

The 2019 Federal Reserve Payments Study

A Federal Reserve System publication



The 2019 Federal Reserve Payments Study (2019 study) is the seventh in a series of triennial studies conducted by the Federal Reserve System since 2001 to estimate aggregate trends in noncash payments in the United States.

This brief contains initial results for 2018 on the national use of core noncash payment systems, defined as credit cards, prepaid and non-prepaid debit cards, the automated clearing-house (ACH) system, and checks. It also reports initial data for 2018 on the national use of automated teller machines (ATMs) for cash withdrawals.¹ The 2018 data are compared with data from previous years to track changes in the U.S. payments system over those years. Some data from previous survey years are restated in this brief to account for new information or to provide consistency in light of changes to survey questions and definitions.²

Estimates of core noncash payment volumes are based on survey data gathered from depository and financial institutions, general-purpose card networks, and general-purpose and private-label card processors and issuers in the United States.³ The 2019 study covers payments initiated in 2018 from U.S. domestic deposit, prepaid debit card program and credit card accounts, as well as withdrawals and deposits of cash at depository institutions. The data encompass the payment and withdrawal activities of consumers and businesses, including for-profit and not-for-profit enterprises and federal, state, and local government agencies.

Key Findings

- The number of core noncash payments, comprising debit card, credit card, ACH, and check payments, reached 174.2 billion in 2018, an increase of 30.6 billion from 2015. The value of these payments totaled \$97.04 trillion in 2018, an increase of \$10.25 trillion from 2015.⁴
- By number, the growth rate of core noncash payments was 6.7 percent per year from 2015 to 2018, higher than the growth rate of 5.1 percent per year from 2012 to 2015. By value, the recent growth rate (3.8 percent per year) was slightly higher than the growth rate of the prior period (3.6 percent per year).
- Total card payments (both credit and debit), which represented 7.3 percent of core noncash payments by value and 75.3 percent by number in 2018, grew at a rate of 8.9 percent per year by number between 2015 and 2018—up from the 6.8 percent yearly rate of increase from 2012 to 2015. Debit cards, including both prepaid and non-prepaid, were used almost twice as often as credit cards in 2018, but the value of credit card payments exceeded the value of debit card payments by almost 30 percent.

¹ While the study does not collect information on the number and value of cash payments, it does collect information on the number and value of various kinds of cash withdrawals from and deposits to the banking system.

² Previous iterations of the triennial study yielded estimates of national totals for card, check, and ACH payments, as well as ATM cash withdrawals, for every three years from 2000 to 2015. Supplementary surveys, conducted in 2017 and 2018, provided national totals for card payments in 2016 and 2017 but provided only partial data on ACH payments, check payments, and ATM cash withdrawals. Previous data and reports are available at https://www.federalreserve.gov/paymentsystems/frps_previous.htm.

³ The Federal Reserve System appreciates the support of the payments and financial services industry in this effort, particularly the essential support of institutions and organizations that responded to the surveys.

⁴ All reported values are in nominal U.S. dollars.

- The value of *remote* general-purpose card payments reached \$3.29 trillion in 2018, nearly equal to the value of *in-person* general-purpose card payments, driven in part by growing e-commerce card payments and the use of cards for recurring bill payments.
- In-person general-purpose card payments increasingly involved chip authentication: More than half used chip authentication in 2018 compared with 2.0 percent in 2015.
- Total ACH payments, comprising both credit transfers and debit transfers, grew 6.0 percent per year by number and 7.2 percent per year by value from 2015 to 2018, faster by both measures than from 2012 to 2015.
- In 2018, for the first time, the number of ACH debit transfers (16.6 billion) exceeded the number of check payments (14.5 billion). In 2000, in contrast, the number of ACH debit transfers stood at 2.1 billion compared to 42.6 billion check payments.
- In a return to the more accelerated decline observed from 2003 to 2012, the number of check payments fell 7.2 percent per year from 2015 to 2018. After increasing from 2012 to 2015, the value of check payments resumed its decline, decreasing 4.0 percent per year from 2015 to 2018.
- The number of ATM cash withdrawals was 5.1 billion in 2018, a slight decline of 0.1 billion from 2015. The average value of ATM cash withdrawals continued to rise, increasing to \$156 in 2018 from \$146 in 2015, accordant with the continued decrease in the total number and the continued rise in the total value of ATM cash withdrawals.

Overview of Noncash Payments

Taken together, prepaid and non-prepaid debit cards, credit cards, ACH credit and debit transfers, and checks compose a set of noncash payment types commonly used today by consumers and businesses in the United States. These core noncash payment types have retained their ability to be used in traditional ways even as they are adapted for use in innovative, nontraditional ways. Indeed, many alternative payment methods and services, such as smartphone and internet-based services, ultimately involve payments processed through the general-purpose card networks or the ACH system.

In 2018, the number of non-prepaid debit card and credit card payments were each well above the number of either prepaid debit card payments, ACH debit transfers, ACH credit transfers, or check payments ([figure 1](#)). The order by value of the different noncash payment types is nearly the reverse of order by number, with ACH credit transfers, ACH debit transfers, and checks each registering substantially higher total values than the three card types in all years of the study since 2000 ([figure 2](#)).

From 2015 to 2018, the average values of ACH credit transfers and checks increased, the average value of ACH debit transfers decreased, and the average values of non-prepaid debit card, prepaid debit card, and credit card payments were essentially unchanged. The overall average value of noncash payments, which includes all of these payment types, declined to \$557 in 2018 from \$604 in 2015 ([table B.1](#)). This decrease in the overall average value of noncash payments reflects the continued expansion of smaller-value card payments in the total number of noncash payments. In particular, despite the substantially lower average value of card payments, the share of card payments out of all noncash payments increased enough to offset the higher average values of ACH and check payments. Detailed discussion of each payment type below will help shed light on these trends.

