees.

In addition to derivative contracts that meet the characteristics of a guarantee, the Firm is both a purchaser and seller of credit protection in the credit derivatives market. For a further discussion of credit derivatives, see Note 6.

Unsettled reverse repurchase and securities borrowing agreements, and unsettled repurchase and securities lending agreements

In the normal course of business, the Firm enters into reverse repurchase agreements and securities borrowing agreements, which are secured financing agreements. Such agreements settle at a future date. At settlement, these commitments result in the Firm advancing cash to and receiving securities collateral from the counterparty. The Firm also enters into repurchase agreements and securities lending agreements. At settlement, these commitments result in the Firm receiving cash from and providing securities collateral to the counterparty. These agreements generally do not meet the definition of a derivative, and therefore, are not recorded on the Consolidated balance sheets until settlement date. These agreements predominantly consist of agreements with regular-way settlement periods. For a further discussion of securities purchased under resale agreements and securities borrowed, and securities sold under repurchase agreements and securities loaned, see Note 13.

Loan sales- and securitization-related indemnifications

Mortgage repurchase liability
In connection with the Firm's mortgage loan sale and securitization activities with GSEs, as described in Note 16, the Firm has made representations and warranties that the loans sold meet certain requirements that may require the Firm to repurchase mortgage loans and/or indemnify the loan purchaser. Further, although the Firm's securitizations are predominantly nonrecourse, the Firm does provide recourse servicing in certain limited cases where it agrees to share credit risk with the owner of the mortgage loans. To the extent that repurchase demands that are received relate to loans that the Firm purchased from third parties that remain viable, the Firm typically will have the right to seek a recovery of related repurchase losses from the third party. Generally, the maximum amount of future payments the Firm would be required to make for breaches of these representations and warranties would be equal to the unpaid principal balance of such loans that are deemed to have defects that were sold to purchasers (including securitization-related SPEs) plus, in certain circumstances, accrued interest on such loans and certain expense.

Private label securitizations
The liability related to repurchase demands associated with private label securitizations is separately evaluated by the Firm in establishing its litigation reserves.

For additional information regarding litigation, see Note 31.

Loans sold with recourse
The Firm provides servicing for mortgages and certain commercial lending products on both a recourse and nonrecourse basis. In nonrecourse servicing, the principal credit risk to the Firm is the cost of temporary servicing advances of funds (i.e., normal servicing advances). In recourse servicing, the servicer agrees to share credit risk with the owner of the mortgage loans, such as Fannie Mae or Freddie Mac or a private investor, insurer or guarantor. Losses on recourse servicing predominantly occur when foreclosure sales proceeds of the property underlying a defaulted loan are less than the sum of the outstanding principal balance, plus accrued interest on the loan and the cost of holding and disposing of the underlying property. The Firm's securitizations are predominantly nonrecourse, thereby effectively transferring the risk of future credit losses to the purchaser of the mortgage-backed securities issued by the trust. At December 31, 2016 and 2015, the unpaid principal balance of loans sold with recourse totaled $2.7 billion and $4.3 billion, respectively. The carrying value of the related liability that the Firm has recorded, which is representative of the Firm's view of the likelihood it will have to perform under its recourse obligations, was $64 million and $82 million at December 31, 2016 and 2015, respectively.

Other off-balance sheet arrangements

Indemnification agreements – general
In connection with issuing securities to investors, the Firm may enter into contractual arrangements with third parties that require the Firm to make a payment to them in the event of a change in tax law or an adverse interpretation of tax law. In certain cases, the contract also may include a termination clause, which would allow the Firm to settle the contract at its fair value in lieu of making a payment under the indemnification clause. The Firm may also enter into indemnification clauses in connection with the licensing of software to clients ("software licensees") or when it sells a business or assets to a third party ("third-party purchasers"), pursuant to which it indemnifies software licensees for claims of liability or damages that may occur subsequent to the licensing of the software, or third-party purchasers for losses they may incur due to actions taken by the Firm prior to the sale of the business or assets. It is difficult to estimate the Firm's maximum exposure under these indemnification arrangements, since this would require an assessment of future changes in tax law and future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Card charge-backs
Commerce Solutions, Card's merchant services business, is a global leader in payment processing and merchant acquiring.

Under the rules of Visa USA, Inc., and MasterCard International, JPMorgan Chase Bank, N.A., is primarily liable for the amount of each processed card sales transaction that is the subject of a dispute between a cardmember and a merchant. If a dispute is resolved in the cardmember's favor, Commerce Solutions will (through the cardmember's issuing bank) credit or refund the amount to the cardmember and will charge back the transaction to the merchant. If Commerce Solutions is unable to collect the amount from the merchant, Commerce Solutions will bear the loss for the amount credited or refunded to the cardmember. Commerce Solutions mitigates this risk by withholding future settlements, retaining cash reserve accounts or by obtaining other security. However, in the unlikely event that: (1) a merchant ceases operations and is unable to deliver products, services or a refund; (2) Commerce Solutions does not have sufficient collateral from the merchant to provide customer refunds; and (3) Commerce Solutions does not have sufficient financial resources to provide customer refunds, JPMorgan Chase Bank, N.A., would recognize the loss.

Commerce Solutions incurred aggregate losses of $85 million, $12 million, and $10 million on $1,063.4 billion, $949.3 billion, and $847.9 billion of aggregate volume processed for the years ended December 31, 2016, 2015 and 2014, respectively. Incurred losses from merchant charge-backs are charged to other expense, with the offset recorded in a valuation allowance against accrued interest and accounts receivable on the Consolidated balance sheets. The carrying value of the valuation allowance was $45 million and $20 million at December 31, 2016 and 2015, respectively, which the Firm believes, based on historical experience and the collateral held by Commerce Solutions of $125 million and $136 million at December 31, 2016 and 2015, respectively, is representative of the payment or performance risk to the Firm related to charge-backs.

Clearing Services – Client Credit Risk
The Firm provides clearing services for clients by entering into securities purchases and sales and derivative transactions with CCPs, including ETDs such as futures and options, as well as OTC-cleared derivative contracts. As a clearing member, the Firm stands behind the performance of its clients, collects cash and securities collateral (margin) as well as any settlement amounts due from or to clients, and remits them to the relevant CCP or client in whole or part. There are two types of margin: variation margin is posted on a daily basis based on the value of clients' derivative contracts and initial margin is posted at inception of a derivative contract, generally on the basis of the potential changes in the variation margin requirement for the contract.

As clearing member, the Firm is exposed to the risk of nonperformance by its clients, but is not liable to clients for the performance of the CCPs. Where possible, the Firm seeks to mitigate its risk to the client through the collection of appropriate amounts of margin at inception and throughout the life of the transactions. The Firm can also cease providing clearing services if clients do not adhere to their obligations under the clearing agreement. In the event of nonperformance by a client, the Firm would close out the client's positions and access available margin. The CCP would utilize any margin it holds to make itself whole, with any remaining shortfalls required to be paid by the Firm as a clearing member.

The Firm reflects its exposure to nonperformance risk of the client through the recognition of margin payables or receivables to clients and CCPs; the clients' underlying securities or derivative contracts are not reflected in the Firm's Consolidated Financial Statements.

It is difficult to estimate the Firm's maximum possible exposure through its role as a clearing member, as this would require an assessment of transactions that clients may execute in the future. However, based upon historical experience, and the credit risk mitigants available to the Firm, management believes it is unlikely that the Firm will have to make any material payments under these arrangements and the risk of loss is expected to be remote.

For information on the derivatives that the Firm executes for its own account and records in its Consolidated Financial Statements, see Note 6.

Exchange & Clearing House Memberships
The Firm is a member of several securities and derivative exchanges and clearing houses, both in the U.S. and other countries, and it provides clearing services. Membership in some of these organizations requires the Firm to pay a pro rata share of the losses incurred by the organization as a result of the default of another member. Such obligations vary with different organizations. These obligations may be limited to members who dealt with the defaulting member or to the amount (or a multiple of the amount) of the Firm's contribution to the guarantee fund maintained by a clearing house or exchange as part of the resources available to cover any losses in the event of a member default. Alternatively, these obligations may include a pro rata share of the residual losses after applying the guarantee fund. Additionally, certain clearing houses require the Firm as a member to pay a pro rata share of losses that may result from the clearing house's investment of guarantee fund contributions and initial margin, unrelated to and independent of the default of another member. Generally a payment would only be required should such losses exceed the resources of the clearing house or exchange that are contractually required to absorb the losses in the first instance. It is difficult to estimate the Firm's maximum possible exposure under these membership agreements, since this would require an assessment of future claims that may be made against the Firm that have not yet occurred. However, based on historical experience, management expects the risk of loss to be remote.

Guarantees of subsidiaries
In the normal course of business, JPMorgan Chase & Co. ("Parent Company") may provide counterparties with guarantees of certain of the trading and other obligations of its subsidiaries on a contract-by-contract basis, as negotiated with the Firm's counterparties. The obligations of the subsidiaries are included on the Firm's Consolidated balance sheets or are reflected as off-balance sheet commitments; therefore, the Parent Company has not recognized a separate liability for these guarantees. The Firm believes that the occurrence of any event that would trigger payments by the Parent Company under these guarantees is remote.

The Parent Company has guaranteed certain long-term debt and structured notes of its subsidiaries, including JPMorgan Chase Financial Company LLC ("JPMFC"), a 100%-owned finance subsidiary. All securities issued by JPMFC are fully and unconditionally guaranteed by the Parent Company. These guarantees, which rank on a parity with the Firm's unsecured and unsubordinated indebtedness, are not included in the table on page 256 of this Note. For additional information, see Note 21.

Note 30 – Commitments, pledged assets and collateral

Lease commitments

At December 31, 2016, JPMorgan Chase and its subsidiaries were obligated under a number of noncancelable operating leases for premises and equipment used primarily for banking purposes, and for energy-related tolling service agreements. Certain leases contain renewal options or escalation clauses providing for increased rental payments based on maintenance, utility and tax increases, or they require the Firm to perform restoration work on leased premises. No lease agreement imposes restrictions on the Firm's ability to pay dividends, engage in debt or equity financing transactions or enter into further lease agreements.

The following table presents required future minimum rental payments under operating leases with noncancelable lease terms that expire after December 31, 2016.

Year ended December 31, (in millions)	
2017	$ 1,598
2018	1,479
2019	1,301
2020	1,151
2021	885
After 2021	3,701
Total minimum payments required	10,115
Less: Sublease rentals under noncancelable subleases	(1,379)
Net minimum payment required	$ 8,736

Total rental expense was as follows.

Year ended December 31, (in millions)	**2016**	2015	2014
Gross rental expense	**$ 1,860**	$ 2,015	$ 2,255
Sublease rental income	**(241)**	(411)	(383)
Net rental expense	**$ 1,619**	$ 1,604	$ 1,872

Pledged assets

The Firm may pledge financial assets that it owns to maintain potential borrowing capacity with central banks and for other purposes, including to secure borrowings and public deposits, and to collateralize repurchase and other securities financing agreements, and to cover customer short sales. Certain of these pledged assets may be sold or repledged or otherwise used by the secured parties and are identified as financial instruments owned (pledged to various parties) on the Consolidated balance sheets. At December 31, 2016 and 2015, the Firm had pledged assets of $441.9 billion and $385.6 billion, respectively, at Federal Reserve banks and FHLBs. In addition, as of December 31, 2016 and 2015, the Firm had pledged $53.5 billion and $50.7 billion, respectively, of financial assets that may not be sold or repledged or otherwise used by the secured parties. Total assets pledged do not include assets of consolidated VIEs; these assets are used to settle the liabilities of those entities. See Note 16 for additional information on assets and liabilities of consolidated VIEs. For additional information on the Firm's securities financing activities and long-term debt, see Note 13 and Note 21, respectively. The significant components of the Firm's pledged assets were as follows.

December 31, (in billions)	**2016**	2015
Securities	**$ 101.1**	$ 124.3
Loans	**374.9**	298.6
Trading assets and other	**153.0**	144.9
Total assets pledged	**$ 629.0**	$ 567.8

Collateral

At December 31, 2016 and 2015, the Firm had accepted financial assets as collateral that it could sell or repledge, deliver or otherwise use with a fair value of approximately $914.1 billion and $748.5 billion, respectively. This collateral was generally obtained under resale agreements, securities borrowing agreements, customer margin loans and derivative agreements. Of the collateral received, approximately $746.6 billion and $580.9 billion, respectively, were sold, repledged, delivered or otherwise used. Collateral was generally used under repurchase agreements, securities lending agreements or to cover customer short sales and to collateralize deposits and derivative agreements.

Note 31 – Litigation

Contingencies

As of December 31, 2016, the Firm and its subsidiaries and affiliates are defendants or putative defendants in numerous legal proceedings, including private, civil litigations and regulatory/government investigations. The litigations range from individual actions involving a single plaintiff to class action lawsuits with potentially millions of class members. Investigations involve both formal and informal proceedings, by both governmental agencies and self-regulatory organizations. These legal proceedings are at varying stages of adjudication, arbitration or investigation, and involve each of the Firm's lines of business and geographies and a wide variety of claims (including common law tort and contract claims and statutory antitrust, securities and consumer protection claims), some of which present novel legal theories.

