



Tax Time

How families manage tax refunds and payments

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Tax Time

How Families Manage Tax Refunds and Payments

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Contents

2	Executive Summary
6	Introduction
8	Findings
26	Implications and Conclusions
28	Data and Methods
31	Endnotes
32	References
33	Suggested Citation

Executive Summary

Every spring, more than a half trillion dollars flow into and out of the financial accounts of American families as they reconcile taxes paid against taxes owed for the prior year. In this report, we analyze daily financial flows and balances for one million families who receive tax refunds or make tax payments. We find that tax reconciliation has a significant and long-lasting impact on spending and saving patterns of some but not all of them.

The vast majority of families receive tax refunds; the average refund is almost six weeks' income. For many of these families, that cash infusion fuels expenditures for more than half the year, and resets their spending and saving patterns. Even six months after the refund, average daily expenditures have settled to a new steady state which is 6.7 percent higher than the pre-refund steady-state, and account balances have settled 11 percent higher. Lower income families and those with lower cash balances are especially likely to time durable goods spending around their tax refund and carry higher revolving credit card debt until they receive it.

The minority of families who owe tax payments pay out an average of 2.5 weeks' income in a single day. However, for these families, the payment itself has no lasting impact on their flows or balances. Families with higher incomes and higher cash balances are over-represented in this group, and the payments they make represent a smaller cash flow event for them than tax refunds do for families who receive them.

JPMCI
Tax Event
Dataset

Sample

34.3
MILLION Families who had a Chase checking account in 2015, 2016, or 2017.

BASE
SAMPLE

8.3
MILLION

Families that meet the following criteria:

- Received at least one tax refund direct deposit or made at least one electronic tax payment from their Chase checking account in the years 2015, 2016, or 2017
- Used their checking account for at least five expenditures in each of the six months before and after the tax refund or tax payment, and for at least \$5,000 in income deposits during the calendar year
- Primary account holder is 24-64 years old

7.6
MILLION

Families who either:

- Received only tax refunds and made no tax payments (tax refund families)
- Made all of the year's tax payments on a single day and did not receive a tax refund (tax payment families)

EVENT STUDY SAMPLE (RANDOM DRAW)

Tax refund families

500,000 Refund events, representing the day the family receives its first tax refund of the year.

Tax payment families

500,000 Payment events, representing the day that a family makes its tax payments for that year.

Financial Outcomes

We analyze daily time series of account balances and categorized inflows and outflows. Our taxonomy of flows comprises three main categories (within these there are additional subcategories).

Expenditures: Outflows from Chase checking accounts:

- Purchases
- Debt and bill payments
- Cash or check withdrawals

Inflows: Inflows to Chase checking accounts:

- Income (labor, government, other)
- Cash, check, electronic deposits

Net Savings: Net transfers to Chase checking account from Chase or non-Chase savings accounts, money market, CD, other saving-oriented cash accounts.

Checking account balances

Revolving Chase credit card balances

Source: JPMorgan Chase Institute

Our findings underscore that fact that, whether by design or not, the tax system is a primary tool by which many families generate lump sums of cash. They raise questions about roles that families, financial service providers, and policy makers might play in creating cheaper and more flexible tools for this purpose.

Finding One

Four-fifths of sample families received one or more refunds and made no payments. Refund recipients tend to have lower average incomes and smaller cash buffers than families making tax payments.

TAX EVENTS EXPERIENCED	PERCENT OF BASE SAMPLE	AVERAGE TAKE-HOME INCOME	AVERAGE CASH BALANCES (WEEKS OF TAKE-HOME INCOME)	AVERAGE AGE OF PRIMARY ACCOUNT HOLDER
Tax Refund Families	78%	\$49,992	7.3	41
Tax Payment Families	7.7%	\$71,091	10.9	43

Source: JPMorgan Chase Institute

The vast majority of families in our base sample are "tax refund" families; they received one or more tax refunds and made no tax payments in a year. "Tax payment families" represent a small minority. In this study we focus on a subset of families making payments—those who make all of their payments in a single day. Tax payment families had higher take-home incomes and larger cash buffers than tax refund families.

Finding Two

Tax refunds amount to almost six weeks' take-home income for the average family receiving them. For families making a tax payment, the average payment is equivalent to 2.5 weeks' income.

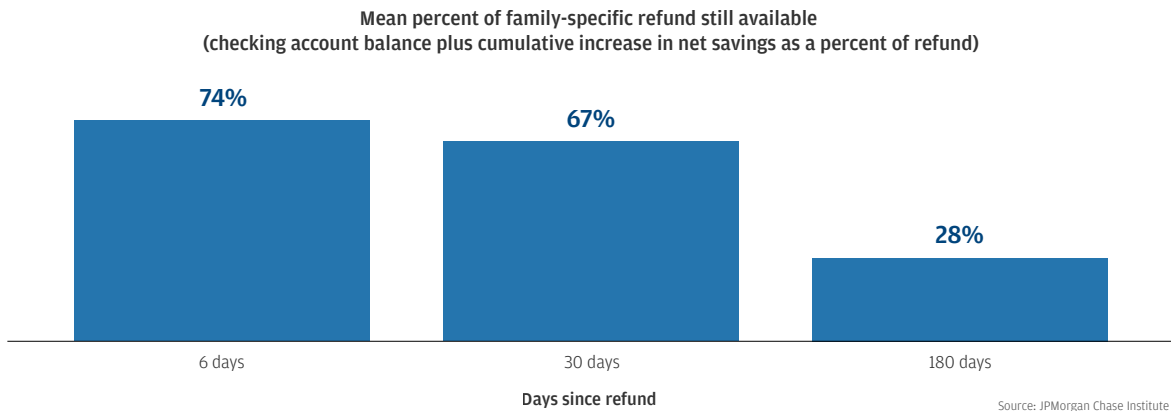
TAX EVENTS EXPERIENCED	REFUND OR PAYMENT AMOUNT (DOLLARS)		REFUND OR PAYMENT AMOUNT (WEEKS OF TAKE-HOME INCOME)	
	Average	Median	Average	Median
Tax Refund Families	\$3,602	\$2,601	5.7	3.3
Tax Payment Families	\$2,923	\$481	2.5	0.6

Source: JPMorgan Chase Institute

Tax refund families receive an average of 5.7 weeks' income in their tax refund, whereas tax payment families pay out an average of 2.5 weeks' income. This is not only because the magnitude of the average tax refund is larger than the magnitude of the average tax payment, but also because families who make a tax payment tend to have higher take-home incomes. Within each group, a majority of families experience much smaller than average impacts.

Finding Three

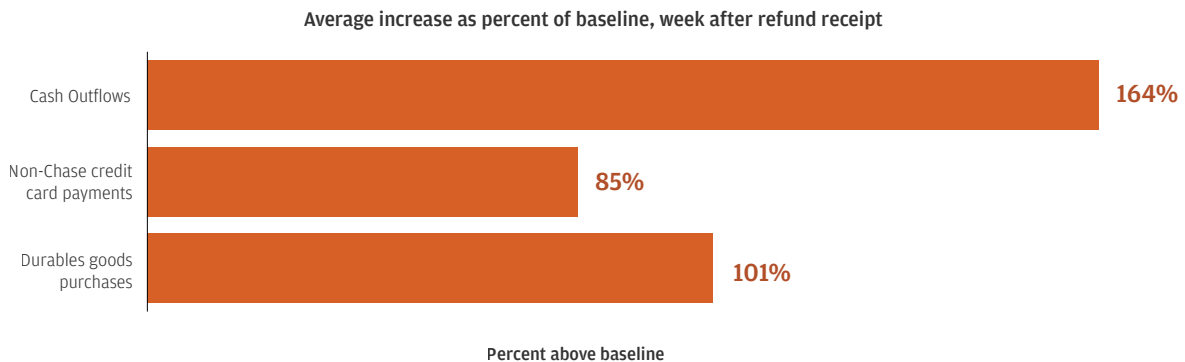
Among tax refund recipients, average expenditures increase sharply as soon as the refund is received. Six months after the refund, families still have an average of 28 percent of their tax refund remaining.



One week after receiving their first tax refund of the year, families on average have about 74 percent remaining either in their checking account or transferred to saving accounts. Six months later, they still have 28 percent of their tax refund remaining.

Finding Four

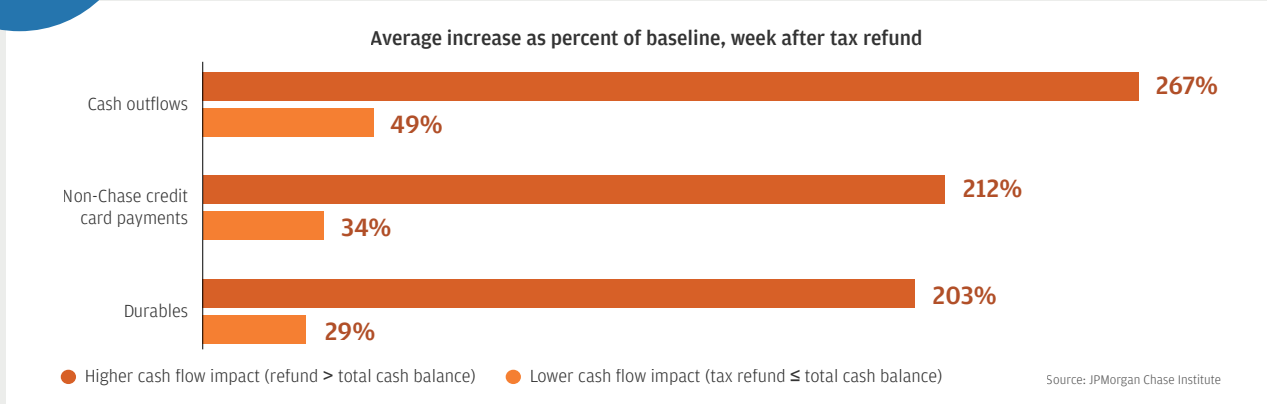
Expenditures on durable goods, credit card payments, and cash withdrawals increase most sharply upon receipt of a tax refund.



Average payments on non-Chase credit cards in the week after the refund is received are 85 percent higher than the average during a typical week prior to the refund. Average expenditures on durable goods double in the week after refund receipt, to \$50 compared to \$25 during a typical week. Families also use their tax refunds to deleverage; average revolving credit card balances are almost eight percent lower in the month after the tax refund relative to the month before.

Finding Five

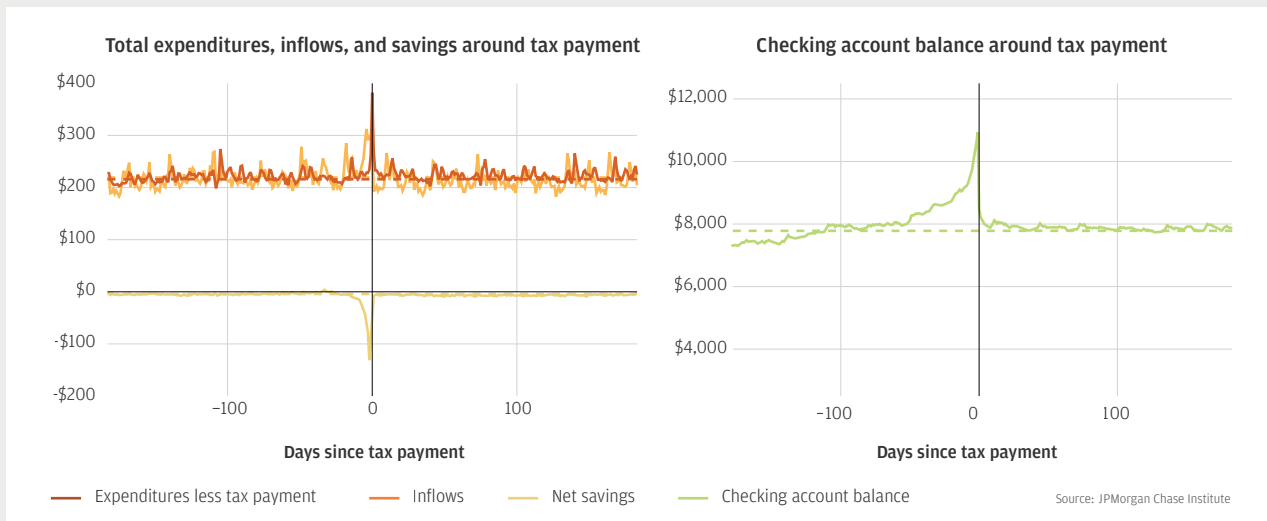
Families for whom the refund has a larger cash flow impact increase their spending and saving most sharply when it arrives.



For almost half of families receiving tax refunds, the refund exceeds the sum of pre-refund balances in all of their cash accounts. Among these families, cash withdrawals, non-Chase credit card bill payments, and durable goods purchases more than triple in the week after the first tax refund is received. Among the rest of families, these flows increase more modestly—by less than 50 percent. We also find that those who file earliest in the season increase their spending and saving most sharply when the refund arrives.

Finding Six

On average, families who make a tax payment cover that payment with cash already available when it is due. Once the payment is made, spending and saving patterns quickly return to their previous steady state.



Tax payment families in our sample do not cut expenditures or increase their labor income to cover the payment. Instead, they transfer cash into their checking accounts during the three weeks leading up to the payment. Unlike with tax refund families, tax payment families' expenditures and account balances settle quickly back to the original steady-state after the payment is made.

Introduction

In 2017, American families received \$335 billion in tax refunds from the U.S. Internal Revenue Service, and sent \$154 billion in payments (Internal Revenue Service, 2017). Most of these flows—representing 2.5 percent of the year’s total GDP—hit families’ financial accounts during the dozen weeks of the traditional tax season, from mid-February to mid-May.

How do Federal, State, and Local tax refunds and payments impact the cash flows of individual families? How prominent are these cash flow events in families’ finances? How do spending and saving respond to these cash flow events, and how do those responses vary across families? What do families do with the refunds they receive, and what does that tell us about how families manage their finances? For the roughly 30 percent of tax filers who have to make a tax payment, how do they cover those payments? In this study, we directly address each of these questions.

In previous JPMorgan Chase Institute research, we reported that out-of-pocket spending on healthcare services jumps by 60 percent in the week after a tax refund is received and remains elevated for 75 days (Farrell et al., 2018a). Most of the additional spending takes place in person at healthcare service facilities, indicating that families time at least some of their healthcare consumption around the receipt of a tax refund. This report builds on that research, investigating more comprehensively how families manage the positive cash flow from tax refunds and negative cash flow from tax payments.

