The Stock Market and Household Financial Behavior

JPMorgan Chase & Co. Institute

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Abstract

In this JPMorgan Chase Institute report, we document a high-frequency relationship between stock market returns and patterns observed in consumer spending and investing behavior. The analysis draws from a core sample of approximately 12 million active Chase credit card users since 2012, and we seek to explain how the distribution of monthly credit card spending changes responds to stock market returns. The right tail of this distribution—characterized by spending increases double or triple a person's typical level—is over two times more sensitive to the market than the center of the distribution. The relationship is more pronounced for male investors than non-investors and women. Applying the same econometric framework for stock market returns to changes in checking account-based spending and changes in labor income does not yield a statistically discernible relationship in our sample. Meanwhile, individuals' transfers to investment accounts display a notable correlation with lagged stock returns, consistent with "returns chasing." Such transfers roughly doubled around the onset of the COVID national emergency, alongside sharp declines in spending.

Our findings imply that policies seeking to exert control over business cycles via the stock market may be successful over short time horizons. However, since stock market gains are associated with spending "splurges" on credit cards and flows into investment brokerage accounts, stimulus aimed at supporting asset prices can come with costs in the form of households' financial vulnerability. If gains in stock prices are not followed by an improving labor market, households that over-extend themselves in terms of spending or equity market exposure would face risks.

About the Institute

The JPMorgan Chase Institute is harnessing the scale and scope of one of the world's leading firms to explain the global economy as it truly exists. Drawing on JPMorgan Chase's unique proprietary data, expertise, and market access, the Institute develops analyses and insights on the inner workings of the economy, frames critical problems, and convenes stakeholders and leading thinkers.

The mission of the JPMorgan Chase Institute is to help decision makers—policymakers, businesses, and nonprofit leaders—appreciate the scale, granularity, diversity, and interconnectedness of the global economic system and use timely data and thoughtful analysis to make more informed decisions that advance prosperity for all.

Table of Contents

Executive Summary

For this JPMorgan Chase Institute report, we analyze granular administrative retail bank data to explore the relationship between the U.S. stock market and consumer behavior, notably consumption and investment. Our research provides a historical perspective that can help policymakers understand how market fluctuations may be transmitted to the real economy over relatively short time horizons. This report documents a correlation between credit card spending and stock returns that plays out over the course of just a few months. This relationship appears to be driven disproportionately by specific types of activity—notably, temporary spending spikes on credit cards—and investor status or gender.

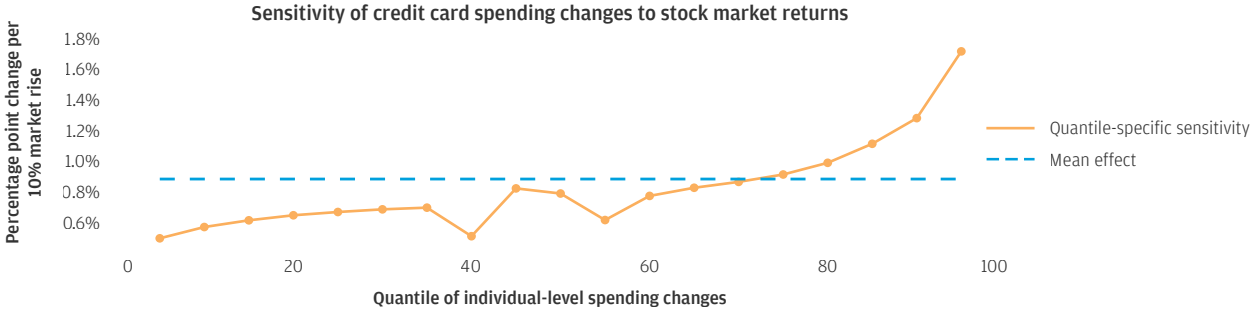
In addition to spending patterns, we examine retail flows to investment accounts. These transfers suggest "returns chasing" behavior; they track lagged stock market changes with an R-squared of over 20 percent. In sum, procyclical behavior can be seen on both spending and investment fronts, and the magnitudes vary across gender and wealth indicators. Specifically, in our sample, credit card spending by men and investors was more responsive to stocks than that of women and non-investors. With respect to investment flows, gender differences were smaller; the sensitivity of male investment flows to market returns was only modestly above the estimate for women. Our data cover much of the period following the Great Recession, from 2012 through mid-2020. Importantly, we separate the COVID-crisis from the rest of the sample, to prevent outliers from this unique shock from driving the results. This perspective can help policymakers understand how dynamics play out within a business cycle and illuminate tradeoffs associated with short-term "management" of the cycle through markets. Since our sample is mainly limited to one economic expansion, we study separately how individuals' spending and investment flows played out during the COVID shock to illustrate similarities and contrasts with the dynamics observed in the preceding years. The analysis can be summarized in the following four findings:

This report documents a correlation between credit card spending and stock returns that plays out over the course of just a few months.

Finding One

Consumer spending is responsive to stock market movements, led by spending bursts on credit cards. In our credit card sample, a 10 percent rise in stock prices is associated with a rise in average spending of just under 1 percent. The effect is somewhat smaller, 0.8 percent, at the center of the spending change distribution, while the right tail of that distribution—characterized by spending increases of double or triple a person's steady-state spending rate—is about two times as sensitive. The time horizon for this relationship is relatively short, with the stock market leading by less than 4 months.[3] Over the period in question, the relationship is not seen for spending via checking accounts or changes in individuals' labor income, suggesting that consumer credit availability or the state of households' liquid assets may play a role in mediating the relationship between stocks and the economy.

Sensitivity of credit card spending changes to stock market returns



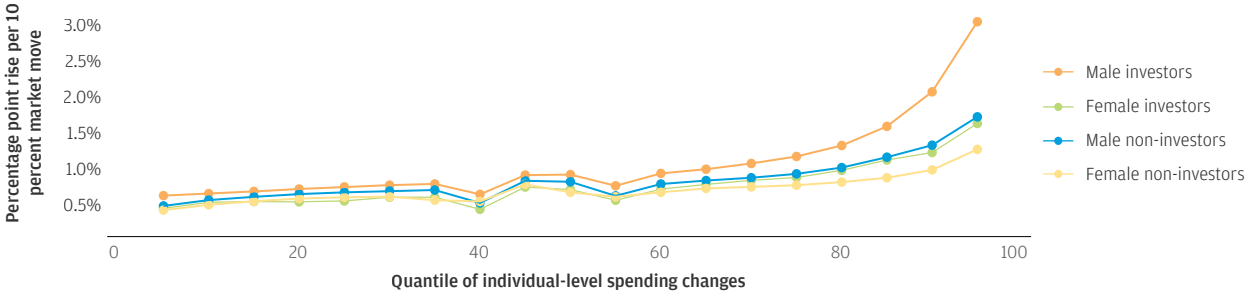
Note: The figure displays the regression-predicted effect of stock market returns on the distribution of individual-level credit card spending changes relative to their typical levels. Estimates are presented at 5 percentage point intervals from the 5th to the 95th quantiles of that distribution, as well as the coefficient for the mean spending change. Higher estimates for the upper quantiles imply that the right tail of the distribution (characterized by spending "splurges" of two to three times a person's usual spending level) moves by more than the middle and lower end of the distribution following stock market changes.

Source: JPMorgan Chase Institute

Finding Two

The spending response to stock market movements is stronger for customers identified as male investors than for non-investor men and for women. Following stock market changes, the median of the distribution of spending by male investors shifts by about 10 percent more than female non-investors, but this gap increases to about double at the 95th percentile. The higher sensitivity for male investors is consistent with a wealth effect interpretation of the stock market-spending correlation, although labor market differences between genders may also be at play. Heterogeneity in our estimates implies that the short-term connection between the stock market and households is amplified by large changes from narrow segments and is less broad-based than suggested by aggregate spending. As such, the macro-financial relationship is subject to change with shifts in the structure of the economy, including inequality, credit availability, and shifting preferences.

Sensitivity of credit card spending changes to stock market returns, by investor-gender groups



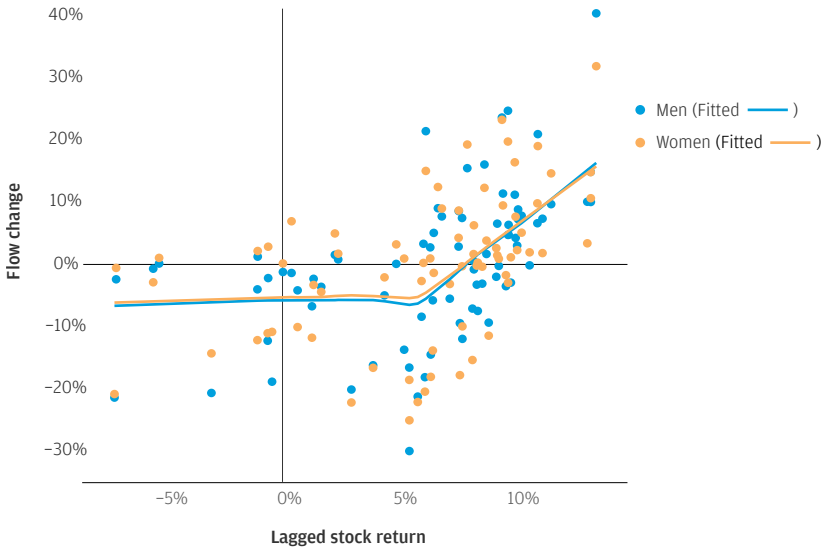
Note: As in the figure above, this plot displays the regression-predicted effect of stock market returns on the distribution of individual-level credit card spending changes.