The Firm believes the estimate of the aggregate range of reasonably possible losses, in excess of reserves established, for its legal proceedings is from $0 to approximately $3.0 billion at December 31, 2016. This estimated aggregate range of reasonably possible losses was based upon currently available information for those proceedings in which the Firm believes that an estimate of reasonably possible loss can be made. For certain matters, the Firm does not believe that such an estimate can be made, as of that date. The Firm's estimate of the aggregate range of reasonably possible losses involves significant judgment, given the number, variety and varying stages of the proceedings (including the fact that many are in preliminary stages), the existence in many such proceedings of multiple defendants (including the Firm) whose share of liability has yet to be determined, the numerous yet-unresolved issues in many of the proceedings (including issues regarding class certification and the scope of many of the claims) and the attendant uncertainty of the various potential outcomes of such proceedings, including where the Firm has made assumptions concerning future rulings by the court or other adjudicator, or about the behavior or incentives of adverse parties or regulatory authorities, and those assumptions prove to be incorrect. In addition, the outcome of a particular proceeding may be a result which the Firm did not take into account in its estimate because the Firm had deemed the likelihood of that outcome to be remote. Accordingly, the Firm's estimate of the aggregate range of reasonably possible losses will change from time to time, and actual losses may vary significantly.

Set forth below are descriptions of the Firm's material legal proceedings.

CIO Litigation. The Firm has been sued in a consolidated shareholder class action, and in a consolidated putative class action brought under the Employee Retirement Income Security Act ("ERISA"), relating to 2012 losses in the synthetic credit portfolio formerly managed by the Firm's Chief Investment Office ("CIO"). A settlement of the shareholder class action, under which the Firm paid $150 million, has received full and final approval from the Court. The putative ERISA class action has been dismissed. That dismissal was affirmed by the appellate court, and a request by the plaintiffs for rehearing by the full appellate court was denied.

Foreign Exchange Investigations and Litigation. The Firm previously reported settlements with certain government authorities relating to its foreign exchange ("FX") sales and trading activities and controls related to those activities. FX-related investigations and inquiries by government authorities, including competition authorities, are ongoing, and the Firm is cooperating with those matters. In May 2015, the Firm pleaded guilty to a single violation of federal antitrust law, and in January 2017, the Firm was sentenced, with judgment entered shortly thereafter. The Department of Labor granted the Firm a temporary one-year waiver, which was effective upon entry of judgment, to allow the Firm and its affiliates to continue to qualify for the Qualified Professional Asset Manager exemption under ERISA. The Firm's application for a lengthier exemption is pending. Separately, in February 2017 the South Africa Competition Commission announced that it had referred its FX investigation of the Firm and other banks to the South Africa Competition Tribunal to commence civil proceedings.

The Firm is also one of a number of foreign exchange dealers defending a class action filed in the United States District Court for the Southern District of New York by U.S.-based plaintiffs, principally alleging violations of federal antitrust laws based on an alleged conspiracy to manipulate foreign exchange rates (the "U.S. class action"). In January 2015, the Firm entered into a settlement agreement in the U.S. class action. Following this settlement, a number of additional putative class actions were filed seeking damages for persons who transacted FX futures and options on futures (the "exchanged-based actions"), consumers who purchased foreign currencies at allegedly inflated rates (the "consumer action"), participants or beneficiaries of qualified ERISA plans (the "ERISA actions"), and purported indirect purchasers of FX instruments (the "indirect purchaser action"). Since then, the Firm has entered into a revised settlement agreement to resolve the consolidated U.S. class action, including the exchange-based actions, and that agreement has been preliminarily approved by the Court. The District Court has dismissed one of the ERISA actions, and the plaintiffs have filed an appeal. The consumer action, a second ERISA action and the indirect purchaser action remain pending in the District Court.

In September 2015, two class actions were filed in Canada against the Firm as well as a number of other FX dealers, principally for alleged violations of the Canadian Competition Act based on an alleged conspiracy to fix the prices of currency purchased in the FX market. The first action was filed in the province of Ontario, and seeks to represent all persons in Canada who transacted any FX instrument. The second action was filed in the province of Quebec, and seeks authorization to represent only those persons in Quebec who engaged in FX transactions. In late 2016, the Firm settled the Canadian class actions; those settlements are subject to Court approval.

General Motors Litigation. JPMorgan Chase Bank, N.A. participated in, and was the Administrative Agent on behalf of a syndicate of lenders on, a $1.5 billion syndicated Term Loan facility ("Term Loan") for General Motors Corporation ("GM"). In July 2009, in connection with the GM bankruptcy proceedings, the Official Committee of Unsecured Creditors of Motors Liquidation Company ("Creditors Committee") filed a lawsuit against JPMorgan Chase Bank, N.A., in its individual capacity and as Administrative Agent for other lenders on the Term Loan, seeking to hold the underlying lien invalid based on the filing of a UCC-3 termination statement relating to the Term Loan. In January 2015, following several court proceedings, the United States Court of Appeals for the Second Circuit reversed the Bankruptcy Court's dismissal of the Creditors Committee's claim and remanded the case to the Bankruptcy Court with instructions to enter partial summary judgment for the Creditors Committee as to the termination statement. The proceedings in the Bankruptcy Court continue with respect to, among other things, additional defenses asserted by JPMorgan Chase Bank, N.A. and the value of additional collateral on the Term Loan that was unaffected by the filing of the termination statement at issue. In addition, certain Term Loan lenders filed cross-claims against JPMorgan Chase Bank, N.A. in the Bankruptcy Court seeking indemnification and asserting various claims.

Interchange Litigation. A group of merchants and retail associations filed a series of class action complaints alleging that Visa and MasterCard, as well as certain banks, conspired to set the price of credit and debit card interchange fees, enacted respective rules in violation of antitrust laws, and engaged in tying/bundling and exclusive dealing. The parties entered into an agreement to settle the cases for a cash payment of $6.1 billion to the class plaintiffs (of which the Firm's share is approximately 20%) and an amount equal to ten basis points of credit card interchange for a period of eight months to be measured from a date within 60 days of the end of the opt-out period. The agreement also provided for modifications to each credit card network's rules, including those that prohibit surcharging credit card transactions. In December 2013, the District Court granted final approval of the settlement.

A number of merchants appealed to the United States Court of Appeals for the Second Circuit, which, in June 2016, vacated the District Court's certification of the class action and reversed the approval of the class settlement. The case has been remanded to the District Court for further proceedings consistent with the appellate decision. Both the plaintiffs and the defendants have filed petitions seeking review by the U.S. Supreme Court of the Second Circuit's decision.

In addition, certain merchants have filed individual actions against Visa and MasterCard, as well as against the Firm and other banks, and those actions are proceeding.

Investment Management Litigation. The Firm is defending two pending cases that are coordinated for pre-trial and trial purposes, alleging that investment portfolios managed by J.P. Morgan Investment Management ("JPMIM") were inappropriately invested in securities backed by residential real estate collateral. Plaintiffs Assured Guaranty (U.K.) and Ambac Assurance UK Limited claim that JPMIM is liable for total losses of more than $1 billion in market value of these securities. Discovery has been completed. In January 2016, plaintiffs filed a joint partial motion for summary judgment in the coordinated actions. In February 2017, the Court ruled in plaintiffs' favor as to the interpretation of an applicable statutory provision and the rejection of a certain defense, but otherwise preserved for trial the determination of whether JPMIM breached the governing contract and is liable for plaintiffs' claimed losses under the standard of gross negligence. The trial is scheduled to begin in March 2017.

Lehman Brothers Bankruptcy Proceedings. In January 2016, JPMorgan Chase Bank, N.A. and Lehman Brothers Holdings Inc. ("LBHI") and several of LBHI's subsidiaries reached an agreement, approved by the Bankruptcy Court, resolving several disputes between the parties. The January 2016 settlement did not resolve the following remaining matters: In the Bankruptcy Court proceedings, LBHI and its Official Committee of Unsecured Creditors filed an objection to the claims asserted by JPMorgan Chase Bank, N.A. against LBHI with respect to clearing advances made to Lehman Brothers Inc., principally on the grounds that the Firm had not conducted the sale of the securities collateral held for its claims in a commercially reasonable manner. LBHI also brought two claims objections relating to securities lending claims and a group of other smaller claims. In January 2017, the Firm entered into an agreement to settle all of these remaining claims, and this settlement has been approved by the Bankruptcy Court.

LIBOR and Other Benchmark Rate Investigations and Litigation. JPMorgan Chase has received subpoenas and requests for documents and, in some cases, interviews, from federal and state agencies and entities, including the U.S. Department of Justice ("DOJ"), the U.S. Commodity Futures Trading Commission ("CFTC"), the U.S. Securities and Exchange Commission ("SEC") and various state attorneys general, as well as the European Commission ("EC"), the U.K. Financial Conduct Authority ("FCA"), the Canadian Competition Bureau, the Swiss Competition Commission ("ComCo") and other regulatory authorities and banking associations around the world relating primarily to the process by which interest rates were submitted to the British Bankers Association ("BBA") in connection with the setting of the BBA's London Interbank Offered Rate ("LIBOR") for various currencies, principally in 2007 and 2008. Some of the inquiries also relate to similar processes by which information on rates is submitted to the European

Banking Federation ("EBF") in connection with the setting of the EBF's Euro Interbank Offered Rates ("EURIBOR") and to the Japanese Bankers' Association for the setting of Tokyo Interbank Offered Rates ("TIBOR"), as well as processes for the setting of U.S. dollar ISDAFIX rates and other reference rates in various parts of the world during similar time periods. The Firm is responding to and continuing to cooperate with these inquiries. As previously reported, the Firm has resolved EC inquiries relating to Yen LIBOR and Swiss Franc LIBOR. In December 2016, the Firm resolved ComCo inquiries relating to these same rates. ComCo's investigation relating to EURIBOR, to which the Firm and other banks are subject, continues. In December 2016, the EC issued a decision against the Firm and other banks finding an infringement of European antitrust rules relating to EURIBOR. The Firm has filed an appeal with the European General Court. In June 2016, the DOJ informed the Firm that the DOJ had closed its inquiry into LIBOR and other benchmark rates with respect to the Firm without taking action. Other inquiries have been discontinued without any action against JPMorgan Chase, including by the SEC, FCA and the Canadian Competition Bureau.

In addition, the Firm has been named as a defendant along with other banks in a series of individual and putative class actions filed in various United States District Courts. These actions have been filed, or consolidated for pre-trial purposes, in the United States District Court for the Southern District of New York. In these actions, plaintiffs make varying allegations that in various periods, starting in 2000 or later, defendants either individually or collectively manipulated the U.S. dollar LIBOR, Yen LIBOR, Swiss franc LIBOR, Euroyen TIBOR, EURIBOR, Singapore Interbank Offered Rate ("SIBOR"), Singapore Swap Offer Rate ("SOR") and/or the Bank Bill Swap Reference Rate ("BBSW") by submitting rates that were artificially low or high. Plaintiffs allege that they transacted in loans, derivatives or other financial instruments whose values are affected by changes in U.S. dollar LIBOR, Yen LIBOR, Swiss franc LIBOR, Euroyen TIBOR, EURIBOR, SIBOR, SOR or BBSW and assert a variety of claims including antitrust claims seeking treble damages. These matters are in various stages of litigation.

In the U.S. dollar LIBOR-related actions, the District Court dismissed certain claims, including the antitrust claims, and permitted other claims under the Commodity Exchange Act and common law to proceed. In May 2016, the United States Court of Appeals for the Second Circuit vacated the dismissal of the antitrust claims and remanded the case to the District Court to consider, among other things, whether the plaintiffs have standing to assert antitrust claims. In July 2016, JPMorgan Chase and other defendants again moved in the District Court to dismiss the antitrust claims, and in December 2016, the District Court granted in part and denied in part defendants' motion, finding that certain plaintiffs lacked standing to assert antitrust claims. Separately, in October 2016, JPMorgan Chase and other defendants filed a petition to the U.S. Supreme Court seeking review of the Second Circuit's decision that vacated the dismissal of plaintiffs' antitrust claims. That petition was denied.

The Firm is one of the defendants in a number of putative class actions alleging that defendant banks and ICAP conspired to manipulate the U.S. dollar ISDAFIX rates. Plaintiffs primarily assert claims under the federal antitrust laws and Commodity Exchange Act. In April 2016, the Firm settled the ISDAFIX litigation, along with certain other banks. Those settlements have been preliminarily approved by the Court.

Madoff Litigation. A putative class action was filed in the United States District Court for the District of New Jersey by investors who were net winners (i.e., Madoff customers who had taken more money out of their accounts than had been invested) in Madoff's Ponzi scheme and were not included in a prior class action settlement. These plaintiffs allege violations of the federal securities law, as well as other state and federal claims. A similar action was filed in the United States District Court for the Middle District of Florida, although it was not styled as a class action, and included claims pursuant to Florida statutes. The Florida court granted the Firm's motion to dismiss the case, and in August 2016, the United States Court of Appeals for the Eleventh Circuit affirmed the dismissal. The plaintiffs have filed a petition for writ of certiorari with the United States Supreme Court. In addition, the same plaintiffs have re-filed their dismissed state claims in Florida state court, where the Firm's motion to dismiss is pending. The New Jersey court granted a transfer motion to the United States District Court for the Southern District of New York, which granted the Firm's motion to dismiss, and the plaintiffs have filed an appeal of that dismissal.

Mortgage-Backed Securities and Repurchase Litigation and Related Regulatory Investigations. The Firm and affiliates (together, "JPMC"), Bear Stearns and affiliates (together, "Bear Stearns") and certain Washington Mutual affiliates (together, "Washington Mutual") have been named as defendants in a number of cases in their various roles in offerings of mortgage-backed securities ("MBS"). Following the settlements referred to below, the remaining civil cases include one investor action, one action by a monoline insurer relating to Bear Stearns' role solely as underwriter, and actions for repurchase of mortgage loans. The Firm and certain of its current and former officers and Board members have also been sued in shareholder derivative actions relating to the Firm's MBS activities, and one action remains pending.