We examine daily financial outcomes in the year around each of 1 million tax refund or tax payment events. The families experiencing these events used a Chase checking account as a primary tool for spending and receiving income and also to receive a tax refund direct deposit or make an electronic tax payment. A large subset also had Chase credit cards; for them, we examine revolving credit card balances.

This study contributes new insights to a growing literature on the short- and medium-run financial impacts of tax refunds and tax payments. We expand the analysis beyond expenditures and income to also include balances and revolving debt.¹ The financial outcomes we study fall into five supercategories, each of which we further categorize in some of the analysis:

- **Expenditures**, comprising bill payments, purchases, and cash, check or electronic withdrawals directly out of the checking account.

- **Inflows**, comprising labor and non-labor income as well as cash, check, or electronic deposits directly into the checking account.
- **Net savings**, comprising electronic transfers directly between the checking account and other Chase or non-Chase savings, money market, Certificates of Deposit (CD), and other saving-oriented cash accounts. We assume that transfers from the checking account to a saving-oriented cash account represents saving, and transfers coming in the opposite direction represent negative saving (that is, dissaving). Therefore, we label the difference between these as “net savings” (or, when negative, “net dissaving”).²
- **Account balances**, both for the checking account specifically as well as for all Chase cash accounts combined (including checking accounts, savings accounts, CDs, or prepaid debit cards). In analyzing the response to tax refunds and payments, we focus on the balance in the checking account separately from net savings; we also examine how responses vary across families based on their total balances in all cash accounts.
- **Revolving credit card balances**, for the subset of families in our sample who also had Chase credit cards.

We observe that tax refunds—and, to a lesser extent, tax payments—are significant cash flow events for most families. In our sample, tax refunds average \$3,600, or 5.7 times weekly take-home income for the families who receive them. For these families, average account balances are at their annual peak on the day they receive their first tax refund of the year. That day is also the most positive cash flow day of the year for 29 percent of them. Tax payments average \$2,900, or 2.5 times weekly take-home income. On the day they make a payment, families spend more than three times more than they do on a typical day, but the tax payment day represents the most negative cash flow event of the year for just nine percent of these families.

In order to identify the financial impacts of refunds, we compare each day’s expenditures, inflows, net savings, and checking account balances to a pre-refund baseline. We discuss the approach in detail in the Data and Methods appendix. We find that among families who receive a refund, expenditures jump sharply as soon as the refund is received—especially durable goods purchases, cash withdrawals, and credit card bill payments. However, a significant fraction is also immediately set aside to savings. Importantly, we find that for many families the tax refund lasts far beyond tax season, fueling spending and saving for more than half the year.

Six months after the refund, the checking account balance is still elevated by an average of \$404 over the pre-refund baseline value of \$3,565 (an 11 percent increase). An average of \$608 has been saved to other bank accounts. This \$1,012, or 28 percent of the average refund, is likely still available in cash at the end of 6 months. This long tail of the impact of a tax refund on spending and saving is often overlooked in discussion around the role that refunds play in families' spending and saving patterns.

For families who make a payment, we find that cash flow management tools are in fact working as expected. Families make their tax payment close to the deadline and cover these payments by moving cash into their checking accounts in the days leading up. We do not observe that families get taken off guard by their payments, for example by cutting back on spending or generating additional labor income in order to cover them.

Findings

1. Four-fifths of sample families received one or more refunds and made no payments. Refund recipients tend to have lower average incomes and smaller cash buffers than families making tax payments.
2. Tax refunds amount to almost six weeks' take-home income for the average family receiving them. For families making a tax payment, the average payment is equivalent to 2.5 weeks' income.
3. Among tax refund recipients, average expenditures increase sharply as soon as the refund is received. Six months after the refund, families still have an average of 28 percent of their tax refund remaining.
4. Expenditures on durable goods, credit card payments, and cash withdrawals increase most sharply upon receipt of a tax refund.
5. Families for whom the refund has a larger cash flow impact increase their spending and saving most sharply when it arrives.
6. On average, families who make a tax payment cover that payment with cash already available when it is due. Once the payment is made, spending and saving patterns quickly return to their previous steady state.

BOX 1: How might a textbook family manage a tax refund or tax payment?

Economic theory outlines reasons why a family might want to use cash flow management tools like a credit card or a savings account to prepare for a tax refund or tax payment which they know is coming. If they could prepare perfectly, they would be able to spend according to their needs—which means, unless by coincidence they had a special need that arose during tax season, they would spend as much in the days around the refund as any typical day. A family who had all the cash flow management tools they needed, and who knew all year precisely what their refund or payment amount was going to be, could manage their finances such that the refund or payment would only affect account balances and net savings and not the timing of their expenditures or inflows.

Even if a family had all the cash flow management tools they needed, they might nonetheless readjust their spending or income in the weeks immediately around their refund or payment. If families do not know precisely how much their payment or refund will be until they file, then they might readjust income or expenditures when they learn this information. If they learn they will be receiving more than they expected or if they owe less than expected, then their expenditures might tick up to a new steady-state. They might also make adjustments to their withholding or saving for the following year in light of that experience, which would shift the steady state of their income or net savings.

If the surprise at filing time is extraordinary, then a family may be forced to make sharp, short run adjustments to their expenditures or income immediately around the refund or payment. A family might use cash flow management tools like a savings account to provision for their tax obligation when they receive the income which is being taxed. However, if they find at filing time that they under-provisioned then they may be forced to cover the payment either by generating additional inflows (for example, working more hours, borrowing from family or friends, or taking a formal loan), or by cutting expenditures, or both. Positive surprises can also drive short run changes. A family might forego attending to some urgent need in order to hold down spending in case their refund turns out to be smaller than expected; once that uncertainty resolves they might increase expenditures immediately to attend to that need.

Findings

Finding One

Four-fifths of sample families received one or more refunds and made no payments. Refund recipients tend to have lower average incomes and smaller cash buffers than families making tax payments.

Our base sample comprises 8.3 million families who used a Chase checking account as a primary tool for spending and receiving income, and for whom we observe at least one electronic tax payment or tax refund direct deposit, which could be Federal, State, or Local. Our analysis covers the years 2015, 2016, and 2017.³ We provide details on our sampling approach and inclusion criteria in the Data and Methods appendix.

In Exhibit 1, we distinguish families in our sample based on the tax events experienced.

- **Refund only families** received one or more tax refunds and made no tax payments in a calendar year. These represent 78 percent of the base sample. Almost 36 percent of families received more than one refund in the same year—for example, one refund from the Federal government and one or more from State governments. It is exceedingly rare for families to receive more than one refund on the same day.
- **Payment only families** made one or more tax payments and received no refunds. They represent 14 percent of the base sample.
- **Refund and payment families** receive one or more refunds and also make one or more payments in the same year. For example, they might receive a Federal tax refund and also make a State tax payment. They make up the remaining eight percent of the base sample.

Exhibit 1: The vast majority of families receive refunds at tax time, and do not make tax payments.

TAX EVENTS EXPERIENCED	PERCENT OF FAMILIES
Refund Only	78.1
<i>One refund in the entire year</i>	42.9
<i>Multiple refunds, all in same day</i>	4.4
<i>Multiple refunds, over multiple days</i>	30.8
Payment only	13.7
<i>One payment in the entire year</i>	5.1
<i>Multiple payments, all in same day</i>	2.6
<i>Multiple payments, over multiple days</i>	6.0
Refund and payment	8.2

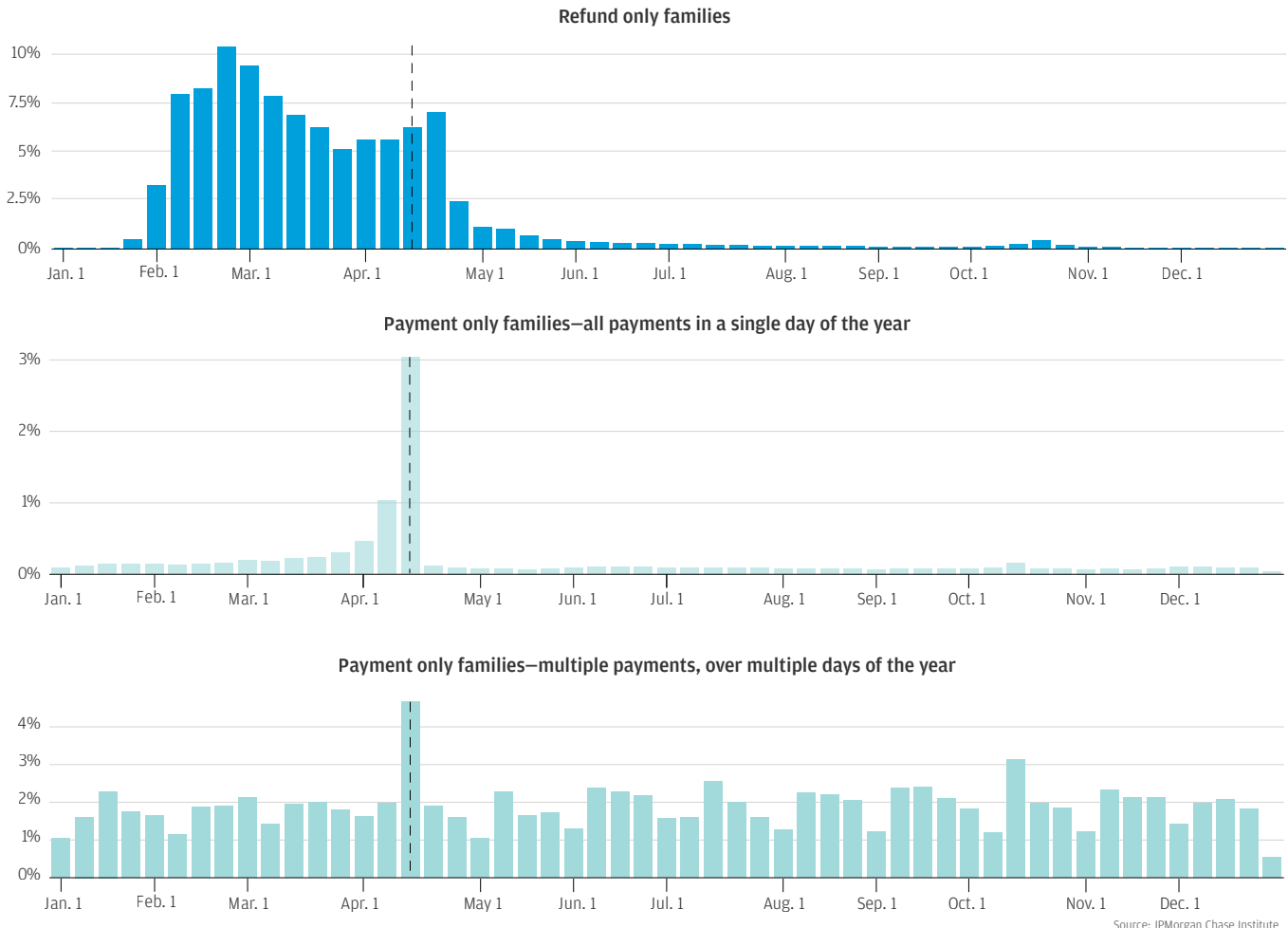
Source: JPMorgan Chase Institute

An important pattern shown in Exhibit 1 is that in contrast to the “refund only” families, it is relatively common for families to make multiple payments on a single day in the year. Overall, about 18 percent of “payment only” families make multiple payments in the same day, whereas only five percent of those who receive refunds receive multiple refunds in the same day. This highlights an important distinction between payments and refunds—the timing of a payment is almost entirely under the control of the family, whereas the timing of a refund is determined not just by when the family files but also by the time required to process the return and issue the refund.

Exhibit 2 further illustrates how the timing of refunds versus payments is impacted by the timing of filing. Families receiving refunds can choose when to file, but then there is a lag until the money is posted in their accounts; they cannot control or perfectly predict that lag. Consistent with what we have shown in previous JPMorgan Chase Institute research, the top panel of Exhibit 2 shows that the vast majority of families who receive tax refunds receive them during the traditional tax season, between mid-February and mid-May (Farrell et al., 2018a). However, there is wide variation in the individual days within tax season when refunds are received. The distribution of receipt dates is bimodal, with one large group of families receiving refunds in the last two weeks of February, and another slightly smaller group receiving them in the two weeks around the filing deadline. (The vertical line represents the filing deadline.) By contrast, payment families have significantly more control over when they make their payment; as the middle panel indicates, almost half of them make the payment within two weeks leading up to the due date.

Another important distinction illustrated in Exhibit 2 is between families who make all of their payments on one day, and those who distribute their payments over multiple days. Families largely self-select into these categories. For example, some families who know that they would otherwise owe taxes at the end of a year when they file may opt to make periodic payments during the year in order to reduce the cash flow impact (or avoid penalties). As the bottom panel in Exhibit 2 shows, these families' payments are distributed across the year, though they tend to concentrate around the middle of January, April, June, and September, when quarterly tax payments are due. Accordingly, in separate analyses (not shown) we observe that those who owed more in taxes were more likely to spread the payments out over multiple days in the year.

Exhibit 2: Refunds are received throughout tax season, whereas most of those who make single payments do so within two weeks of the due date.



In light of these patterns, we focus the remainder of this study on families who receive refunds and make no payments in a year, and those who make all their payments in a single day. We will refer to these groups as "tax refund families" and "tax payment families," respectively. For these two groups, the tax refund and tax payment are sharp and unambiguously positive and negative cash flow events, respectively—unlike the “refund and payment” group, for whom the sequence and time gaps between the events are complicating factors. In analyzing the cash flow impacts of tax payments, we exclude those who spread their payments out over multiple days in the year, because the families who self-select into this group are managing their tax obligations in a way that is specifically designed to reduce their cash flow impact.

Exhibit 1 indicates that refund recipient families represent the vast majority. To what extent do these families represent a stable and distinct “type”? Exhibit 3 indicates that families usually have the same experience year after year, but not always. Among families who receive refunds and make no payments in each year and whom we observe again the following year, more than 90 percent have the same experience again. Only four percent end up making payments and receiving no refunds the following year. By contrast, among those who make all their tax payments in a single day in one year and whom we observe again the following year, the plurality go on to have the same experience—but, more than a third end up receiving refunds and making no payments the following year. When we compare characteristics of families who make payments versus those who receive refunds, therefore, we are comparing reasonably stable “types” of families, but families can and do switch from one group to the other from year to year.

Exhibit 3: There is substantial stability in tax events experienced by families from one year to the next—especially for families receiving refunds.