Source: JPMorgan Chase Institute

Finding Three

Flows into investment accounts are notably sensitive to changes in the stock market—a 10 percent rise in stocks translates to a short-term increase in the magnitude of transfers of over 10 percent for both men and women—showing a pattern of returns chasing. These sensitivities are much larger than those observed for spending, as are the correlations. The number of people transferring net funds to their investment accounts also increases with stock market gains, suggesting an element of herding behavior among retail investors. In our data, the relationship is asymmetric; stock market gains predict stronger flows to investment accounts, but stock market losses have little average effect.

Monthly changes in transfers to investment accounts and stock market returns: Oct 2013 - Jan 2020



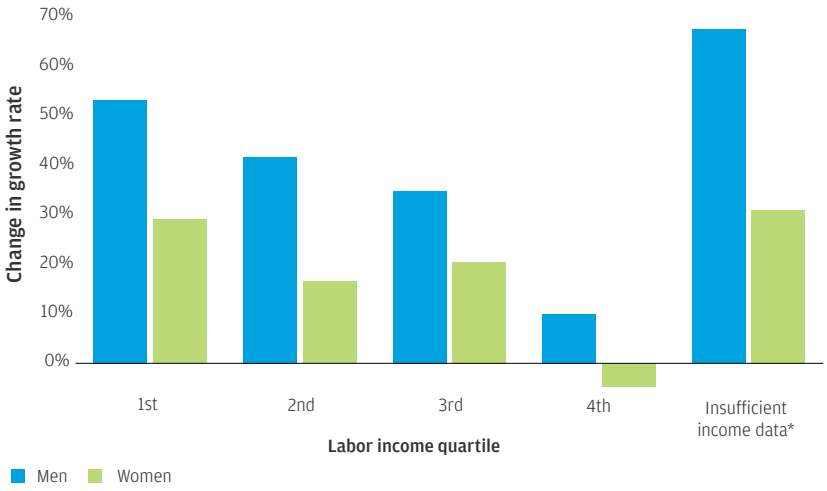
Note: Lagged stock returns are aggregated using the MIDAS framework described in this report. In this case, they are approximately equal to returns over the current and previous 6 months.

Source: JPMorgan Chase Institute

Finding Four

The COVID shock to the economy, which strongly dampened consumer spending, resulted in a large spike in transfers to investment accounts, especially for men. This rise in household investments is consistent with the aggregate increase in the personal savings rate starting in March 2020. The increase in the growth rate of investment flows in the several months following the COVID national emergency was about two times stronger for men than for women.

Growth in transfers to investment accounts during COVID (March-July 2020)



Note: Plot shows percentage point change in the growth rate of investment account flows, comparing March to July 2020 versus the same months of 2019 less each category's year-over-year growth rate in 2019. Individuals that do not meet our deposit account activity criteria are in the bucket: "Insufficient income data."

Source: JPMorgan Chase Institute

Implications

Our findings imply that policies seeking to exert control over business cycles via the stock market may be successful over short time horizons. However, stock market gains are associated with spending "splurges" on credit cards and flows into investment brokerage accounts, suggesting that stimulus aimed at supporting asset prices can come with costs in the form of households' financial vulnerability. If gains in stock prices are not followed by an improving labor market, households that over-extend themselves in terms of credit card spending or equity market exposure would face risks. More research should be done to fully understand how credit availability and liquid assets may influence the breadth and intensity of households' responses to market movements. Finally, heterogeneity in response to stocks across gender and investor status suggest that macro-financial linkages are likely to change over time, and rising inequality could narrow the segments of the population that respond directly to financial market changes.

Introduction

Since the onset of the COVID pandemic, economic indicators and stocks have experienced wide swings. Declines in equity markets in the spring of 2020 reflected growing awareness of the extent of economic damage caused by the pandemic in the U.S. However, the subsequent rebound in stock indices to record highs despite sustained risks to the economy and high unemployment has led many observers to debate whether markets may have become disconnected from the real economy.

Prior research has explained why household spending and investing are typically linked with the stock market. First, an important and direct channel is comprised of a wealth effect—increasing stock prices raise the wealth of stockholders, influencing spending power and risk tolerance. Second, indirect channels include those running through household expectations—higher stock prices can indicate future gains in labor income and job security—and behavioral effects like changes in sentiment or confidence.

In this JPMorgan Chase Institute report, we analyze granular administrative retail bank data to explore the relationship between U.S. stocks and consumer behavior—notably, the extent to which increases in stocks translate to changes in consumer spending and investing.

Specifically, we ask three questions:

- How sensitive is consumer spending to stock market changes? How does sensitivity differ by gender, investor status, and income?[1] These features capture important differences, including wealth and labor market disparities, which may drive heterogeneity in how monetary policy is transmitted to households.
- How sensitive are flows into investment accounts to stock market changes? Is there evidence of herding behavior that raises financial stability concerns for households or the market itself?[2]
- How did spending and investing behavior around the COVID national emergency compare with prior patterns?

Our data cover much of the period following the Great Recession, 2012 through 2020, and we focus on interactions that occur over relatively short time intervals. Importantly, we separate the COVID-crisis from the rest of the sample to prevent outliers from this unique shock from driving the results. This perspective can help policymakers understand how dynamics play out within a business cycle and illuminate tradeoffs associated with short-term "management" of the cycle through markets. Our sample is limited to one economic expansion ending in a major contraction. Given this limitation, we study separately how individuals' spending and investment behavior played out during the COVID shock to illustrate similarities and contrasts with the dynamics observed in the preceding years.

About the Data

This report is based on JPMorgan Chase data assets spanning over 70 million retail clients. For our analysis on consumer spending behavior (Findings 1 and 2), we employ filters to capture individuals with consistent transactions over a sizeable time period, enabling a rich panel dimension to our analysis. Specifically, we require 36 consecutive months of transactions either on Chase credit cards or deposit accounts, with a minimum of 3 and 5 transactions, respectively, in each of these months. After applying these filters, we have a core analytical sample of 12 million credit card clients, and 12 million deposit account holders, with some overlap. The time period covered in our data starts in January 2011 for credit cards and October 2012 in the deposit sample, and both run through July 2020.

In Findings 2 and 3, we make use of transactions involving investment accounts—such as Chase or third-party stock brokerage accounts. Finding 4, which covers spending and investing dynamics during the COVID crisis, is based on a sample of checking account and credit card customers with activity in every month of 2019.

We use investment account-related transactions to parse investors from those for which we see no such indication of investment account holdings. This means that we are likely correctly identifying investors, but our non-investor category almost certainly contains a substantial portion of "false negatives," or individuals that indeed have investments but transact only infrequently or via non-Chase accounts. This drawback of our data means that the quantitative differences that we measure between investors and non-investors may be understated. Additionally, most of these investment account transfers are likely involving taxable personal accounts; retirement accounts, e.g. 401(k)s, are often funded directly, prior to the receipt of payrolls in checking accounts. Further details about how our investor status identifier compares to publicly available data on stock market participation can be found in **Finding 2, Box 3: Investors and the wealth distribution.** Summary statistics for our core sample are presented in table below.

Table 1: Dynamics of over 12 million individuals drive our main spending results.

Summary statistics of our core credit card sample

Total count	12,384,000	
	Investors	**Non-investors**
Percent of total count	10%	90%
Average monthly credit card spend	3,242	3,276
Median monthly credit card spend	2,122	2,019
Gender	**Percent of investors**	**Percent of non-investors**
Male	50%	48%
Female	28%	36%
Missing/other	21%	16%
Age		
Baby boomer	28%	39%
Gen X	23%	25%
Gen Y & Z	41%	24%
Missing/other	8%	12%

Note: Percentages may not sum to 100 due to rounding.

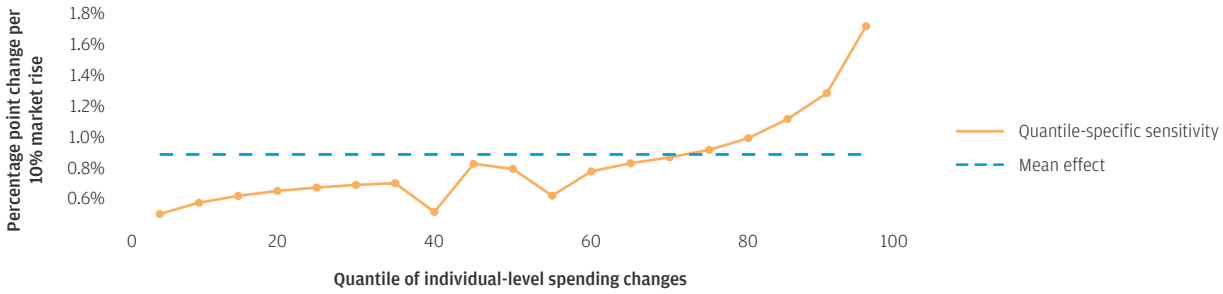
Source: JPMorgan Chase Institute

Finding One

Consumer spending increases following stock market rises, led by spending bursts on credit cards. Consumer spending is correlated with the stock market: a 10 percent rise in stock prices is associated with a rise in average credit card spend of just under 1 percent (see Table 2).[4] We take advantage of the panel nature of individual spending data, which allows us to detect a notably larger sensitivity of spending in the right tail of the distribution of individuals' spending changes.[5] The 95th percentile of the distribution moves by almost 2 percent after a 10 percent stock market rise, compared to a more muted change of less than 1 percent at the median and lower percentiles (see Figure 1). This means that large spending rises—characterized by spending increases of double or triple a person's steady-state spending rate—are more likely after stock market gains. The time horizon for this relationship is relatively short. The stock market leads by less than 4 months, which we measure using a statistical method known as **Mixed Data Sampling** (MIDAS) regressions, as well as simple lagged returns. See **Box 1: How we set up our regressions** for further details. This procedure enables the data to inform an optimal lag structure, enhancing explanatory power compared to simple lagged returns.