Figure 1. Trends in noncash payments, by number, 2000–18

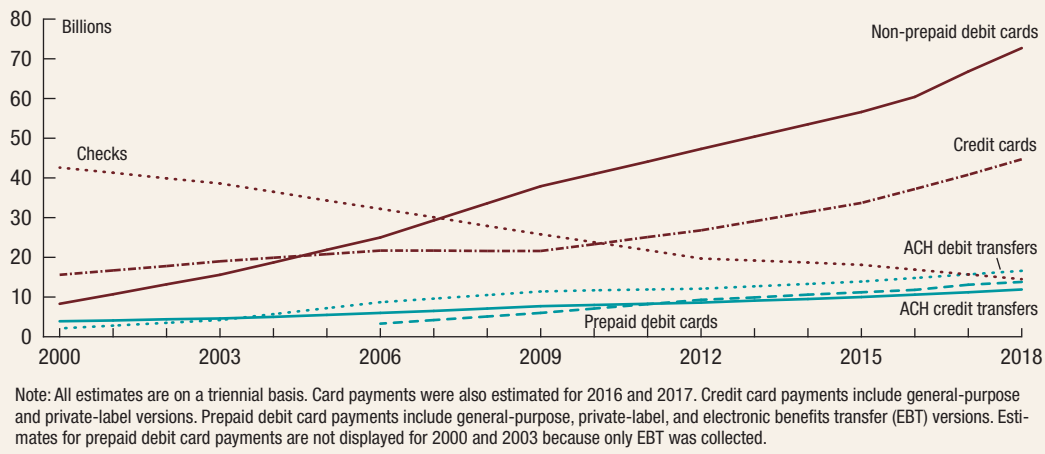
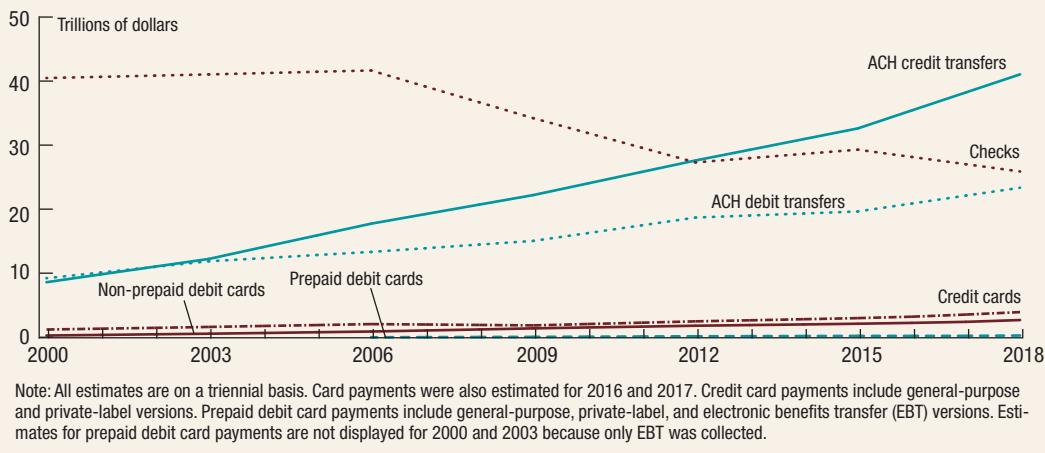


Figure 2. Trends in noncash payments, by value, 2000–18



Card Payments

Total card payments grew to 131.2 billion with a value of \$7.08 trillion in 2018, up 29.7 billion and \$1.56 trillion since 2015. Card payments grew at an accelerated rate of 8.9 percent per year by number and 8.6 percent per year by value from 2015 to 2018, compared with 6.8 percent per year by number and 5.9 percent per year by value from 2012 to 2015 (table B.2). The similar growth rates by number and value from 2015 to 2018 coincide with a stable average value of \$54 for card payments in those two years. In 2018, card payments comprised 75.3 percent of all noncash payments by number but only 7.3 percent by value, an increase from 70.7 percent by number and 6.4 percent by value in 2015.

Non-prepaid debit card payments accounted for 55.4 percent of all card payments in 2018 by number, a negligible decrease from 55.8 percent in 2015. The number of non-prepaid debit card payments increased by 16.0 billion since 2015 to reach 72.7 billion in 2018. This total is approximately equal to the total number of noncash payments of all payment types reported for 2000 in the first triennial study. The number of non-prepaid debit card payments grew

8.7 percent per year from 2015 to 2018, slightly faster than the growth in value of 8.1 percent per year. Growth in the number and value of non-prepaid debit card payments accelerated over the 2015 to 2018 period compared with the 2012 to 2015 period, although the average value of non-prepaid debit card payments was stable at \$38 in 2015 and 2018.

Prepaid debit card payments accounted for 10.5 percent of all card payments in 2018 by number, a decrease from 11.1 percent in 2015. The number of prepaid debit card payments increased to 13.8 billion with a value of \$0.35 trillion in 2018, an increase of 2.6 billion and \$0.06 trillion from 2015.⁵

- *General-purpose prepaid debit card payments* accounted for 43.7 percent of all prepaid debit card payments in 2018 by number, up from 37.9 percent in 2015. General-purpose prepaid debit card payments reached 6.0 billion with a value of \$0.19 trillion in 2018, increasing from 4.3 billion and \$0.15 trillion in 2015. These increases in the number and value of payments from 2015 to 2018 correspond to growth rates by number and value of 12.3 percent per year and 8.7 percent per year, respectively. The average value of these payments dropped from \$35 in 2015 to \$32 in 2018.
- *Private-label prepaid debit card payments* accounted for 40.2 percent of all prepaid debit card payments by number, up from 38.9 percent in 2015. These payments increased to 5.5 billion in 2018 from 4.4 billion in 2015, corresponding to a growth rate of 8.3 percent per year from 2015 to 2018. The value of these payments increased more rapidly, at 12.5 percent per year from 2015 to 2018, to reach \$0.10 trillion in 2018, up from \$0.07 trillion in 2015. Consistent with the more rapid growth in value than number, the average value of private-label prepaid debit card payments has increased steadily from \$13 in 2012 to \$16 in 2015 to \$18 in 2018.
- *Prepaid EBT card payments* by number and value were about one in six of all prepaid debit card payments in 2018. The number of prepaid EBT card payments was 2.2 billion with a value of \$0.06 trillion in 2018, a decline of 5.2 percent per year by number and 7.8 percent per year by value from 2015. By number and value, the decline in prepaid EBT card payments slowed growth in total prepaid debit card payments from 2015 to 2018. The average value of prepaid EBT card payments declined from \$29 in 2015 to \$26 in 2018.