Issuer Litigation – Individual Purchaser Actions. With the exception of one remaining action, the Firm has settled all of the individual actions brought against JPMC, Bear Stearns and Washington Mutual as MBS issuers (and, in some cases, also as underwriters of their own MBS offerings).

Underwriter Actions. The Firm is defending one remaining action by a monoline insurer relating to Bear Stearns' role solely as underwriter for another issuer's MBS offering. The issuer is defunct.

Repurchase Litigation. The Firm is defending a number of actions brought by trustees, securities administrators and/or master servicers of various MBS trusts on behalf of purchasers of securities issued by those trusts. These cases generally allege breaches of various representations and warranties regarding securitized loans and seek repurchase of those loans or equivalent monetary relief, as well as indemnification of attorneys' fees and costs and other remedies. The Firm has reached a settlement with Deutsche Bank National Trust Company, acting as trustee for various MBS trusts, and the Federal Deposit Insurance Corporation (the "FDIC") in connection with the litigation related to a significant number of MBS issued by Washington Mutual; that case is described in the Washington Mutual Litigations section below. Other repurchase actions, each specific to one or more MBS transactions issued by JPMC and/or Bear Stearns, are in various stages of litigation.

In addition, the Firm and a group of 21 institutional MBS investors made a binding offer to the trustees of MBS issued by JPMC and Bear Stearns providing for the payment of $4.5 billion and the implementation of certain servicing changes by JPMC, to resolve all repurchase and servicing claims that have been asserted or could have been asserted with respect to 330 MBS trusts created between 2005 and 2008. The offer does not resolve claims relating to Washington Mutual MBS. The trustees (or separate and successor trustees) for this group of 330 trusts have accepted the settlement for 319 trusts in whole or in part and excluded from the settlement 16 trusts in whole or in part. The trustees' acceptance has received final approval from the court.

Additional actions have been filed against third-party trustees that relate to loan repurchase and servicing claims involving trusts sponsored by JPMC, Bear Stearns and Washington Mutual.

The Firm has entered into agreements with a number of MBS trustees or entities that purchased MBS that toll applicable statute of limitations periods with respect to their claims, and has settled, and in the future may settle, tolled claims. There is no assurance that the Firm will not be named as a defendant in additional MBS-related litigation.

Derivative Actions. A shareholder derivative action against the Firm, as nominal defendant, and certain of its current and former officers and members of its Board of Directors relating to the Firm's MBS activities is pending in California federal court. Defendants have filed a motion to dismiss the action.

Government Enforcement Investigations and Litigation. The Firm is responding to an ongoing investigation being conducted by the DOJ's Criminal Division and two United States Attorney's Offices relating to MBS offerings securitized and sold by the Firm and its subsidiaries.

Mortgage-Related Investigations and Litigation. In January 2017, a Consent Judgment was entered by the United States District Court for the Southern District of New York resolving allegations by the Civil Division of the United States Attorney's Office for the Southern District of New York that the Firm violated the Fair Housing Act and Equal Credit Opportunity Act by giving pricing discretion to independent mortgage brokers in its wholesale lending distribution channel which, according to the government's model, may have charged higher fees and interest rates to African-American and Hispanic borrowers than non-Hispanic White borrowers during the period between 2006 and 2009. The Firm denied liability but agreed to pay a total of approximately $55 million to resolve this matter. In addition, three municipalities have commenced litigation against the Firm alleging violations of an unfair competition law or the Fair Housing Act. The municipalities seek, among other things, civil penalties for the unfair competition claim, and, for the Fair Housing Act claims, damages resulting from lost tax revenue and increased municipal costs associated with foreclosed properties. The municipal actions are stayed pending an appeal by the City of Los Angeles to the United States Court of Appeals for the Ninth Circuit, as well as the United States Supreme Court's review of decisions of the United States Court of Appeals for the Eleventh Circuit which held, among other things, that the City of Miami has standing under the Fair Housing Act to pursue similar claims against other banks.

Municipal Derivatives Litigation. Several civil actions were commenced in New York and Alabama courts against the Firm relating to certain Jefferson County, Alabama (the "County") warrant underwritings and swap transactions. The claims in the civil actions generally alleged that the Firm made payments to certain third parties in exchange for being chosen to underwrite more than $3 billion in warrants issued by the County and to act as the counterparty for certain swaps executed by the County. The County filed for bankruptcy in November 2011. In June 2013, the County filed a Chapter 9 Plan of Adjustment, as amended (the "Plan of Adjustment"), which provided that all the above-described actions against the Firm would be released and dismissed with prejudice. In November 2013, the Bankruptcy Court confirmed the Plan of Adjustment, and in December 2013, certain sewer rate payers filed an appeal challenging the confirmation of the Plan of Adjustment. All conditions to the Plan of Adjustment's effectiveness, including the dismissal of the actions against the Firm, were satisfied or waived and the transactions contemplated by the Plan of Adjustment occurred in December 2013. Accordingly, all the above-described actions against the Firm have been dismissed pursuant to the terms of the Plan of Adjustment. The appeal of the Bankruptcy Court's order confirming the Plan of Adjustment remains pending.

Petters Bankruptcy and Related Matters. JPMorgan Chase and certain of its affiliates, including One Equity Partners ("OEP"), have been named as defendants in several actions filed in connection with the receivership and bankruptcy proceedings pertaining to Thomas J. Petters and certain affiliated entities (collectively, "Petters") and the Polaroid

Corporation. The principal actions against JPMorgan Chase and its affiliates have been brought by a court-appointed receiver for Petters and the trustees in bankruptcy proceedings for three Petters entities. These actions generally seek to avoid certain putative transfers in connection with (i) the 2005 acquisition by Petters of Polaroid, which at the time was majority-owned by OEP; (ii) two credit facilities that JPMorgan Chase and other financial institutions entered into with Polaroid; and (iii) a credit line and investment accounts held by Petters. In January 2017, the Court denied the defendants' motion to dismiss an amended complaint filed by the plaintiffs.

Proprietary Products Investigations and Litigation. In December 2015, JPMorgan Chase Bank, N.A. and J.P. Morgan Securities LLC agreed to a settlement with the SEC, and JPMorgan Chase Bank, N.A. agreed to a settlement with the CFTC, regarding disclosures to clients concerning conflicts associated with the Firm's sale and use of proprietary products, such as J.P. Morgan mutual funds, in the Firm's CCB and AWM wealth management businesses, and the U.S. Private Bank's disclosures concerning the use of hedge funds that pay placement agent fees to JPMorgan Chase broker-dealer affiliates. The Firm settled with an additional government authority in July 2016, and continues to cooperate with inquiries from other government authorities concerning disclosure of conflicts associated with the Firm's sale and use of proprietary products. A putative class action, which was filed in the United States District Court for the Northern District of Illinois on behalf of financial advisory clients from 2007 to the present whose funds were invested in proprietary funds and who were charged investment management fees, was dismissed by the Court. The dismissal has been affirmed on appeal.

Referral Hiring Practices Investigations. In November 2016, the Firm entered into settlements with DOJ, the SEC and the Board of Governors of the Federal Reserve System (the "Federal Reserve") to resolve those agencies' respective investigations relating to a former hiring program for candidates referred by clients, potential clients and government officials in the Asia Pacific region. Other related investigations are ongoing, and the Firm continues to cooperate with these investigations.

Washington Mutual Litigations. Proceedings related to Washington Mutual's failure are pending before the United States District Court for the District of Columbia and include a lawsuit brought by Deutsche Bank National Trust Company, initially against the FDIC and amended to include JPMorgan Chase Bank, N.A. as a defendant, asserting an estimated $6 billion to $10 billion in damages based upon alleged breaches of certain representations and warranties given by certain Washington Mutual affiliates in connection with mortgage securitization agreements. The case includes assertions that JPMorgan Chase Bank, N.A. may have assumed liabilities for the alleged breaches of representations and warranties in the mortgage securitization agreements. In June 2015, the court ruled in favor of JPMorgan Chase Bank, N.A. on the question of whether the Firm or the FDIC bears responsibility for Washington Mutual Bank's repurchase obligations, holding that JPMorgan Chase Bank, N.A. assumed only those liabilities that were reflected on Washington Mutual Bank's financial accounting records as of September 25, 2008, and only up to the amount of the book value reflected therein. The FDIC has appealed that ruling.

JPMorgan Chase has also filed complaints in the United States District Court for the District of Columbia against the FDIC, in its corporate capacity as well as in its capacity as receiver for Washington Mutual Bank, asserting multiple claims for indemnification under the terms of the Purchase & Assumption Agreement between JPMorgan Chase Bank, N.A. and the FDIC relating to JPMorgan Chase Bank, N.A.'s purchase of substantially all of the assets and certain liabilities of Washington Mutual Bank (the "Purchase & Assumption Agreement").

The Firm, Deutsche Bank National Trust Company and the FDIC have signed a settlement agreement to resolve (i) pending litigation brought by Deutsche Bank National Trust Company against the FDIC and JPMorgan Chase Bank, N.A., as defendants, relating to alleged breaches of certain representations and warranties given by certain Washington Mutual affiliates in connection with mortgage securitization agreements and (ii) JPMorgan Chase Bank, N.A.'s outstanding indemnification claims pursuant to the terms of the Purchase & Assumption Agreement. The settlement is subject to certain judicial approval procedures, and both matters are stayed pending approval of the settlement.

Wendel. Since 2012, the French criminal authorities have been investigating a series of transactions entered into by senior managers of Wendel Investissement ("Wendel") during the period from 2004 through 2007 to restructure their shareholdings in Wendel. JPMorgan Chase Bank, N.A., Paris branch provided financing for the transactions to a number of managers of Wendel in 2007. JPMorgan Chase has cooperated with the investigation. The investigating judges issued an *ordonnance de renvoi* on November 30, 2016, referring JPMorgan Chase Bank, N.A. to the French *tribunal correctionnel* for alleged complicity in tax fraud. No date for trial has been set by the court. The Firm has been successful in legal challenges made to the Court of Cassation, France's highest court, which have been referred back to and remain pending before the Paris Court of Appeal. In addition, civil proceedings have been commenced against JPMorgan Chase Bank, N.A. by a number of the managers. The claims are separate, involve different allegations and are at various stages of proceedings.

* * *

In addition to the various legal proceedings discussed above, JPMorgan Chase and its subsidiaries are named as defendants or are otherwise involved in a substantial number of other legal proceedings. The Firm believes it has meritorious defenses to the claims asserted against it in its currently outstanding legal proceedings and it intends to defend itself vigorously in all such matters. Additional legal proceedings may be initiated from time to time in the future.

The Firm has established reserves for several hundred of its currently outstanding legal proceedings. In accordance with the provisions of U.S. GAAP for contingencies, the Firm accrues for a litigation-related liability when it is probable that such a liability has been incurred and the amount of the loss can be reasonably estimated. The Firm evaluates its outstanding legal proceedings each quarter to assess its litigation reserves, and makes adjustments in such reserves, upwards or downward, as appropriate, based on management's best judgment after consultation with counsel. During the years ended December 31, 2016, 2015 and 2014, the Firm's legal expense was a benefit of $(317) million and an expense of $3.0 billion and $2.9 billion, respectively. There is no assurance that the Firm's litigation reserves will not need to be adjusted in the future.

In view of the inherent difficulty of predicting the outcome of legal proceedings, particularly where the claimants seek very large or indeterminate damages, or where the matters present novel legal theories, involve a large number of parties or are in early stages of discovery, the Firm cannot state with confidence what will be the eventual outcomes of the currently pending matters, the timing of their ultimate resolution or the eventual losses, fines, penalties or impact related to those matters. JPMorgan Chase believes, based upon its current knowledge, after consultation with counsel and after taking into account its current litigation reserves, that the legal proceedings currently pending against it should not have a material adverse effect on the Firm's consolidated financial condition. The Firm notes, however, that in light of the uncertainties involved in such proceedings, there is no assurance that the ultimate resolution of these matters will not significantly exceed the reserves it has currently accrued or that a matter will not have material reputational consequences. As a result, the outcome of a particular matter may be material to JPMorgan Chase's operating results for a particular period, depending on, among other factors, the size of the loss or liability imposed and the level of JPMorgan Chase's income for that period.

Note 32 – International operations

The following table presents income statement- and balance sheet-related information for JPMorgan Chase by major international geographic area. The Firm defines international activities for purposes of this footnote presentation as business transactions that involve clients residing outside of the U.S., and the information presented below is based predominantly on the domicile of the client, the location from which the client relationship is managed, or the location of the trading desk. However, many of the Firm's U.S. operations serve international businesses.

As the Firm's operations are highly integrated, estimates and subjective assumptions have been made to apportion revenue and expense between U.S. and international operations. These estimates and assumptions are consistent with the allocations used for the Firm's segment reporting as set forth in Note 33.

The Firm's long-lived assets for the periods presented are not considered by management to be significant in relation to total assets. The majority of the Firm's long-lived assets are located in the U.S.