TAX EVENTS EXPERIENCED	TAX EVENTS EXPERIENCED THE FOLLOWING YEAR (PERCENT OF ROW)			
	Refunds only	Payments only (all on one day)	Payments only (multiple days)	Payments and refunds
Tax refund families	90.5%	3.0%	1.0%	5.6%
Tax payment families	36.3%	39.2%	13.8%	10.8%

Note: Each year, 26 percent of tax refund families and 46 percent of tax payment families are lost from the base sample. The percentages in this table are among those who remain in the sample for two consecutive years. If a row does not add exactly to 100, that is only because of rounding.

Source: JPMorgan Chase Institute

Not only are families likely to receive tax refunds year after year, but for individual families the magnitudes of the tax refund are relatively stable from one year to the next. When we observe families receiving refunds in two consecutive years, the total refunded amounts are within 15 percent of each other about a third of the time, and within 25 percent of each other 47 percent of the time. By contrast, payment amounts are more volatile; within 15 percent of each other only 16 percent of the time, and within 25 percent only 25 percent of the time (not shown). As we discuss in Box 1, one reason that a family might end up needing to rapidly readjust spending or income in the weeks around a tax refund or payment is if its size is a surprise. The patterns in Exhibits 2 and 3 suggest that—especially for refund families—their experience in the prior year is a reliable benchmark for what they can expect.

We next turn to comparing the financial characteristics of payment versus refund families.⁴ Exhibit 4 illustrates the distribution of observed take-home income for each group. Exhibit 5 summarizes these distributions with the mean and median, and also reports mean and median average daily cash balances during the tax year in terms of the number of weeks’ take-home income that the tax refund or payment represents.⁵ In this case, the “cash balances” are the total across all cash accounts, not just the checking account. Among families receiving refunds, median observed take-home income is just above \$38,000; among those making payments, it is significantly higher, above \$46,000. There is substantial overlap in these distributions, especially among the lowest income families, but the highest income families are over-represented among those making payments.

Exhibit 4: There is substantial overlap in the income distributions of refund and payment families, but the highest income families are over-represented in the payment group.

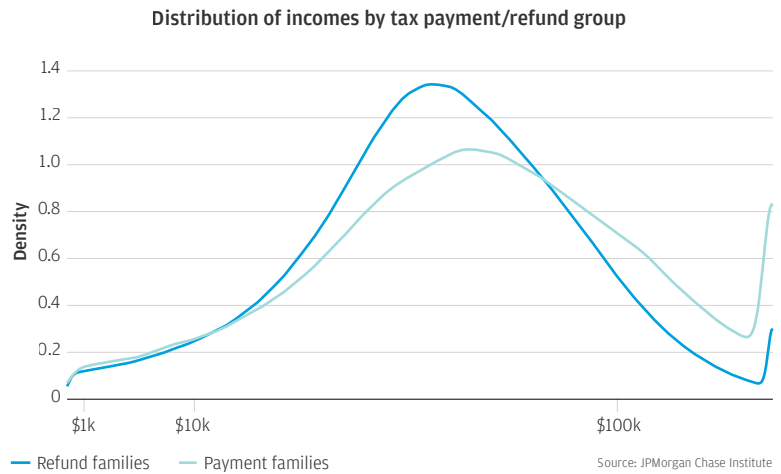


Exhibit 5: Refund families are younger, lower income, and have less in savings than payment families

TAX EVENTS EXPERIENCED	TAKE-HOME INCOME		CASH BALANCES (WEEKS OF TAKE-HOME INCOME)		AGE OF PRIMARY ACCOUNT HOLDER	
	Average	Median	Average	Median	Average	Median
Tax refund families	\$49,992	\$38,383	7.3	2.3	41	39
Tax payment families	\$71,091	\$46,402	10.9	3.2	43	42

Source: JPMorgan Chase Institute

The middle two columns in Exhibit 5 indicate that the variation in cash balances across the groups qualitatively track variation in take-home income. Only half of refund recipient families had cash reserves equivalent to 2.3 weeks of take-home income or more; among families making payments, the median is 3.2 weeks’ worth of income. This may in part reflect the fact that earnings that might otherwise have been held in savings by the refund families were instead held in their tax withholding, whereas payment families were provisioning for their payment in their own accounts. Finally, refund recipient families tend to be younger.

Having characterized these differences between the refund and payment “types” of families, we next explore variation within each group in terms of the cash flow impacts of the refunds they receive and the payments they make.

**Finding
Two**

Tax refunds amount to almost six weeks’ take-home income for the average family receiving them. For families making a tax payment, the average payment is equivalent to 2.5 weeks’ income.

Exhibit 6 illustrates the distributions of refund and payment amounts; Exhibit 7 summarizes the distributions with the mean and median dollar amounts and weeks’ worth of take-home income. Comparing the two groups, Exhibits 6 and 7 indicate that the cash flow impacts of tax refunds are larger on average than those of tax payments. Refund families receive an average of 5.7 weeks’ income in their tax refund, whereas payment families pay out an average of 2.5 weeks’ income. This is not only because the magnitude of the average tax refund is larger than that of the average tax payment, but also because, as we showed in Exhibit 5, families who make a tax payment tend to have higher take-home incomes.

At least as important as this difference between the two groups, however, is the wide variation in the cash flow impact of the tax event within each group. As Exhibit 6 shows, the amounts refunded or paid vary significantly within both groups. Most refund recipient families receive \$2,000 to \$3,000, but a significant fraction is represented in the long right tail, receiving more than \$5,000. Similarly, most payment families make a modest payment of less than \$1,000, but a significant fraction make payments in excess of \$10,000. These skewed distributions are also reflected in Exhibit 7. Although the average tax payment represented 2.5 weeks’ worth of take-home income, for half of families it represented only a few days’ worth or less. Similarly for refunds, they represented an average of almost six weeks income, but for half of families they represented 3.3 weeks or less.

Taken together, these results highlight the wide variation in the relative magnitude of tax refunds and payments compared to families’ typical cash flows. In the analysis that follows, we report these averages but also characterize the broad variation across families in how they manage their cash flows around these events.

Exhibit 6: Most payments are smaller in magnitude than most refunds, but amounts vary widely within each group.

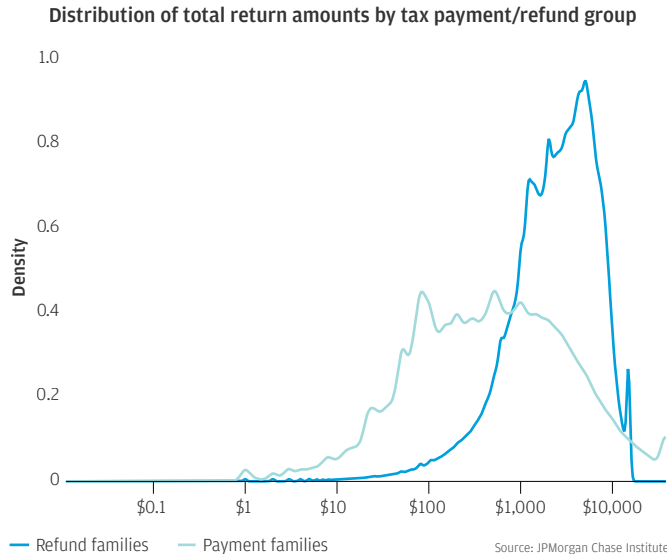


Exhibit 7: The average cash flow impacts of refunds and payments are much greater than the impacts felt by most families.

TAX EVENTS EXPERIENCED	REFUND OR PAYMENT AMOUNT (DOLLARS)		REFUND OR PAYMENT AMOUNT (WEEKS OF TAKE-HOME INCOME)	
	Average	Median	Average	Median
Tax refund families	\$3,602	\$2,601	5.7	3.3
Tax payment families	\$2,923	\$481	2.5	0.6

Source: JPMorgan Chase Institute

**Finding
Three**

Among tax refund recipients, average expenditures increase sharply as soon as the refund is received. Six months after the refund, families still have an average of 28 percent of their tax refund remaining.

The wide distribution in timing of tax refunds (see Exhibit 3) lends itself well to an event study framework in order to measure how families use their refunds. Rather than analyzing daily flows and balances in calendar time, which would reflect all sorts of seasonal or even weekly variation, we instead analyze them in the time around the refund itself, which comes on different dates for different families, even among families who file their returns around the same time. As we discuss in detail in the Data and Methods appendix, we compute a baseline value for each financial outcome, which is the average during the period from six months before up to three weeks before the first refund of the year.⁶ We then compute the “refund response” as the difference between each day’s sample average value and the baseline.

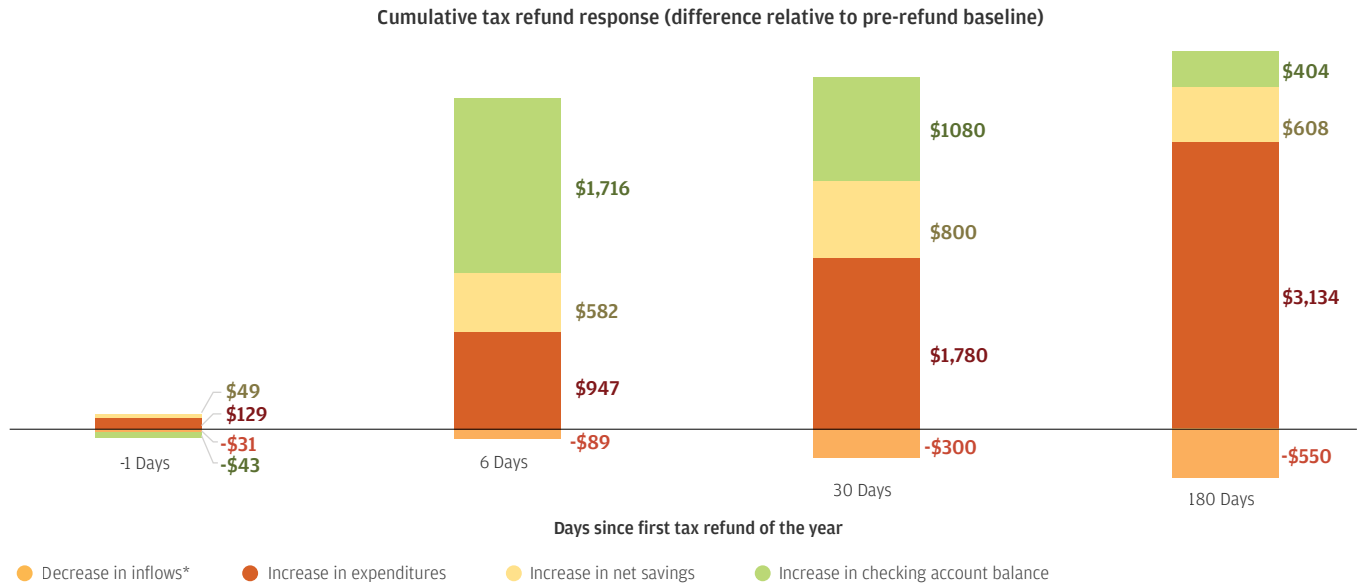
When the tax refund is credited to their account, recipients might spend some of it paying bills or making purchases, or transfer some of it out to other accounts. Anything they do not spend or transfer will remain in the checking account, showing up as a balance elevated relative to the pre-refund baseline. In addition to increasing expenditures or savings when the tax refund is received, families might also reduce their inflows. For example, family members who have flexibility in their labor supply may use the arrival of a tax refund to cut back their working hours for a while. Because the refund could in principle be used to offset a reduction in inflows, we measure the inflow response as the decline relative to baseline, rather than the increase.

In Exhibit 8, we show the average cumulative expenditure, inflow, and net savings responses to the refund starting three weeks before it arrives, up to the day before, a week after, a month after, and six months after. We also include the increase in the checking account balance on each day relative to the baseline. These four outcomes—increases in expenditures, increases in net savings, declines in inflows, and increases in the account balance—should in principle account for the entire refund.⁷ In reality, we observe an increase rather than a decrease in inflows after the arrival of the tax refund (thus reflected as a negative decrease in inflows in Exhibit 8).

The leftmost bar indicates that on average families spend only negligible amounts from their refund before it arrives, even though they would have known how much to expect as soon as they filed. Total expenditures in the three weeks leading up to the refund are only \$99 (or nine percent) higher than during a typical three-week period during the baseline. Furthermore, we do not observe an uptick in net dissaving in advance of the refund, implying that families do not tap into savings in order to get access to their refunds in the days between filing and receiving the cash.

By contrast, as the second bar shows, in the week after the refund arrives their expenditures jump dramatically; during that week, their expenditures are elevated by 74 percent above a typical week and cumulatively by \$947.⁸ Rather than declining, inflows actually increase in the week after the refund arrives, indicating that families do not use the cash infusion from the refund to offset other sources of inflows. By six months after the refund, the average checking account balance remains elevated by \$404, which is 11 percent of the baseline average, and an additional \$608 have been transferred to other accounts. These \$1,012 represent about 28 percent of the average tax refund. The cumulative \$550 increase in inflows six months after the tax refund enables the sum of the increases in expenditures, net savings, and checking account balance to exceed the tax refund (\$3,602).

Exhibit 8: Average expenditures and net savings increase sharply immediately after the refund is received.



*Because families might decrease their inflows (e.g. cut back on hours worked) when their tax refund arrives, we measure the inflow response to the tax refund as a decrease relative to baseline. In fact, families' inflows increased relative to baseline, thus appearing as a "negative decrease."

Source: JPMorgan Chase Institute

The results in Exhibit 8 are average dollar responses to the tax refund, compared against the average tax refund. As we discuss in the Data and Methods appendix, however, we can compute each family's dollar response normalized by the size of their own individual tax refund. In Exhibit 9, we focus on increases in net savings and checking account balance, normalized by each family's tax refund size. For ease of exposition, we add these two responses, since together they indicate how much of the refund is likely still available to spend. The third row shows that a month after the refund, the average family still has two-thirds of their refund either in their checking account or transferred to other accounts, but the median family has only 37 percent.⁹ By six months after the refund, the average family has either transferred or held in their checking account 28 percent of the refund, but half of families have less than seven percent, indicating that families front-load their use of cash from tax refunds (see Box 2). The fact that the median fraction saved is consistently so much smaller than the average suggests that a small number of families save extraordinarily large fractions.

Exhibit 9: Six months after receiving a tax refund, half of families have less than seven percent remaining.