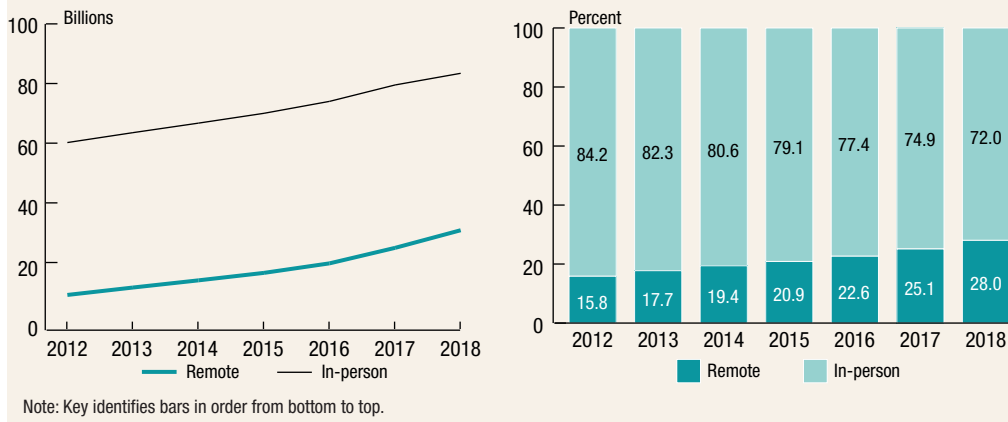
Credit card payments accounted for 34.1 percent of all card payments in 2018 by number, up slightly from 33.2 percent in 2015.⁶ Credit card payments totaled 44.7 billion with a value of \$3.98 trillion in 2018, up from a total of 33.7 billion with a value of \$3.05 trillion in 2015. These increases in the number and value of credit card payments from 2015 to 2018 correspond to growth rates by number and value of 9.9 percent per year and 9.3 percent per year, respectively. As with non-prepaid debit cards, credit card growth by both number and value accelerated from the previous three-year period. Since 2012, reflecting the slightly higher growth rate in the number of payments compared to the value of payments, the average value of credit card payments has steadily declined from \$95 in 2012 to \$91 in 2015 to \$89 in 2018.

- *General-purpose credit card payments* accounted for 91.5 percent of all credit card payments in 2018 by number, down slightly from 92.1 percent in 2015. General-purpose credit card payments were 40.9 billion with a value of \$3.64 trillion in 2018, reflecting growth of

⁵ For purposes of the study, prepaid debit cards comprise general-purpose prepaid debit cards, which share the same networks as non-prepaid debit cards, private-label prepaid debit cards used on proprietary networks for purchases at specific merchants, and electronic benefits transfer (EBT) cards used to provide government assistance, predominantly the Supplemental Nutritional Assistance Program (SNAP) to low-income families.

⁶ For purposes of the study, credit cards are composed of general-purpose credit cards and private-label credit cards used on proprietary networks for purchases at specific merchants.

Figure 3. Trends and distribution of remote and in-person general-purpose card payments, by number, 2012–18



9.7 percent per year by number and 9.1 percent per year by value from 2015. The average value of these payments decreased slightly from \$90 in 2015 to \$89 in 2018.

- *Private-label credit card payments* accounted for 8.5 percent of all credit card payments in 2018 by number, up from 7.9 percent in 2015. Private-label credit card payments increased to 3.8 billion with a value of \$0.34 trillion in 2018, reflecting growth of 12.7 percent per year by number and 11.0 percent per year by value from 2015. Private-label credit card payments averaged \$93 in 2015 and \$89 in 2018, similar to the average values of general-purpose credit card payments in those years.

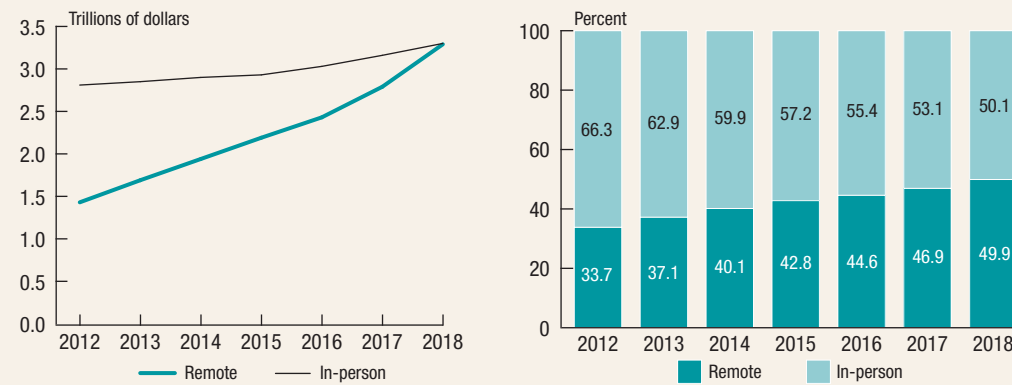
Remote General-Purpose Card Payments

The number of remote general-purpose card payments (hereafter, “remote card payments”) grew 20.5 percent per year from 2015 to 2018, which was significantly higher than the growth rate of 5.8 percent per year for in-person general-purpose card payments (hereafter, “in-person card payments”) over the same period. At the same time, the number of in-person card payments continued to exceed the number of remote card payments by a substantial margin over the 2015 to 2018 period (figure 3). In 2018, the number of in-person card payments was 86.1 billion, up 13.4 billion from 2015, compared with 33.5 billion remote card payments in 2018, up 14.3 billion from 2015.

Even though a wide gap remained between the number of remote and in-person card payments in 2018, remote card payments had closed the gap in value with in-person card payments (figure 4). From 2015 to 2018, the value of remote card payments increased 14.4 percent per year, a substantially higher growth rate than the 4.0 percent per year growth of in-person card payments over the same period. From 2012 to 2018, the increase in the total value of remote card payments was nearly four times the increase in the total value of in-person card payments. As a result, while the value of in-person card payments had risen to \$3.30 trillion in 2018, the value of remote card payments in 2018 was nearly the same at \$3.29 trillion.