As of or for the year ended December 31, (in millions)	Revenue[b]	Expense[c]	Income before income tax expense	Net income	Total assets
2016					
Europe/Middle East and Africa	**$ 13,842**	**$ 8,550**	**$ 5,292**	**$ 3,783**	**$ 394,134** [d]
Asia and Pacific	**6,112**	**4,213**	**1,899**	**1,212**	**156,946**
Latin America and the Caribbean	**1,959**	**1,632**	**327**	**208**	**42,971**
Total international	**21,913**	**14,395**	**7,518**	**5,203**	**594,051**
North America[a]	**73,755**	**46,737**	**27,018**	**19,530**	**1,896,921**
Total	**$ 95,668**	**$ 61,132**	**$ 34,536**	**$ 24,733**	**$ 2,490,972**
2015					
Europe/Middle East and Africa	$ 14,206	$ 8,871	$ 5,335	$ 4,158	$ 347,647 [d]
Asia and Pacific	6,151	4,241	1,910	1,285	138,747
Latin America and the Caribbean	1,923	1,508	415	253	48,185
Total international	22,280	14,620	7,660	5,696	534,579
North America[a]	71,263	48,221	23,042	18,746	1,817,119
Total	$ 93,543	$ 62,841	$ 30,702	$ 24,442	$ 2,351,698
2014					
Europe/Middle East and Africa	$ 16,013	$ 10,123	$ 5,890	$ 3,935	$ 481,328 [d]
Asia and Pacific	6,083	4,478	1,605	1,051	147,357
Latin America and the Caribbean	2,047	1,626	421	269	44,567
Total international	24,143	16,227	7,916	5,255	673,252
North America[a]	70,969	48,186	22,783	16,490	1,899,022
Total	$ 95,112	$ 64,413	$ 30,699	$ 21,745	$ 2,572,274

(a) Substantially reflects the U.S.
(b) Revenue is composed of net interest income and noninterest revenue.
(c) Expense is composed of noninterest expense and the provision for credit losses.
(d) Total assets for the U.K. were approximately $310 billion, $306 billion, and $434 billion at December 31, 2016, 2015 and 2014, respectively.

Note 33 – Business segments

The Firm is managed on a line of business basis. There are four major reportable business segments – Consumer & Community Banking, Corporate & Investment Bank, Commercial Banking and Asset & Wealth Management. In addition, there is a Corporate segment. The business segments are determined based on the products and services provided, or the type of customer served, and they reflect the manner in which financial information is currently evaluated by management. Results of these lines of business are presented on a managed basis. For a further discussion concerning JPMorgan Chase's business segments, see Segment results of this footnote.

The following is a description of each of the Firm's business segments, and the products and services they provide to their respective client bases.

Consumer & Community Banking

CCB offers services to consumers and businesses through bank branches, ATMs, online, mobile and telephone banking. CCB is organized into Consumer & Business Banking (including Consumer Banking/Chase Wealth Management and Business Banking), Mortgage Banking (including Mortgage Production, Mortgage Servicing and Real Estate Portfolios) and Card, Commerce Solutions & Auto. Consumer & Business Banking offers deposit and investment products and services to consumers, and lending, deposit, and cash management and payment solutions to small businesses. Mortgage Banking includes mortgage origination and servicing activities, as well as portfolios consisting of residential mortgages and home equity loans. Card, Commerce Solutions & Auto issues credit cards to consumers and small businesses, offers payment processing services to merchants, originates and services auto loans and leases, and services student loans.

Corporate & Investment Bank

The CIB, which consists of Banking and Markets & Investor Services, offers a broad suite of investment banking, market-making, prime brokerage, and treasury and securities products and services to a global client base of corporations, investors, financial institutions, government and municipal entities. Banking offers a full range of investment banking products and services in all major capital markets, including advising on corporate strategy and structure, capital-raising in equity and debt markets, as well as loan origination and syndication. Banking also includes Treasury Services, which provides transaction services, consisting of cash management and liquidity solutions. Markets & Investor Services is a global market-maker in cash securities and derivative instruments, and also offers sophisticated risk management solutions, prime brokerage, and research. Markets & Investor Services also includes Securities Services, a leading global custodian that provides custody, fund accounting and administration, and securities lending products principally for asset managers, insurance companies and public and private investment funds.

Commercial Banking

CB delivers extensive industry knowledge, local expertise and dedicated service to U.S. and U.S. multinational clients, including corporations, municipalities, financial institutions and nonprofit entities with annual revenue generally ranging from $20 million to $2 billion. In addition, CB provides financing to real estate investors and owners. Partnering with the Firm's other businesses, CB provides comprehensive financial solutions, including lending, treasury services, investment banking and asset management to meet its clients' domestic and international financial needs.

Asset & Wealth Management

AWM, with client assets of $2.5 trillion, is a global leader in investment and wealth management. AWM clients include institutions, high-net-worth individuals and retail investors in many major markets throughout the world. AWM offers investment management across most major asset classes including equities, fixed income, alternatives and money market funds. AWM also offers multi-asset investment management, providing solutions for a broad range of clients' investment needs. For Wealth Management clients, AWM also provides retirement products and services, brokerage and banking services, including trusts and estates, loans, mortgages and deposits. The majority of AWM's client assets are in actively managed portfolios.

Corporate

The Corporate segment consists of Treasury and CIO and Other Corporate, which includes corporate staff units and expense that is centrally managed. Treasury and CIO are predominantly responsible for measuring, monitoring, reporting and managing the Firm's liquidity, funding and structural interest rate and foreign exchange risks, as well as executing the Firm's capital plan. The major Other Corporate units include Real Estate, Enterprise Technology, Legal, Compliance, Finance, Human Resources, Internal Audit, Risk Management, Oversight & Control, Corporate Responsibility and various Other Corporate groups.

Segment results

The following tables provide a summary of the Firm's segment results as of or for the years ended December 31, 2016, 2015 and 2014 on a managed basis. The Firm's definition of managed basis starts with the reported U.S. GAAP results and includes certain reclassifications to present total net revenue (noninterest revenue and net interest income) for each of the reportable business segments on a FTE basis. Accordingly, revenue from investments receiving tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities. This allows management to assess the comparability of revenue from year-to-year arising from both taxable and tax-exempt sources. The corresponding income tax impact related to tax-exempt items is recorded within income tax expense/(benefit).

Segment results and reconciliation

As of or for the year ended December 31, (in millions, except ratios)	Consumer & Community Banking			Corporate & Investment Bank			Commercial Banking			Asset & Wealth Management		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Noninterest revenue	**$ 15,255**	$ 15,592	$ 15,937	**$ 24,325**	$ 23,693	$ 23,420	**$ 2,320**	$ 2,365	$ 2,349	**$ 9,012**	$ 9,563	$ 9,588
Net interest income	**29,660**	28,228	28,431	**10,891**	9,849	11,175	**5,133**	4,520	4,533	**3,033**	2,556	2,440
Total net revenue	**44,915**	43,820	44,368	**35,216**	33,542	34,595	**7,453**	6,885	6,882	**12,045**	12,119	12,028
Provision for credit losses	**4,494**	3,059	3,520	**563**	332	(161)	**282**	442	(189)	**26**	4	4
Noninterest expense	**24,905**	24,909	25,609	**18,992**	21,361	23,273	**2,934**	2,881	2,695	**8,478**	8,886	8,538
Income/(loss) before income tax expense/(benefit)	**15,516**	15,852	15,239	**15,661**	11,849	11,483	**4,237**	3,562	4,376	**3,541**	3,229	3,486
Income tax expense/(benefit)	**5,802**	6,063	6,054	**4,846**	3,759	4,575	**1,580**	1,371	1,741	**1,290**	1,294	1,333
Net income/(loss)	**$ 9,714**	$ 9,789	$ 9,185	**$ 10,815**	$ 8,090	$ 6,908	**$ 2,657**	$ 2,191	$ 2,635	**$ 2,251**	$ 1,935	$ 2,153
Average common equity	**$ 51,000**	$ 51,000	$ 51,000	**$ 64,000**	$ 62,000	$ 61,000	**$ 16,000**	$ 14,000	$ 14,000	**$ 9,000**	$ 9,000	$ 9,000
Total assets	**535,310**	502,652	455,634	**803,511**	748,691	861,466	**214,341**	200,700	195,267	**138,384**	131,451	128,701
Return on common equity	**18%**	18%	18%	**16%**	12%	10%	**16%**	15%	18%	**24%**	21%	23%
Overhead ratio	**55**	57	58	**54**	64	67	**39**	42	39	**70**	73	71

(table continued from above)

As of or for the year ended December 31, (in millions, except ratios)	Corporate			Reconciling Items[(a)]			Total		
	2016	2015	2014	**2016**	2015	2014	**2016**	2015	2014
Noninterest revenue	**$ 938**	$ 800	$ 1,972	**$ (2,265)**	$ (1,980)	$ (1,788)	**$ 49,585**	$ 50,033	$ 51,478
Net interest income	**(1,425)**	(533)	(1,960)	**(1,209)**	(1,110)	(985)	**46,083**	43,510	43,634
Total net revenue	**(487)**	267	12	**(3,474)**	(3,090)	(2,773)	**95,668**	93,543	95,112
Provision for credit losses	**(4)**	(10)	(35)	**—**	—	—	**5,361**	3,827	3,139
Noninterest expense	**462**	977	1,159	**—**	—	—	**55,771**	59,014	61,274
Income/(loss) before income tax expense/(benefit)	**(945)**	(700)	(1,112)	**(3,474)**	(3,090)	(2,773)	**34,536**	30,702	30,699
Income tax expense/(benefit)	**(241)**	(3,137)	(1,976)	**(3,474)**	(3,090)	(2,773)	**9,803**	6,260	8,954
Net income/(loss)	**$ (704)**	$ 2,437	$ 864	**$ —**	$ —	$ —	**$ 24,733**	$ 24,442	$ 21,745
Average common equity	**$ 84,631**	$ 79,690	$ 72,400	**$ —**	$ —	$ —	**$ 224,631**	$ 215,690	$ 207,400
Total assets	**799,426**	768,204	931,206	**NA**	NA	NA	**2,490,972**	2,351,698	2,572,274
Return on common equity	**NM**	NM	NM	**NM**	NM	NM	**10%**	11%	10%
Overhead ratio	**NM**	NM	NM	**NM**	NM	NM	**58**	63	64

(a) Segment managed results reflect revenue on a FTE basis with the corresponding income tax impact recorded within income tax expense/(benefit). These adjustments are eliminated in reconciling items to arrive at the Firm's reported U.S. GAAP results.

Note 34 – Parent Company

The following tables present Parent Company-only financial statements.

Statements of income and comprehensive income[a]

Year ended December 31, (in millions)	2016	2015	2014
Income			
Dividends from subsidiaries and affiliates:			
Bank and bank holding company	**$ 10,000**	$ 10,653	$ –
Nonbank[b]	**3,873**	8,172	14,716
Interest income from subsidiaries	**794**	443	378
Other interest income	**207**	234	284
Other income from subsidiaries, primarily fees:			
Bank and bank holding company	**852**	1,438	779
Nonbank	**1,165**	(1,402)	52
Other income	**(846)**	1,773	508
Total income	**16,045**	21,311	16,717
Expense			
Interest expense to subsidiaries and affiliates[b]	**105**	98	169
Other interest expense	**4,413**	3,720	3,645
Noninterest expense	**1,643**	2,611	827
Total expense	**6,161**	6,429	4,641
Income before income tax benefit and undistributed net income of subsidiaries	**9,884**	14,882	12,076
Income tax benefit	**876**	1,640	1,430
Equity in undistributed net income of subsidiaries	**13,973**	7,920	8,239
Net income	**$ 24,733**	$ 24,442	$ 21,745
Other comprehensive income, net	**(1,521)**	(1,997)	990
Comprehensive income	**$ 23,212**	$ 22,445	$ 22,735

Balance sheets[a]

December 31, (in millions)	2016	2015
Assets		
Cash and due from banks	**$ 113**	$ 74
Deposits with banking subsidiaries	**5,450**	65,799
Trading assets	**10,326**	13,830
Available-for-sale securities	**2,694**	3,154
Loans	**77**	1,887
Advances to, and receivables from, subsidiaries:		
Bank and bank holding company	**524**	32,454
Nonbank	**46**	58,674
Investments (at equity) in subsidiaries and affiliates:		
Bank and bank holding company	**422,028**	225,613
Nonbank[b]	**13,103**	34,205
Other assets	**10,257**	18,088
Total assets	**$ 464,618**	$ 453,778
Liabilities and stockholders' equity		
Borrowings from, and payables to, subsidiaries and affiliates[b]	**$ 13,584**	$ 11,310
Other borrowed funds	**3,831**	3,722
Other liabilities	**11,224**	11,940
Long-term debt[c][d]	**181,789**	179,233
Total liabilities[d]	**210,428**	206,205
Total stockholders' equity	**254,190**	247,573
Total liabilities and stockholders' equity	**$ 464,618**	$ 453,778

Statements of cash flows[a]

