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Payments Evolution from Paper to Electronic Payments by Merchant Type

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Abstract:
The use of paper instruments—cash and checks—has been declining in the United States, and consumers have been gradually replacing paper with cards and electronic payments. Stavins (2021) examines the evolution of payments from paper to cards and electronic payments, while Shy (2020) shows the payments landscape across merchant types. This paper combines the cross-sectional analysis across merchants with the aggregate time series study to analyze the evolution of consumer payments by merchant type. Using data from a representative diary survey of US consumers collected annually over the past several years, we examine changes for each merchant type to assess which transactions shifted from paper to electronic payments and from in-person to remote transactions. We find that cash use declined faster than check use, in large part because transactions shifted from in person to remote. While the cash-use share of transactions dropped for almost all merchant types, changes in check use were much more heterogenous across merchants. COVID-19 accelerated the payments evolution away from cash for some merchant types, as their drop in cash payments was much larger during the pandemic than prior to it. Merchants whose transactions are typically conducted in person experienced the largest decline in cash payments during the pandemic. Regression results show that the probability of using either cash or checks declined significantly in 2019 and 2020, even after controlling for merchant types, the dollar value of transactions, and consumers' socio-demographic attributes.

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Section 1. Introduction

US payments have been shifting away from paper instruments—cash and checks—and toward card and electronic payments. Although that transformation has been taking place for several years, the majority of US consumers continue to hold paper checks, even if they rarely use those checks to make payments, and almost every consumer in the United States continues to use cash. One of the reasons why this transition from paper to cards and electronic payments has extended over many years, or even decades, is that both consumers and merchants are heterogenous, and no single method of payment serves all consumers or all types of merchants.

Previous research shows that consumer payment behavior is heterogenous across consumers who make payments (Stavins 2017; Schuh and Stavins 2010; Shy 2021) and across merchants who accept them (Shy 2020; Greene et al. 2020). Similarly, the path of payment transformation away from paper has not been uniform across consumers or across merchants. Even if consumers opt to shift away from checks, merchants may prefer to accept checks rather than credit and debit cards, for which merchants are charged high processing fees (Felt et al. 2020). For example, a consumer may prefer to use debit cards for most transactions, but they continue to write a paper check to pay rent every month because that is what their landlord expects. Alternatively, a merchant may prefer to accept cash to avoid high merchant fees, but they accept credit cards to keep their customers from going next door to a competitor that accepts cards.

Stavins (2021) shows how the transition has varied across consumers, while Shy (2020) shows how consumer payments have varied across merchant types. In this paper, we use data from a detailed diary of consumer payment behavior collected from a representative sample of US consumers to analyze changes in payment use from 2017 to 2020 across different merchant types. We show how cash use and check use changed in the aggregate and by merchant type, and which payment methods replaced the use of cash and checks for merchant types that experienced the largest change in cash or check use by consumers. Our sample includes data collected before and during the COVID-19 pandemic, allowing us to analyze how the pandemic affected payment use across different merchant types.

Our analysis shows that, compared with the share of payments made by check, the share made with cash declined more rapidly during the sample period, and the decline in cash use by consumers was experienced by almost all merchant types. The payments evolution was more heterogenous across merchant types for check use—for some merchant types, the share of payments made by check declined, while for others it did not change at all. In addition to shifting from paper to electronic methods, payments shifted from in person to remote. Because remote payments are not conducted with cash, the increase in remote payments led to a decline in the use of cash. The share of check transactions conducted remotely increased substantially over the past few years, especially in 2020 during the pandemic.

Analysis of individual merchant types allows us to observe the effect of the COVID-19 pandemic on consumer payment behavior in various sectors. Although the pandemic accelerated a shift away from cash and away from in-person transactions in general (Greene and Stavins 2021), that effect varied greatly across merchant types. In particular, merchants whose transactions were typically conducted in person, such as fast-food restaurants or arts and entertainment venues, experienced the largest decline in cash use by consumers during the pandemic.

Based on data from the Federal Reserve Payments Study (FRPS), the total number of check payments in the United States decreased 8.2 percent per year on average from 2015 through 2018 (FRS 2020). From 2000 through 2018, the total number of checks, including those paid by businesses and the government, plummeted from 42.6 billion to 14 billion, a 67 percent drop. During the same time period, the number of checks written by consumers fell from 19.3 billion to 7.1 billion, a 63 percent drop (Figure 1a). The decline in the share of payments made by check was even more pronounced—the aggregate check-use share dropped from 58.8 percent of all noncash payments in 2000 to 8.1 percent in 2018 (Figure 1b). Despite the decline in check use over the past several years, the United States still had the largest percentage of check use as a share of noncash payments in the world, according to a comparison of check use among 22 countries conducted by the Bank for International Settlements (BIS) in 2019 (Figure 2). In addition to other payment methods, our data include cash use, which is rarely available in other sources. For a comparison of cash use across countries, see Khiaonarong and Humphrey (2019).