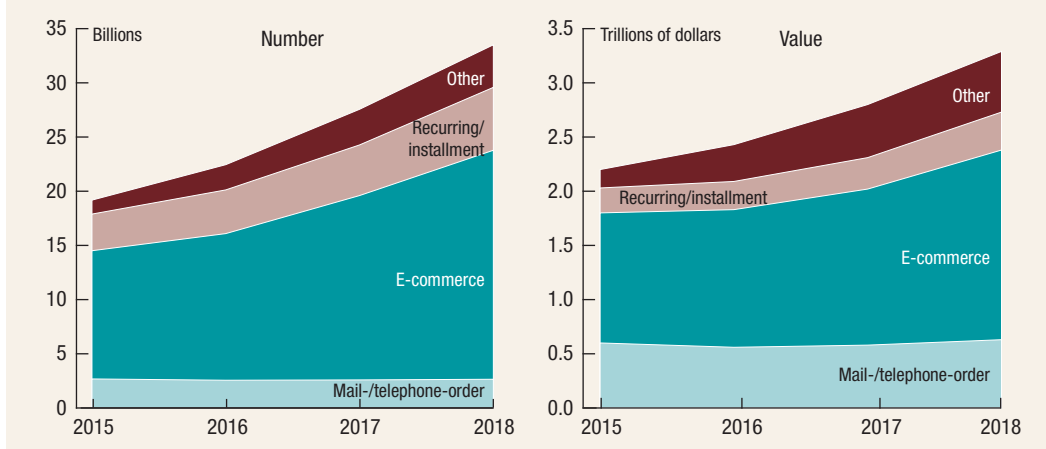
To obtain information about the main sources of growth in remote card payments since 2015, the surveys requested an allocation of remote card payments to four categories: mail-/telephone-order, internet purchase (e-commerce), recurring/installment (e.g., bill pay), and other (figure 5).

Figure 4. Trends and distribution of remote and in-person general-purpose card payments, by value, 2012–18



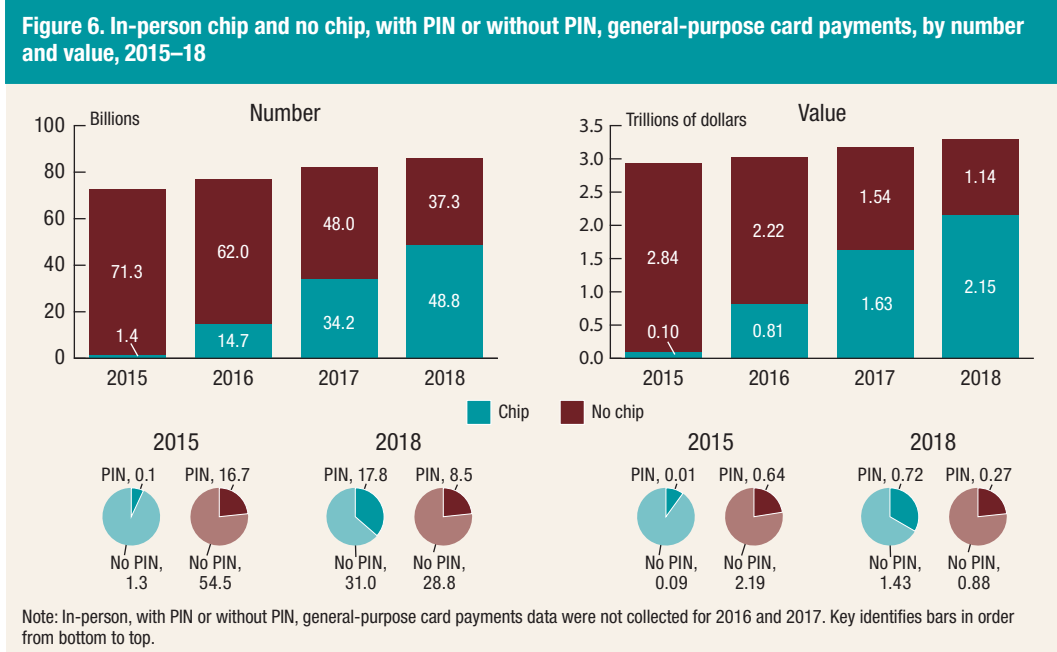
Note: Key identifies bars in order from bottom to top.

Figure 5. Trends in remote general-purpose card payments, by number and value, 2015–18



By number, e-commerce payments with cards were by far the largest category in both 2015 and 2018, representing 61.7 percent of all remote card payments in 2015 and 63.0 percent in 2018. After growing 21.3 percent per year from 2015 to 2018, the number of e-commerce payments with cards reached 21.1 billion in 2018. The number of recurring/installment payments with cards grew nearly as fast from 2015 to 2018, at 19.8 percent per year, yielding 5.8 billion payments in 2018 and making those payments the second largest by number among those four categories. The third largest category in 2018 by number was other remote card payments, which reached 3.9 billion in 2018. Finally, mail-/telephone-order card payments totaled 2.7 billion in both 2015 and 2018, dropping from 14.0 percent of all remote card payments in 2015 to 7.9 percent in 2018.

Despite the closing of the gap in value between in-person and remote card payments, the value of remote card payments grew relatively slowly from 2015 to 2018 compared to the number. Reflecting the slower growth in value, the average value of remote card payments declined from \$114 in 2015 to \$98 in 2018. This decline in the overall average value was driven by declines in the average values for the e-commerce and recurring/installment categories. In par-



ticular, the average value of e-commerce payments with cards declined from \$101 in 2015 to \$83 in 2018, while the average value of recurring/installment payments with cards declined from \$68 to \$60 over the same period. By contrast, the average value of mail-/telephone-order payments with cards increased over the period, rising from \$224 in 2015 to \$239 in 2018, while the average value for other remote card payments grew from \$128 to \$142 over the same period.

In-Person General-Purpose Card Payments

A notable development in recent years for in-person card payments in the United States has been the widespread issuance of chip-based EMV cards beginning in 2015 and the deployment of point-of-sale terminals that support chip-based payment technology.⁷ In 2018, the number of such chip-authenticated card payments reached 48.8 billion, a substantial increase from the 1.4 billion in-person chip-authenticated card payments in 2015 and larger than the 37.3 billion in-person card payments without chip authentication in 2018 (figure 6).