The relationship that we detect over the period from January 2012 to January 2020 operates at a higher-frequency than some prior studies that measure statistical relationships that play out over the course of several quarters or years.[6] This difference is likely due, in part, to the fact that we are focusing within a single economic expansion in which variation in both spending and stocks are affected by intra-cycle shifts in growth, sentiment, and near-term expectations.

Figure 1: Sensitivity of spending to stock market returns is driven by large spending increases on credit cards.



Note: The figure displays the regression-predicted effect of stock market returns on the distribution of individual-level credit card spending changes relative to their typical levels. Estimates are presented at 5 percentage point intervals from the 5th to the 95th quantiles of that distribution, as well as the coefficient for the mean spending change. Higher estimates for the upper quantiles implies that the right tail of the distribution (characterized by spending "splurges" of two to three times a person's usual spending level) moves by more than the middle and lower end of the distribution following stock market changes.

Source: JPMorgan Chase Institute

Table 2: Stock market moves of 10 percent are associated with a rise in average spending of nearly 1 percent and almost double that amount in the right-tail of the spending change distribution.

Regression: Quantiles of the spending change distribution

	Mean	Median	95th percentile
S&P 500*	0.91	0.81	1.74
Standard error**	0.25	0.22	0.59
R-squared	6.1%	8.5%	4.1%

Note: Regression coefficients represent the predicted percentage point rise in the mean, median, and 95th percentile, respectively, of the distribution of individuals' spending changes for a 10 percent increase in the stock market.

*Stock returns of the current and previous 3 months, measured via the MIDAS regression framework.
**Standard errors are heteroscedasticity and autocorrelation consistent.

Source: JPMorgan Chase Institute

Box 1: How we set up our regressions:

This report uses de-identified data of individual-level spending dynamics, which provides a view into how households experience spending changes and goes beyond what can be discerned from widely-available data sources. Our goal is to show how features of the distribution of household-level spending changes relate to stock market returns—rather than only focusing on totals or averages—which is done in two steps.

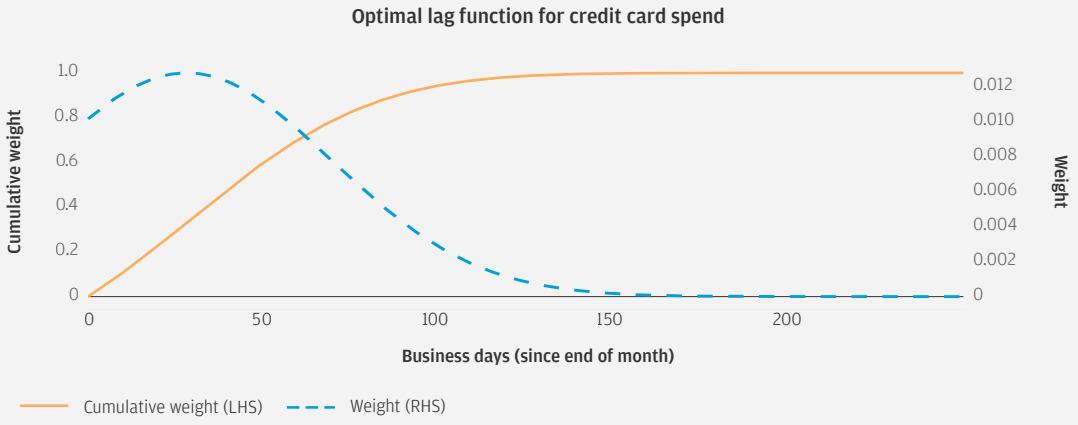
First, for every month we compute quantiles (e.g., the median, or the 90th percentile) from the distribution of spending changes. Each month's change is measured relative to the run rate of the prior 12 months' median spend level. We then control for customer, sample composition, calendar month, and time trend effects. This gives us a picture of how the distribution of individual spending changes through time, and provides the stationarity required by our high-frequency approach.

Next, we attempt to explain movements in the points (i.e. quantiles) of this distribution using prior stock market returns. This is done using simple lagged returns as well as a process that seeks the optimal way to weight past returns to maximize explanatory power. Details of this method are laid out in **Appendix A: Optimal Lagged Stock Returns.** Results from the two methods are similar. The specification is as follows:

$$y_{\tau,t} = \alpha_\tau + \beta_\tau F\left(R_{t,t-h}\right) + u_{\tau,t}$$

Here, ***y*** represents the outcome variable of interest (i.e., spending changes); τ represents the quantile of spending changes; ***t*** represents time; and the function ***F*** aggregates stock returns from the period ***t-h*** to ***t***. The set of β_τ coefficients are those that are plotted in Figure 1 above across the τ axis. For this report we use a functional form for ***F*** that has been employed in prior academic work, and the optimized function for credit card spend is in Figure 2.

Figure 2: Stock market returns occurring within the past 4 months matter most for spending.



Source: JPMorgan Chase Institute

We also examine checking account-based measures of spending, which include debit card swipes and ATM cash withdrawals. Contrasting the estimates derived from credit card data, point estimates for spending through checking accounts in the same regression framework are statistically insignificant, although positive. The differences could be due to noise in checking account outflows that we did not control for in this report. However, a straight read of the dichotomy suggests a role for credit availability in mediating the stocks-spending relationship.

As stated above, the relationship we detect between stocks and individual-level credit card spending operates at a high frequency; most of the impact of a stock market change shows up within the same quarter. This lag tenor is shorter than that seen for other aggregate macroeconomic indicators, which is described in **Box 2: How long is the lag between stocks and the real economy?** Since business cycles drive much of the variation in macro-financial variables, the channels that are causing the relationships we measure—over a single expansion—may be different. Causation in both directions is probably influencing the correlations we observe: stock market changes may be predicting a near-term change in spending (that would have occurred anyway), and spending may be influenced by the stock market.

That said, we view the high frequency of the connection we document as suggestive of channels originating with the stock market which then influence spending—including effects on wealth, sentiment, or expectations. These move considerably more quickly than typical business cycles. (This is discussed further in Finding 2, where we explore heterogeneity across consumer types.) Moreover, another important household-level indicator, labor income, does not exhibit the same rapid response to stock market changes over the period we study, suggesting an independent role for channels connected with the stock market in driving spending. Applying regressions relating stocks to incomes of the same form we employ for spending, we find very weak explanatory power; all regressions carry an R-squared less than 1 percent, and coefficients are statistically insignificant, although positive. This absence of a clear relationship between stocks and labor income at the individual level may be due to the lack of a full business cycle in our data and our high-frequency perspective.

Box 2: How long is the lag between stocks and the real economy?

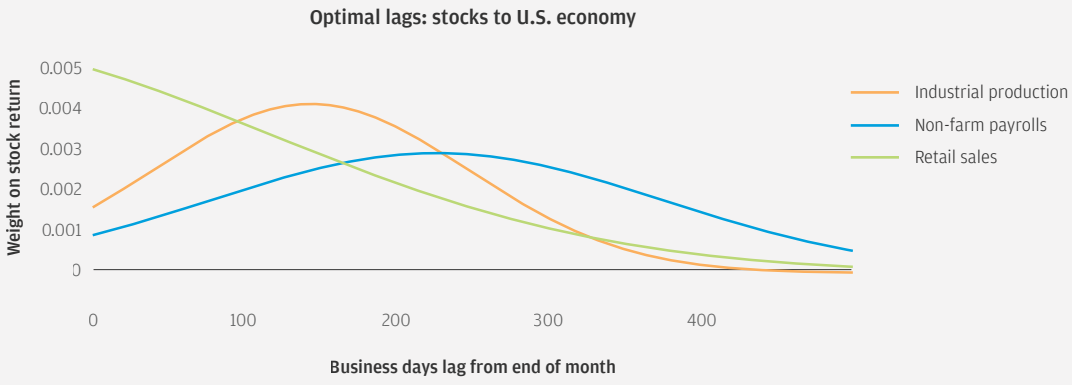
The stock market has long been recognized as a leading indicator of economic conditions, according to academic and industry research.[7] Market participants eagerly scrutinize economic news and data to identify the likelihood of the next turn of the business cycle, contributing to a tendency for stocks to decline ahead of economic downturns and then rise as expectations of a recovery solidify. Meanwhile, another line of research and the Federal Reserve's policy discussions acknowledge a causal channel running from the equity market to the economy. Both strands of literature imply a leader-follower relationship between the market and the economy, but exactly how far ahead stocks look is largely an empirical question.

Since stock prices fluctuate on a high frequency basis and the real economy moves more slowly—many indicators are available only at monthly or quarterly frequencies—we employ an econometric method that allows for pairing of mixed frequency data. The procedure, known as Mixed Data Sampling (MIDAS),[8] helps minimize information loss from aggregating a fast-moving variable so that it can be used in regression analysis vis-à-vis low frequency data. To do this, returns of the stock market are weighted by a flexible lag function, allowing for a few parameters to pin down a lag structure that fits the data best. In particular, we follow Ghysels, Sinko, and Valkanov (2007) and use the following functional form for the weight of stock return ***t-k***, and optimize over the two parameters Θ_1 and Θ_2.[9]

$$W(k, \Theta_1, \Theta_2) = \frac{e^{\Theta_1 k + \Theta_2 k^2}}{\sum_{k=1}^{K} e^{\Theta_1 k + \Theta_2 k^2}}$$

Executing a variant of the MIDAS algorithm on key U.S. macroeconomic indicators—retail sales, industrial production, and jobs growth—we estimate the optimal lag functions for stock returns seen in Figure 3. Data for this exercise are from a relatively recent period of 1995 to January 2020 in order to minimize the influence of the changing structure of the economy on our results. The weighting functions display a distinct relationship between the three economic indicators and the stock market: retail sales move most quickly (as most of the weight is given to short stock market lags), jobs growth is the slowest, and industrial production is in between. These estimates are unsurprising given prior literature on the topic, which tends to consider the labor market as a lagging indicator relative to the other two.