This paper is organized as follows. Section 2 describes the data and provides an overview of changes in the shares of payments made with cash and by check. Section 3 provides a deeper analysis of changes in the shares of payments made with cash among the 10 merchant types that use cash most intensively. Section 4 provides a deeper analysis of changes in the shares of payments made by check among the 10 merchant types that use checks most intensively. Section 5 describes results from regression analysis. Section 6 concludes.

Section 2. Use of cash and checks over 2017–2020: An overview

This section describes the data sources and provides an overview of the declines in the shares of payments made with cash and checks, both classified as "paper" payment instruments.

Section 2a. Data

The analysis of consumer payment choice involves a classification of payment methods into categories such as cash, paper checks, credit cards, debit cards, prepaid cards, and electronic payments out of bank accounts. Data on "how consumers pay" are collected by consumer surveys in which consumers list all the payment instruments they have (adopt) and how they use them.

In particular, in diary surveys consumers record—either in real time or by the end of each day—information about all of their payment-related activities, including dollar amounts, transaction types, merchant types, and payment methods, as well as money transfers in general and ATM cash withdrawals in particular.

We use data from the 2017, 2018, 2019, and 2020 Diary of Consumer Payment Choice (DCPC).[1] The DCPC surveys a representative sample of US adults. DCPC respondents record all of their transactions during three consecutive days. Transactions include purchases (in person or

[1] The diary is conducted through a collaboration between the Federal Reserve Banks of Atlanta, Boston, and San Francisco. The data and assisting documents (codebooks) are publicly available for downloading from the Federal Reserve Bank of Atlanta's Consumer Payments webpage. Summary reports are given in Greene and Stavins (2021) and Kim, Kumar, and O'Brien (2021). Similar surveys are conducted by the Bank of Canada; see Henry, Huynh, and Welte (2018).

online), bill payments, and ATM withdrawals and deposits. Respondents' three-day diaries are evenly distributed throughout the month of October each year. Each October diary day has an equal number of overlapping respondents recording their first-, second-, and third-day payment information.[2]

Table 1 shows the number of respondents and the number of individual transactions made by respondents each year in the sample period.[3] Some of the respondents participated in multiple years; others were added and dropped from one year to another.

When recording their purchases, respondents selected one of 21 merchant categories for each transaction. The number and share of payments as well as the share of the dollar value of payments made at each of the 21 merchant categories in each year are listed in Table 2. These 21 merchant categories cover all types of payments consumers usually make. The merchant-type numbers (1 to 21) correspond to the merchant-type numbers collected in the raw data that, as noted above, are publicly available for downloading.

In the analysis below, we compare the shares of payments made with cash and by check to the share made by cards, which include credit, debit, and prepaid cards, and to the share made by electronic methods, which include online banking bill payments (OBBP) and bank account number payments (BANP). Figure 3 shows the share of each payment method category: cash, check, cards, and electronic by year, based on the DCPC data. The data show that consumers reduced their share of payments made with cash and increased their share of payments made by cards over the past several years. The share of payments made remotely increased for several payment methods, most notably for checks and credit cards, especially in 2020 during the COVID-19 pandemic (Figure 4).

For some merchant types, the number of cash or check transactions is very low or even zero. Merchant types with low use of cash or checks exhibit high volatility in their share of payments made with cash or by check over time due to the very small number of observations.

[2] Jonker and Kosse (2009) compare payment diaries with different time lengths and find that shorter diaries yield more accurate information due to "survey fatigue," which leads respondents to underreport their payment activities.
[3] The 2020 DCPC sample is smaller compared with earlier years because it was split into two subsamples to test different survey designs.

The numbers reported in summary tables are unweighted, although the weighted numbers are similar and available from the authors upon request.