Chip-authenticated card payments in the United States do not generally require the entry of a PIN, although many chip cards support entry of a PIN while using the chip. Increased use of either chips or PINs separately can increase the security of card payments, while the use of a

⁷ Chip-authenticated payments include both those that use the EMV specification and those that do not. Chip-authenticated payments can be made with debit or credit cards or tokens that contain computer microchips or with digital wallets on mobile devices. EMV is a trademark of EMVCo, the organization that sets EMV specifications. Chip card adoption is discussed in more detail in Federal Reserve System, *The 2016 Federal Reserve Payments Study* (Washington: Federal Reserve Board, December 2016), www.federalreserve.gov/paymentsystems/2016-payment-study.htm; Federal Reserve System, *The Federal Reserve Payment Study: 2017 Annual Supplement* (Washington: Federal Reserve Board, December 2017), www.federalreserve.gov/paymentsystems/2017-December-The-Federal-Reserve-Payments-Study.htm; and Federal Reserve System, *The Federal Reserve Payment Study: 2018 Annual Supplement* (Washington: Federal Reserve Board, December 2018), <https://www.federalreserve.gov/paymentsystems/2018-December-The-Federal-Reserve-Payments-Study.htm>.

chip and PIN together can further reduce the risk of third-party payments fraud.⁸ In fact, the data show that in-person card payments in the United States have involved not only increasing use of chips but also both rising use of PINs and rising use of chips and PINs together. In particular, 26.3 billion in-person card payments were based on PIN authentication in 2018, compared with 16.9 billion in 2015, an increase of 9.4 billion over the three-year period. PIN-authenticated payments constituted 30.6 percent of all in-person card payments in 2018, up from 23.2 percent in 2015 (figure 6). Moreover, 17.8 billion in-person card payments, constituting 20.7 percent of all in-person card payments in 2018, involved the use of a chip and PIN together, compared to just 135 million and a negligible percent in 2015.

Unlike remote card payments, the average value of in-person card payments changed little from 2015 to 2018, declining slightly from \$40 to \$38. Chip-authenticated card payments tended to be of higher average value (\$44) compared to card payments without chip authentication (\$31) in 2018. The average value of chip-authenticated payments was relatively high in 2015 (\$68) during the initial phase of the EMV rollout in the United States. Among in-person card payments without chip authentication, those involving PIN authentication were slightly higher, on average (\$31), than those not involving PIN authentication (\$30) in 2018. Among card payments with chip authentication, those also involving PIN authentication were for *lower* amounts, on average (\$41), than those not involving PIN authentication (\$46) in the same year.

Automated Clearinghouse Payments

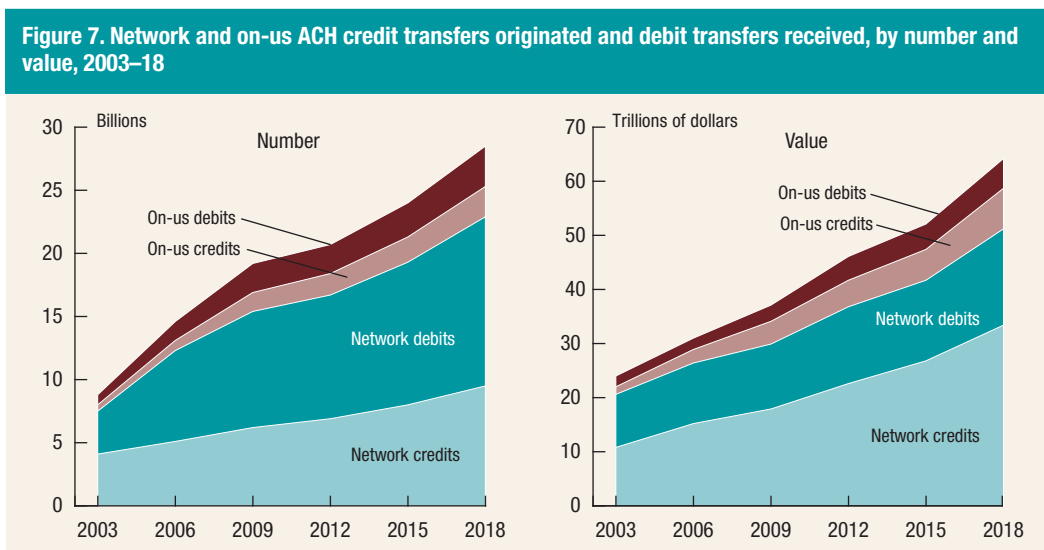
Total ACH payments are estimated to have reached 28.5 billion with a value of \$64.16 trillion in 2018, an increase of 4.6 billion and \$12.08 trillion since 2015. Total ACH payments grew at an accelerated rate of 6.0 percent per year by number and 7.2 percent per year by value from 2015 to 2018, compared with 4.9 percent by number and 4.1 percent by value from 2012 to 2015. ACH payments accounted for 66.1 percent of the value of all noncash payments in 2018, up from 60.0 percent in 2015. By number, ACH payments were 16.4 percent of all noncash payments in 2018, down from 16.7 percent in 2015.

ACH Credit and Debit Transfers

Payments through the ACH system include both credit transfers and debit transfers. ACH credit transfers are payments for which the payer's depository institution "pushes" funds to the payee's depository institution, such as direct-deposit payroll payments. ACH debit transfers are payments for which the payee's depository institution "pulls" funds from the payer's depository institution, such as an insurance or mortgage payment drawn from an individual's account on a prearranged basis.

ACH credit transfers were 11.9 billion with a value of \$40.87 trillion in 2018, an increase of 1.9 billion and \$8.40 trillion since 2015. ACH credit transfers grew at a higher rate of 6.0 percent per year by number and 8.0 percent per year by value from 2015 to 2018, compared with 5.1 percent per year by number and 5.7 percent per year by value from 2012 to 2015. ACH debit transfers were 16.6 billion with a value of \$23.28 trillion in 2018, an increase of 2.7 billion and \$3.68 trillion since 2015. ACH debit transfers also grew at a higher rate of 6.1 percent

⁸ Additional information on third-party payments fraud is presented in Federal Reserve System, *Changes in U.S. Payments Fraud from 2012 to 2016: Evidence from the Federal Reserve Payments Study* (Washington: Federal Reserve Board, October 2018), <https://www.federalreserve.gov/publications/files/changes-in-us-payments-fraud-from-2012-to-2016-20181016.pdf>.



per year by number and 5.9 percent per year by value from 2015 to 2018, compared with 4.8 percent per year by number and 1.7 percent per year by value from 2012 to 2015.