Figure 3: Macroeconomic indicators exhibit heterogeneity in lead-lag relationships with stocks; retail sales changes most quickly



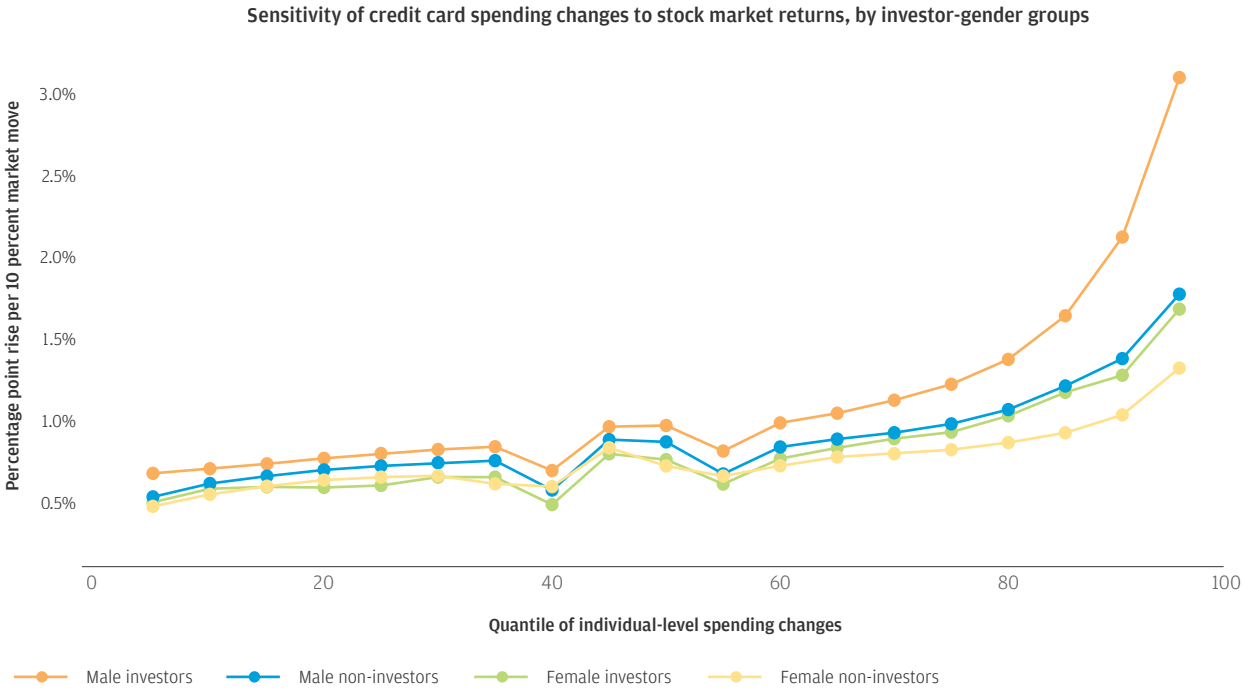
Note: Plot depicts the optimal weights applied to daily stock returns to minimize the mean squared error of residuals in a regression of each macroeconomic time series on stock returns. Each variable is made stationary prior to the MIDAS regression by computing percent differences relative to each variables' rolling trailing twelve month medians.

Source: JPMorgan Chase Institute

Finding Two

The spending response to stock market movements is stronger for customers identified as male investors than for non-investor men and women. The relationship between credit card spending and the stock market exhibits heterogeneity; in our sample, the spending of male investors—defined as individuals with transfers to or from an investment account—is more sensitive to market returns than male non-investors and women. Following stock market changes, the median of the distribution of spending by male investors shifts by 12 to 34 percent more than other categories of individuals, and the gap is much wider, 75 to 135 percent, at the 95th percentile of their respective distributions. Heterogeneity in responses, particularly in the right tail of the distribution of spending changes, implies that the short-term connection between the stock market and households is amplified by large changes from narrow segments and is less broad-based than suggested by aggregate spending.

Figure 4: Credit card spending bursts by male investors display greatest sensitivity to stock market gains.



Note: As in Figure 1, this plot displays the regression-predicted effect of stock market returns on the distribution of individual-level credit card spending changes relative to their typical levels. Estimates are presented at 5 percentage point intervals from the 5th to the 95th quantiles of that distribution. Higher estimates for the upper quantiles implies that the right tail of the distribution (characterized by spending "splurges" of two to three times a person's usual spending level) moves by more than the middle and lower end of the distribution following stock market changes.

Source: JPMorgan Chase Institute

Table 3: Regression estimates depict meaningfully stronger links between stocks and large spending changes for men, in both sensitivity and R-squared.

	Median		95th percentile	
	Female non-investors	Male investors	Female non-investors	Male investors
S&P 500*	0.72	0.97	1.32	3.10
Standard error**	0.25	0.26	0.63	0.66
R-squared	6.0%	11.6%	2.6%	9.2%

Note: Regression coefficients represent the predicted percentage point rise in the median and 95th percentile, respectively, of the distribution of individuals' spending changes for a 10 percent increase in the stock market.

*Stock returns of the current and previous 3 months, measured via MIDAS regression framework.
**Standard errors are heteroscedasticity and autocorrelation consistent.

Source: JPMorgan Chase Institute

Differences in sensitivity across investor-gender groups are both economically and statistically significant, particularly when comparing dynamics of large spending changes. Focusing on sensitivity at the average of the distributions, male investors have statistically significantly higher coefficients than each of the other three categories at the 5 percent level of significance or better. Resampling sub-periods in our data allow us to test this significance by revealing how sensitive our estimates are to changing the weights given to various observations. Importantly, spending patterns across investor and gender categories are highly correlated. When looking at estimates measured across resampled histories, these correlations make the differences between coefficients of different subgroups more stable than the estimates themselves. This feature of the data supports analysis of heterogeneity between subgroups of individuals. **Appendix C: Testing for Heterogeneity** explains this methodology further and includes a summary of statistical significance for differences between investor-gender groups.

Investor status is strongly positively correlated with levels of labor income, and men are more likely than women to have such investment transfers within labor income groups. See **Box 3: Investors and income distribution** for further details, including comparisons with publicly available data on the distribution of stock market wealth. The stronger connection between investors' credit card spending and stock returns, relative to non-investors, suggests a number of potential channels. This is the case in terms of both fit (R-squared) and outright sensitivity. First, a wealth effect could explain this difference, as equity market investors experience gains in wealth in sync with price fluctuations. Second, the gaps could be due to greater awareness of market movements, in conjunction with the assumption that observing stocks moving higher bodes well for future economic outcomes. The latter channel could be further parsed between a connection between stocks and changes in expectations of future outcomes (a rational explanation) and sentiment (a behavioral interpretation).

Within investor-gender groups, middle- and lower-income individuals tend to exhibit greater sensitivity to stocks in terms of credit card spending compared to those in the top quartile of individual incomes. Regression results broken out by income levels are presented in **Appendix B: Differences in Spending Sensitivity by Income**. Lower wage individuals therefore may be at greater risk of overusing credit after stock market gains, if not matched with subsequent increases in earnings.

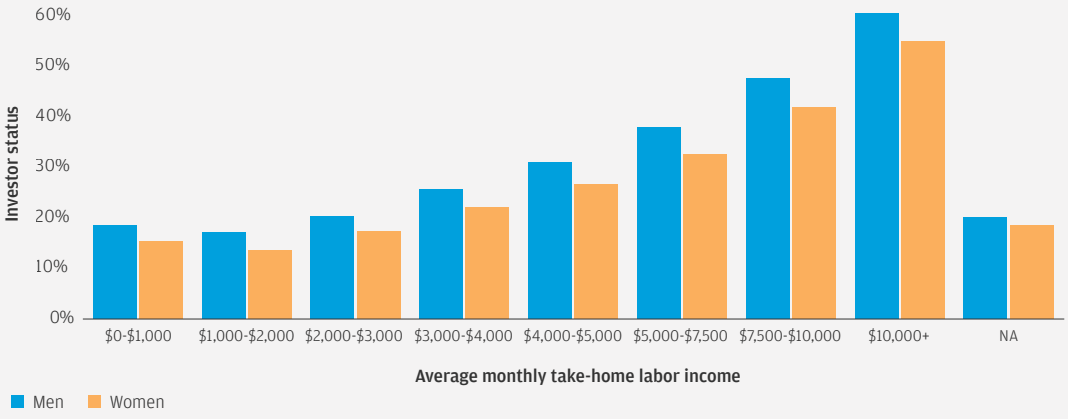
Differences across individuals' exposures to the macroeconomic cycle—via the labor market, or otherwise—could explain differential responses in spending to stock market fluctuations, particularly across genders. Work by Guvenen (2017) and Heathcote et al. (2020) has shown stark gender heterogeneity in individuals' exposures to business cycles. In particular, lower wage men tend to experience larger swings in labor market outcomes during economic downturns, which could provide a rational basis for their larger spending responses to stock market changes.

Box 3: Investors and the income distribution

According to the Federal Reserve's Survey of Consumer Finances (SCF) and other studies, over 50 percent of U.S. households hold stocks.[10] However, this figure drops to 15 percent when considering only direct holdings of stocks outside of retirement accounts, according to the SCF. Investor status in our data is most closely associated with this latter subset of investors, i.e. those with taxable personal investment accounts.

In our sample of active deposit account holders—after filtering for those with positive average labor income—we find a strongly positive relationship between investor status and income (see Figure 5). Over the entire income distribution, men are several percentage points more likely to be investors than women. For the lower labor income brackets, less than 20 percent of individuals in our data are tagged as investors, which rises to over 50 percent for those with average take home labor earnings exceeding $10,000 per month.

Figure 5: High earners and men are more likely to be investors.



Note: Bars denote the percent of individuals in our active deposit account sample that are classified as investors. Labor income is take home pay. The 'NA' bin captures individuals for which we lack sufficient labor income data.