Section 2b. Use of cash over 2017–2020

Table 3 shows the same list of 21 merchant types, but sorted from highest to lowest by the share of transactions conducted in cash based on the 2017 diary survey data. The top row shows the share of all transactions (All) conducted in cash each year, revealing a sharp decline in the share of payments made with cash over time, from 30.5 percent in 2017 to 19.7 in 2020. The largest drop in the share of transactions made with cash was from 2019 to 2020, but 2020 was an unusual year due to the pandemic-related business lockdowns. Table 4 shows that cash transactions are almost exclusively made in person, and that has not changed over time. However, the shift from in-person purchases to online shopping that took place during the pandemic may not be just a temporary phenomenon; rather, it likely will lead to a long-term decline in the use of cash (Greene, Merry, and Stavins 2021). It is likely that some consumers who used cash more intensively before COVID-19 but switched to electronic forms of payment will continue to use electronic payment methods instead of returning to cash.

Regarding the share of cash use from 2017 through 2019 (before the pandemic), Table 3 shows that the overall share of payments made with cash fell 3 percentage points from 2017 to 2018 and 1.5 percentage points from 2018 to 2019. From October 2019 to October 2020, the cash-use share declined 6.4 percentage points. As noted in Kim et al. (2021), the share of payments made by debit card surpassed the share of payments made with cash starting in 2018.

Person-to-person payments (P2P, merchant type 16) have had the highest cash-use share, with 72.8 percent of all such transactions conducted in cash in 2017. However, most P2P transactions are not for commercial purposes. The cash-use shares of payments at fast-food restaurants and coffee shops (merchant type 4), for charitable donations (merchant type 17), and at arts, entertainment, and recreation venues (merchant type 7) were 45 to 50 percent in 2017, but they each fell below 30 percent in 2020 mostly due to the pandemic. The bottom rows in Table 3 are merchant types that mainly accept bill payments, which explains their relatively low shares of cash payments.

The last column in Table 3 displays the average annual change, calculated based on the 2017–2020 data. With the exception of hotels and motels (merchant type 13) and taxis, airplanes, and delivery (merchant type 9), the average annual change was negative for all merchant types, indicating that the cash-use share of payments decreased almost uniformly across all types of merchants from 2017 to 2020. Charitable organizations (merchant type 17) and fast-food restaurants (merchant type 4) experienced the largest drops in their cash-use shares, with the average annual changes exceeding 7 percentage points.

Figure 5 displays the share of transactions paid with cash over the 2017–2020 period for what were the top five most cash-intensive merchant types in 2017, and Figure 6 displays the same for merchant types ranked six through ten. Although the specific trends vary across merchant types, all show that cash has become less important to US consumers as a payment method during the past few years. In Section 3 below, we analyze the most cash-intensive merchant types in greater detail.

Section 2c. Use of checks over 2017–2020

Even though the total use of paper checks in the United States has declined over the past several years, the shift has not been as large for checks written by consumers. Table 5 shows the share of transactions made by check over the 2017–2020 period, both for all merchants and broken down by merchant type.

The top row (All) in Table 5 displays the share of payments made by check over the 2017–2020 period.[4] The share declined by 0.4 to 0.7 percentage point (or 6 to 10 percent) annually from 2017 to 2019, and then increased by 0.4 percentage point (or 6.7 percent) in 2020, the pandemic year.[5] In each year, the share of payments made by check remained at or above 6 percent.

[4] Additional insights on the use of checks are detailed in FRS (2020).
[5] For year-by-year volumes and values of checks processed by the Federal Reserve, see https://www.federalreserve.gov/paymentsystems/check_govcheckprocannual.htm, which also shows a rise in the volume of checks from 2019 to 2020. Note that not all checks are processed by the Federal Reserve.

Unlike cash transactions, check transactions are more evenly split between in person and remote, with the remote share overtaking the in-person share over time (Table 4 and Figure 7). The largest increase in the share of check transactions made remotely occurred from 2019 to 2020, when the share grew by more than 7 percentage points. Unlike cash, checks can be either mailed or handed to a recipient in person. This flexibility of check payments for use with either in-person or remote transactions likely contributed to the increase in their overall payment-use shares during the pandemic year.

Comparing Table 5 (checks) with Table 3 (cash) reveals much more heterogeneity in the use of checks across merchant types relative to the use of cash. The three merchant types at the bottom of Table 5 (fast-food restaurants and coffee shops, transportation, and sit-down restaurants and bars) see barely any payments by check.

Building contractors and rent payments are at the top of the list of merchant types in Table 5 because they rely heavily on the use of checks. These merchant types are paid by check because their transactions typically carry large dollar values (for home repairs and improvements as well as rent), and checks have been found to be used for larger-value transactions, on average, compared with cash or cards (see Figure 1 in Greene et al. 2020). Merchants in the United States pay high processing fees for credit card payments they receive. Because those fees are calculated as a percentage of the value of the transaction, merchants especially prefer to receive checks for large-value transactions.[6] While credit cards are typically accepted for large-value *purchases* (whether in person or online), large-value *services* often cannot be paid with a credit card, and consumers instead use checks to pay for those services.