Year ended December 31, (in millions)	2016	2015	2014
Operating activities			
Net income	**$ 24,733**	$ 24,442	$ 21,745
Less: Net income of subsidiaries and affiliates[b]	**27,846**	26,745	22,972
Parent company net loss	**(3,113)**	(2,303)	(1,227)
Cash dividends from subsidiaries and affiliates[b]	**13,873**	17,023	14,714
Other operating adjustments	**(18,166)**	2,483	(1,681)
Net cash provided by operating activities	**(7,406)**	17,203	11,806
Investing activities			
Net change in:			
Deposits with banking subsidiaries	**60,349**	30,085	(31,040)
Available-for-sale securities:			
Proceeds from paydowns and maturities	**353**	120	12,076
Other changes in loans, net	**1,793**	321	(319)
Advances to and investments in subsidiaries and affiliates, net	**(51,967)**	(81)	3,306
All other investing activities, net	**114**	153	32
Net cash provided by/(used in) investing activities	**10,642**	30,598	(15,945)
Financing activities			
Net change in:			
Borrowings from subsidiaries and affiliates[b]	**2,957**	(4,062)	4,454
Other borrowed funds	**109**	(47,483)	(5,778)
Proceeds from the issuance of long-term debt	**41,498**	42,121	40,284
Payments of long-term debt	**(29,298)**	(30,077)	(31,050)
Proceeds from issuance of preferred stock	**–**	5,893	8,847
Treasury stock and warrants repurchased	**(9,082)**	(5,616)	(4,760)
Dividends paid	**(8,476)**	(7,873)	(6,990)
All other financing activities, net	**(905)**	(840)	(921)
Net cash provided by/(used in) financing activities	**(3,197)**	(47,937)	4,086
Net increase/(decrease) in cash and due from banks	**39**	(137)	(53)
Cash and due from banks at the beginning of the year	**74**	211	264
Cash and due from banks at the end of the year	**$ 113**	$ 74	$ 211
Cash interest paid	**$ 4,550**	$ 3,873	$ 3,921
Cash income taxes paid, net	**1,053**	8,251	200

(a) On September 1, 2016, in connection with the Firm's 2016 Resolution Submission, the Parent Company established the IHC, and during the fourth quarter of 2016 contributed substantially all of its direct subsidiaries, other than JPMorgan Chase Bank, N.A. (totaling $55.4 billion), as well as most of its other assets (totaling $160.5 billion) and intercompany indebtedness to the IHC. Total noncash assets contributed were $62.3 billion.
(b) Affiliates include trusts that issued guaranteed capital debt securities ("issuer trusts"). For further discussion on these issuer trusts, see Note 21.
(c) At December 31, 2016, long-term debt that contractually matures in 2017 through 2021 totaled $26.9 billion, $21.2 billion, $13.0 billion, $21.9 billion and $17.9 billion, respectively.
(d) For information regarding the Parent Company's guarantees of its subsidiaries' obligations, see Notes 21 and 29.

Selected quarterly financial data (unaudited)

(Table continued on next page)

As of or for the period ended	2016				2015			
(in millions, except per share, ratio, headcount data and where otherwise noted)	4th quarter	3rd quarter	2nd quarter	1st quarter	4th quarter	3rd quarter	2nd quarter	1st quarter
Selected income statement data								
Total net revenue	**$ 23,376**	**$ 24,673**	**$ 24,380**	**$ 23,239**	$ 22,885	$ 22,780	$ 23,812	$ 24,066
Total noninterest expense	**13,833**	**14,463**	**13,638**	**13,837**	14,263	15,368	14,500	14,883
Pre-provision profit	**9,543**	**10,210**	**10,742**	**9,402**	8,622	7,412	9,312	9,183
Provision for credit losses	**864**	**1,271**	**1,402**	**1,824**	1,251	682	935	959
Income before income tax expense	**8,679**	**8,939**	**9,340**	**7,578**	7,371	6,730	8,377	8,224
Income tax expense	**1,952**	**2,653**	**3,140**	**2,058**	1,937	(74)	2,087	2,310
Net income	**$ 6,727**	**$ 6,286**	**$ 6,200**	**$ 5,520**	$ 5,434	$ 6,804	$ 6,290	$ 5,914
Per common share data								
Net income: Basic	**$ 1.73**	**$ 1.60**	**$ 1.56**	**$ 1.36**	$ 1.34	$ 1.70	$ 1.56	$ 1.46
Diluted	**1.71**	**1.58**	**1.55**	**1.35**	1.32	1.68	1.54	1.45
Average shares: Basic	**3,570.7**	**3,597.4**	**3,635.8**	**3,669.9**	3,674.2	3,694.4	3,707.8	3,725.3
Diluted	**3,606.0**	**3,629.6**	**3,666.5**	**3,696.9**	3,704.6	3,725.6	3,743.6	3,757.5
Market and per common share data								
Market capitalization	**$ 307,295**	**$ 238,277**	**$ 224,449**	**$ 216,547**	$ 241,899	$ 224,438	$ 250,581	$ 224,818
Common shares at period-end	**3,561.2**	**3,578.3**	**3,612.0**	**3,656.7**	3,663.5	3,681.1	3,698.1	3,711.1
Share price:[(a)]								
High	**$ 87.39**	**$ 67.90**	**$ 66.20**	**$ 64.13**	$ 69.03	$ 70.61	$ 69.82	$ 62.96
Low	**66.10**	**58.76**	**57.05**	**52.50**	58.53	50.07	59.65	54.27
Close	**86.29**	**66.59**	**62.14**	**59.22**	66.03	60.97	67.76	60.58
Book value per share	**64.06**	**63.79**	**62.67**	**61.28**	60.46	59.67	58.49	57.77
Tangible book value per share ("TBVPS")[(b)]	**51.44**	**51.23**	**50.21**	**48.96**	48.13	47.36	46.13	45.45
Cash dividends declared per share	**0.48**	**0.48**	**0.48**	**0.44**	0.44	0.44	0.44	0.40
Selected ratios and metrics								
Return on common equity ("ROE")	**11%**	**10%**	**10%**	**9%**	9%	12%	11%	11%
Return on tangible common equity ("ROTCE")[(b)]	**14**	**13**	**13**	**12**	11	15	14	14
Return on assets ("ROA")	**1.06**	**1.01**	**1.02**	**0.93**	0.90	1.11	1.01	0.94
Overhead ratio	**59**	**59**	**56**	**60**	62	67	61	62
Loans-to-deposits ratio	**65**	**65**	**66**	**64**	65	64	61	56
HQLA (in billions)[(c)]	**$ 524**	**$ 539**	**$ 516**	**$ 505**	$ 496	$ 505	$ 532	$ 614
CET1 capital ratio[(d)]	**12.4%**	**12.0%**	**12.0%**	**11.9%**	11.8%	11.5%	11.2%	10.7%
Tier 1 capital ratio[(d)]	**14.1**	**13.6**	**13.6**	**13.5**	13.5	13.3	12.8	12.1
Total capital ratio[(d)]	**15.5**	**15.1**	**15.2**	**15.1**	15.1	14.9	14.4	13.6
Tier 1 leverage ratio	**8.4**	**8.5**	**8.5**	**8.6**	8.5	8.4	8.0	7.5
Selected balance sheet data (period-end)								
Trading assets	**$ 372,130**	**$ 374,837**	**$ 380,793**	**$ 366,153**	$ 343,839	$ 361,708	$ 377,870	$ 398,981
Securities	**289,059**	**272,401**	**278,610**	**285,323**	290,827	306,660	317,795	331,136
Loans	**894,765**	**888,054**	**872,804**	**847,313**	837,299	809,457	791,247	764,185
Core loans	**806,152**	**795,077**	**775,813**	**746,196**	732,093	698,988	674,767	641,285
Average core loans	**799,698**	**779,383**	**760,721**	**737,297**	715,282	680,224	654,551	631,955
Total assets	**2,490,972**	**2,521,029**	**2,466,096**	**2,423,808**	2,351,698	2,416,635	2,449,098	2,576,619
Deposits	**1,375,179**	**1,376,138**	**1,330,958**	**1,321,816**	1,279,715	1,273,106	1,287,332	1,367,887
Long-term debt[(e)]	**295,245**	**309,418**	**295,627**	**290,754**	288,651	292,503	286,240	280,123
Common stockholders' equity	**228,122**	**228,263**	**226,355**	**224,089**	221,505	219,660	216,287	214,371
Total stockholders' equity	**254,190**	**254,331**	**252,423**	**250,157**	247,573	245,728	241,205	235,864
Headcount	**243,355**	**242,315**	**240,046**	**237,420**	234,598	235,678	237,459	241,145

(Table continued from previous page)

As of or for the period ended	2016				2015			
(in millions, except ratio data)	4th quarter	3rd quarter	2nd quarter	1st quarter	4th quarter	3rd quarter	2nd quarter	1st quarter
Credit quality metrics								
Allowance for credit losses	**$ 14,854**	**$ 15,304**	**$ 15,187**	**$ 15,008**	$ 14,341	$ 14,201	$ 14,535	$ 14,658
Allowance for loan losses to total retained loans	**1.55%**	**1.61%**	**1.64%**	**1.66%**	1.63%	1.67%	1.78%	1.86%
Allowance for loan losses to retained loans excluding purchased credit-impaired loans[(f)]	**1.34**	**1.37**	**1.40**	**1.40**	1.37	1.40	1.45	1.52
Nonperforming assets	**$ 7,535**	**$ 7,779**	**$ 7,757**	**$ 8,023**	$ 7,034	$ 7,294	$ 7,588	$ 7,714
Net charge-offs	**1,280**	**1,121**	**1,181**	**1,110**	1,064	963	1,007	1,052
Net charge-off rate	**0.58%**	**0.51%**	**0.56%**	**0.53%**	0.52%	0.49%	0.53%	0.57%

Note: Effective January 1, 2016, the Firm adopted new accounting guidance related to (1) the recognition and measurement of DVA on financial liabilities where the fair value option has been elected, and (2) the accounting for employee stock-based incentive payments. For additional information, see Accounting and Reporting Developments on pages 135–137 and Notes 3, 4, and 25.

(a) Share prices are from the New York Stock Exchange.
(b) TBVPS and ROTCE are non-GAAP financial measures. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Financial Performance Measures on pages 48–50.
(c) HQLA represents the amount of assets that qualify for inclusion in the liquidity coverage ratio under the U.S. rule ("U.S. LCR"). For additional information, see HQLA on page 111.
(d) Ratios presented are calculated under the Basel III Transitional rules and for the capital ratios represent the Collins Floor. See Capital Risk Management on pages 76–85 for additional information on Basel III.
(e) Included unsecured long-term debt of $212.6 billion, $226.8 billion, $220.6 billion, $216.1 billion, $211.8 billion, $214.6 billion, $209.1 billion, $209.0 billion respectively, for the periods presented.
(f) Excludes the impact of residential real estate PCI loans, a non-GAAP financial measure. For further discussion of these measures, see Explanation and Reconciliation of the Firm's Use of Non-GAAP Financial Measures and Key Performance Measures on pages 48–50. For further discussion, see Allowance for credit losses on pages 105–107.

Distribution of assets, liabilities and stockholders' equity; interest rates and interest differentials

Consolidated average balance sheet, interest and rates

Provided below is a summary of JPMorgan Chase's consolidated average balances, interest rates and interest differentials on a taxable-equivalent basis for the years 2014 through 2016. Income computed on a taxable-equivalent basis is the income reported in the Consolidated statements of income, adjusted to present interest income and average rates earned on assets exempt from income taxes (primarily federal taxes) on a basis comparable with other taxable investments. The incremental tax rate used for calculating the taxable-equivalent adjustment was approximately 38% in 2016, 2015 and 2014.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2016 Average balance	2016 Interest[e]	2016 Average rate
Assets			
Deposits with banks	$ 392,160	$ 1,863	0.48%
Federal funds sold and securities purchased under resale agreements	205,368	2,265	1.10
Securities borrowed	102,964	(332) [f]	(0.32)
Trading assets	215,565	7,373	3.42
Taxable securities	235,211	5,538	2.35
Non-taxable securities[a]	44,176	2,662	6.03
Total securities	279,387	8,200	2.94 [h]
Loans	866,378	36,866 [g]	4.26
Other assets[b]	39,782	875	2.20
Total interest-earning assets	2,101,604	57,110	2.72
Allowance for loan losses	(13,965)		
Cash and due from banks	18,660		
Trading assets – equity instruments	95,528		
Trading assets – derivative receivables	70,897		
Goodwill	47,310		
Mortgage servicing rights	5,520		
Other intangible assets:			
Purchased credit card relationships	17		
Other intangibles	905		
Other assets	135,143		
Total assets	$ 2,461,619		
Liabilities			
Interest-bearing deposits	$ 925,270	$ 1,356	0.15%
Federal funds purchased and securities loaned or sold under repurchase agreements	178,720	1,089	0.61
Commercial paper	15,001	135	0.90
Trading liabilities – debt, short-term and other liabilities[c]	198,904	1,170	0.59
Beneficial interests issued by consolidated VIEs	40,180	504	1.25
Long-term debt	295,573	5,564	1.88
Total interest-bearing liabilities	1,653,648	9,818	0.59
Noninterest-bearing deposits	402,698		
Trading liabilities – equity instruments	20,737		
Trading liabilities – derivative payables	55,927		
All other liabilities, including the allowance for lending-related commitments	77,910		
Total liabilities	2,210,920		
Stockholders' equity			
Preferred stock	26,068		
Common stockholders' equity	224,631		
Total stockholders' equity	250,699 [d]		
Total liabilities and stockholders' equity	$ 2,461,619		
Interest rate spread			2.13%
Net interest income and net yield on interest-earning assets		$ 47,292	2.25

(a) Represents securities that are tax exempt for U.S. Federal income tax purposes.
(b) Includes margin loans.
(c) Includes brokerage customer payables.
(d) The ratio of average stockholders' equity to average assets was 10.2% for 2016, 9.7% for 2015, and 9.2% for 2014. The return on average stockholders' equity, based on net income, was 9.9% for 2016, 10.2% for 2015, and 9.7% for 2014.
(e) Interest includes the effect of related hedging derivatives. Taxable-equivalent amounts are used where applicable.
(f) Securities borrowed's negative interest income and yield, for the years ended December 31, 2016, 2015 and 2014, are a result of client-driven demand for certain securities combined with the impact of low interest rates; the offset of this stock borrow activity is reflected as lower net interest expense reported within short-term and other liabilities.
(g) Fees and commissions on loans included in loan interest amounted to $808 million in 2016, $936 million in 2015, and $1.1 billion in 2014.
(h) The annualized rate for securities based on amortized cost was 2.99% in 2016, 2.94% in 2015, and 2.82% in 2014, and does not give effect to changes in fair value that are reflected in AOCI.
(i) Reflects a benefit from the favorable market environments for dollar-roll financings.