DAYS SINCE FIRST REFUND OF THE YEAR	MEAN PERCENT OF FAMILY-SPECIFIC REFUND STILL AVAILABLE (CHECKING ACCOUNT BALANCE PLUS CUMULATIVE INCREASE IN NET SAVINGS AS A PERCENT OF REFUND)*	
	Average	Median
-1	6.4%	-5.2%
6	74%	59%
30	67%	37%
180	28%	6.7%

*To reduce the impact of extreme values, we exclude the 0.97 percent of family-years in which the total refund was less than \$50 when computing the statistics in this table.

Source: JPMorgan Chase Institute

BOX 2: How much of the tax refund “should” be left after a week? A month? Six months?

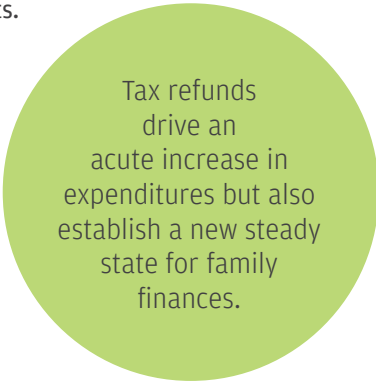
By six months after the refund, the average recipient family has less than 28 percent of the refund left in the checking account or transferred to other accounts, and half of families have less than seven percent. Is this “too little”?

In Box 1 we noted that a family who had all the cash flow management tools they needed, and who knew all year precisely what their refund or payment was going to be, could manage their finances such that the refund or payment would not affect the timing of their expenditures or other inflows. In such a situation, the fraction of the tax refund which “should” remain after six months depends on how the family intended to incorporate the cash infusion into their lives. If they budgeted to save less than their goal during the year with the intention of using their tax refund to make up the difference, then having only seven percent left after six months would clearly represent a mistake or indicate that an emergency had arisen. If they planned steady flows of expenditures, inflows, and saving throughout the year, then they might spend down the refund steadily throughout the year so that families would still have something like 50 percent of the tax refund left by the end of six months. A family might intend all along to spend their entire tax refund very quickly after it arrives, if the tax system is their best tool for saving up a lump sum; in that case, an important question arises about why cheaper and more flexible tools do not work.

Therefore, for the average family to have only 28 percent of one year’s tax refund left when there are still at least four months left until the next year’s refund raises important questions about whether they have all the tools and information they need in order to integrate their refunds into their medium run financial planning.

Exhibit 10 shows the full event studies, from which Exhibits 8 and 9 provide a series of snapshots. The left panel shows daily averages for each of the flow outcomes (expenditure, inflows, and net savings). The right panel shows daily average balances in the checking account.

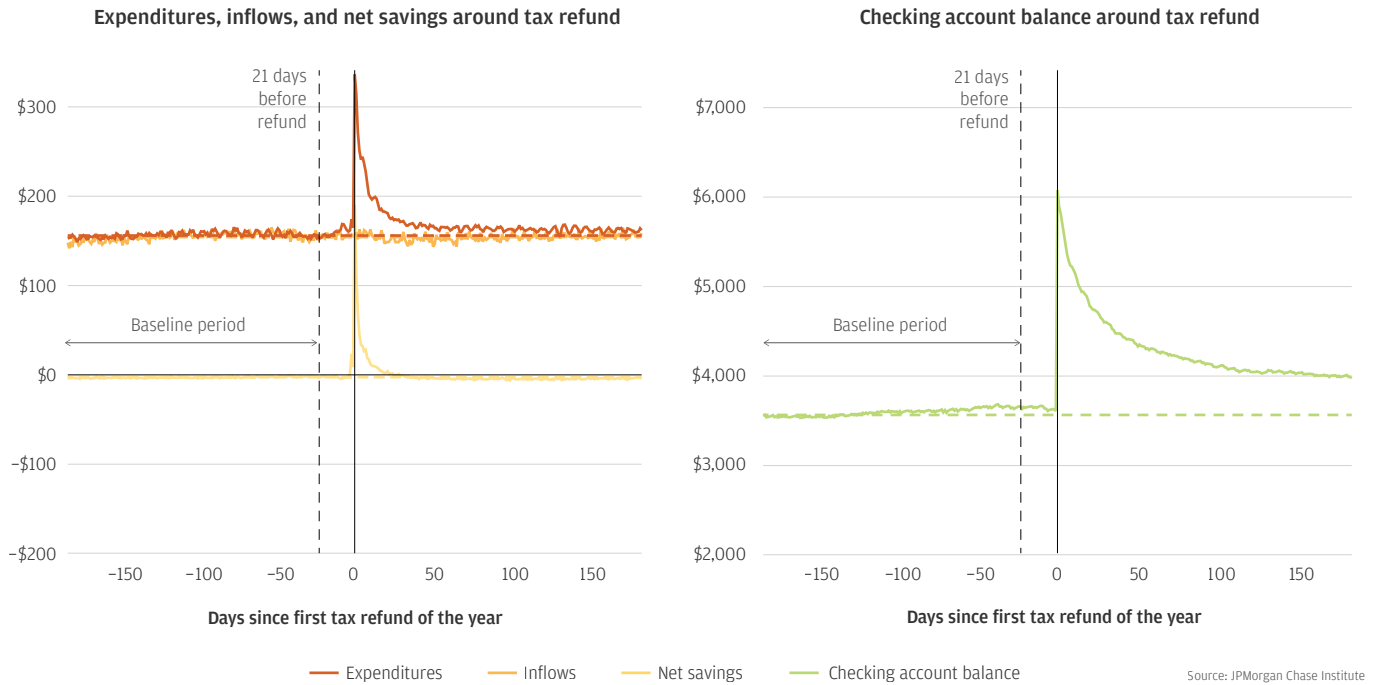
Expenditures spike to \$340 on the day the tax refund is received, from a stable baseline of \$156 per day. This represents an increase of 119 percent. Corresponding with the leftmost bar in Exhibit 8, there is an observable but negligible increase in expenditures in the three weeks before the refund arrives. Notably, even six months after refund receipt, average expenditures remain \$11 (6.7 percent) above the average baseline. Average inflows remain almost perfectly constant at \$155 per day every day for a year around the arrival of the first tax refund. Average net dissavings is steady at about -\$2.65 per day throughout the six months leading up to the refund. Then, over a 36 day span beginning on the day the first refund is received, these flows switch directions. On the day the refund is received, a net \$190 flows from the checking account into other accounts.¹⁰ This indicates that families do not cut back on hours worked or reduce inflows from other sources when their tax refund arrives.



Tax refunds drive an acute increase in expenditures but also establish a new steady state for family finances.

The right panel of Exhibit 10 shows how these flow dynamics add up to changes in the balance in the checking account itself. Average checking account balances spike to \$5,983 on the day of refund receipt from an average baseline of \$3,565. This represents an increase of 68 percent. Notably, the elevation in the checking account balance six months after the refund represents a new steady state. After the spike, balances decline steadily over 110 days and then settle 11 percent above the average baseline. This pattern is not driven by a few outliers; six months after the refund, 41 percent of families have account balances that are more than five percent above their pre-refund baseline (not shown).¹¹

Exhibit 10: Average expenditures on the day a tax refund is received are 119 percent above baseline, and over the next 110 days the average account balance settles to a new steady state, 11 percent above baseline.



Taken together, these results indicate that tax refunds drive an acute increase in expenditures, but also establish a new steady state for family finances. Where does the acute expenditure response to the refund go? Do all categories of expenditure scale up proportionally in response to the cash flow, or do families put the tax refund toward special purposes? In the next section, we examine this question.

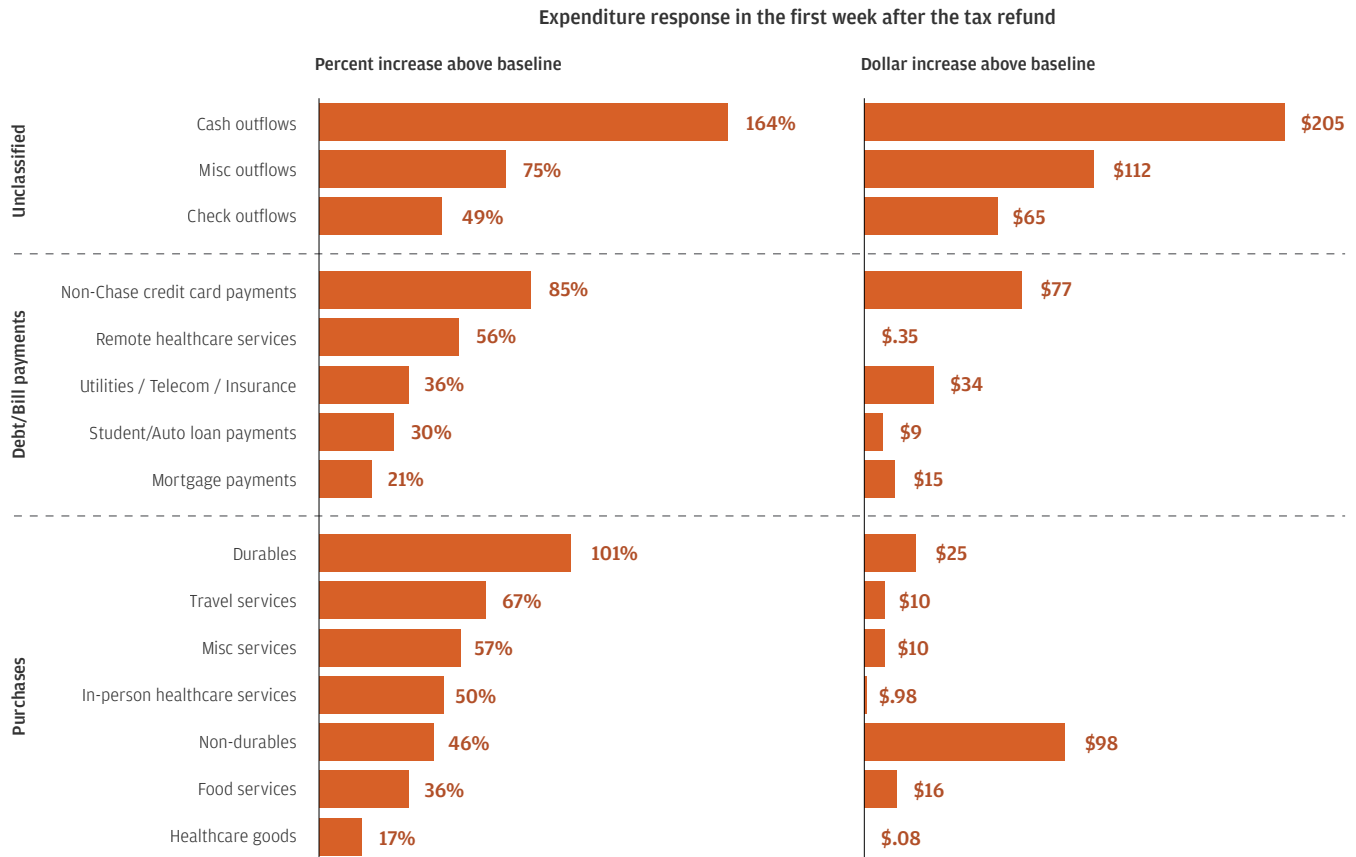
**Finding
Four****Expenditures on durable goods, credit card payments, and cash withdrawals increase most sharply upon receipt of a tax refund.**

In Exhibit 11, we decompose the expenditure response during the week after the first tax refund is received. Average cash withdrawals during that week are 2.6 times the average baseline (\$330 in that week, compared with \$125 over a baseline week). Altogether, the average increase in cash, check, and electronic withdrawals during that week represents about 55 percent of the average expenditure response. We have much better visibility into the uses to which the rest of the response is put, as reflected in the detailed categorizations in the middle and bottom sections.

About a fifth of the expenditure response goes to paying down bills—mostly bills for past consumption, including credit card bills and health care bills. Average payments on non-Chase credit cards in the week after the refund is received are \$167, 85 percent higher than the the baseline average. Some of this may represent increased consumption shortly before the refund was received, and some of it may represent paying down revolving balances amassed from consumption in the more distant past. We are able to investigate revolving balances directly for the subset of families who have a Chase credit card. In Exhibit 12, we focus on this subset, and track average revolving balances in the months around the tax refund. These debts decline from \$2,277 in the month before the refund is received, to \$2,100 in the month after, representing a 7.7 percent decrease. If we restrict the sample to those who carried a revolving balance at any point during the pre-refund baseline, the decrease in that select subset is over nine percent.¹² This evidence indicates that families use part of their refunds, which are after all just repayments of interest-free loans to the government, to pay down interest-bearing revolving credit card debt.

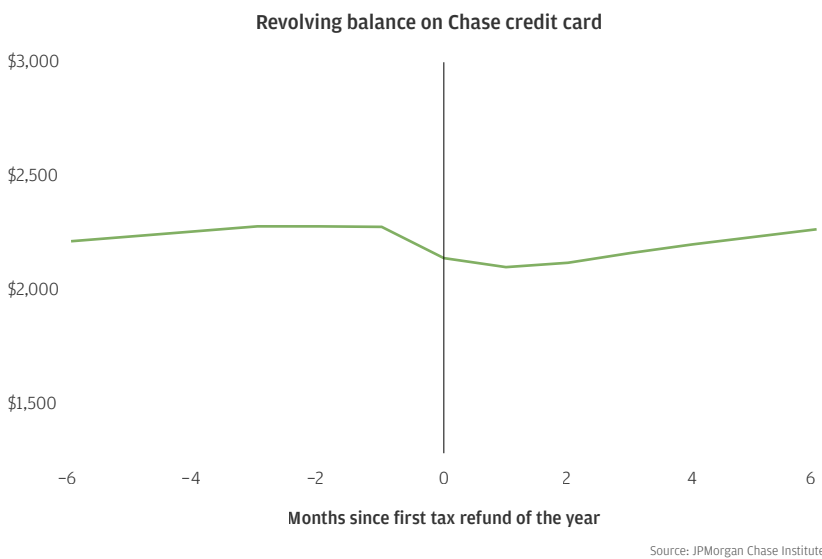
Turning back to Exhibit 11, the bottom section decomposes the remaining quarter of the expenditure response, which goes to purchases. Average expenditures on durable goods double in the week after refund receipt, to \$50 compared with \$25 during a baseline week. This suggests that families take advantage of the cash infusion from a tax refund to spend on large ticket items, from which they benefit over an extended period of time. It is very unlikely that a specific need for a durable good systematically arises just as a family is receiving their tax refund. The fact that the timing of these purchases is driven in part by the timing of the tax refund suggests that some families make purchases either earlier or later than they would have if they had had all the cash flow management tools and information that they needed. If they put off needed purchases while waiting for their tax refunds, they miss out on the benefits of these purchases in the meantime. Some families may also make purchases prematurely when the refund arrives, in order to ensure that the cash is not put to some other use. Unlike durable goods purchases, spending at healthcare service providers, at non-durable goods merchants, and at bars and restaurants (“food services”) likely represents consumption at the time of expenditure. Therefore, this spending represents consumption which had been deferred during the baseline period. Purchases in these three categories increase by 50 percent, 46 percent, and 36 percent respectively.