Hotels (merchant type 13) and transportation (merchant type 9) exhibit significant declines in the share of payments made by check, from 9.3 percent and 6.5 percent, respectively, in 2017 to 0 percent in 2020.

Figure 8 displays the shares of transactions made by check over the 2017–2020 period for the top five most check-intensive merchant types, and Figure 9 displays the same for merchant types ranked six through ten. As the two figures show, there is much more variation across

[6] The Federal Reserve Bank of Kansas City provides data on interchange fees levied on merchants for receiving credit card payments, showing that interchange fees in the United States are high relative to other countries and European countries in particular; see https://www.kansascityfed.org/research/interchange-fees/.

merchant types in how those shares changed over time compared with the cash-use shares displayed in Figures 5 and 6. In the section below, we analyze the most cash-intensive merchant types in greater detail.

Section 3. Analysis of merchant types with the highest cash-use shares

Table 6 displays the evolution of the cash-use share and other payment method shares for the top 10 cash-intensive merchant types, illustrating which payment methods consumers shift to when they reduce their use of cash over time. Note that the shares do not sum to 100 because we omitted payments made with money orders, mobile payment apps,[7] account-to-account transfers, income deductions, and "other"[8] instruments. There were very few transactions made with those payment methods each year, and there was very little change in those numbers over time; therefore, omitting them from the tables did not affect the results. Card (debit, credit, and prepaid cards) and electronic (BANP and OBBP) payments were the most common methods that consumers shifted to over time. We focus on a subset of merchant types that were the most intensive recipients of cash at the start of our sample period.

In general, the transition away from cash and the corresponding increase in card and electronic payments accelerated during the COVID-19 pandemic. Both merchants and consumers tried to avoid potential virus transmission while handling payments, and so some transactions that previously were paid in cash shifted to other methods that do not require direct contact.[9]

Person-to-person (merchant type 16): Most P2P payments are not paid to commercial establishments; they are paid to friends or family members, and they include some casual payments, such as to a babysitter or a dog walker. P2P payments are made mostly in cash, as shown in Figure 5. Table 6 shows that the share of P2P payments made with cash dropped from

[7] Payments made with mobile apps include those made with money stored in apps such as PayPal, Venmo, and Zelle. Note that if, for example, a consumer charges a debit card to pay through Venmo, that payment is recorded as a debit card payment.
[8] "Other" instruments include multiple payment instruments for a single payment, unreported payment instruments, and responses that could not be categorized as any of the existing payment instruments.
[9] Auer, Cornelli, and Frost (2020) present scientific evidence showing that the probability of viral transmission via banknotes is low compared with other frequently touched objects such as credit card terminals and PIN pads.

72.8 percent in 2017 to 63.5 percent in 2019 and then to 62.3 percent in 2020. This trend is interesting because most of the drop occurred before 2020 (the pandemic year) and is therefore likely to be a long-term trend. Table 6 shows that the sharp decline in P2P cash payments from 2017 to 2019 was compensated for by an increase in the share of P2P payments made by card or an electronic method, such as when consumers use PayPal, Venmo, or Zelle. The latter rose from 2.1 percent in 2017 to 8.2 percent in 2019. The drop in the share of P2P payments made using electronic methods in 2020 is surprising, given the decline in social interactions during the pandemic.

The share of P2P payments made remotely increased every year of our sample period (Table 7). However, the largest increase occurred from 2018 to 2019, when the share rose from 17.8 percent to 21.9 percent. From 2019 to 2020, the share of P2P payments made remotely grew by only 1 percentage point.

Fast-food restaurants, coffee shops, etc. (merchant type 4): Figure 5 and Table 6 show that the share of payments made with cash dropped from 49.3 percent in 2017 to 42 percent in 2019, followed by a large drop to 27.4 percent in 2020. Although many establishments were closed during the pandemic, fast-food restaurants were more likely to remain open compared with sit-down restaurants and bars. Table 6 shows that the drop in the cash-use share of payments in this merchant category was accompanied by an increase in the share of payments made by card—from 48 percent in 2017 to 56.1 percent in 2019 and to 69.7 percent in 2020. During the pandemic, many consumers avoided handling cash when conducting transactions in person, and some transactions were conducted remotely. Table 7 shows that the share of transactions made remotely with this merchant type held fairly steady at 3.5 to 3.9 percent from 2017 through 2019. From 2019 to 2020, the share increased 10 percentage points to 13.7 percent, a large change. In some cases, consumers chose to place orders online, even when they later picked up their orders in person. Such transactions induced consumers to shift from cash to credit or debit cards.