Within the Consolidated average balance sheets, interest and rates summary, the principal amounts of nonaccrual loans have been included in the average loan balances used to determine the average interest rate earned on loans. For additional information on nonaccrual loans, including interest accrued, see Note 14.

(Table continued from previous page)

2015			2014		
Average balance	Interest[e]	Average rate	Average balance	Interest[e]	Average rate
$ 427,963	$ 1,250	0.29%	$ 358,072	$ 1,157	0.32%
206,637	1,592	0.77	230,489	1,642	0.71
105,273	(532) [f]	(0.50)	116,540	(501) [f]	(0.43)
206,385	6,694	3.24	210,609	7,386	3.51
273,730	6,550	2.39	318,970	7,617	2.39
42,125	2,556	6.07	34,359	2,158	6.28
315,855	9,106	2.88 [h]	353,329	9,775	2.77 [h]
787,318	33,321 [g]	4.23	739,175	32,394 [g]	4.38
38,811	652	1.68	40,879	663	1.62
2,088,242	52,083	2.49	2,049,093	52,516	2.56
(13,885)			(15,418)		
22,042			25,650		
105,489			116,650		
73,290			67,123		
47,445			48,029		
6,902			8,387		
25			62		
1,067			1,316		
138,792			146,343		
$ 2,469,409			$ 2,447,235		
$ 876,840	$ 1,252	0.14%	$ 872,893	$ 1,633	0.19%
192,510	609	0.32	208,560	604 [i]	0.29 [i]
38,140	110	0.29	59,916	134	0.22
207,810	622	0.30	220,137	712	0.32
49,200	435	0.88	47,974	405	0.84
284,940	4,435	1.56	269,814	4,409	1.63
1,649,440	7,463	0.45	1,679,294	7,897	0.47
418,948			391,408		
17,282			16,246		
64,716			54,758		
79,293			81,111		
2,229,679			2,222,817		
24,040			17,018		
215,690			207,400		
239,730 [d]			224,418 [d]		
$ 2,469,409			$ 2,447,235		
		2.04%			2.09%
	$ 44,620	2.14		$ 44,619	2.18

Interest rates and interest differential analysis of net interest income – U.S. and non-U.S.

Presented below is a summary of interest rates and interest differentials segregated between U.S. and non-U.S. operations for the years 2014 through 2016. The segregation of U.S. and non-U.S. components is based on the location of the office recording the transaction. Intercompany funding generally consists of dollar-denominated deposits originated in various locations that are centrally managed by Treasury and CIO.

(Table continued on next page)

Year ended December 31, (Taxable-equivalent interest and rates; in millions, except rates)	2016 Average balance	2016 Interest	2016 Average rate
Interest-earning assets			
Deposits with banks:			
U.S.	$ 328,831	$ 1,708	0.52%
Non-U.S.	63,329	155	0.25
Federal funds sold and securities purchased under resale agreements:			
U.S.	112,902	1,166	1.03
Non-U.S.	92,466	1,099	1.19
Securities borrowed:			
U.S.	73,297	(341) (c)	(0.46)
Non-U.S.	29,667	9	0.03
Trading assets – debt instruments:			
U.S.	116,211	3,825	3.29
Non-U.S.	99,354	3,548	3.57
Securities:			
U.S.	216,726	6,971	3.22
Non-U.S.	62,661	1,229	1.97
Loans:			
U.S.	788,213	35,110	4.45
Non-U.S.	78,165	1,756	2.25
Other assets, predominantly U.S.	39,782	875	2.20
Total interest-earning assets	2,101,604	57,110	2.72
Interest-bearing liabilities			
Interest-bearing deposits:			
U.S.	703,738	1,029	0.15
Non-U.S.	221,532	327	0.15
Federal funds purchased and securities loaned or sold under repurchase agreements:			
U.S.	121,945	773	0.63
Non-U.S.	56,775	316	0.56
Trading liabilities – debt, short-term and other liabilities:(a)			
U.S.	133,788	86 (c)	0.06
Non-U.S.	80,117	1,219	1.52
Beneficial interests issued by consolidated VIEs, predominantly U.S.	40,180	504	1.25
Long-term debt:			
U.S.	283,169	5,533	1.95
Non-U.S.	12,404	31	0.25
Intercompany funding:			
U.S.	(20,405)	10	–
Non-U.S.	20,405	(10)	–
Total interest-bearing liabilities	1,653,648	9,818	0.59
Noninterest-bearing liabilities(b)	447,956		
Total investable funds	$ 2,101,604	$ 9,818	0.47%
Net interest income and net yield:		$ 47,292	2.25%
U.S.		40,705	2.49
Non-U.S.		6,587	1.42
Percentage of total assets and liabilities attributable to non-U.S. operations:			
Assets			23.1
Liabilities			20.7

(a) Includes commercial paper.
(b) Represents the amount of noninterest-bearing liabilities funding interest-earning assets.
(c) Securities borrowed's negative interest income and yield, for the years ended December 31, 2016, 2015 and 2014, are a result of client-driven demand for certain securities combined with the impact of low interest rates; the offset of this stock borrow activity is reflected as lower net interest expense reported within trading liabilities – debt, short-term and other liabilities.
(d) Reflects a benefit from the favorable market environments for dollar-roll financings.

For further information, see the "Net interest income" discussion in Consolidated Results of Operations on pages 40–42.

(Table continued from previous page)

2015			2014		
Average balance	Interest	Average rate	Average balance	Interest	Average rate
$ 388,833	$ 1,021	0.26%	$ 328,145	$ 825	0.25%
39,130	229	0.59	29,927	332	1.11
118,945	900	0.76	125,812	719	0.57
87,692	692	0.79	104,677	923	0.88
78,815	(562) (c)	(0.71)	77,228	(573) (c)	(0.74)
26,458	30	0.11	39,312	72	0.18
106,465	3,572	3.35	109,678	4,045	3.69
99,920	3,122	3.12	100,931	3,341	3.31
200,240	6,676	3.33	193,856	6,586	3.40
115,615	2,430	2.10	159,473	3,189	2.00
699,664	31,468	4.50	635,846	30,165	4.74
87,654	1,853	2.11	103,329	2,229	2.16
38,811	652	1.68	40,879	663	1.62
2,088,242	52,083	2.49	2,049,093	52,516	2.56
638,756	761	0.12	620,708	813	0.13
238,084	491	0.21	252,185	820	0.33
140,609	366	0.26	146,025	130 (d)	0.09 (d)
51,901	243	0.47	62,535	474	0.76
166,838	(394) (c)	(0.24)	194,771	(284) (c)	(0.15)
79,112	1,126	1.42	85,282	1,130	1.33
49,200	435	0.88	47,974	405	0.84
273,033	4,386	1.61	256,726	4,366	1.70
11,907	49	0.41	13,088	43	0.33
(50,517)	7	–	(122,467)	(176)	–
50,517	(7)	–	122,467	176	–
1,649,440	7,463	0.45	1,679,294	7,897	0.47
438,802			369,799		
$ 2,088,242	$ 7,463	0.36%	$ 2,049,093	$ 7,897	0.39%
	$ 44,620	2.14%		$ 44,619	2.18%
	38,033	2.34		37,018	2.46
	6,587	1.42		7,601	1.39
		24.7			28.9
		21.1			22.6

Changes in net interest income, volume and rate analysis

The table below presents an analysis of the effect on net interest income from volume and rate changes for the periods 2016 versus 2015 and 2015 versus 2014. In this analysis, when the change cannot be isolated to either volume or rate, it has been allocated to volume.

Year ended December 31, (On a taxable-equivalent basis; in millions)	**2016 versus 2015** Increase/(decrease) due to change in: Volume	Rate	Net change	2015 versus 2014 Increase/(decrease) due to change in: Volume	Rate	Net change
Interest-earning assets						
Deposits with banks:						
U.S.	**$ (324)**	**$ 1,011**	**$ 687**	$ 163	$ 33	$ 196
Non-U.S.	**59**	**(133)**	**(74)**	53	(156)	(103)
Federal funds sold and securities purchased under resale agreements:						
U.S.	**(55)**	**321**	**266**	(58)	239	181
Non-U.S.	**56**	**351**	**407**	(137)	(94)	(231)
Securities borrowed:						
U.S.	**24**	**197**	**221**	(12)	23	11
Non-U.S.	**–**	**(21)**	**(21)**	(14)	(28)	(42)
Trading assets – debt instruments:						
U.S.	**317**	**(64)**	**253**	(100)	(373)	(473)
Non-U.S.	**(24)**	**450**	**426**	(27)	(192)	(219)
Securities:						
U.S.	**515**	**(220)**	**295**	226	(136)	90
Non-U.S.	**(1,051)**	**(150)**	**(1,201)**	(918)	159	(759)
Loans:						
U.S.	**3,992**	**(350)**	**3,642**	2,829	(1,526)	1,303
Non-U.S.	**(220)**	**123**	**(97)**	(324)	(52)	(376)
Other assets, predominantly U.S.	**21**	**202**	**223**	(36)	25	(11)
Change in interest income	**3,310**	**1,717**	**5,027**	1,645	(2,078)	(433)
Interest-bearing liabilities						
Interest-bearing deposits:						
U.S.	**76**	**192**	**268**	10	(62)	(52)
Non-U.S.	**(21)**	**(143)**	**(164)**	(26)	(303)	(329)
Federal funds purchased and securities loaned or sold under repurchase agreements:						
U.S.	**(113)**	**520**	**407**	(12)	248	236
Non-U.S.	**26**	**47**	**73**	(50)	(181)	(231)
Trading liabilities – debt, short-term and other liabilities: (a)						
U.S.	**(24)**	**504**	**480**	66	(176)	(110)
Non-U.S.	**14**	**79**	**93**	(81)	77	(4)
Beneficial interests issued by consolidated VIEs, predominantly U.S.	**(113)**	**182**	**69**	11	19	30
Long-term debt:						
U.S.	**219**	**928**	**1,147**	251	(231)	20
Non-U.S.	**1**	**(19)**	**(18)**	(4)	10	6
Intercompany funding:						
U.S.	**(17)**	**20**	**3**	(1)	184	183
Non-U.S.	**17**	**(20)**	**(3)**	1	(184)	(183)
Change in interest expense	**65**	**2,290**	**2,355**	165	(599)	(434)
Change in net interest income	**$ 3,245**	**$ (573)**	**$ 2,672**	$ 1,480	$ (1,479)	$ 1

(a) Includes commercial paper.

2016 Annual Report or 2016 Form 10-K: Annual report on Form 10-K for year ended December 31, 2016, filed with the U.S. Securities and Exchange Commission.

ABS: Asset-backed securities

Active foreclosures: Loans referred to foreclosure where formal foreclosure proceedings are ongoing. Includes both judicial and non-judicial states.

AFS: Available-for-sale

ALCO: Asset Liability Committee

Allowance for loan losses to total loans: Represents period-end allowance for loan losses divided by retained loans.

Alternative assets: The following types of assets constitute alternative investments – hedge funds, currency, real estate, private equity and other investment funds designed to focus on nontraditional strategies.

AWM: Asset & Wealth Management

AOCI: Accumulated other comprehensive income/(loss)

ARM: Adjustable rate mortgage(s)

AUC: Assets under custody

AUM: "Assets under management": Represent assets managed by AWM on behalf of its Private Banking, Institutional and Retail clients. Includes "Committed capital not Called," on which AWM earns fees.

Auto loan and lease origination volume: Dollar amount of auto loans and leases originated.

Beneficial interests issued by consolidated VIEs: Represents the interest of third-party holders of debt, equity securities, or other obligations, issued by VIEs that JPMorgan Chase consolidates.

Benefit obligation: Refers to the projected benefit obligation for pension plans and the accumulated postretirement benefit obligation for OPEB plans.

BHC: Bank holding company

Card Services includes the Credit Card and Commerce Solutions businesses.

CB: Commercial Banking

CBB: Consumer & Business Banking

CCAR: Comprehensive Capital Analysis and Review

CCB: Consumer & Community Banking

CCO: Chief Compliance Officer

CCP: "Central counterparty" is a clearing house that interposes itself between counterparties to contracts traded in one or more financial markets, becoming the buyer to every seller and the seller to every buyer and thereby ensuring the future performance of open contracts. A CCP becomes counterparty to trades with market participants through novation, an open offer system, or another legally binding arrangement.

CDS: Credit default swaps

CEO: Chief Executive Officer

CET1 Capital: Common Equity Tier 1 Capital

CFTC: Commodity Futures Trading Commission

CFO: Chief Financial Officer

Chase Bank USA, N.A.: Chase Bank USA, National Association

CIB: Corporate & Investment Bank

CIO: Chief Investment Office

Client assets: Represent assets under management as well as custody, brokerage, administration and deposit accounts.