Exhibit 11: Average cash withdrawals, durable goods purchases, and payments on non-Chase credit card bills all increase by 85 percent or more in the week after a tax refund.



Source: JPMorgan Chase Institute

Exhibit 12: Average credit card revolving debt declines by 7.7 percent in the month after the tax refund relative to the month before.



As we discussed in the context of Exhibits 6 and 7, there is considerable heterogeneity in the cash flow impact of tax refunds; furthermore, Exhibit 9 highlights evidence of heterogeneity across families in how the tax refund is used. In the next section, we explore variation in the spending and saving responses to tax refunds in more detail.

Families use part of their refunds, which are after all just repayments of interest-free loans to the government, to pay down interest-bearing revolving credit card debt.

Finding Five

Families for whom the refund has a larger cash flow impact increase their spending and saving most sharply when it arrives.

Exhibit 9 indicated broad variance beneath the average response to refunds. In this section, we explore variation across two characteristics in how families allocate their tax refunds.¹³ The first is whether or not their refund exceeded their average total cash balances during the months of September, October, and November in the year prior to the refund. For this stratification, we use the sum of balances in all of a family’s cash accounts, not just the checking account that receives the refund. The second characteristic is when families received their refunds. In previous JPMorgan Chase Institute research, we reported that those who received their refunds earlier in the tax season tended to receive larger refunds, and tended to spend a larger fraction of their refunds on healthcare services in particular (Farrell et al., 2018b). As we noted, these two patterns indicate that families have an idea how much of a refund to expect, and that those who expect more cash or who have more of an intention to spend it file earlier in the season.

Exhibit 13 describes the strata. The top panel indicates that for half of those receiving refunds exceeding their average pre-refund cash balances (“higher impact” stratum), the first tax refund of the year represented a lump-sum cash infusion equivalent to more than four times the cash they had on hand at the end of the prior calendar year, and more than one-tenth of their annual take-home income that year. The average impacts are even more extreme than these medians—on average the refund represents 52 times cash on hand and more than 15 percent of the year’s income. The average tax refund in the higher impact stratum is 58 percent higher than in the lower impact stratum, whereas cash balances are 89 percent lower and take-home income is 31 percent lower. The bottom panel confirms the finding we reported in previous research, that those who are owed larger refunds tend to file earlier in the season (Farrell et al., 2018b). It also shows that the cash flow impact of the earlier refunds is significantly greater than that of the later refunds, because of steep gradients in cash balances and take-home income. Those who file earliest have cash balances 61 percent lower, and incomes 28 percent lower, than those who file latest. This may in part reflect the fact that lower income families who qualify for refundable tax credits—especially the Earned Income Tax Credit—tend to file early in the season in order to get access to the cash (Aladangady et al., 2018)

Exhibit 13: Tax refunds represent about 10 percent of the year’s take-home income for earlier filers, and for the half of the sample in the higher cash flow impact group.

Stratum*	Percent of sample	AVERAGE AMOUNTS			TAX REFUND, AS PERCENT OF TOTAL CASH BALANCES		TAX REFUND, AS PERCENT OF ANNUAL TAKE-HOME INCOME	
		Tax refund	Cash balances	Take-home income	Median	Average	Median	Average
Stratification on cash flow impact								
<i>Higher impact (refund > balance)</i>	47%	\$4,477	\$1,222	\$40,661	417%	5,173%	9.9%	15.4%
<i>Lower impact (refund ≤ balance)</i>	52%	\$2,830	\$10,969	\$58,658	39%	94%	4.1%	6.8%
Stratification on month of first refund								
<i>January or February</i>	40%	\$3,775	\$3,653	\$42,135	228%	4,688%	7.8%	13%
<i>March</i>	28%	\$3,590	\$6,575	\$50,529	112%	1,293%	6.4%	10.6%
<i>April or May</i>	28%	\$3,255	\$9,297	\$58,314	63%	834%	4.9%	8.5%

*Total cash balances from the prior year are not available for one percent of the sample; these families are excluded from the impact stratification. In addition, four percent of families received their first tax refund outside the traditional tax season; these are excluded from the filing timing stratification. Only families with positive cash balances are included in calculations here.

Source: JPMorgan Chase Institute

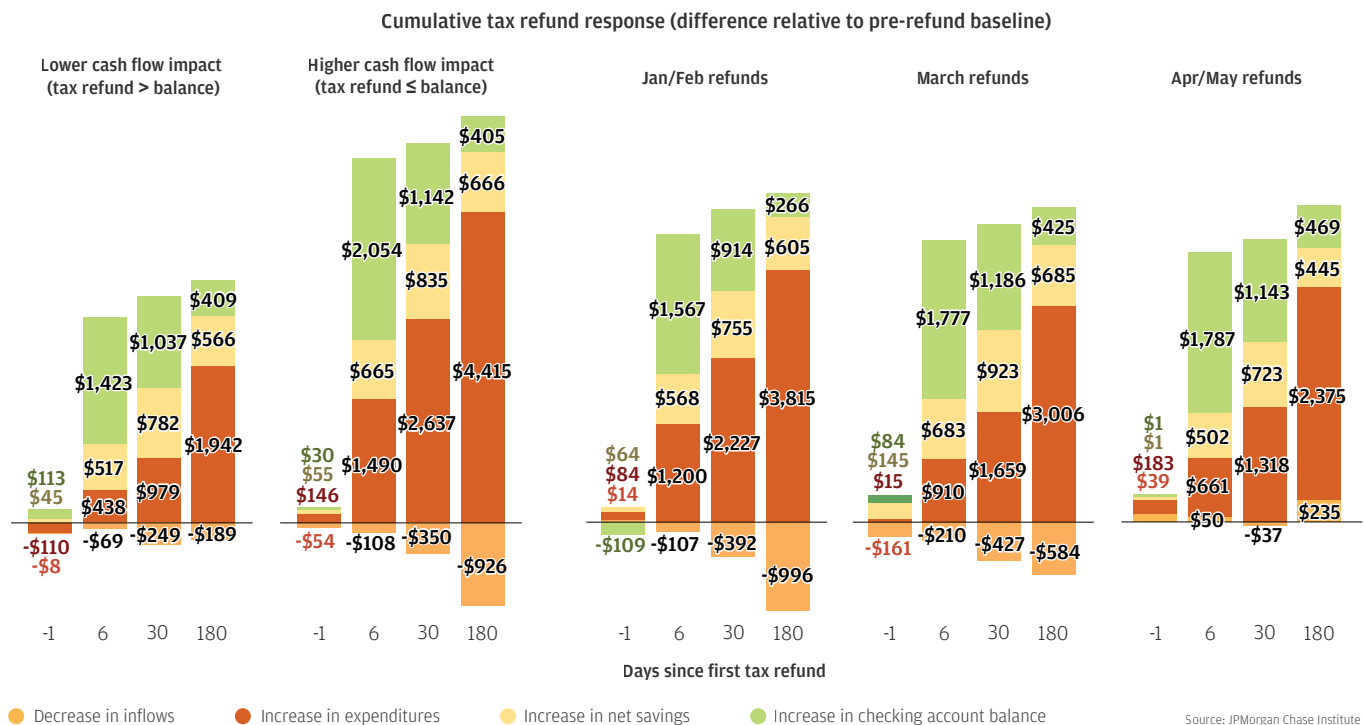
Exhibit 14 compares the overall dollar responses to the tax refund across the strata.¹⁴ The left panel compares across cash flow impact strata, and the right panel compares across months of first refund. Every group increases expenditures sharply as soon as the refund arrives. In the left panel, the spike in expenditures for the higher cash flow impact stratum is significantly higher than for the lower impact stratum. Within just six days after the tax refund arrives, the higher cash-flow impact group increases their expenditures by \$1,490 (42 percent of the average baseline) compared to just \$438 (8.6 percent) for the lower impact group.

In the right panel, the spike in expenditures one week after the refund is highest at \$1,200 (33 percent of the average baseline) for those who receive their refund in January or February, compared to \$661 (13 percent) among those receive their refund in April or May. It is noteworthy that those who receive their refunds late in the season make use of cash flow management tools to partially readjust their spending in the time after filing and before receiving the cash; almost seven percent of the six-month expenditure response occurs in the three weeks before the refund arrives (\$183, out of a total six-month expenditure response of \$2,375). No other group increases expenditure in anticipation of the arrival of the refund.

Notably, no group uses their tax refund to offset other sources of inflow. In fact, inflows increase after the arrival of the tax refund to a greater extent for both the higher impact stratum and earlier filers. This may reflect regression to the mean. For example, some of the families in the higher impact stratum may have had negative income experiences during the prior year—like a spell of unemployment—which drove them to spend down cash balances, which is how they ended up with balances less than refunds. Similarly in the right panel, those who file earliest in the season may be recovering from negative income experiences and filing earlier in order to get access to the cash from their refunds.

Every group increases net savings when the tax refund arrives by similar dollar amounts, despite the fact that the average refund to the high cash-flow impact group is more than twice the size of those in the low cash-flow impact group (see Exhibit 13). By the end of six months after the tax refund is received, the average dollar amounts remaining are similar for both cash-flow impact strata (for the lower impact stratum, \$409 increase in checking account balance and \$566 transferred to other accounts for a total of \$975; for the higher impact, \$405 in the checking account and \$666 transferred for a total of \$1,071). We observe a similar pattern with filing timing—average increases in account balance plus net savings at the end of six months are similar in absolute amount across all three strata. Notably, average account balances are still elevated in every group six months after the refund.

Exhibit 14: Families for whom the tax refund has a larger cash flow impact, and families who file earlier in the season, spend their refunds more quickly



In Exhibit 15, we compute the average fraction of the refund that likely remains for each group. As with Exhibit 9, we compute this as the sum of each family’s increase over baseline in checking account balance and net savings, divided by the size of its own tax refund. We report only the average fractions in Exhibit 15; the median fractions are considerably lower but the gradients across strata are directionally similar. No group spends down their refunds smoothly over the course of the year. By the end of six months after the refund, a similar fraction of the tax refund remains for families in each stratum (26 percent for the higher impact stratum and January/February recipients, compared with 31 percent for the lower impact stratum and 27 percent for March, April, and May recipients). However, February recipients and higher impact group have less of their (comparatively larger) refunds remaining after the first week (two-thirds, compared with 80 percent for March, April, and May recipients and 83 percent for the lower impact group.).

Exhibit 15: Families for whom the tax refund has higher cash-flow impact have a smaller fraction of the tax refund available a week, a month, and six months after the refund

AVERAGE FRACTION OF FAMILY-SPECIFIC REFUND STILL AVAILABLE
(INCREASE IN CHECKING ACCOUNT BALANCE PLUS CUMULATIVE INCREASE IN NET SAVING, AS PERCENT OF REFUND)

Days since first refund	Higher cash flow impact	Lower cash flow impact	Jan/Feb refunds	March refunds	April/May refunds
-1	4.8%	8.0%	2.6%	12%	8.3%
6	64%	83%	68%	83%	77%
30	46%	86%	58%	76%	71%
180	26%	31%	26%	32%	21%