Source: JPMorgan Chase Institute

Finding Three

Flows into investment accounts are notably sensitive to changes in the stock market—a 10 percent rise in stocks translates to a short-term increase in the magnitude of transfers of over 10 percent for both men and women—showing a pattern consistent with returns chasing.[11] Individuals in our sample transferred greater amounts of funds into investment accounts following stock market rises.[12] These sensitivities, as displayed in Table 4, are much larger than those observed for credit card spending. The R-squareds are each over 20 percent. The average relationship described by the regression coefficients obscure an asymmetric response in transfers to investment accounts; stock market gains predict stronger flows to investment accounts, but stock market losses have only a muted effect (see Figure 6). However, since we lack insight into the actual transactions in those investment accounts, we cannot rule out a symmetric response featuring sales of stocks following losses.

Table 4: Transfers to investment accounts rise after stock market gains.

Regression: Flows to investment accounts

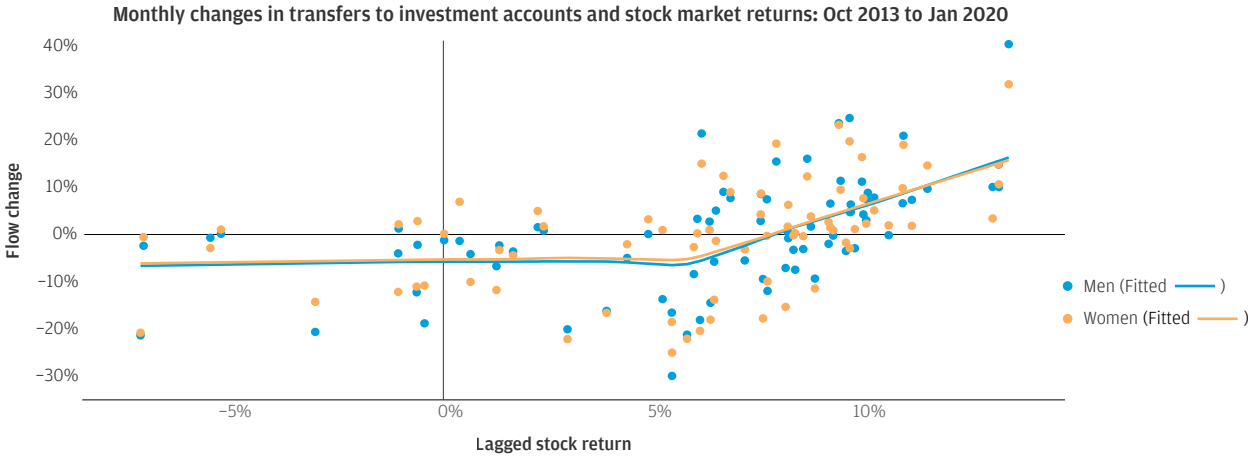
	Men	Women
S&P 500*	11.62	10.28
Standard error**	3.49	3.61
R-squared	24.3%	20.5%

Note: Regression coefficients represent the predicted percentage point rise in total transfers to investment accounts for a 10 percent increase in the stock market.

*Stock returns aggregated via MIDAS-framework.
**Standard errors are heteroscedasticity and autocorrelation consistent.

Source: JPMorgan Chase Institute

Figure 6: Positive relationship between investment account transfers and stock returns exhibits asymmetry.



Note: Lagged stock returns are aggregated using the MIDAS framework described in this report. In this case, they are approximately equal to returns over the current and previous 6 months.

Source: JPMorgan Chase Institute

The time period over which we observe the strongest link between the two variables is somewhat longer than that seen for credit card spending, at approximately 6 months. Many individuals in our data interact with their investment accounts infrequently, potentially explaining this longer lag.

In addition to studying the dollar value of flows, we also examine how the number of people that actively transfer money to their investment accounts moves with the market. This provides a perspective on the extent to which retail investors as a whole exhibit momentum trading or "herding" behavior. We find that the number of people that transfer significant amounts of money to their investment accounts in a given month follows past returns, with a correlation somewhat lower than that observed for the aggregate flow amounts.[13] For a 10 percent rise in the stock market, the population sending money into their investment accounts grows by about 5 percent for both men and women (see Table 5).

Prior work by the Institute finds evidence that this kind of "momentum" trading is also exhibited by some institutional investors and may have important implications for market prices. In fact, asset managers—a category that includes retail-oriented mutual funds—stands out in that research as potentially contributing to a herding dynamic during a period of elevated market volatility.

To the extent that stock prices merely reflect fundamentals, the procyclicality of investment flows that we observe could be benign. In this case, rising stock prices would be sustainable and supported by an improving labor market; personal incomes would grow and the change in households' financial risk profile would normalize. However, as noted in Finding 1, we do not find a significant relationship between labor incomes and stock returns in our sample, raising questions as to the plausibility that these flows represent the mere adjustment of behavior to rational expectations. A theory of "extrapolative expectations"[14] or momentum trading seems to better fit the relationships observed in our sample.

To the extent stock prices diverge from economic reality—for example, during asset price bubbles or episodes of forced selling—then retail investors could be negatively impacted. In this case, trend-chasing behavior would lead many households to "buy high, and sell low." Further, the flows themselves may contribute to asset price swings. This would amount to a self-reinforcing dynamic where the last people to start following the trend would lose the most.

Table 5: The number of individuals transferring funds to their investment accounts rises after stock market gains.

Regression: Number of clients with transfers to investment accounts

	Men	Women
S&P 500*	4.87	5.48
Standard error**	2.38	2.43
R-squared	11.3%	14.5%

Note: Outcome variable is the percent change in the number of individuals with more than $1,000 in net transfers to investment accounts per 10 percent change in stock prices, using analogous methodology as flows (results shown in Table 4).

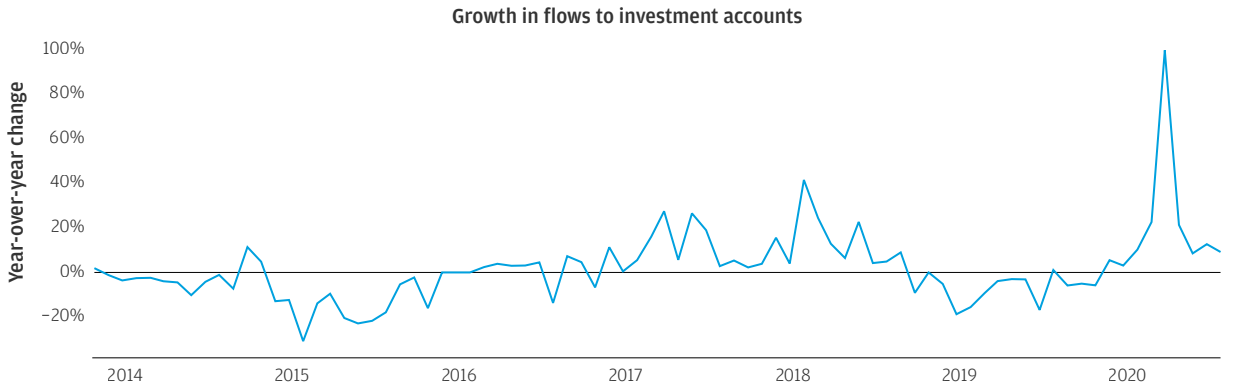
*Stock returns of the current and previous 6 months, measured via the MIDAS regression framework.
**Standard errors are heteroscedasticity and autocorrelation consistent.

Source: JPMorgan Chase Institute

Finding Four

The COVID shock to the economy, which strongly dampened consumer spending, resulted in a large spike in transfers to investment accounts, especially for men. Growth in transfers to individuals' investment accounts rose sharply in the spring of 2020 to the highest level in our sample, alongside declines in consumer spending that were more pronounced for investors relative to non-investors. The year-on-year rise in transfers to investment accounts in our data reached a high of 100 percent in March (see Figure 7).[15] Since equity prices rose by roughly 40 percent from their low on March 23 through mid-year, those that made stock purchases earlier benefited considerably through capital appreciation, with associated effects on wealth inequality. Substantial heterogeneity, particularly by gender, underlie the dynamics of total transfers. Investment flows of men experienced a growth rate of over 117 percent in March, alongside an increase of 67 percent for women, although the pace of these transfers slowed in the subsequent months (see Figure 8).

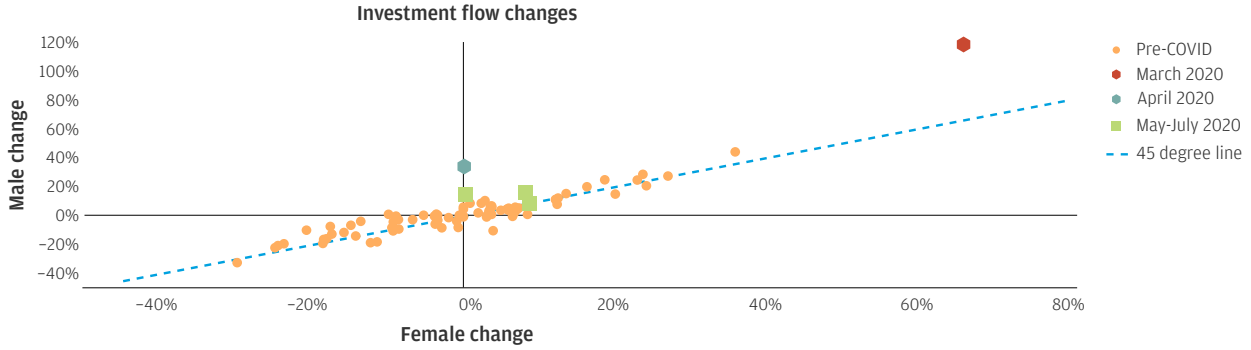
Figure 7: Transfers to investment accounts rise sharply around the COVID crisis.