Client deposits and other third-party liabilities: Deposits, as well as deposits that are swept to on-balance sheet liabilities (e.g., commercial paper, federal funds purchased and securities loaned or sold under repurchase agreements) as part of client cash management programs. During the third quarter 2015 the Firm completed the discontinuation of its commercial paper customer sweep cash management program.

CLO: Collateralized loan obligations

CLTV: Combined loan-to-value

Collateral-dependent: A loan is considered to be collateral-dependent when repayment of the loan is expected to be provided solely by the underlying collateral, rather than by cash flows from the borrower's operations, income or other resources.

Commerce Solutions is a business that primarily processes transactions for merchants.

Commercial Card: provides a wide range of payment services to corporate and public sector clients worldwide through the commercial card products. Services include procurement, corporate travel and entertainment, expense management services, and business-to-business payment solutions.

COO: Chief Operating Officer

Core loans: Represents loans considered central to the Firm's ongoing businesses; core loans exclude loans classified as trading assets, runoff portfolios, discontinued portfolios and portfolios the Firm has an intent to exit.

Credit cycle: A period of time over which credit quality improves, deteriorates and then improves again (or vice versa). The duration of a credit cycle can vary from a couple of years to several years.

Credit derivatives: Financial instruments whose value is derived from the credit risk associated with the debt of a third-party issuer (the reference entity) which allow one party (the protection purchaser) to transfer that risk to another party (the protection seller). Upon the occurrence of a credit event by the reference entity, which may include, among other events, the bankruptcy or failure to pay its obligations, or certain restructurings of the debt of the reference entity, neither party has recourse to the reference entity. The protection purchaser has recourse to the protection seller for the difference between the face value of the CDS contract and the fair value at the time of settling the credit derivative contract. The determination as to whether a credit event has occurred is generally made by the relevant International Swaps and Derivatives Association ("ISDA") Determinations Committee.

Criticized: Criticized loans, lending-related commitments and derivative receivables that are classified as special mention, substandard and doubtful categories for regulatory purposes and are generally consistent with a rating of CCC+/Caa1 and below, as defined by S&P and Moody's.

CRO: Chief Risk Officer

CTC: CIO, Treasury and Corporate

CVA: Credit valuation adjustments

Debit and credit card sales volume: Dollar amount of card member purchases, net of returns.

Deposit margin/deposit spread: Represents net interest income expressed as a percentage of average deposits.

Distributed denial-of-service attack: The use of a large number of remote computer systems to electronically send a high volume of traffic to a target website to create a service outage at the target. This is a form of cyberattack.

DFAST: Dodd-Frank Act Stress Test

Dodd-Frank Act: Wall Street Reform and Consumer Protection Act

DOJ: U.S. Department of Justice

DOL: U.S. Department of Labor

DRPC: Directors' Risk Policy Committee

DVA: Debit valuation adjustment

E&P: Exploration & Production

EC: European Commission

Eligible LTD: Long-term debt satisfying certain eligibility criteria

Embedded derivatives: are implicit or explicit terms or features of a financial instrument that affect some or all of the cash flows or the value of the instrument in a manner similar to a derivative. An instrument containing such terms or features is referred to as a "hybrid." The component of the hybrid that is the non-derivative instrument is referred to as the "host." For example, callable debt is a hybrid instrument that contains a plain vanilla debt instrument (i.e., the host) and an embedded option that allows the issuer to redeem the debt issue at a specified date for a specified amount (i.e., the embedded derivative). However, a floating rate instrument is not a hybrid composed of a fixed-rate instrument and an interest rate swap.

ERISA: Employee Retirement Income Security Act of 1974

EPS: Earnings per share

ETD: "Exchange-traded derivatives": Derivative contracts that are executed on an exchange and settled via a central clearing house.

EU: European Union

Fannie Mae: Federal National Mortgage Association

FASB: Financial Accounting Standards Board

FCA: Financial Conduct Authority

FCC: Firmwide Control Committee

FDIA: Federal Depository Insurance Act

FDIC: Federal Deposit Insurance Corporation

Federal Reserve: The Board of the Governors of the Federal Reserve System

Fee share: Proportion of fee revenue based on estimates of investment banking fees generated across the industry from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking fee competitive analysis and volume-based league tables for the above noted industry products.

FFELP: Federal Family Education Loan Program

FFIEC: Federal Financial Institutions Examination Council

FHA: Federal Housing Administration

FHLB: Federal Home Loan Bank

FICO score: A measure of consumer credit risk provided by credit bureaus, typically produced from statistical models by Fair Isaac Corporation utilizing data collected by the credit bureaus.

Firm: JPMorgan Chase & Co.

Forward points: Represents the interest rate differential between two currencies, which is either added to or subtracted from the current exchange rate (i.e., "spot rate") to determine the forward exchange rate.

FRC: Firmwide Risk Committee

Free standing derivatives: a derivative contract entered into either separate and apart from any of the Firms other financial instruments or equity transactions. Or, in conjunction with some other transaction and is legally detachable and separately exercisable.

FSB: Financial Stability Board

FTE: Fully taxable equivalent

FVA: Funding valuation adjustment

FX: Foreign exchange

G7: Group of Seven nations: Countries in the G7 are Canada, France, Germany, Italy, Japan, the U.K. and the U.S.

G7 government bonds: Bonds issued by the government of one of the G7 nations.

Ginnie Mae: Government National Mortgage Association

GSE: Fannie Mae and Freddie Mac

GSIB: Global systemically important banks

HAMP: Home affordable modification program

Headcount-related expense: Includes salary and benefits (excluding performance-based incentives), and other noncompensation costs related to employees.

HELOAN: Home equity loan

HELOC: Home equity line of credit

Home equity – senior lien: Represents loans and commitments where JPMorgan Chase holds the first security interest on the property.

Home equity – junior lien: Represents loans and commitments where JPMorgan Chase holds a security interest that is subordinate in rank to other liens.

Households: A household is a collection of individuals or entities aggregated together by name, address, tax identifier and phone. Reported on a one-month lag.

HQLA: High quality liquid assets

HTM: Held-to-maturity

ICAAP: Internal capital adequacy assessment process

IDI: Insured depository institutions

IHC: JPMorgan Chase Holdings LLC, an intermediate holding company

Impaired loan: Impaired loans are loans measured at amortized cost, for which it is probable that the Firm will be unable to collect all amounts due, including principal and interest, according to the contractual terms of the agreement. Impaired loans include the following:

- All wholesale nonaccrual loans
- All TDRs (both wholesale and consumer), including ones that have returned to accrual status

Interchange income: A fee paid to a credit card issuer in the clearing and settlement of a sales or cash advance transaction.

Investment-grade: An indication of credit quality based on JPMorgan Chase's internal risk assessment system. "Investment grade" generally represents a risk profile similar to a rating of a "BBB-"/"Baa3" or better, as defined by independent rating agencies.

ISDA: International Swaps and Derivatives Association

JPMorgan Chase: JPMorgan Chase & Co.

JPMorgan Chase Bank, N.A.: JPMorgan Chase Bank, National Association

JPMorgan Clearing: J.P. Morgan Clearing Corp.

JPMorgan Securities: J.P. Morgan Securities LLC

Loan-equivalent: Represents the portion of the unused commitment or other contingent exposure that is expected, based on average portfolio historical experience, to become drawn prior to an event of a default by an obligor.

LCR: Liquidity coverage ratio

LDA: Loss Distribution Approach

LGD: Loss given default

LIBOR: London Interbank Offered Rate

LLC: Limited Liability Company

LOB: Line of business

Loss emergence period: Represents the time period between the date at which the loss is estimated to have been incurred and the realization of that loss.

LTIP: Long-term incentive plan

LTV: "Loan-to-value": For residential real estate loans, the relationship, expressed as a percentage, between the principal amount of a loan and the appraised value of the collateral (i.e., residential real estate) securing the loan.

Origination date LTV ratio

The LTV ratio at the origination date of the loan. Origination date LTV ratios are calculated based on the actual appraised values of collateral (i.e., loan-level data) at the origination date.

Current estimated LTV ratio

An estimate of the LTV as of a certain date. The current estimated LTV ratios are calculated using estimated collateral values derived from a nationally recognized home price index measured at the metropolitan statistical area ("MSA") level. These MSA-level home price indices consist of actual data to the extent available and forecasted data where actual data is not available. As a result, the estimated collateral values used to calculate these ratios do not represent actual appraised loan-level collateral values; as such, the resulting LTV ratios are necessarily imprecise and should therefore be viewed as estimates.

Combined LTV ratio

The LTV ratio considering all available lien positions, as well as unused lines, related to the property. Combined LTV ratios are used for junior lien home equity products.

Managed basis: A non-GAAP presentation of financial results that includes reclassifications to present revenue on a fully taxable-equivalent basis. Management uses this non-GAAP financial measure at the segment level, because it believes this provides information to enable investors to understand the underlying operational performance and trends of the particular business segment and facilitates a comparison of the business segment with the performance of competitors.

Master netting agreement: An agreement between two counterparties who have multiple contracts with each other that provides for the net settlement of all contracts, as well as cash collateral, through a single payment, in a single currency, in the event of default on or termination of any one contract.

MBS: Mortgage-backed securities

MD&A: Management's discussion and analysis

MMDA: Money Market Deposit Accounts

Moody's: Moody's Investor Services

Mortgage origination channels:

Retail – Borrowers who buy or refinance a home through direct contact with a mortgage banker employed by the Firm using a branch office, the Internet or by phone. Borrowers are frequently referred to a mortgage banker by a banker in a Chase branch, real estate brokers, home builders or other third parties.

Correspondent – Banks, thrifts, other mortgage banks and other financial institutions that sell closed loans to the Firm.

Mortgage product types:

Alt-A

Alt-A loans are generally higher in credit quality than subprime loans but have characteristics that would disqualify the borrower from a traditional prime loan. Alt-A lending characteristics may include one or more of the following: (i) limited documentation; (ii) a high CLTV ratio; (iii) loans secured by non-owner occupied properties; or (iv) a debt-to-income ratio above normal limits. A substantial proportion of the Firm's Alt-A loans are those where a borrower does not provide complete documentation of his or her assets or the amount or source of his or her income.

Option ARMs

The option ARM real estate loan product is an adjustable-rate mortgage loan that provides the borrower with the option each month to make a fully amortizing, interest-only or minimum payment. The minimum payment on an option ARM loan is based on the interest rate charged during the introductory period. This introductory rate is usually significantly below the fully indexed rate. The fully indexed rate is calculated using an index rate plus a margin. Once the introductory period ends, the contractual interest rate charged on the loan increases to the fully indexed rate and adjusts monthly to reflect movements in the index. The minimum payment is typically insufficient to cover interest accrued in the prior month, and any unpaid interest is deferred and added to the principal balance of the loan. Option ARM loans are subject to payment recast, which converts the loan to a variable-rate fully amortizing loan upon meeting specified loan balance and anniversary date triggers.

Prime

Prime mortgage loans are made to borrowers with good credit records who meet specific underwriting requirements, including prescriptive requirements related to income and overall debt levels. New prime mortgage borrowers provide full documentation and generally have reliable payment histories.

Subprime

Subprime loans are loans that, prior to mid-2008, were offered to certain customers with one or more high risk characteristics, including but not limited to: (i) unreliable or poor payment histories; (ii) a high LTV ratio of greater than 80% (without borrower-paid mortgage insurance); (iii) a high debt-to-income ratio; (iv) an occupancy type for the loan is other than the borrower's primary residence; or (v) a history of delinquencies or late payments on the loan.

MSA: Metropolitan statistical areas

MSR: Mortgage servicing rights

Multi-asset: Any fund or account that allocates assets under management to more than one asset class.

NA: Data is not applicable or available for the period presented.

NAV: Net Asset Value

Net Capital Rule: Rule 15c3-1 under the Securities Exchange Act of 1934.

Net charge-off/(recovery) rate: Represents net charge-offs/(recoveries) (annualized) divided by average retained loans for the reporting period.

Net mortgage servicing revenue includes the following components:

Operating revenue predominantly represents the return on Mortgage Servicing's MSR asset and includes:

- Actual gross income earned from servicing third-party mortgage loans, such as contractually specified servicing fees and ancillary income; and
- The change in the fair value of the MSR asset due to the collection or realization of expected cash flows.

Risk management represents the components of

Mortgage Servicing's MSR asset that are subject to ongoing risk management activities, together with derivatives and other instruments used in those risk management activities.

Net production revenue: Includes net gains or losses on originations and sales of mortgage loans, other production-related fees and losses related to the repurchase of previously sold loans.

Net revenue rate: Represents Card Services net revenue (annualized) expressed as a percentage of average loans for the period.

Net yield on interest-earning assets: The average rate for interest-earning assets less the average rate paid for all sources of funds.

NM: Not meaningful

NOL: Net operating loss

Nonaccrual loans: Loans for which interest income is not recognized on an accrual basis. Loans (other than credit card loans and certain consumer loans insured by U.S. government agencies) are placed on nonaccrual status when full payment of principal and interest is not expected, regardless of delinquency status, or when principal and interest have been in default for a period of 90 days or more unless the loan is both well-secured and in the process of collection. Collateral-dependent loans are typically maintained on nonaccrual status.

Nonperforming assets: Nonperforming assets include nonaccrual loans, nonperforming derivatives and certain assets acquired in loan satisfaction, predominantly real estate owned and other commercial and personal property.