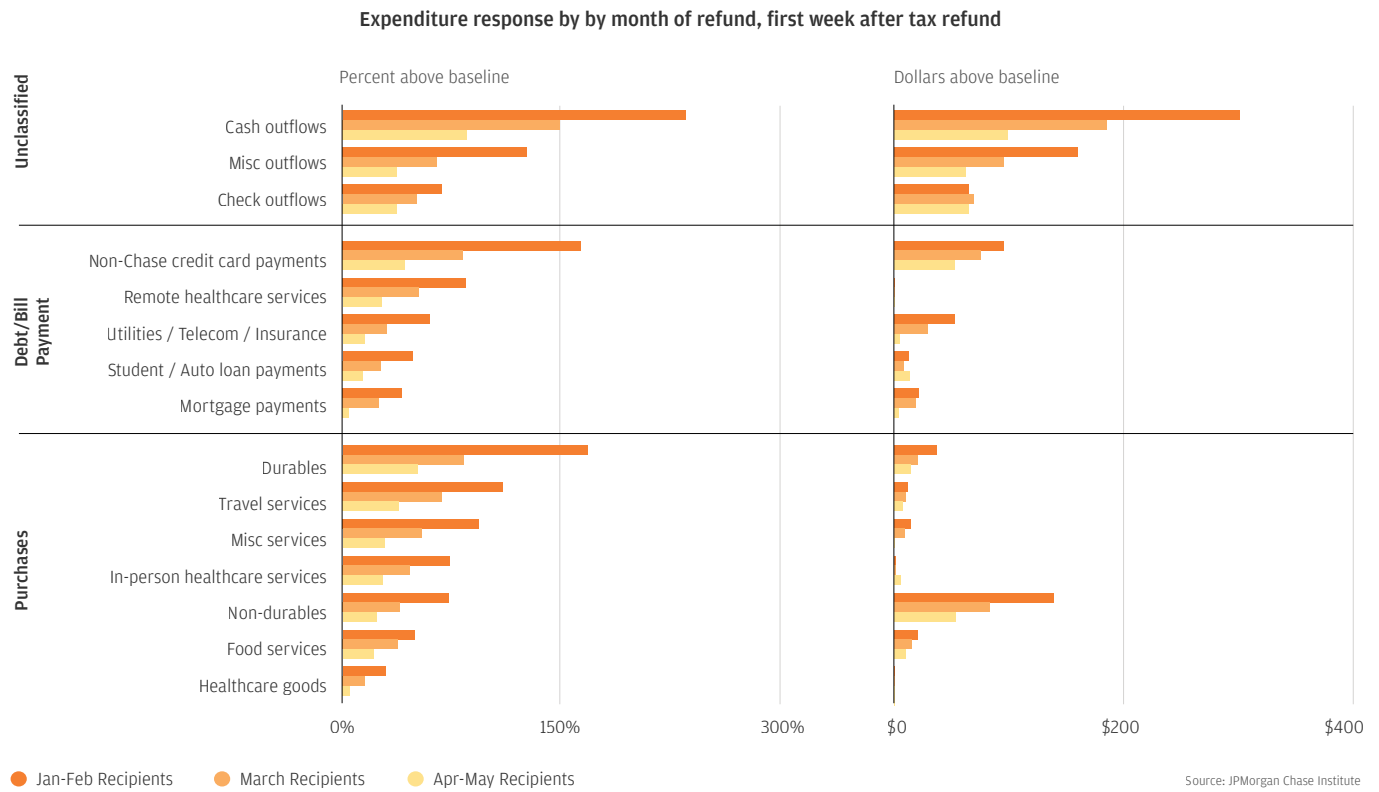
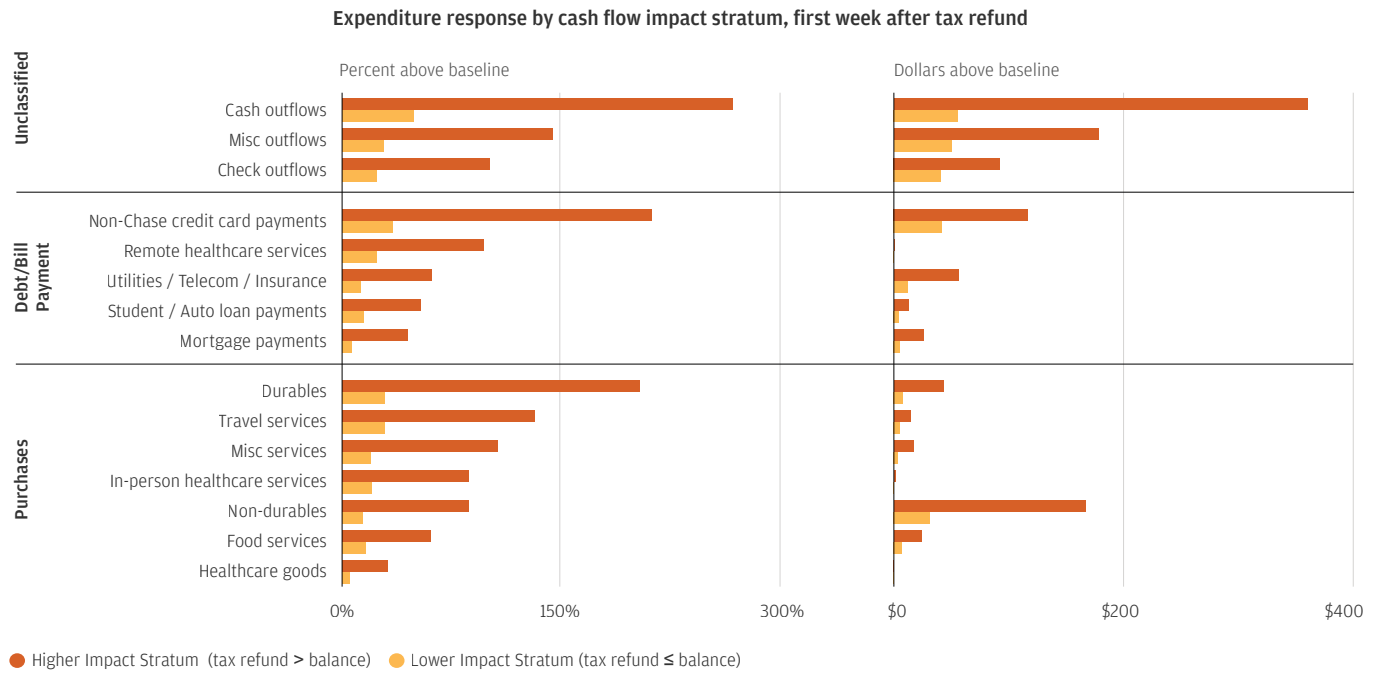
*To reduce the impact of extreme values, we exclude the 0.97 percent of family-years in which the total refund was less than \$50 when computing the statistics in the table.

Source: JPMorgan Chase Institute

Exhibit 16 decomposes the expenditure spike in the week after the refund, separately for higher and lower cash flow impact strata and for earlier and later filers. In the top panel, slightly more than half of the total expenditure response for each stratum is increases in cash, check, and electronic withdrawals. In the high impact stratum, average cash withdrawals spike by 267 percent (compared with 49 percent in the lower impact stratum). Bill payments account for about a fifth of the expenditure response among the higher impact group, and a quarter among the lower impact group. In both groups, the sharpest bill payment response by far is in credit card payments. Average credit card payments in the higher impact group spike by 212 percent; in the lower impact group, the spike is just 34 percent. Purchases account for a quarter of the expenditure response in the higher impact group, and a fifth in the lower impact group. Notably, average durable goods purchases in the week after the refund are 204 percent above baseline for the higher impact stratum and only 29 percent for the lower. The higher impact group is more likely to use their tax refunds for large ticket purchases possibly because they have so much less cash available to make these purchases at other times of the year. In addition, expenditure categories more likely to represent consumption at the time of payment, such as in-person healthcare services, non-durables, and food services, all increase by more than 60 percent for the higher impact group compared to 20 percent or less for the lower impact group.¹⁵

The bottom panel of Exhibit 16 decomposes the expenditure spike for the earlier and later filers. For all three groups, just over half of the total expenditure response is in the form of cash, check, or electronic withdrawals; about a fifth is in the form of bill payments, and the remainder goes to purchases. Average cash withdrawals are 234 percent above baseline for the earliest filers, but only 85 percent above baseline for the latest filers. About a tenth of the expenditure response for each group goes to paying credit card bills; among the earliest filers these payments spike by 163 percent compared with only 43 percent among the latest filers. In the area of purchases, the sharpest spike for all three groups is in durable goods, but the magnitudes vary significantly across the groups. For the earliest filers, spending on durable goods is 167 percent above baseline in the week after refund receipt, whereas for the latest filers it is only 52 percent.¹⁶

Exhibit 16: Families for whom the tax refund has a larger cash flow impact, and families who file earlier in the season, increase expenditure in every category in the week after receiving a tax refund

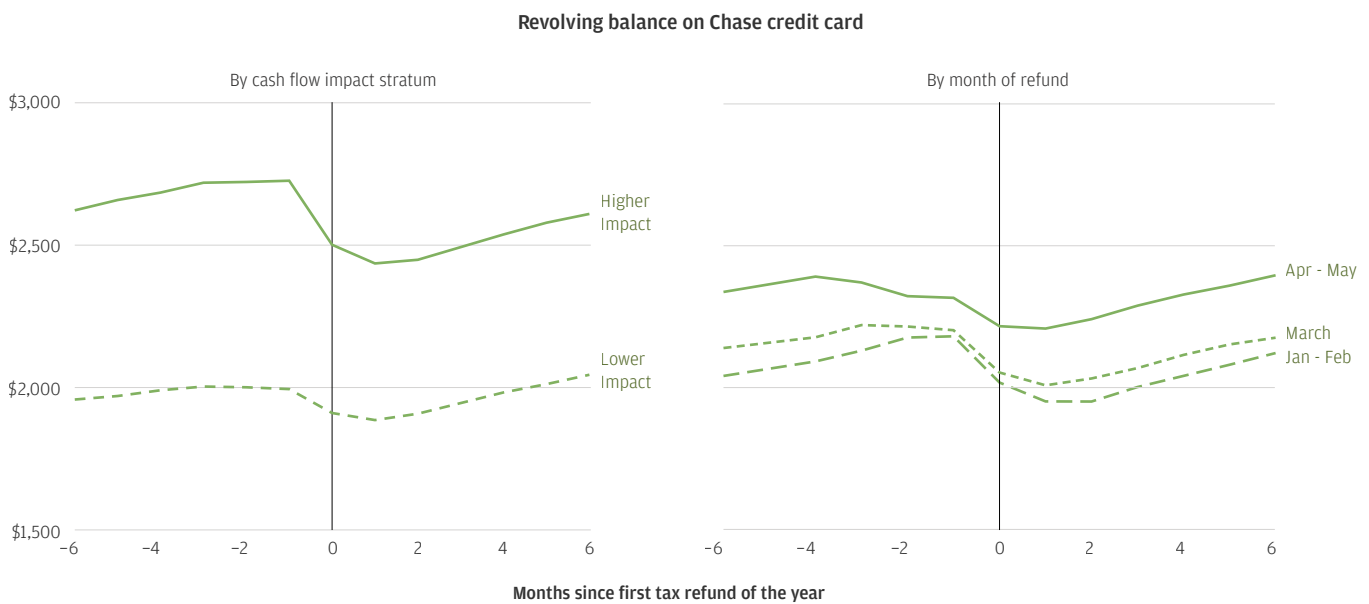


Source: JPMorgan Chase Institute

Taken together, the results in Exhibit 16 highlight the fact that all of the strata allocate their spending out of the tax refund in similar ways—around 55 percent goes to cash, check, or electronic withdrawals (mostly cash); around a quarter to a fifth goes to paying bills (primarily credit card bills), and the remainder goes to purchases. However, magnitudes of these expenditure responses, in both absolute dollar terms and proportional to the average baseline in each stratum, vary significantly across strata. Those for whom the tax refund has the largest cash flow impact, and the earliest filers, rely much more on their refunds to make large ticket purchases, increase consumption of goods and services, and pay their credit card bills. They also increase consumption more sharply in response to the refund.

To what extent does the sharp increase in non-Chase credit card bill payments reflect paying down revolving balances, and to what extent does it represent more purchases in the month before the refund? In Exhibit 17, we focus on the subset of families who have Chase credit cards and analyze the revolving balances on those cards in the months around the refund. In the month after the refund compared with the month before it, average revolving balances decline by more than 10 percent in the higher impact stratum, and by less than 5.5 percent in the lower impact stratum. Similarly, revolving balances decline by 10 percent among those who received their refunds in January or February, 8.7 percent among those who receive their refunds in March, and 4.5 percent among those who receive their refunds in April or May.

Exhibit 17: Families for whom the tax refund has higher cash flow impact, and those who file earlier, use the refund to pay down revolving credit card debt



Source: JPMorgan Chase Institute

Taken together, the results in this section highlight the central role that tax refunds play in the financial lives of up to half of those who receive them. The 47 percent of families for whom the tax refund had the higher cash flow impact spend almost \$3,500, or 15 percent, more on average in the six months after receiving their refunds compared with the six months before. Meanwhile over those same six months, as they have been spending from their refunds, withholdings or tax credits have been amassing which will give rise to next year’s refund, which will drive another round of the cycle. An informative contrast is the other 52 percent families, for whom the refund is a lower cash flow impact event. For that group, bill payments and purchases barely change, and the average total expenditure response over six months represents less than five percent of average total expenditure.

In the next section, we turn attention to the higher income, higher cash-wealth group in our sample—those who make a tax payment.

Finding Six

On average, families who make a tax payment cover that payment with cash already available when it is due. Once the payment is made, spending and saving patterns quickly return to their previous steady state.

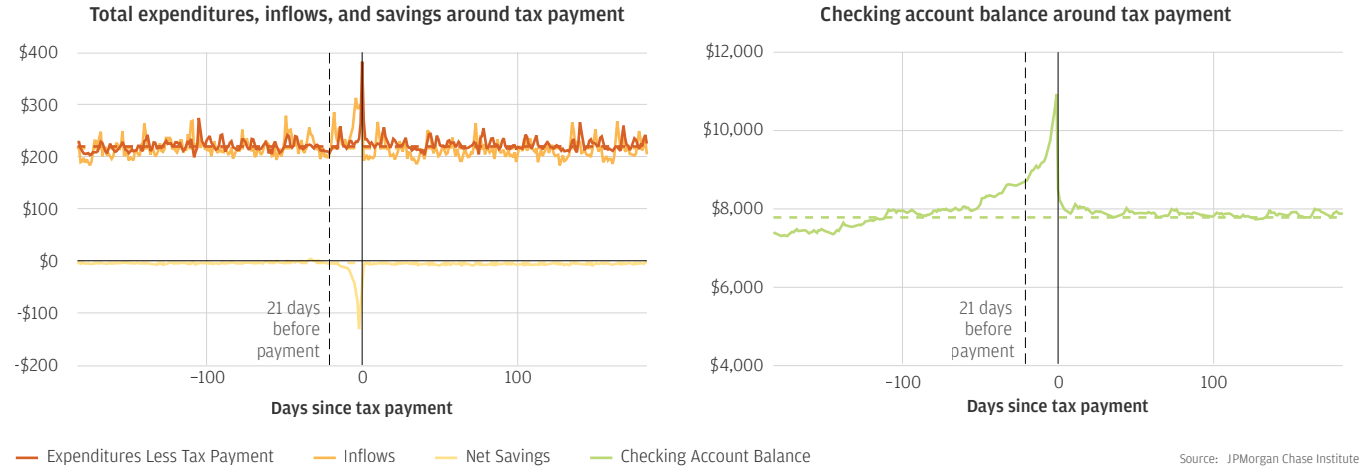
The results in the preceding sections indicate that tax refunds are a major financial event for a significant fraction of families who receive them. In Exhibit 5, we observed that the average payment family in our sample paid out 2.5 weeks’ take-home income in a single day. Even though families who make a tax payment have considerably higher cash balances and take-home incomes than families who receive tax refunds, provisioning for these payments may not be straightforward. Among families whom we observe two years in a row, a significant fraction who make payments in one year did not make payments in the prior year. Furthermore, even among those who do make payments two years in a row, the payment amounts vary significantly; 75 percent of them have payment amounts that differ by 25 percent or more from one year to the next.

Given that a family’s experience from the prior year is not a very reliable indicator of their payment in the current year, are payment families taken off guard by their tax liability? If they are surprised by the bill when they file, they may have to cut expenditure in order to amass the payment, or find some source of additional income, or take on additional credit card debt.

Exhibit 18 tracks expenditures, inflows, net savings, and checking account balances in the year around a tax payment. As the right panel shows, the average checking account balance during the baseline period is \$7,783, more than 2.5 times the average payment amount of \$2,983 (see Exhibit 7). This pattern is not driven by a few families with very high balances; even 100 days before the payment, 71 percent of families have enough cash already in their checking accounts to cover the full payment (not shown). Nonetheless, as the left panel shows, average net savings turn sharply negative beginning about three weeks before the payment is made, reflecting transfers from saving-oriented accounts into the checking account. These transfers reach their highest absolute value two days before the payment is made. Non-refund inflows into the checking account are also elevated during the week prior to payment, peaking four days before the payment is made. Turning back to the right panel, after all these inflows, on the day before the payment is made, the average checking account balance has reached \$10,792 or 39 percent above the average baseline, and 3.6 times the average payment.