Note: Growth rate is for total transfers from checking accounts to investment accounts. The series shows growth relative to the prior 12-month rolling median level, with calendar month and time trend effects removed.

Source: JPMorgan Chase Institute

Figure 8: Investment flows of men and women are highly correlated, but flows during the COVID crisis show stronger increases for men.



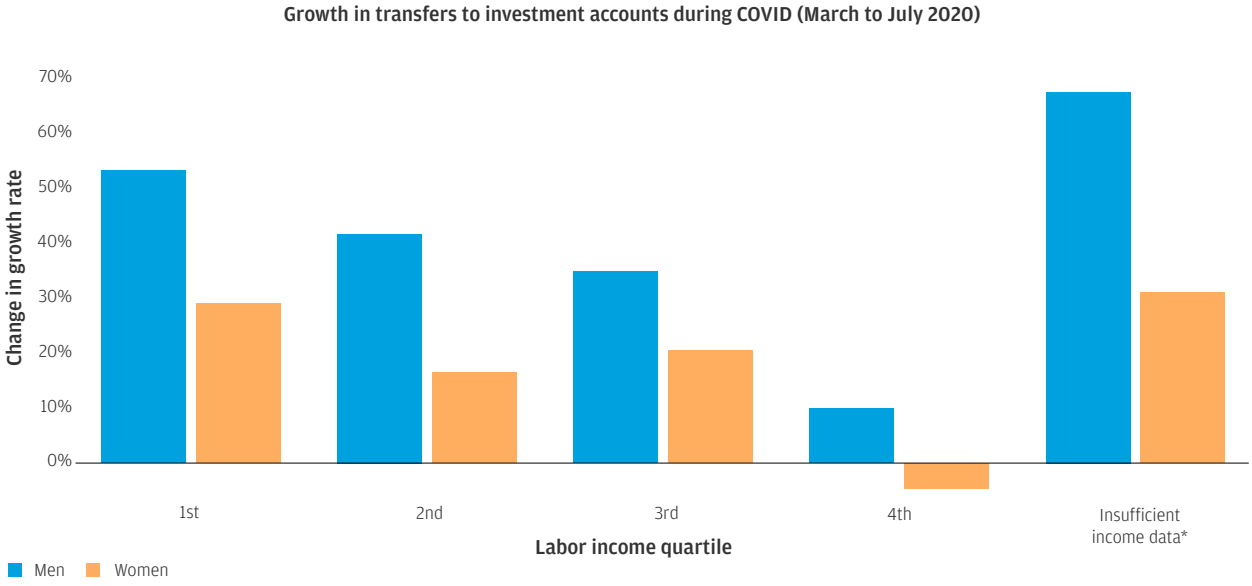
Note: The scatter plot depicts growth rates of total transfers to investment accounts for men and women. Percent changes in flows are measured relative to their trailing 12 month median amount, with calendar month and time trend effects removed. Observations above the 45-degree line—notably, March and April 2020—indicate higher growth for men than women.

Source: JPMorgan Chase Institute

Investors of varying labor incomes participated in the sharp increase in funds transfers to investment accounts, but men uniformly experienced substantially higher growth rates (see Figure 9). Across the board, men experienced roughly two times the percentage point rise in growth of such transfers during the period from March through July 2020. For both men and women, the lowest labor income quartile—measured relative to other investors—experienced the highest percentage point rise in flows during these months, compared to higher-earning individuals. Meanwhile, individuals that did not meet our criteria for a steady income measurement displayed an even stronger increase.[16]

The increase in flows to investment accounts in March 2020 runs counter to the relationship typically observed; in our data, flows to investments normally decline after stock market drops, as documented in Finding 3. Volatility in March spiked to historic levels. After dropping by 28 percent from March 1 to 23 (34 percent if measured from market highs in February), the market had rebounded by 16 percent by the end of the month. In addition to this extraordinary volatility, we provide a perspective below on spending patterns around this time, which may help explain the rise in investment account flows.

Figure 9: Across the income distribution, male transfers to investment accounts far exceeded those of women during the COVID-19 crisis through July 2020.



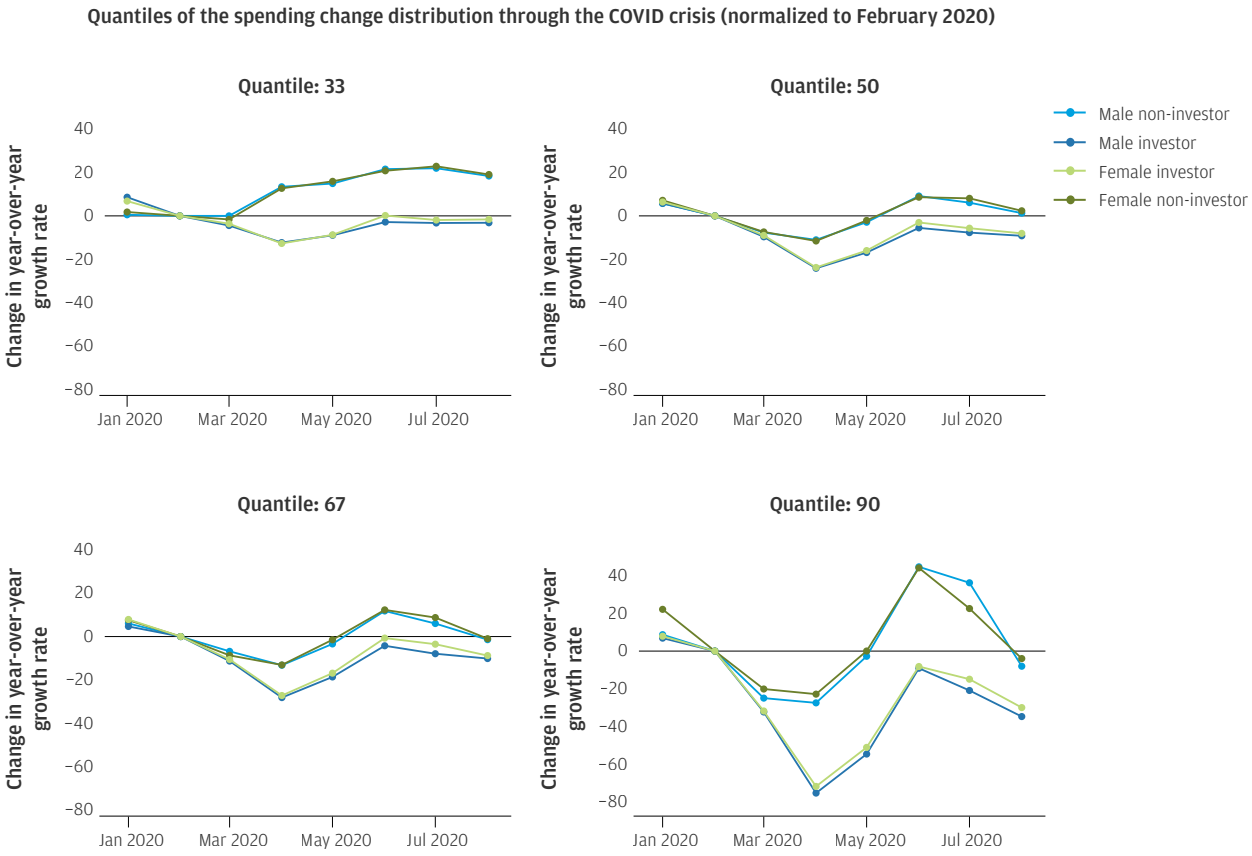
Note: Plot shows percentage point change in the growth rate of investment account flows, comparing total flows during March to July 2020 versus the same months of 2019 less each category's year-over-year growth rate in 2019. Individuals that do not meet our deposit account activity criteria are in the bucket, "Insufficient income data."

Source: JPMorgan Chase Institute

Due to the unique nature of the COVID shock—in which many avenues of spending were effectively shut down—consumer expenditures fell heterogeneously. Intuitively, spending on necessities, which make up a higher portion of spending for lower-income households, declined by less than other categories, like restaurants.[17] Meanwhile, government transfers in the form of unemployment insurance and economic stimulus payments were, appropriately, biased towards lower-income households.[18] Consistent with this dynamic, we see investors in our data experiencing a larger decline in total spending relative to non-investors. The declines were sharpest at the high-end of the distribution of spending changes. That is, the likelihood of large increases in spend dropped precipitously, with the 90th percentile of year-on-year spending changes falling by 25 and 74 percentage points for non-investors and investors, respectively, in April relative to February 2020. The lower portions of the spending change distribution were less affected, on balance, with the median dropping by 11 and 24 percent, respectively, for non-investors and investors (see Figure 10).

Sharp changes in spending dynamics during the COVID crisis may help explain why investment account flows followed a similarly unique path. But why did investment flows of men increase sharply relative to those of women? The spending paths of men and women were fairly parallel through April, alongside remarkably distinct investment flow dynamics. Labor market consequences—women have experienced greater labor market setbacks during the pandemic[19]—may help explain part of their more muted investment account activity. Other candidate explanations include differences in risk preferences and the classification of gender for joint accounts.[20]

Figure 10: Spending of investors declines relative to non-investors through the COVID crisis, as fewer investors experience spending "splurges."



Note: Plots track the given quantiles of the spending change distribution through 2020, normalized by their February 2020 level. For example, the rise for the 33rd quantile for non-investors during the COVID crisis implies that large spending declines became less likely for those individuals, i.e., the left tails shifted to the right; the negative readings for the 90th quantile of the investors' distributions represent a leftward shift in the right tails.

Source: JPMorgan Chase Institute

Conclusions and Implications

We find evidence of a high-frequency connection between stock market returns and consumer behavior: more individuals experience bursts in credit card spending following stock market gains, and investors tend to transfer more funds to their investment accounts, chasing the market. Heterogeneity in spending patterns is apparent, with male investors exhibiting the strongest connection to stock returns in terms of spending, relative to females and non-investing males. We further document a large acceleration in transfers to investment accounts that coincided with the COVID national emergency and sizeable declines in spending.