Network and On-Us ACH

Most ACH payments pass between depository institutions over the ACH network and are reported by the network operators. Some depository institutions also process ACH payments between their own customers internally, called in-house on-us payments or, for simplicity, on-us payments.⁹

Network ACH payments reached 22.9 billion with a value of \$51.25 trillion in 2018, an increase of 3.7 billion and \$9.61 trillion since 2015. These payments grew at an increased rate of 6.0 percent per year by number and 7.2 percent per year by value from 2015 to 2018, compared with 4.9 percent per year by number and 4.1 percent per year by value from 2012 to 2015. On-us ACH payments are estimated to have been 5.6 billion by number, with a value of \$12.90 trillion in 2018, an increase of 0.9 billion and \$2.47 trillion since 2015. On-us ACH payments are estimated to have grown at a rate of 6.3 percent per year by number and 7.3 percent per year by value from 2015 to 2018.¹⁰

Network and on-us ACH payments can be further broken down into credit and debit transfers (figure 7). Network ACH credit transfers were 9.5 billion with a value of \$33.42 trillion in 2018, an increase of 1.5 billion and \$6.64 trillion since 2015. From 2015 to 2018, network ACH credit transfers grew at a rate of 5.8 percent per year by number and 7.7 percent per year by value. In 2018, network ACH debit transfers reached 13.4 billion with a value of \$17.83 trillion, an increase of 2.2 billion and \$2.97 trillion since 2015. These debit transfers grew at a rate of 6.1 percent per year by number and 6.3 percent per year by value from 2015 to 2018. On-us

⁹ Total network ACH payments in this report are estimated from data provided by the ACH network operators. In some cases, on-us payments are not processed in house and, instead, are included in files submitted to the ACH network operators. These payments are then returned to the depository institution that submitted them; such payments are included in the network ACH estimates. A negligible number of ACH payments are cleared and settled bilaterally between two depository institutions through a process called direct exchange.

¹⁰ Estimates of on-us ACH payments over the 2012 to 2018 period are likely to be revised after further data analysis. See the section [A Note about In-House On-Us ACH Measurement](#) in Appendix A: About the Federal Reserve Payments Study.

ACH credit transfers were 2.4 billion with a value of \$7.45 trillion in 2018, an increase of 0.4 billion and \$1.75 trillion since 2015. From 2015 to 2018, on-us ACH credit transfers grew at a rate of 6.6 percent per year by number and 9.4 percent per year by value. On-us ACH debit transfers were 3.2 billion with a value of \$5.45 trillion in 2018, an increase of 0.5 billion and \$0.71 trillion. These increases corresponded to growth of 6.1 percent per year by number and 4.8 percent per year by value from 2015 to 2018.

Check Payments

Checks Paid and Checks Written

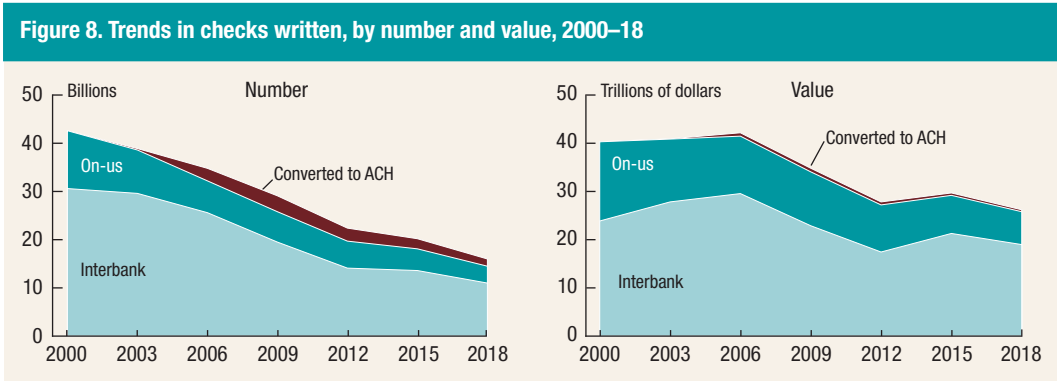
Check payments declined to 14.5 billion with a value of \$25.80 trillion in 2018, a decrease of 3.6 billion and \$3.39 trillion from 2015. From 2015 to 2018, check payments declined 7.2 percent per year by number and 4.0 percent per year by value. Although the rate of decline by number is higher than the decline of 2.8 percent per year from 2012 to 2015, it is in line with declines posted from 2003 to 2012. By value, changes in check payments have proven to be less stable than changes by number. In particular, value declined from 2015 to 2018, following an increase from 2012 to 2015. Previously, checks had declined from 2006 to 2012 after having increased from 2000 to 2006. The average value of check payments grew to \$1,779 in 2018, compared with \$1,609 in 2015 and \$1,378 in 2012. The average value of check payments in 2000 was \$945. Check payments accounted for 8.3 percent by number and 26.6 percent by value of core noncash payments in 2018, down from 58.8 percent by number and 67.4 percent by value in 2000.

Some checks are taken out of the check clearing process and converted to ACH payments, but the practice has declined since peaking around the time that electronic check-processing took hold. The sum of check payments and checks converted to ACH payments is equal to total checks written (table B.1). Total checks written declined to 16.0 billion with a value of \$26.20 trillion in 2018, a decrease of 4.2 billion and \$3.48 trillion from 2015. The average value of checks written grew to \$1,635 in 2018 from \$1,468 in 2015.

Interbank and On-Us Checks

Check payments are composed of interbank and on-us check payments and exclude checks converted to ACH payments.¹¹ When a commercial check is deposited at a different depository institution than the paying depository institution—the one that holds the account against which the check was written—it is called an interbank check. Commercial checks that are deposited at the paying depository institution are called on-us checks. The number of interbank check payments fell to 11.0 billion with a value of \$18.98 trillion in 2018, a decrease of 2.6 billion and \$2.31 trillion from 2015 (figure 8). From 2015 to 2018, interbank check payments declined 6.9 percent per year by number and 3.8 percent per year by value. On-us check payments fell to 3.5 billion with a value of \$6.82 trillion in 2018, a decrease of 1.0 billion and \$1.07 trillion from 2015. On-us check payments declined more rapidly than interbank check payments at 8.2 percent per year by number and 4.8 percent per year by value from 2015 to 2018.