Notably, the left panel also shows that expenditures (not including the tax payment itself) peak on the day that the payment is made. In further analyses not shown here, we found that this spike is accounted for by a tripling of electronic withdrawals from the checking account, likely indicating that families make other electronic payments on the same day that they pay their tax bill. Most pertinent, the left panel clearly shows that families do not cut back on expenditures in the weeks leading up to the payment or in the weeks after.

Exhibit 18: Families making payments begin transferring cash into the checking account three weeks before they make the payment



Given that the vast majority of families who make payments out of their checking accounts already had enough cash to cover the payment even months before making it, we tried to isolate a subset who may have had to scramble to cover their payments. We isolate families who did not have sufficient balances in their checking accounts to cover the payment 21 days prior to making it.¹⁷ This higher cash-flow impact stratum contains 27 percent of payment families. In Exhibit 19, we compare them to the other 73 percent of families (the lower cash-flow impact stratum). We report initial balances (as of 21 days before the payment was due) and payment amounts, as well as increases in net dissaving, non-labor inflows, and labor income, as well as reductions in expenditures in the three weeks leading up to the payment. The right column shows that among the low impact group most families do not appear to adjust flows in preparation for the payment.

As the left column shows, among higher impact families half had 31 percent or less of the payment in their accounts and therefore needed to increase their balances by 69 percent over the next three weeks in order to make the payment. Even in this group, however, more than half fully covered that difference through increased net dissaving and non-income inflows, which include wire transfers as well as cash, check, and electronic deposits. It is possible that some of these non-income inflows represent formal or informal loans including cash or checks from friends or family; however, in that case in order to pay back these loans families would have to either generate additional income or cut expenditures; we see no evidence that a significant fraction of these families does either of those even over six months after making the payment (not shown). Therefore, the evidence suggests that at most only a small minority of families who make payments cover them by generating additional income or cutting expenditures.

Exhibit 19: Only a small minority of families cover their tax payments by cutting their expenditures or increasing their labor income

	HIGHER IMPACT (TAX PAYMENT > CHECKING ACCOUNT BALANCE)	LOWER IMPACT (TAX PAYMENT ≤ CHECKING ACCOUNT BALANCE)
Percent of sample	27%	73%
Median payment amount	\$1,370	\$347
Median initial checking account balance (21 days before tax payment)	\$354	\$2,907
Median initial balance (as percent of payment)	31%	654%
Median increase in non-labor inflows and net dissaving (percent of payment)	76%	-8.9%
Median increase in labor income and reduction in expenditures (percent of payment)	21%	1.1%

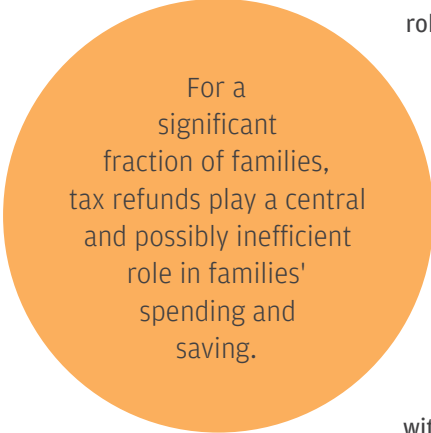
Source: JPMorgan Chase Institute

In additional analyses not shown here, we tried other approaches to isolating subpopulations with significant fractions of families who were taken off guard by their payments. We examined payments among the lowest income quintile, among those who paid after the deadline, and among those who appeared illiquid at the end of the calendar year prior to the payment. In all of these cases, the vast majority of payers covered their payments with net dissaving and non-income inflows. We did not see evidence of average families in any of these groups cutting expenditures or increasing labor or non-labor income in order to cover the payment.¹⁸

The results in this section provide further detail on evidence reported in academic research on tax payments (Baugh et al., 2018), that families who make payments are able to cover them without disrupting their usual pattern of expenditures. As Exhibit 18 shows, this is in part because the vast majority of payments are sufficiently low, and the families making them maintain sufficiently high account balances to cover them out of available cash. However, even among the quarter of families for whom this is not true, most manage to cover the payment without disrupting their usual expenditure patterns.

Implications and Conclusions

Every spring, more than half a trillion dollars flow into and out of families' financial accounts as they reconcile taxes paid against taxes owed for the prior year. In this report, we analyze daily financial flows and balances for one million families who receive tax refunds or make tax payments, and find that these flows have a significant impact on the financial lives of some but not all of them. The vast majority of families receive tax refunds averaging almost six weeks' income.



For a significant fraction of families, tax refunds play a central and possibly inefficient role in families' spending and saving.

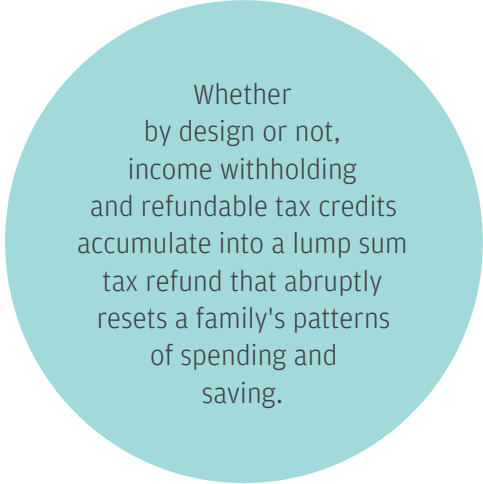
For a significant fraction of these families, the tax refund plays a central and possibly inefficient role in their annual finances. They time expenditures—including purchases of durable goods—partially around tax time, rather than solely around when the need for these expenditures arises. They also use their refunds, which are after all just repayments of interest free loans to the government, to pay down interest-bearing credit card debt. Whether by design or not, income withholding and refundable tax credits accumulate into a lump sum tax refund that abruptly resets a family's patterns of spending and saving.

For many of these families, that cash infusion fuels expenditures and resets cash reserves for more than half the year. For the minority of families who make payments, the payment itself has no lasting impact on their flows or balances. Higher income and higher cash-wealth families are over-represented in this group, and payment amounts represent a smaller fraction of cash balances and income for these families, compared with refund amounts for families who receive a refund. Even among families who appeared insufficiently liquid to cover their payments, spending and saving patterns and account balances quickly returned to their steady state as soon as the payment was made.

These patterns indicate important unmet needs and raise important questions which policy experiments and financial service innovations could help to address. Why do so many families end up receiving tax refunds, and so few end up owing payments? Why are families receiving so much of their income during tax season, rather than throughout the year? Given that the previous tax season appears to be a reliable guide for predicting what will happen in each tax season, why are refunds so disruptive to families' patterns of saving and spending?

A number of factors may play a role in explaining why refunds are so much more prevalent than payments.¹⁹ First, default levels of withholding of labor income, as well as the structure of refundable credits, may push families toward receiving large refunds. Second, families may be unable to accurately forecast their tax liabilities every year and take precautionary measures to avoid owing a tax payment. They may want to ensure they do not incur interest or penalties, or that they will not have to scramble to cover an unexpected payment. It is true that we found no evidence that families who owe a tax payment have difficulty making such payment, but this may reflect the fact that families who are most at risk of experiencing that difficulty take action to ensure they get a refund, even if that means foregoing expenses or accumulating revolving credit card debt throughout the year. Third, families may use tax withholdings as a commitment device to force savings and manage their cash flows in ways they would otherwise have difficulty doing. Fourth, they may exhibit “inertia” or slowness to adjust their withholdings as their life circumstances change to permit more allowances (Jones, 2012). Finally, tax preparation services may asymmetrically advise families who owe a payment at tax time to adjust their withholdings for the future year, but offer no such advice to families who receive a (large) tax refund. Each of these possible explanations lends itself to potential policy interventions and innovations.

Could more transparency reduce the uncertainty around tax time obligations and let families take the reins more directly? Even within the existing withholding and reconciliation system, and even without any new innovation in cash flow management tools, families might be more empowered to plan their spending and saving if they had a clearer idea of their comprehensive tax liability and withholdings throughout the year. Observing withholding is fairly straightforward for many. (If they only work one job, they can find it on every paystub.) Estimating taxes due is far more difficult. Policy reforms and technological innovations which empower families to estimate in real time the marginal taxes due on the income they have already earned and forecast what will be due on income they expect to earn could address an important unmet need. In fact, innovations like these could even make it administratively feasible to reconcile taxes more frequently than once a year. More frequent reconciliation could give families more options on how to manage their cash flows.



Whether by design or not, income withholding and refundable tax credits accumulate into a lump sum tax refund that abruptly resets a family's patterns of spending and saving.

Could new cash flow management tools improve families' capacity to save adequately and manage their cash flows and their tax liabilities at the same time? Part of the reason for the asymmetry wherein payments are less disruptive to families who make them than refunds are to families who receive them might be that families who end up making payments are those who have the highest capacity to use existing cash flow management tools to provision for their obligations. In that case, a hybrid cash flow management/tax provisioning tool that combines some of the commitment and "set and forget it" features of payroll withholding with the control and transparency of a traditional bank account could address an important unmet need for refund families. Such a tool might allow families to set cash aside to cover their tax obligations while making it possible (and appropriately difficult) to adjust the accumulating balance if their income were to change unexpectedly or if they encountered an emergency that required immediate action.

Should tax withholding defaults be less conservative and easier to change? Currently the default settings on a W-4 form and the difficulty and infrequency with which families adjust their withholdings result in families receiving a tax refund, even if they are ineligible for any refundable tax credits. If families were nudged to withhold less, such that some of those who receive refunds under the current system ended up owing a payment instead, would they be able to provision for that payment on their own, just as payment families in our sample were able to do? Policy experiments to answer this question must be undertaken with great care to ensure that families are not confronted with costly negative surprises at filing time.

Data and Methods

Sampling

For this study, we assembled a base sample of 8.3 million families who used a Chase checking account as a primary tool for spending and receiving income, and who used that account to receive a tax refund direct deposit or make an electronic tax payment.

To arrive at this sample, we begin with a universe of 34.3 million de-identified Chase customers who had checking accounts in 2015, 2016, or 2017; among these, we identify 34 million tax refund direct deposits and 20 million electronic tax payment transactions. These transactions belong to 14.1 million unique primary account holders. Since many families share accounts, we treat each primary account holder as representing a family, and therefore describe these as 14.1 million families. Tax transactions may be related to Federal, State, or Local taxes.

From this universe of 14.1 million families, we screen out primary account holders under the age of 24 or over the age of 64, in order to focus the analysis on families whose breadwinners are at the point in their lifecycle when they are least likely to be financing their consumption primarily through either borrowing (the younger) or spending down/earning returns on accumulated assets (the older). We also screen out families for whom we see fewer than five expenditures per month in any of the six months before and six months after the tax transaction. We also screen out families for whom we see less than \$5,000 in inflows, not counting transfers from other personal bank accounts, in the tax year that corresponds to the tax transaction (so, for example, for refunds or payments in 2016, this screen is based on 2015 inflows). The purpose of these screens is to focus the analysis on families who are using the Chase checking account as a primary tool for spending and receiving income. This leaves our base sample of 8.3 million unique families, which is described in Exhibit 1.

Our sample be drawn based on observed tax transactions, which means that families who neither received a refund direct deposit nor made an electronic tax payment are entirely missing from the universe out of which we build it. Drawing on scholarly research and on data reported by the US Internal Revenue Service, we estimate that up to one-third of American families may fall into this group. These would include:

- Families who did not file tax returns. As many as 10 percent of Americans may not be represented in any tax filing document, because their families did not file a tax return with the Federal government (Cilke, 2014).
- Families who filed taxes but who were not owed a refund and did not owe a payment. In 2017, 3.3 percent of tax filers neither overpaid their taxes nor had taxes due at the time of filing. (IRS, 2017)
- Families who received refunds or made payments by some means other than an electronic bank transfer—for example, by paper check, or by applying one year’s tax refund toward the following year’s expected tax payment. In 2017, 78 percent of filers overpaid their taxes, and over 97 percent of those who overpaid their taxes opted to receive a refund (IRS, 2017), and of those, 84 percent opted to receive the refund by direct deposit (IRS, 2016).

Taken together, this implies that our study does not address the financial behavior of around a third of American families—the approximately 10 percent who do not file at all, the 2.9 percent who are not owed refunds or payments (3.3 of the 90 percent who file), the 13 percent who get refunds through some means other than direct deposit (18 percent of those who overpay their taxes), and then some fraction of the remaining 17 percent who owed payments (namely, the fraction who made their payments by paper check or with a credit card). We cannot draw inferences from this report about how those families manage their cash flows.

How representative is our base sample of the remaining two-thirds of American families? According to the IRS (2017), about 78 percent of families who filed returns overpaid their taxes, and about 18 percent owed payments at the time of filing. Comparing with Exhibit 1, which includes not only the Federal tax outcomes reported by the IRS but also State and Local outcomes, we see roughly similar proportions. The average Federal tax refund in our base sample is around \$3,200 (including both the “refunds only” and “refund and payment” subsets), which is higher than the average refund reported by IRS (\$2,800). Furthermore, the average Federal payment in our base sample (not including periodic payments) is around \$3,000, which is considerably lower than the average taxes due at filing reported by the IRS (2017) of around \$5,000. These discrepancies may be driven in part by the fact that our sample is likely to under-represent the highest

and lowest income American families. If we exclude the top and bottom Adjusted Gross Income groups from the Federal statistics, the payment and refund amounts closely match those reported by the IRS (2017). However, the discrepancy between our averages and those in the Federal statistics may also indicate that those who have the largest payments to make may not use electronic payment from a checking account to cover them.

For most of the analysis in this report, we focus on two subsets of the base sample—families who received only refunds and made no payments, and those who made all of the year’s payments on a single day and did not receive a refund. Together, these two subsets represent 7.3 million unique families and 14 million family-years. In Findings 1 and 2, we describe basic characteristics of all 14 million family-years, treating each family-year as its own observation. In the rest of the report, we improve computational efficiency by drawing a simple random sample of 500,000 family-years from each of the two subsets. These one million family-years are our “event study sample.”