Implications:

- **Monetary policy and financial stability.** Our findings that consumer spending responds to recent stock market returns—and that investors have a greater sensitivity—is consistent with the Fed's traditional framework that incorporates wealth effects and other channels running from markets to the real economy. The heterogeneity in responses that we measure can be used by policymakers at the Federal Reserve and elsewhere to support ongoing efforts to increasingly consider distributional aspects of their decisions.[21] Meanwhile, stock market gains are associated with spending "splurges" on credit cards and flows into investment brokerage accounts, suggesting that stimulus aimed at supporting asset prices can come with costs in the form of households' financial vulnerability. If gains in stock prices are not followed by an improving labor market, households that over-extend themselves in terms of spending or equity market exposure would face risks. Additionally, returns-chasing behavior can contribute to asset price bubbles (and busts), which may require attention from the central bank to break volatile feedback loops.
- **Wealth inequality.** This report has implications for policymakers concerned with the growth of inequality in recent years. We explore heterogeneity in the effects of spending and investment behavior in relation to stock market returns, across dimensions linked to wealth inequality. In particular, we find that male investors have the strongest responses to stocks, in terms of spending and investment account flows. In theory—and as our results imply—growing concentration of wealth may make it harder for monetary policy actions to reach the broad sections of the population with little or no financial wealth.
- **Credit access.** Policies that relate to the breadth and depth of credit availability may be informed by our analysis. We document closer links between credit card spending and stocks than those seen in our data on checking account-based spending and labor incomes. Given these indications, further study of individuals' access to credit would help advance policymakers' ability to judge the impact of policy alternatives, including monetary policy and others that seek to influence consumer spending.

While our analysis indicates that markets can have an impact on consumer financial behavior—and that some channels operate very quickly—it also suggests that policies seeking to stimulate the economy via the stock market could carry longer-term costs to consumer financial health in the form of increases in credit card payments and exposure to stock market volatility. Policymakers, especially those at the Federal Reserve, should recognize the long-term consequences of stimulating the economy through higher asset prices.

Finally, the heterogeneity we document implies that macro-financial relationships are subject to change with shifts in the structure of the economy, including inequality, credit availability, and preferences. This means that a sustainable and equitable distribution of financial wealth—in addition to social welfare benefits—would pay dividends in the form of broadening and stabilizing mechanisms used by policymakers to influence macroeconomic outcomes.

Appendices

Appendix A: Optimal Lagged Stock Returns

Throughout this report, we relate metrics of consumer behavior to stock returns using two methods: (1) simple lagged returns; and (2) optimally-weighted returns. The first measures the return over some horizon, here, up to 6 months. The second involves weighting lagged returns using a function that allows for the weight to evolve according to two parameters. The method is laid out in Finding 1, and discussed further here. Specifically, we allow the weight of daily stock returns with lag k, starting from the last day of the month denoted by t, to be calibrated using the following function form, dictated by two parameters, Θ_1 and Θ_2.

$$W(k, \Theta_1, \Theta_2) = \frac{e^{\Theta_1 k + \Theta_2 k^2}}{\sum_{k=1}^{K} e^{\Theta_1 k + \Theta_2 k^2}}$$

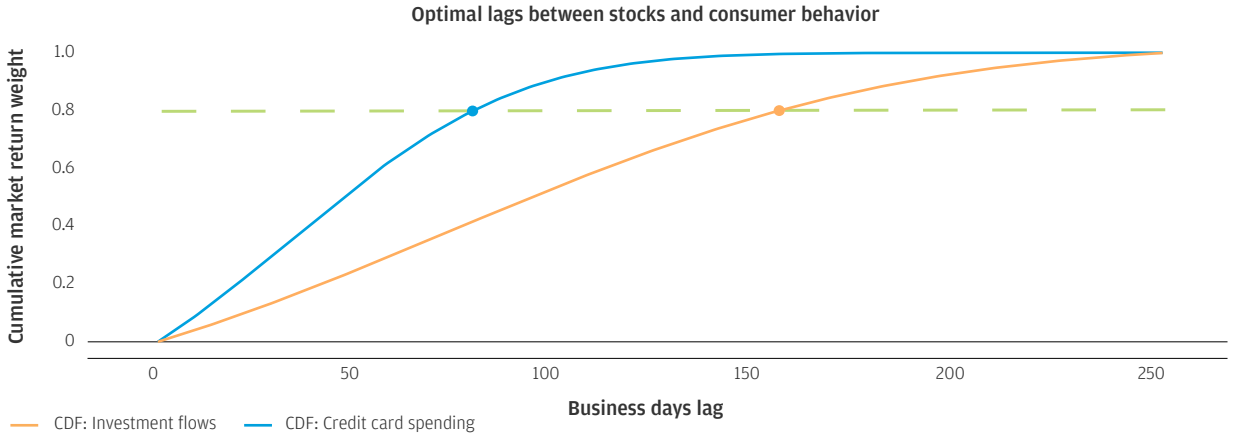
The form of the regression is given as follows along with the stock returns aggregation function:

$$y_{\tau,t} = \alpha_\tau + \beta_\tau F\left(R_{t,t-h}\right) + u_{\tau,t}$$

$$F(R_{t,t-K}) = \sum_{k=1}^{K} W(k, \Theta_1, \Theta_2) R_{t-k}$$

We find that the lag which maximizes the explanatory power between investment account flows and stocks over our sample is somewhat longer than our estimates for spending. For spending, at least 80 percent of the weight on stock market performance occurs within the 3 months preceding spending (plus the present month), versus approximately 6 months for investment flows (see Figure A1). When re-optimizing for each gender, we did not see substantial evidence of heterogeneity in terms of timing.

Figure A1: The estimated lag between stocks and spending is somewhat shorter than that for flows to investment accounts.

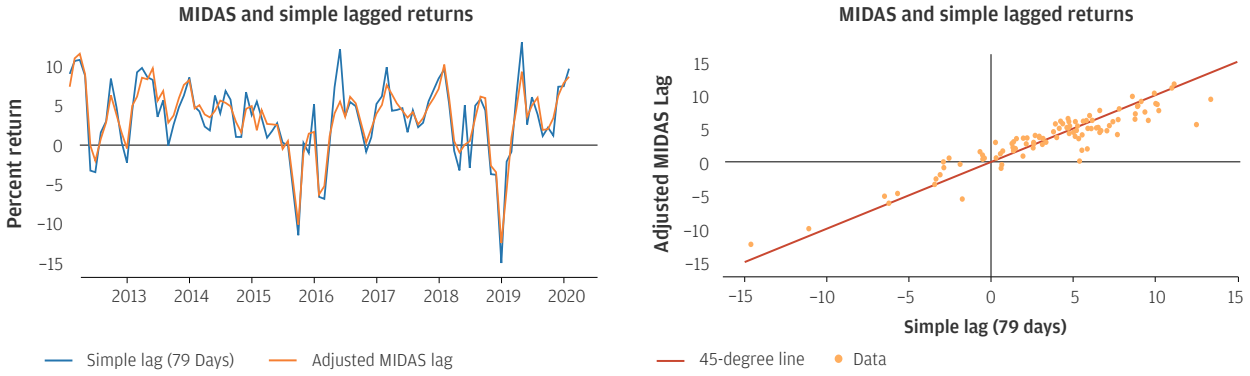


Note: Figure depicts the cumulative weights put on daily stock market returns. For example, for predicting spending in the month of May, the optimization would aggregate the past 12 months of stock returns such that the vast majority, 80 percent, of the total weight would be placed on performance from February 1 to May 31—a period of about 80 business days. The lag is somewhat longer for investment flows.

Source: JPMorgan Chase Institute

Stock returns aggregated this way can be interpreted as the average percent change in stocks over a period of interest. We compute an approximate one-to-one relation between simple price returns over a period of several months and MIDAS returns to help intuition for our regression estimates. Based on the optimization, the lags are 4 months for spending and 7 months for investment flows, inclusive of the present month. For illustration, the mapping between the two is depicted in Figure A2 below using the lag appropriate for alignment with our spending data. The differences between the two series are subtle, with the simple lag somewhat more prone to sharp outliers than the smoother MIDAS series.

Figure A2: MIDAS lagged stock returns closely map to simple lagged returns.