Charitable or religious donations (merchant type 17): Figure 5 and Table 6 show that the share of payments made with cash in this merchant category fell from 46 percent in 2017 to 38.3 in 2019 and then to 23.5 percent in 2020. As was the case with the fast-food category discussed above, the sharp drop in the use of cash in 2020 can be attributed to the decline in in-person interactions during the pandemic. The share of charitable or religious donations made remotely increased

from 34 percent in 2019 to 48 percent in 2020, suggesting that consumers might have continued making donations but avoided doing so in person to minimize the spread of infections (Table 7). Table 6 shows that the decline in the share of donations made with cash was replaced by an increase in the card-use share, from 9.1 percent in 2017 to 13.1 percent in 2019 and to 27.5 percent in 2020.

Arts, entertainment, recreation (merchant type 7): Figure 5 and Table 6 document a large decline in the cash-use share of payments in this merchant category, from 45.5 percent in 2017 to 36.9 percent in 2019 and to 27.9 percent in 2020. As with merchant types 17 and 4 described above, the sharp drop in cash use in 2020 can be explained by the pandemic, when many establishments in this category were closed for several months, and several venues shifted from live performances to virtual events, often via Zoom. In addition, consumers likely switched from attending in-person events to purchasing video games or renting movies online. Lastly, even for in-person events, many venues required purchases using QR codes or credit cards to avoid potential virus transmission while accepting payments. All those factors contributed to the decline in the cash-use share of payments for this merchant category.

The decline in in-person transactions and in cash use for this merchant category preceded the pandemic. From 2017 to 2019, the share of payments made remotely with this merchant type grew by 11.4 percentage points, from 25.8 percent to 37.2 percent, followed by an additional increase of 11.8 percentage points to 49 percent from 2019 to 2020 (Table 7). The pandemic accelerated the decline of the share of payments made in person with this merchant type, in turn leading to a decline in the cash-use share of payments. Table 6 shows that the drop in the share of payments made with cash was compensated for by a rise in the share of payments made by card, from 37.5 percent in 2017 to 49.6 percent in 2019 and to 55.8 percent in 2020.

General services: hairdressers, auto repair, etc. (merchant type 6): In contrast to what happened with the merchant types described above that rely heavily on cash, the cash-use share of payments declined more gradually for general service merchants, as shown in Figure 5 and Table 6. Many of the services included in this merchant type, such as haircutting, dog grooming, and auto repair, must be conducted in person. Table 7 shows that the share of payments made remotely with this merchant category grew modestly over time, from 18.4 percent in 2017 to 23 percent in 2020. The cash-use share of payments fell from 38.1 percent in 2017 to 34.7 percent in

2019 and to 32.8 percent in 2020—a relatively small decline. Some of the decline was compensated for by an increase in the check-use share from 2017 to 2018 and by an increase in electronic payments from 4.3 percent of all payments in 2018 to 6.3 percent in 2019.

Sit-down restaurants and bars (merchant type 3): Figure 6 and Table 6 show the decline in the share of payments made with cash in this merchant category, from 35.2 percent in 2017 to 32.5 percent in 2019, followed by a drop to 28.3 percent in 2020. The decline in the use of cash was compensated for by a rise in the card-use share of payments from 62.5 percent in 2017 to 65.7 percent in 2019 and to 70.6 percent in 2020. Similar to fast-food restaurants and coffee shops, many restaurants were either closed or had to limit their capacity during the COVID-19 pandemic. Therefore, they had to rely on takeout orders, and customers had to switch from paying in cash to using their cards when ordering their meals online or over the phone. Table 7 shows that the share of payments made remotely with this merchant category grew substantially during the pandemic, from 1.5 percent in 2019 to 8.6 percent in 2020.

Gas stations (merchant type 2): Figure 6 and Table 6 show a reduction in the share of payments made with cash at gas stations, from 34.9 percent in 2017 to 29 percent in 2019 and then to 24.8 percent in 2020. Table 6 shows that the reduction in the cash-use share of payment was compensated for by a rise in the card-use share of payments, from 62.4 percent in 2017 to 68.8 percent in 2019 and to 72.4 percent in 2020. Note that gas stations were classified at "essential" businesses and remained open throughout the pandemic. Not surprisingly, consumers continued to make in-person transactions at gas stations at the same rate as before the pandemic (Table 7). The reduction in cash use can therefore be attributed to the desire to avoid paying in person or coming into contact with cash handled by others in order to prevent infection.