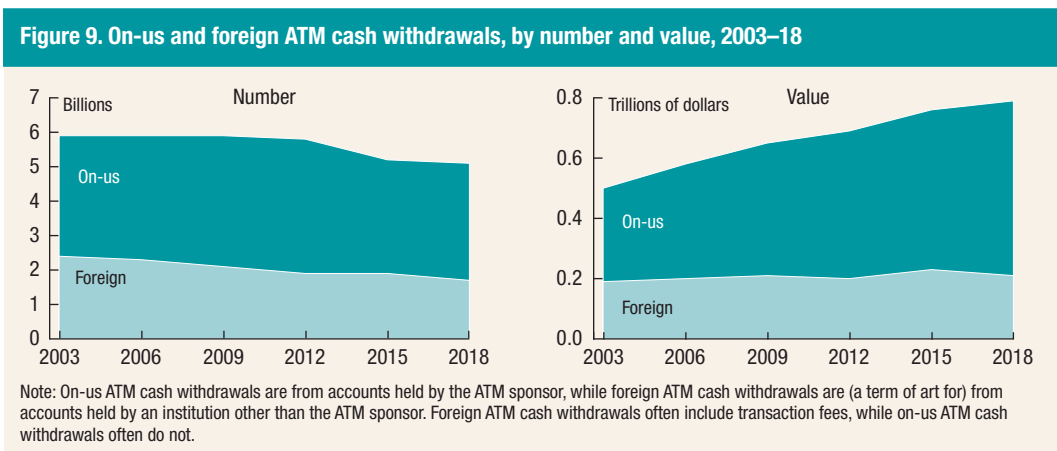
¹¹ Once converted, the check is considered a “source document” for the ACH payment.



Automated Teller Machine Cash Withdrawals

While ATM cash withdrawals—estimated in each triennial study since 2003—hovered just below 6.0 billion through 2012, the number of withdrawals had dropped in 2015 and 2018. The number of ATM cash withdrawals fell to 5.1 billion in 2018, a slight decline of 0.1 billion since 2015, while the value grew to \$0.80 trillion, an increase of \$0.03 trillion from 2015 (figure 9). ATM cash withdrawals fell at a rate of 0.9 percent per year by number from 2015 to 2018, while increasing at a rate of 1.5 percent per year by value. The average value of ATM cash withdrawals was \$156 in 2018, an increase from \$146 in 2015.

On-us ATM cash withdrawals, made from ATMs owned by the account holder’s depository institution, were 3.4 billion by number with a value of \$0.58 trillion in 2018. While the number of on-us ATM cash withdrawals remained relatively stable, the value increased throughout 2003 to 2018, and specifically grew 3.0 percent per year from 2015 to 2018. Foreign ATM cash withdrawals—those made from ATMs not owned by the account holder’s depository institution—fell to 1.7 billion by number with a value of \$0.21 trillion in 2018, a decrease of 0.2 billion and \$0.02 trillion from 2015. Foreign ATM cash withdrawals declined at a rate of 3.7 percent per year by number and 2.3 percent per year by value from 2015 to 2018. The shares of on-us ATM cash withdrawals in total ATM cash withdrawals have increased from 64.0 percent by number and 69.9 percent by value in 2015 to 67.0 percent by number and 73.1 percent by value in 2018.



Appendix A: About the Federal Reserve Payments Study

The Federal Payments Study (FRPS) is a collaborative effort by staff members at the Federal Reserve Bank of Atlanta and the Board of Governors of the Federal Reserve System to track and document developments in the U.S. payments system through the collection of quantitative survey data. Estimates of payments activity enable policymakers, the payments industry, and the public to better understand payment trends and help to inform strategies to foster further improvements in the payments infrastructure.

The estimates reported in this brief are based on information gathered in two survey efforts:

- *Depository and Financial Institutions Payments Survey (DFIPS)*
- *Networks, Processors, and Issuers Payments Surveys (NPIPS)*

Estimates of aggregate totals and trends are developed from individual institutions' response data provided in the surveys, which remain confidential.

2019 Depository and Financial Institutions Payments Survey

The 2019 DFIPS, administered with the help of the GCI Analytics office of McKinsey & Company, collected the number and value of noncash payments, cash withdrawals, and deposits posted to customer accounts and unauthorized transactions (third-party fraud) that took place during calendar year 2018. Noncash payments include transactions by check, ACH, wire transfer, debit card (including non-prepaid and prepaid), credit card, and alternative payment initiation methods and services.¹²

A nationally representative, stratified random sample of 3,800 depository institutions, including some credit card banks, in the United States was drawn. The largest depository institutions were sampled at a higher rate in an effort to count as many transactions as possible and reduce the error introduced by the estimation process. The sample included commercial banks, savings institutions, and credit unions. Estimates for the full population of depository institutions were based on separate ratio estimators constructed for each size and institution-type stratum. Surveys were returned by 1,381 depository institutions.

A Note about In-House On-U.S. ACH Measurement

As discussed in past reports, the nature of internal ACH processing methods complicate accurate measurement because internal databases of depository institutions often include very large value offset ACH transfers that inflate the estimates for the value of in-house on-us ACH payments. Depository institutions have varying methods of tracking internal ACH payments. Since 2012, the structure of the triennial surveys that collect these data has changed several times to try to improve accuracy, which nevertheless complicates attempts to consistently estimate the number and value of in-house on-us ACH payments.

In order to construct consistent estimates for this brief, ratios of total ACH payments to network ACH payments by number were calculated as the average of estimated ratios from the separate surveys. The average ratios were calculated for ACH credit transfers (1.29) and ACH debit transfers (1.25) separately, and were used to derive in-house on-us ACH payments for each year. Then the average value of network ACH payments was used in combination with an estimate of the total number of in-house on-us ACH payments to calculate the value of

¹² Additional detailed data from the surveys are expected to be released later.

in-house on-us ACH credit and debit transfers separately, an approach used to report total ACH payments prior to the 2013 study.

2019 Networks, Processors, and Issuers Payments Surveys

The 2019 NPIPS, administered with the help of Blueflame Consulting, estimated the number and value of electronic payments in the United States for calendar year 2018. Data were collected through surveys sent to the full population of the relevant payment organizations, such as card networks, issuers and processors of card and alternative payment methods and services. Aggregate estimates were constructed by totaling data for the individual organizations. In cases of nonresponse or missing data, estimates for individual organizations were constructed from available information. Surveys were returned by 55 payment organizations that process, clear, or settle core noncash payments. Relevant for future work, surveys were also returned by 90 organizations involved in alternative payment methods and systems, as well as 131 transit system operators.