Measurement

We analyze 986 million transactions into and out of the Chase checking accounts in our event study sample over the span from 182 days before the tax refund or payment until 182 days after. For those in the sample who have Chase credit cards, we also analyze all of the transactions on those cards during that period. We use an array of administrative information about each transaction in order to classify each transaction into one of three supercategories, which we further subdivide for some parts of the analysis:

- **Expenditures**, comprising bill payments, purchases, and cash, check or electronic payments directly out of the checking account. Any outflow from the checking account that is not a direct transfer to another Chase or non-Chase personal bank account is classified into this supercategory. We further subdivide this supercategory into three categories:
 1. **Purchases**, which include point-of-sale debit and credit card swipes at merchants, digit wallet payments at merchants, and remote electronic payments to merchants.
 2. **Debt/bill payments**, which include point-of-payment or remote electronic payments to loan servicers, non-Chase credit card providers, or utilities, telecommunications, or insurance providers. It is important to note that past purchases on non-Chase credit cards end up in this category on the date when the credit card bill is paid, whereas purchases on Chase credit cards end up in the “purchases” category on the date when the purchase is made.
 3. **Unclassified expenditures**, which include cash withdrawals, paper checks, electronic contributions to charities or political organizations, and any electronic transactions for which there was not enough information to classify it more specifically. This last group includes for example transfers to some digital wallets.
- **Inflows**, comprising labor income, non-labor income, and cash, check, or electronic deposits directly into the checking account. Any inflow to the checking account that is not a direct transfer from another Chase or non-Chase personal bank account is classified into this supercategory. We further subdivide this supercategory into three categories:
 1. **Labor income**, which includes all direct deposits that are identified as payroll.
 2. **Non-labor income**, which includes all direct deposits with a Federal, State, or Local government as source. These include Social Security payments, Unemployment Insurance payments, Veterans’ Administration benefits, and others. This category also includes inflows from investment accounts.
 3. **Non-income inflows**, which includes wire transfers, cash and check deposits, transfers from digital wallets, and other electronic deposits where the source cannot be directly identified. Importantly, formal or informal/interpersonal loans would most likely fall in this category, as would some forms of dissaving like a cash withdrawal from a non-Chase account followed by a cash deposit into the checking account.

- **Net savings**, comprising electronic transfers directly between the checking account and other Chase or non-Chase savings, money market, Certificates of Deposit, and other saving-oriented cash accounts. We assume that transfers from the checking account to a saving-oriented cash account represents savings, and transfers coming in the opposite direction represent dissaving. Therefore, we label the difference between these as “net saving” (or, when negative, “net dissaving”). Importantly, if families transfer cash out of the checking account and then spend directly from the saving-oriented account, then the transfer would be inappropriately labeled as saving. On the other hand, if they transfer cash into the checking account and then hold it there, then the transfers would be inappropriately labeled as dissaving. To the extent that misclassifications like these offset each other or are consistent over the year, they will not impact our results.

Computing responses to tax refunds

For each refund family in our event study sample, we compute daily expenditures, inflows, and net savings as defined above, as well as daily checking account balances, on each of the 365 days around the first tax refund of the year. We then compute a family-specific baseline, which is that family’s average daily value for each of these outcomes for the 162 days leading up to 21 days before the first tax refund. We choose to end the baseline period at 21 days before the first refund in order to allow for possible anticipatory spending. Global average values for each of these outcomes are: \$156 per day in expenditures, \$154 per day in inflows, \$2.66 in net savings, and an average daily checking account balance of \$3,565. For each family-day in the event study we compute a family-specific tax refund response as the difference between that day’s value for that family and the pre-refund baseline for that family. In Exhibits 8 and 14, we report average and median cumulative sums of these responses from 21 days before the tax refund until one day before, seven days after, 31 days after, and 181 days after the refund. (By construction, the cumulative refund response is \$0 for every family at 21 days before the refund is received). We also compute each family’s responses normalized by the total value of all tax refunds received that year; in Exhibits 9 and 15 we report median and average values of these ratios.

In order to reduce the impact of extreme values on the averages, we trim the tails of all distributions, Winsorizing at the 99.5 percentile for distributions that are bounded from below (for example, refund sizes which are bounded from below at zero), and the 0.5 and 99.5 for distributions that are not bounded from below. When we report sums, we do not trim the tails of individual components before adding—so, for example, we trim the tails of total expenditure, rather than trimming the tails of cash withdrawals, check withdrawals, and so on, and then adding up the Winsorized components. For this reason, averages of individual components may not sum perfectly to average values for the supercategories.

For the daily event studies, we remove systematic calendar variation from expenditures, inflows, and net savings at the family-day level. We do this by restricting analysis to the baseline period (the 162 days leading up to 21 days before the first tax refund), and regressing each day’s values for each supercategory against a rich set of calendar controls including separate indicators for each day of the week, an indicator for major holidays, indicators for days that are likely to be biweekly or bimonthly paydays, and others. The unit of observation in these regressions is the family/day/supercategory. We apply the parameter estimates from each regression to the entire event study, and for each family/day/supercategory we compute a regression residual and add it back to the family-specific baseline average value to get the daily time series depicted in Exhibits 11 and 18. In order to improve computational efficiency, we compute the responses reported in Exhibits 8, 9, 12, 14, and 19 using unsmoothed values. For analyses at the weekly or monthly level, using smoothed values has no substantive impact on the patterns reported here but is computationally expensive; daily variation as shown in Exhibits 11 and 18 would be considerably more difficult to read without smoothing.

Computing preparation for tax payment

As with the refund response analyses, we compute daily expenditures, inflows, net savings, and daily checking account balances for each payment family in our event study sample on each of the 365 days around the day they make their tax payment(s). In computing expenditures, we do not include the family’s tax payment(s). We then compute a family-specific baseline, which is that family’s average daily value for each of these outcomes for the 162 days leading up to 21 days before the first tax refund. In this case, the choice to end the baseline at 21 days before the tax refund is data-driven; we observed a kink in the trend of average account balances starting then (see Exhibit 17). Global average values for each of these outcomes are: \$219 per day in expenditures, \$215 per day in inflows, \$4.23 in net savings, and an average daily checking account balance of \$7,782.

Systematic calendar variation was smoothed out of the daily event studies in the left panel of Exhibit 17 using the same regression technique described for the refund response analysis, described above.

Endnotes

- 1 Baugh et al., (2018) use a very similar research design and administrative data from an online financial account aggregator to identify financial impacts of tax refunds and tax payments. Our analysis expands on theirs by including cash balances and revolving credit card debt, and more granular income and spending categories. In addition, we take advantage of a larger sample size in order to further segment both refund and payment families and test whether there are pockets in these two groups where these overall patterns do not hold. We also offer more insights into differences between families making payments and families receiving refunds. Our main findings agree with theirs—expenditures respond sharply to the arrival of a tax refund, but not to the disbursement of a tax payment. Other related papers that examine the impacts of tax refunds and rebates on a more limited range of financial outcomes include Agarwal et al., (2007), which examines the impacts of the 2001 tax rebate on credit card payments, spending, and debt; and Parker and Souleles (2017), which looks at the spending response out of the 2008 economic stimulus payments. More recently, Aladangady et al., (2018) examines how Earned Income Tax Credit recipients spend their rebate. Two stylized facts emerge from these papers. First, households increase consumption and pay down more debt at the time the tax refund or rebate is received. Second, the consumption response is proportionally larger for more liquidity-constrained households.
- 2 This taxonomy of flows is qualitatively accurate but imperfect. Not all transfers from the checking account to saving-oriented accounts necessarily represent saving, nor do all transfers in the opposite direction necessarily represent dissaving. For example, families can spend directly out of a saving-oriented account, in which case a transfer into that account offsets expenditure and does not represent net savings. Similarly, if families target a specific buffer amount to hold in their checking accounts, then they may transfer cash from a saving-oriented account into the checking account but not spend it, in which case the transfer does not represent dissaving. Similarly, not all saving takes place through a direct transfer into a saving-oriented account. For example, after receiving a refund, a family may shift spending toward the checking account and allow other inflows to accumulate in other accounts.
- 3 The first refunds or payments affected by the “Tax Cuts and Jobs Act of 2017” would appear in 2019 data; this report includes only refunds and payments prior to the tax reform bill.
- 4 The unit of analysis here is the family/year, so if a family is in one group in 2015 and another in 2016, then they contribute one observation to each group.
- 5 The balances and take-home income represented in Exhibits 4 and 5 are from the calendar year preceding the year of the payment or refund; they are the income and average daily balance from the tax year on which the payment or refund is based.
- 6 As we have reported above, about 58 percent of families in this group receive more than one refund over more than one day (for example, a Federal refund, followed a few days later by a State refund). We focus the event study around the day that the first refund is received. This allows us to identify whether families begin to take action in the days between when they file (and therefore learn precisely how much to expect) and when they receive any cash. Although the event study centers around the first refund of the year, when we compute responses as a fraction of the refund we use the sum of all refund amounts, not just the first refund.
- 7 There are at least three reasons why the increases in expenditures, increases in net savings, declines in inflows, and increases in the account balance might not exactly add up to the entire tax refund amount. First, families who receive multiple refunds likely do not receive them all on the same day, so initial levels of flows and balances will likely not sum to the total refund amount as refunds subsequent to the first have not arrived yet. Second, as discussed in the Data and Methods section, we trim the tails of the distribution of each category, so the components may not add up perfectly. Third, as we discuss in the Data and Methods section, we include Chase credit card transactions in expenditures, rather than payments of Chase credit card bills. This introduces a discrepancy between the timing of expenditure changes on the one hand and the timing of offsetting changes in other flows and checking account balances on the other.
- 8 The cumulative response starting three weeks before the refund is received up to the end of the first week after is \$947, as shown in the second bar. Of these, \$129 occur during the three weeks leading up to the refund, as shown in the leftmost bar. This leaves \$818 occurring during the first week after the tax refund arrives.
- 9 Another noteworthy pattern in the second and third rows is that in the week and month after the refund is received, the average fractions saved (74 percent and 67 percent, respectively) are significantly higher than the ratio of the average saving response to the average tax refund (which can be computed from Exhibit 8: 64 percent and 52 percent, respectively—for example, for day 6 the sum of \$582 in net savings and \$1,716 in elevated account balance represents 64 percent of the \$3,607 average refund). This reflects the fact that the families who received the largest refunds saved the smallest fractions over those early days. By six months after the refund is received, the average fraction saved is equal to the ratio of average saving response to average tax refund, which reflects the fact that there is no longer any strong correlation between refund saved and fraction saved.
- 10 Taking the areas under the curves in Exhibit 9 starting from day -21 and up to days -1, 6, 30, and 180 would yield values that are substantively the same but slightly numerically different from those shown in Exhibit 8. This is because, as we discuss in the Data and Methods section, systematic calendar-time variation is smoothed out of the event studies in Exhibit 9, but it is not smoothed out of the snapshots in Exhibit 8. Systematic calendar variation creates sufficient noise that Exhibit 9 would be considerably more difficult to read if the series were not smoothed.
- 11 As we discuss in the Data and Methods section, an inclusion criterion for our event study is that we observe account activity for the 365 days around the arrival of the first tax refund of each year (182 days before receipt, the day of receipt, and 182 days after). However, we also drew a sample for whom we observe account activity beginning 182 days before the refund and ending 365 days after. For this subset, we observe a similar pattern—average account balances settle to a new steady state, which is just over 11 percent above the baseline average, starting around 110 days after receipt. They remain 10-14

percent above baseline until about day 320, when they begin to rise again; they never return to the original baseline. At 361 days since refund receipt, average account balances are 32 percent above baseline, presumably in large part because of the following year's refund.

- 12 Since the temporal resolution of credit card balances is relatively coarse (monthly, rather than daily), and since the three months of tax season overlap substantially with the first quarter of a new year, it is possible that some of the pattern in Exhibit 10 reflects a run-up in holiday spending, which is then paid for in the first quarter of the following year. However, as shown in Exhibit 8, the sharp decline in revolving balances comes alongside an increase in overall expenditure that significantly exceeds any increase in income. Therefore, the cash infusion from the tax refund almost certainly enables a significant fraction of the deleveraging we observe.
- 13 In analyses not discussed in this report, we also stratified on a third characteristic—namely, quintile of take-home income. Those comparisons are substantively the same as the comparisons we report here—the lower income quintiles, like earlier filers and the “high impact” stratum, hold a smaller fraction of their refunds in cash at the end of six months and, like the earlier filers, pay down more revolving credit card debt in the month when they receive their refunds.
- 14 The baseline values are: for the higher impact stratum, \$129 per day in expenditures, \$127 per day in inflows, \$2.48 per day in net dissaving, and average daily checking account balances of \$1,064. For the lower impact stratum, \$181 per day in expenditure, \$180 per day in inflows, \$2.89 per day in net dissaving, and average daily checking account balances of \$5,877. For January and February refund recipients, \$129 per day in expenditures, \$129 per day in inflows, \$1.32 per day in net dissaving, and average daily checking account balances of \$1,915. For March refund recipients, \$157 per day in expenditures, \$156 per day in inflows, \$2.60 per day in net dissaving, and average daily account balances of \$3,524. For April or May recipients, \$181 per day in expenditures, \$180 per day in inflows, \$3.50 in net dissaving, and average daily checking account balances of \$5,459.
- 15 In the week after the refund, average cash withdrawals are \$495 for the higher impact stratum and \$171 for the lower, compared with baselines of \$135 and \$115. Average credit card bill payments are \$172 for the higher impact stratum and \$166 for the lower, compared with baselines of \$55 and \$123. Durable goods purchases are \$64 for the higher impact stratum and \$37 for the lower, compared with baselines of \$21 and \$29.
- 16 In the week after the refund, average cash withdrawals are \$431 for the earliest filers and \$216 for the latest, compared with baselines of \$129 and \$117. Average credit card bill payments are \$155 for the earliest filers and \$175 for the latest, compared with baselines of \$59 and \$123. Durable goods purchases are \$59 for the earliest filers and \$42 for the latest, compared with baselines of \$22 and \$28.
- 17 In the high impact versus low impact segmentation we perform on tax refund families above, we compare the size of the tax refund to the average magnitude of balances across all liquid accounts in October, November, and December of the prior year. In this segmentation of tax payment families we compare the size of the tax payment(s) to just the checking account balance as of 21 days prior to making the payment. We focus on the checking account because we wanted a baseline period closer to the tax payment, and average daily balances were not available for all deposit account types (only end of month balances in some cases).
- 18 However, it is important to note two subpopulations which may include many families who were taken off guard by their payments, but who are not included in these analyses. First, we identify payers using the presence of a payment transaction, so those who fail to pay for more than a calendar year will not appear in our sample. Furthermore, those who pay their tax bills with credit cards are not included in our sample.
- 19 See Jones, (2012), for a recent review of the literature on several of the potential explanations for overwithholding mentioned here.

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