Grocery stores etc. (merchant type 1): Figure 6 and Table 6 show a decline in the share of payments made with cash at grocery stores from 32 percent in 2017 to 30.3 percent in 2019 and to 22.3 percent in 2020. Similar to gas stations, grocery stores were classified as "essential" businesses during the pandemic and were open throughout that period. While the share of payments made remotely with grocery stores increased from 2.8 percent in 2017 to 3.6 percent in 2018 and 2019 and to 6.4 percent in 2020 (Table 7), the vast majority of grocery store payments continued to be conducted in person in 2020 during the pandemic. The reduction in cash use likely can be attributed to the desire to avoid paying in person or handling cash during the

pandemic, and not to a decline in in-person shopping. As consumers reduced their cash use at grocery stores, the card-use share of payments rose from 64.3 percent in 2017 to 67.1 percent in 2019 and to 74.9 percent in 2020.

Schools, colleges, childcare centers (merchant type 20): Figure 6 and Table 6 show a 3.2 percentage point decline in the cash-use share of payments in this merchant category, from 29.3 percent in 2017 to 26.1 in 2019 and to 18.4 percent in 2020, when many schools and childcare centers were either operating virtually or closed due to the pandemic. Table 6 shows the shift away from cash use was compensated for mostly by a sharp increase in the use of electronic payments and, to a lesser degree, an increase in card payments. The share of payments made by electronic methods for educational transactions more than doubled from 2017 to 2020.

The share of remote payments in this merchant category increased from 39 percent in 2017 to 49.5 percent in 2019 and to 68.4 percent in 2020, demonstrating that the pandemic accelerated the shift to remote payments (Table 7). However, it is unclear whether that shift will continue with the resumption of in-person education and childcare.

Building contractors (merchant type 11): Figure 6 and Table 6 show that although contractors rely most heavily on payments by check, in 2017 they received 26 percent of their payments in cash. The cash-use share of payments dropped substantially—to 11.8 percent in 2019 (prior to the pandemic) and further to 10 percent in 2020. Because most of that decline occurred prior to the pandemic, the drop in cash use likely was caused by changes in consumer and merchant preferences. Table 6 shows that the decline in cash payments in this merchant category was compensated for by a rise in both card and electronic payments. In particular, the share of card payments rose fourfold from 2017 to 2020, while the share of electronic payments almost tripled from 2017 to 2019.

Section 4. Analysis of merchant types with the highest check-use shares

Figure 8 displays the share of transactions that consumers made by check over time for the five merchant types that had the first- to fifth-highest check-use shares of payments in 2017 (the reference year in our analysis). Similarly, Figure 9 displays the shares of transactions that consumers made by check over time for the five merchant types with the sixth- to tenth-highest

check-use shares of payments in 2017. Table 8 displays the evolution of the check-use share and other payment method shares by merchant categories for the top 10 check recipients to demonstrate which payment instruments consumers have switched to when substituting away from checks over time. Table 9 shows the share of check transactions that were conducted remotely with each merchant category, which is helpful in determining which types of merchants contributed to the increase in the share of check transactions conducted remotely shown in Table 4.

In this section, we focus on the merchant categories with the highest shares of consumer payments made by check, analyzing the evolution of payments received by those types of merchants over the 2017–2020 period.

Building contractors (merchant type 11): Building contractors had the highest check-use share among all merchant types throughout our sample period. Figure 8 and Table 8 show that contractors consistently have relied heavily on check payments. As noted in Section 2 of this paper, building contractors' transactions are typically large in value, so they refuse or discourage card payments to avoid high processing fees. As we mentioned above, such fees are proportional to the dollar values of the credit card payments. The check-use share of payments in this merchant category fell from 60 percent in 2017 to 47.1 percent in 2019 and then rose slightly to 50 percent in 2020. Some of the check payments shifted to card payments, which quadrupled from 10 percent of the payments in 2017 to 40 percent in 2020. A smaller fraction of checks shifted to electronic payment methods, which rose from 4 percent of the payments in 2017 to 11.8 in 2019.