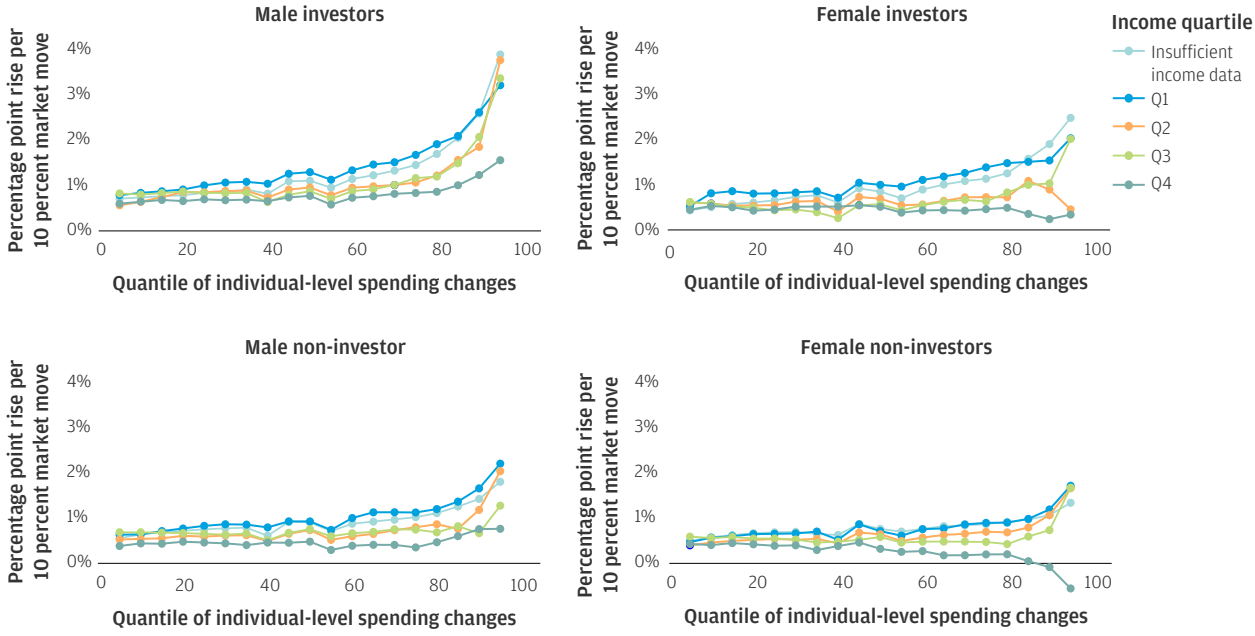


Source: JPMorgan Chase Institute

Appendix B: Differences in Spending Sensitivity by Income

Correlation between credit card spending and stock market returns spans the income distribution, although the magnitude of the spending sensitivity is somewhat lower for the highest earners. To see this, Figure B1 displays these sensitivities across labor income quartiles, with a fifth bucket for individuals for which we lack sufficient income data to categorize. Male investors, within each labor income quartile, tend to have higher sensitivities than other categories. However, the highest income quartile in each of the four gender-investor subsets have lower coefficients than other income quartiles, in addition to the uncategorized income subset. This implies that the overall stocks-spending dynamics that we document are driven by the lower- and middle-portions of the income distribution. So while investor status tends to predict a higher spending sensitivity, the relationships we document for credit card spending do not seem to be driven mainly by the income rich.

Figure B1: Sensitivity of spending to stocks varies across the income distribution.



Note: Plots display regression coefficients across the distribution of credit card spending changes, using the equivalent methodology as in Findings 1 and 2. For each investor-gender category, the coefficients represent the sensitivity for individuals in given labor income quartiles, plus a bucket for individuals for which we lack sufficient labor income data.

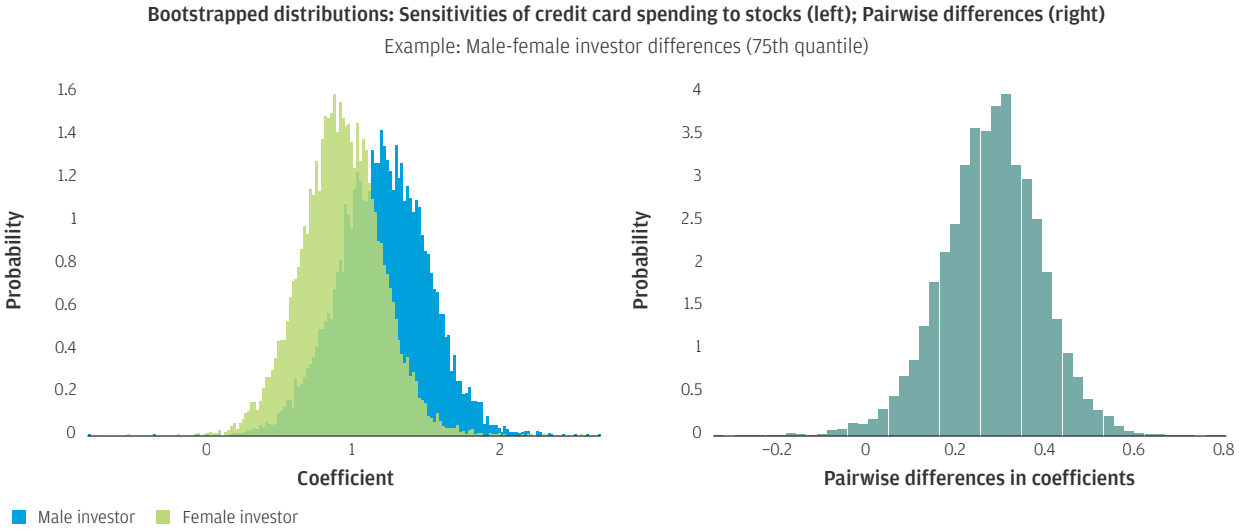
Source: JPMorgan Chase Institute

Appendix C: Testing for Heterogeneity

Here, we test the statistical significance of cross-group heterogeneity in the relationship between stocks and spending. We achieve this through a bootstrap method that allows for time dependence between observations, termed a moving block bootstrap. The method entails resampling, with replacement, blocks of time in our sample window, which effectively shuffles the weight given to any given block of periods randomly. This helps uncover the degree of uncertainty in our estimates.

By computing coefficients in our primary regression framework by investor and gender status many times across resampled data, we can then examine the distribution of the differences between coefficients. For example, running the bootstrapped coefficients led to male investors being measured as more sensitive to stocks than female investors in approximately 99 percent of the randomly re-weighted histories, using coefficients for the 75th quantile. Importantly, the estimates for each segment of the population are highly correlated across bootstrap runs, which increases the precision of making inference about the gaps across segment-specific metrics. To illustrate this, Figure C1 shows histograms of the individual coefficients alongside the histogram of their pairwise differences (i.e. $\beta_{male\ investor} - \beta_{female\ investor}$), using the coefficients for the 75th quantile of the respective spending distributions. Despite overlap between the individual histograms, men had a higher coefficient in almost all of the pairwise comparisons.

Figure C1: Bootstrapped coefficient distributions show differences across investor-gender types.



Source: JPMorgan Chase Institute

Table C1: Bootstrapping provides statistical significance tests for differences across categories.

Selected bootstrapped significance tests: p-values

	Median	75th quantile	95th quantile	Average
β: **Male investors > male non-investors**	9.0%	5.4%	1.1%	2.1%
β: **Male investors > female investors**	0.0%	0.7%	0.2%	0.0%
β: **Male investors > female non-investors**	0.6%	1.3%	0.9%	0.8%
β: **Male non-investors > female non-investors**	0.6%	0.5%	2.5%	0.3%

Note: Values denote the level of statistical significance at which the null hypothesis of no difference between the coefficients can be rejected.

Source: JPMorgan Chase Institute

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Endnotes

1 Of particular importance for our work, a quickly-growing body of research has emphasized heterogeneity in households' response to information and wealth shocks. However, availability of detailed, granular data has limited this area of research. Return to page

2 An extensive body of literature has explored the relationship between investor flows, sentiment, and stock returns. These studies often grapple with whether fluctuations in investor transactions appear rational or whether psychological explanations like herding effects better fit the data. Return to page

3 The tenor of the lead-lag relationship is pinned down through a statistical optimization technique, MIDAS regression, which is described further in the full text of Finding 1. Return to page

4 In this report, the stock market returns are for the S&P 500 stock index. Return to page

5 We depict how households experience ups and downs in their spending by measuring—for every month—each individual's percent change in spending from their median spend over the previous twelve months and remove customer and calendar effects. The large sample size enables us to view how the distribution of these spending fluctuations moves through time, which helps smooth over idiosyncratic household fluctuations and provides a view of dynamics operating across the economy. Return to page

6 Examples include Gabriel Chodorow-Reich (2020) and Case, Quigley, and Shiller (2001). Return to page

7 See, for example, Adrian et al. (2019) and Fischer and Merton (1984). Return to page

8 See Ghysels, Sinko, and Valkanov (2007). Return to page

9 The lags, denoted by k, are capped for practical purposes at a finite look-back period of K. In all of our analyses on post-crisis data we use a cap of 250 business days, which is more than sufficient to capture the dynamics of interest; almost all of the weight is applied to returns within 3 to 6 months of the measurement month. In the example in this box—in which relationships through multiple business cycles are considered—a cap of 500, or approximately two years, is used. Return to page

10 For example, Gallup polls survey the percentage of Americans that hold stock. The latest "Fed Survey of Consumer Finance" covers data as of 2019. Return to page

11 Lin (2020) finds a negative relationship between demand for retail bank deposits and stock returns, consistent with this dynamic. Return to page

12 Note, we cannot tell from these transfers what assets were ultimately purchased. However, stocks and mutual funds are by far the most commonly-held financial assets outside of retirement accounts; only 1.1 percent of households directly hold bonds, according to the Federal Reserve's 2019 "Study of Consumer Finances." Return to page

13 In our baseline results, we count the number of individuals with more than $1,000 in net transfers to their investment accounts in each month. The dynamics of this count is the left-hand-side variable for the regression in Table 5. Return to page

14 As discussed in Greenwood and Shleifer (2014), survey data the authors study are consistent with the notion that individuals revise expectations of future returns in the same direction as past returns; i.e. they extrapolate recent experience into the future. This phenomenon runs counter to the hypothesis of returns reverting to historical averages. Return to page

15 Flow volumes are measured relative to the median over the prior 12 months, with month-specific fixed effects removed. Return to page

16 For this analysis, we required 36 consecutive months of five or more deposit account transactions to record an average labor income measure. This is consistent with the activity criteria used in the previous Findings. Return to page

17 "The Initial Household Spending Response to COVID 19," JPMorgan Chase Institute. Return to page

18 "The Unemployment Benefit Boost," JPMorgan Chase Institute. Return to page

19 See, for example, the October 6, 2020 speech by Fed Chair Powell, "Recent Economic Developments and the Challenges Ahead." Return to page

20 The accounts of men may be used more often as the primary account of a household. Return to page

21 The Federal Reserve's strategic policy review ending in August 2020 led to an adjustment of its stated strategy for maximum employment, by adding that it is "a broad-based and inclusive goal." Additionally, research informing the review recognized a role for considering distributional aspects its policy analysis; see for example Feiveson et al. (2020). Return to page

Acknowledgments

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