NOW: Negotiable Order of Withdrawal

NSFR: Net stable funding ratio

OAS: Option-adjusted spread

OCC: Office of the Comptroller of the Currency

OCI: Other comprehensive income/(loss)

OEP: One Equity Partners

OIS: Overnight index swap

OPEB: Other postretirement employee benefit

ORMF: Operational Risk Management Framework

OTTI: Other-than-temporary impairment

Over-the-counter ("OTC") derivatives: Derivative contracts that are negotiated, executed and settled bilaterally between two derivative counterparties, where one or both counterparties is a derivatives dealer.

Over-the-counter cleared ("OTC-cleared") derivatives: Derivative contracts that are negotiated and executed bilaterally, but subsequently settled via a central clearing house, such that each derivative counterparty is only exposed to the default of that clearing house.

Overhead ratio: Noninterest expense as a percentage of total net revenue.

Parent Company: JPMorgan Chase & Co.

Participating securities: Represents unvested stock-based compensation awards containing nonforfeitable rights to dividends or dividend equivalents (collectively, "dividends"), which are included in the earnings per share calculation using the two-class method. JPMorgan Chase grants restricted stock and RSUs to certain employees under its stock-based compensation programs, which entitle the recipients to receive nonforfeitable dividends during the vesting period on a basis equivalent to the dividends paid to holders of common stock. These unvested awards meet the definition of participating securities. Under the two-class method, all earnings (distributed and undistributed) are allocated to each class of common stock and participating securities, based on their respective rights to receive dividends.

PCA: Prompt corrective action

PCI: "Purchased credit-impaired" loans represents loans that were acquired in the Washington Mutual transaction and deemed to be credit-impaired on the acquisition date in accordance with the guidance of the FASB. The guidance allows purchasers to aggregate credit-impaired loans acquired in the same fiscal quarter into one or more pools, provided that the loans have common risk characteristics (e.g., product type, LTV ratios, FICO scores, past due status, geographic location). A pool is then accounted for as a single asset with a single composite interest rate and an aggregate expectation of cash flows.

PD: Probability of default

PRA: Prudential Regulatory Authority

Pre-provision profit/(loss): Represents total net revenue less noninterest expense. The Firm believes that this financial measure is useful in assessing the ability of a lending institution to generate income in excess of its provision for credit losses.

Pretax margin: Represents income before income tax expense divided by total net revenue, which is, in management's view, a comprehensive measure of pretax performance derived by measuring earnings after all costs are taken into consideration. It is one basis upon which management evaluates the performance of AWM against the performance of their respective competitors.

Principal transactions revenue: Principal transactions revenue is driven by many factors, including the bid-offer spread, which is the difference between the price at which the Firm is willing to buy a financial or other instrument and the price at which the Firm is willing to sell that instrument. It also consists of realized (as a result of closing out or termination of transactions, or interim cash payments) and unrealized (as a result of changes in valuation) gains and losses on financial and other instruments (including those accounted for under the fair value option) primarily used in client-driven market-making activities and on private equity investments. In connection with its client-driven market-making activities, the Firm transacts in debt and equity instruments, derivatives and commodities (including physical commodities inventories and financial instruments that reference commodities).

Principal transactions revenue also includes certain realized and unrealized gains and losses related to hedge accounting and specified risk-management activities, including: (a) certain derivatives designated in qualifying hedge accounting relationships (primarily fair value hedges of commodity and foreign exchange risk), (b) certain derivatives used for specific risk management purposes, primarily to mitigate credit risk, foreign exchange risk and commodity risk, and (c) other derivatives.

PSU(s): Performance share units

RCSA: Risk and Control Self-Assessment

Real assets: Real assets include investments in productive assets such as agriculture, energy rights, mining and timber properties and exclude raw land to be developed for real estate purposes.

REIT: "Real estate investment trust": A special purpose investment vehicle that provides investors with the ability to participate directly in the ownership or financing of real-estate related assets by pooling their capital to purchase and manage income property (i.e., equity REIT) and/or mortgage loans (i.e., mortgage REIT). REITs can be publicly or privately held and they also qualify for certain favorable tax considerations.

Receivables from customers: Primarily represents margin loans to brokerage customers that are collateralized through assets maintained in the clients' brokerage accounts, as such no allowance is held against these receivables. These receivables are reported within accrued interest and accounts receivable on the Firm's Consolidated balance sheets.

Regulatory VaR: Daily aggregated VaR calculated in accordance with regulatory rules.

REO: Real estate owned

Reported basis: Financial statements prepared under U.S. GAAP, which excludes the impact of taxable-equivalent adjustments.

Retained loans: Loans that are held-for-investment (i.e., excludes loans held-for-sale and loans at fair value).

Revenue wallet: Proportion of fee revenue based on estimates of investment banking fees generated across the industry (i.e., the revenue wallet) from investment banking transactions in M&A, equity and debt underwriting, and loan syndications. Source: Dealogic, a third-party provider of investment banking competitive analysis and volume-based league tables for the above noted industry products.

RHS: Rural Housing Service of the U.S. Department of Agriculture

ROA: Return on assets

ROE: Return on equity

ROTCE: Return on tangible common equity

RSU(s): Restricted stock units

RWA: "Risk-weighted assets": Basel III establishes two comprehensive methodologies for calculating RWA (a Standardized approach and an Advanced approach) which include capital requirements for credit risk, market risk, and in the case of Basel III Advanced, also operational risk. Key differences in the calculation of credit risk RWA between the Standardized and Advanced approaches are that for Basel III Advanced, credit risk RWA is based on risk-sensitive approaches which largely rely on the use of internal credit models and parameters, whereas for Basel III Standardized, credit risk RWA is generally based on supervisory risk-weightings which vary primarily by counterparty type and asset class. Market risk RWA is calculated on a generally consistent basis between Basel III Standardized and Basel III Advanced, both of which incorporate the requirements set forth in Basel 2.5.

S&P: Standard and Poor's 500 Index

SAR(s): Stock appreciation rights

SCCL: single-counterparty credit limits

SEC: Securities and Exchange Commission

Seed capital: Initial JPMorgan capital invested in products, such as mutual funds, with the intention of ensuring the fund is of sufficient size to represent a viable offering to clients, enabling pricing of its shares, and allowing the manager to develop a track record. After these goals are achieved, the intent is to remove the Firm's capital from the investment.

Short sale: A short sale is a sale of real estate in which proceeds from selling the underlying property are less than the amount owed the Firm under the terms of the related mortgage, and the related lien is released upon receipt of such proceeds.

Single-name: Single reference-entities

SLR: Supplementary leverage ratio

SMBS: Stripped mortgage-backed securities

SOA: Society of Actuaries

SPEs: Special purpose entities

Structural interest rate risk: Represents interest rate risk of the non-trading assets and liabilities of the Firm.

Structured notes: Structured notes are predominantly financial instruments containing embedded derivatives.

Suspended foreclosures: Loans referred to foreclosure where formal foreclosure proceedings have started but are currently on hold, which could be due to bankruptcy or loss mitigation. Includes both judicial and non-judicial states.

Taxable-equivalent basis: In presenting managed results, the total net revenue for each of the business segments and the Firm is presented on a tax-equivalent basis. Accordingly, revenue from investments that receive tax credits and tax-exempt securities is presented in the managed results on a basis comparable to taxable investments and securities; the corresponding income tax impact related to tax-exempt items is recorded within income tax expense.

TBVPS: Tangible book value per share

TCE: Tangible common equity

TDR: "Troubled debt restructuring" is deemed to occur when the Firm modifies the original terms of a loan agreement by granting a concession to a borrower that is experiencing financial difficulty.

TLAC: Total Loss Absorbing Capacity

U.K.: United Kingdom

Unaudited: Financial statements and information that have not been subjected to auditing procedures sufficient to permit an independent certified public accountant to express an opinion.

U.S.: United States of America

U.S. GAAP: Accounting principles generally accepted in the U.S.

U.S. government-sponsored enterprises ("U.S. GSEs") and U.S. GSE obligations: In the U.S., GSEs are quasi-governmental, privately held entities established by Congress to improve the flow of credit to specific sectors of the economy and provide certain essential services to the public. U.S. GSEs include Fannie Mae and Freddie Mac, but do not include Ginnie Mae, which is directly owned by the U.S. Department of Housing and Urban Development. U.S. GSE obligations are not explicitly guaranteed as to the timely payment of principal and interest by the full faith and credit of the U.S. government.

U.S. LCR: Liquidity coverage ratio under the final U.S. rule.

U.S. Treasury: U.S. Department of the Treasury

VA: U.S. Department of Veterans Affairs

VaR: "Value-at-risk" is a measure of the dollar amount of potential loss from adverse market moves in an ordinary market environment.

VCG: Valuation Control Group

VGF: Valuation Governance Forum

VIEs: Variable interest entities

Warehouse loans: Consist of prime mortgages originated with the intent to sell that are accounted for at fair value and classified as trading assets.

Washington Mutual transaction: On September 25, 2008, JPMorgan Chase acquired certain of the assets of the banking operations of Washington Mutual Bank ("Washington Mutual") from the FDIC.

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Beijing, China

Jaime Augusto Zobel de Ayala
Chairman and Chief Executive Officer
Ayala Corporation
Makati City, Philippines

* Ex-officio

JPMorgan Chase & Co.

Corporate headquarters
270 Park Avenue
New York, NY 10017-2070
Telephone: 212-270-6000
jpmorganchase.com

Principal subsidiaries

JPMorgan Chase Bank,
National Association
Chase Bank USA,
National Association
J.P. Morgan Securities LLC
J.P. Morgan Securities plc

Annual Report on Form 10-K

The Annual Report on Form 10-K of JPMorgan Chase & Co. as filed with the U.S. Securities and Exchange Commission will be made available without charge upon request to:

Office of the Secretary
JPMorgan Chase & Co.
270 Park Avenue
New York, NY 10017-2070

Stock listing

New York Stock Exchange
London Stock Exchange

The New York Stock Exchange ticker symbol for the common stock of JPMorgan Chase & Co. is JPM.

Financial information about JPMorgan Chase & Co. can be accessed by visiting the Investor Relations website at jpmorganchase.com. Additional questions should be addressed to:

Investor Relations
JPMorgan Chase & Co.
270 Park Avenue
New York, NY 10017-2070
Telephone: 212-270-6000

Directors

To contact any of the Board members or committee chairs, the Lead Independent Director or the non-management directors as a group, please mail correspondence to:

JPMorgan Chase & Co.
Attention (Board member(s))
Office of the Secretary
270 Park Avenue
New York, NY 10017-2070

The Corporate Governance Principles of the Board, the charters of the principal Board committees, the Code of Conduct, the Code of Ethics for Finance Professionals and other governance information can be accessed by visiting our website at jpmorganchase.com and clicking on "Governance" under the "About us" tab.

Transfer agent and registrar

Computershare
480 Washington Boulevard
Jersey City, NJ 07310-2053
Telephone: 800-758-4651
computershare.com

Investor Services Program

JPMorgan Chase & Co.'s Investor Services Program offers a variety of convenient, low-cost services to make it easier to reinvest dividends and buy and sell shares of JPMorgan Chase & Co. common stock. A brochure and enrollment materials may be obtained by contacting the Program Administrator, Computershare, by calling 800-758-4651, by writing to the address indicated above or by visiting its website at www-us.computershare.com/Investor.

Direct deposit of dividends

For information about direct deposit of dividends, please contact Computershare.

Stockholder inquiries

Contact Computershare:

By telephone:

Within the United States, Canada and
Puerto Rico: 800-758-4651
(toll free)

From all other locations:
201-680-6862 (collect)

TDD service for the hearing impaired within the United States, Canada and Puerto Rico: 800-231-5469 (toll free)

All other locations:
201-680-6610 (collect)

By regular mail:

Computershare
P.O. Box 30170
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By overnight delivery:

Computershare
211 Quality Circle
Suite 210
College Station, TX 77845
United States

Duplicate mailings

If you receive duplicate mailings because you have more than one account listing and you wish to consolidate your accounts, please write to Computershare at the address above.

Independent registered public accounting firm

PricewaterhouseCoopers LLP
300 Madison Avenue
New York, NY 10017-6204

As of 2009, JPMorgan Chase & Co. has distributed shareholder information under the U.S. Securities and Exchange Commission "Notice and Access" rule. As a result, the firm prints 700,000 fewer Annual Reports and Proxy Statements, which saves on an annual basis approximately 6,400 trees and 800 metric tons of CO_2 emissions.

This Annual Report is printed on paper made from well-managed forests and other controlled sources. The paper is independently certified by BVQI to the Forest Stewardship Council® (FSC®) standards. The paper contains a minimum of 20% post-consumer waste recycled fibers.

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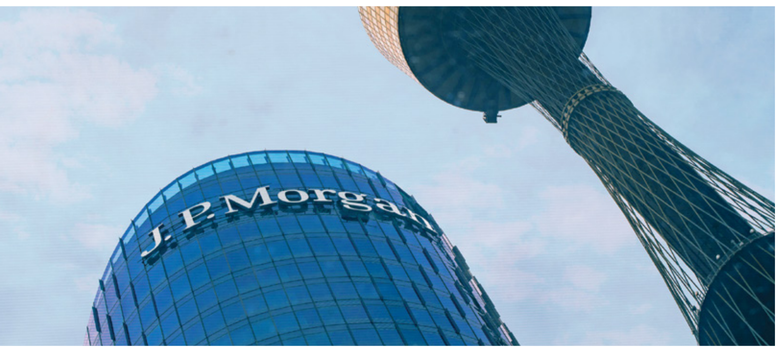

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