The share of check payments made remotely with this merchant category grew substantially during the pre-pandemic period of our sample, from 13.3 percent in 2017 to 37.5 percent in 2019. During the pandemic, the share of check payments made remotely grew modestly to 40 percent. Although the pandemic necessitated that many interactions become remote in general, that was not the case for this service sector. Merchants in this category—building contractors, plumbers, electricians, HVAC contractors, etc.—had to work in person even during the pandemic, so it is not surprising that the pandemic did not lead to a substantial increase in the share of check payments made remotely. Rather, the increase in remote payments is part of a long-term evolution.

Rent for apartments, homes, etc. (merchant type 14): Landlords rely heavily on check payments for the same reason as building contractors: Monthly rents are large-value payments, so landlords often require checks to avoid high fees levied by card-payment processors. Figure 8 and Table 8 show that although the share of payments made by check declined from 39.8 percent in 2017 to 30.8 percent in 2019, it climbed sharply to 45.2 percent in 2020. The share of rent-check payments made remotely actually decreased throughout the sample period, from 43.9 percent in 2017 to 28.6 percent in 2020. Table 8 shows a small increase in the share of rent payments made by card, from 11.7 percent in 2017 to 14.5 percent in 2020, and a small shift in the shares of payments made with cash and by electronic methods, but so far rent payments have not undergone an evolution away from paper payment instruments.

Charitable or religious donations (merchant type 17): Similar to building contractors and landlords, charitable and religious institutions try to avoid the high processing fees by avoiding card payments and accepting either cash or checks. In some cases, they may refuse to accept cards, just as landlords tend to do, while in other cases they may impose a processing fee for card payments in order to recoup their own high cost of accepting card transactions. Figure 8 and Table 8 show that the share of payments made by check to these institutions remained more or less steady during the sample period. Check payments constituted 34.5 percent of all transactions in 2017, rose to 37.2 percent in 2019, and then fell to 33.3 percent in 2020 during the pandemic. The share of payments made by card tripled over that period, growing from 9.1 percent in 2017 to 27.5 percent in 2020, but that increase resulted from a decline in cash payments and not from a shift away from checks. The share of payments made by electronic methods remained stable at 9 to 10 percent.

The share of check payments made remotely to this merchant type more than doubled during our sample period, increasing from 13.7 percent in 2017 to 29.4 in 2020. However, as with building contractors, the majority of that growth took place from 2017 to 2019, with only a modest increase from 2019 to 2020.

Government taxes or fees (merchant type 19): Like building contractors and charitable organizations, governments typically either refuse to accept card payments or impose a processing fee if payers use credit cards to make their payments. For that reason, as shown in Figure 8 and Table 8, the share of payments made with checks in this merchant category

remained steady at 29 to 33 percent. Table 8 shows an increase in the share of payments made by card from 17.7 percent in 2017 to 22.9 in 2019 and then a sharp increase to 35.4 percent in 2020. As was the case with charitable donations, the increase in card payments resulted from a drop in cash payments and not from any significant changes in the share of payments made by check.

The share of check payments made remotely rose from 51.6 percent in 2017 to 62.5 percent in 2019 before falling to 50 percent in 2020—resulting in a very small overall change during our sample period.

Schools, colleges, childcare centers (merchant type 20): This is the only merchant category among the top five check receivers that experienced a steady decline in the share of consumer payments made by check (Figure 8 and Table 8). The check-use share fell from 31.7 percent in 2017 to 21.1 percent in 2020, a 10-percentage point drop. The observed decline in check payments, combined with the decline in the share of payments made with cash, as discussed above, imply that this merchant category has undergone a substantial evolution away from paper payments and toward card and especially electronic payments. The share of payments made by electronic methods increased nearly 150 percent, rising from 10.6 percent in 2017 to 26.3 percent in 2020. The share of check payments made remotely rose from 33.3 percent in 2017 and 2019 to 37.5 percent in 2020; this increase might have been caused by the pandemic.

Utilities not paid to the government (merchant type 8): This merchant category includes many utility payments, such as gas, electricity, and water. Figure 9 and Table 8 show that one-fifth to one-fourth of payments made to utility companies were paid by check. Moreover, the share of payments by check remained steady from 2017 to 2019 (around 22 percent) and increased to 25.6 percent in 2020. Table 8 shows that the share of payments made with cash declined over time, and the card-use share increased from 19.2 percent in 2017 to 23.6 percent in 2020. Electronic methods remained the dominant payment category, with a relatively steady payment share ranging from 42 to 49 percent.

The share of check payments made remotely for this merchant category remained steady at about 70 percent from 2017 to 2019 but rose to 82.3 percent in 2020. The pandemic likely contributed to this increase, causing both merchants and consumers to prefer remote transactions.