Appendix B: Tables

Table B.1. Noncash payments, 2012, 2015, and 2018									
Noncash payment type	2012			2015			2018		
	Number (billions)	Value (\$ trillions)	Average (\$)	Number (billions)	Value (\$ trillions)	Average (\$)	Number (billions)	Value (\$ trillions)	Average (\$)
Total	123.9	78.01	630	143.6	86.78	604	174.2	97.04	557
Cards	83.4	4.65	56	101.5	5.52	54	131.2	7.08	54
Debit cards	56.5	2.10	37	67.8	2.47	36	86.4	3.10	36
Non-prepaid	47.3	1.87	40	56.6	2.18	38	72.7	2.75	38
Prepaid	9.3	0.23	25	11.2	0.29	26	13.8	0.35	25
General purpose	3.1	0.11	35	4.3	0.15	35	6.0	0.19	32
Private label	3.7	0.05	13	4.4	0.07	16	5.5	0.10	18
Electronic benefits transfer (EBT)	2.5	0.07	30	2.6	0.08	29	2.2	0.06	26
Credit cards	26.8	2.55	95	33.7	3.05	91	44.7	3.98	89
General purpose	24.4	2.27	93	31.0	2.80	90	40.9	3.64	89
Private label	2.5	0.28	112	2.7	0.25	93	3.8	0.34	89
Automated clearinghouse (ACH)	20.7	46.15	2,225	23.9	52.08	2,177	28.5	64.16	2,250
Credit transfers	8.6	27.51	3,194	10.0	32.48	3,253	11.9	40.87	3,441
Debit transfers	12.1	18.65	1,538	13.9	19.60	1,406	16.6	23.28	1,399
Network	16.7	36.88	2,205	19.3	41.64	2,159	22.9	51.25	2,234
Credit transfers	6.9	22.64	3,259	8.0	26.78	3,333	9.5	33.42	3,512
Debit transfers	9.8	14.24	1,456	11.3	14.86	1,321	13.4	17.83	1,328
On-us	4.0	9.28	2,311	4.6	10.44	2,249	5.6	12.90	2,315
Credit transfers	1.7	4.86	2,920	2.0	5.70	2,922	2.4	7.45	3,154
Debit transfers	2.3	4.41	1,880	2.7	4.74	1,761	3.2	5.45	1,697
Checks	19.7	27.21	1,378	18.1	29.18	1,609	14.5	25.80	1,779
Interbank	14.1	17.44	1,234	13.6	21.29	1,564	11.0	18.98	1,725
On-us	5.6	9.77	1,740	4.5	7.90	1,746	3.5	6.82	1,949
Additional estimates									
Checks written	22.5	27.83	1,239	20.2	29.68	1,468	16.0	26.20	1,635
Checks converted to ACH	2.7	0.62	227	2.1	0.50	238	1.5	0.40	263
ATM cash withdrawals	5.8	0.69	118	5.2	0.76	146	5.1	0.80	156

Note: General-purpose card figures are defined as net, authorized, and settled. Figures may not sum because of rounding. Checks written is the sum of "Checks" and "Checks converted to ACH," which uses the check as a source document to initiate the ACH payment.

Table B.2. Changes and rates of change in noncash payments, 2012, 2015, and 2018

Noncash payment type	2012–15 Change		2012–15 CAGR		2015–18 Change		2015–18 CAGR	
	Number (billions)	Value (\$ trillions)	Number (percent)	Value (percent)	Number (billions)	Value (\$ trillions)	Number (percent)	Value (percent)
Total	19.7	8.77	5.1	3.6	30.6	10.25	6.7	3.8
Cards	18.2	0.87	6.8	5.9	29.7	1.56	8.9	8.6
Debit cards	11.3	0.37	6.3	5.5	18.6	0.63	8.4	7.8
Non-prepaid	9.4	0.31	6.2	5.2	16.0	0.57	8.7	8.1
Prepaid	2.0	0.06	6.6	8.2	2.6	0.06	7.1	5.9
General purpose	1.1	0.04	10.7	10.5	1.8	0.04	12.3	8.7
Private label	0.7	0.02	6.1	14.2	1.2	0.03	8.3	12.5
Electronic benefits transfer (EBT)	0.1	0.00	1.7	0.2	-0.4	-0.02	-5.2	-7.8
Credit cards	6.8	0.51	7.9	6.2	11.1	0.93	9.9	9.3
General purpose	6.6	0.53	8.4	7.3	9.9	0.84	9.7	9.1
Private label	0.2	-0.03	2.8	-3.5	1.2	0.09	12.7	11.0
Automated clearinghouse (ACH)	3.2	5.92	4.9	4.1	4.6	12.08	6.0	7.2
Credit transfers	1.4	4.97	5.1	5.7	1.9	8.40	6.0	8.0
Debit transfers	1.8	0.95	4.8	1.7	2.7	3.68	6.1	5.9
Network	2.6	4.76	4.9	4.1	3.7	9.61	6.0	7.2
Credit transfers	1.1	4.13	5.0	5.7	1.5	6.64	5.8	7.7
Debit transfers	1.5	0.63	4.8	1.4	2.2	2.97	6.1	6.3
On-us	0.6	1.16	5.0	4.0	0.9	2.47	6.3	7.3
Credit transfers	0.3	0.84	5.4	5.4	0.4	1.75	6.6	9.4
Debit transfers	0.3	0.33	4.7	2.4	0.5	0.71	6.1	4.8
Checks	-1.6	1.97	-2.8	2.4	-3.6	-3.39	-7.2	-4.0
Interbank	-0.5	3.85	-1.2	6.9	-2.6	-2.31	-6.9	-3.8
On-us	-1.1	-1.88	-7.0	-6.9	-1.0	-1.07	-8.2	-4.8
Additional estimates								
Checks written	-2.2	1.85	-3.4	2.2	-4.2	-3.48	-7.5	-4.1
Checks converted to ACH	-0.6	-0.12	-8.5	-7.0	-0.6	-0.09	-9.9	-6.8
ATM cash withdrawals	-0.6	0.08	-3.4	3.6	-0.1	0.03	-0.9	1.5

Note: General-purpose card figures are defined as net, authorized, and settled. Figures may not sum because of rounding. CAGR is compound annual growth rate. Checks written is the sum of "Checks" and "Checks converted to ACH," which uses the check as a source document to initiate the ACH payment.

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