Hospitals, doctors, dentists, etc. (merchant type 18): Figure 9 and Table 8 show that the share of payments made by check barely changed over the years (21.9 percent in 2017 and 22.5 percent in 2020). The sharp decline in the cash-use share of payments was offset by a rise in the card-use share of payments from 48.7 percent in 2017 to 62.7 percent in 2020. The share of payments by electronic methods remained relatively low and even declined somewhat in 2020.

While the share of payments made by check changed little over the sample period, the share of check payments made remotely grew substantially from 54 percent in 2017 to 65.3 percent in 2019 and to 78.3 percent in 2020. The increase in the remote share of check payments in 2020 was likely caused by the pandemic, because the risk of contracting COVID-19 was especially high at nursing homes and hospitals, causing many people to avoid such places. Some consumers switched their nonessential appointments to virtual visits or skipped visits altogether.

Professional services (merchant type 12): Figure 9 and Table 8 show an increase in the share of payments made by check in this merchant category, from 18.2 percent in 2017 to 23 percent in 2019 and to 26.5 percent in 2020. This was the largest increase in the check-use share of payments among the top 10 merchant types. The rise in the share of payments by check compensated for some of the decline in the share of payments made with cash, which was most noticeable during the pandemic in 2020. The share of payments made by electronic methods also declined in 2020, while the share of payments made by card increased. The share of check payments made remotely remained steady from 2019 to 2020.

Financial services (merchant type 15): The vast majority of payments to financial services merchants are made electronically. The remaining payments are split between check and card payments. Figure 9 and Table 8 show a small decline in the share of payments made by check, from 14.6 percent in 2017 to 11.3 percent in 2020. The usage shares of all payment methods remained more or less level over time, indicating a lack of change in consumer and merchant preferences for payment methods in this merchant category. Because payments for financial services are typically not made in person, the pandemic did not have a substantial impact on the way consumers make such payments. The share of check payments made remotely changed little over the sample period.

Person-to-person (merchant type 16): The majority of P2P payments were made with cash throughout the sample period. Figure 9 and Table 8 show a small decline in the share of P2P

payments made by check, from 12.6 percent in 2017 to 10.8 percent in 2020. That decline, combined with the decline in the share of P2P payments made with cash discussed above, indicate that individuals slowly shifted away from making P2P payments with paper instruments to using cards and electronic methods. The share of check payments made remotely remained fairly steady over the sample period.

Section 5. Regression analysis

Our analysis so far has focused on changes in cash use and check use over time for selected merchants. However, it is reasonable to assume that different consumers make purchases in different merchant categories, and that the dollar values of transactions vary across merchants. For example, high-income consumers who use credit cards more often are more likely to eat at sit-down restaurants, while lower-income consumers who tend to use cash are more likely to eat at fast-food establishments. Rent payments tend to have high dollar values, while convenience store purchases have low values on average. In this section, we estimate regressions to analyze how cash and check use evolved over time for each merchant category while controlling for transaction and payee characteristics.

To assess the probability of using cash or check for a specific transaction, we estimate the following payment choice equations:

$$\Pr(Y_{ijt} = 1) = f(M_j, V_{ijt}, R_j, \alpha_t, X_{it}), \quad (1)$$

where Y_{ijt} equals 1 if consumer *i* paid for transaction type *j* in year *t* with cash (check), and 0 otherwise; M_j is a set of dummy variables equal to 1 if merchant is type *j*, and 0 otherwise; V_{ijt} is the log of the dollar value of the transaction conducted by consumer *i* at merchant *j* in year *t*; R_j equals 1 if the transaction was made remotely, and 0 if it was in person (check regression only); α_t is a set of dummy variables equal to 1 in year *t*, and 0 otherwise; and X_{it} is a vector of demographic characteristics of consumer *i*, including age, education, income, gender, race, homeownership, and work status. The subscript *t* indicates that some of those characteristics may have changed over time, especially work status and income.

We estimate two separate equations: one to estimate the probability of using cash and the other for the probability of using a check for a specific transaction. The coefficients of particular interest are the merchant and year dummy coefficients. The regression results are displayed in Table 10. The regressions are at the transaction level, and there are 41,526 observations in the sample covering the 2017–2020 period.

Section 5a. Cash

The first column in Table 10 shows the results of estimating equation (1) with the dependent variable Y_{ijt} equal to 1 if a transaction is conducted with cash, and 0 otherwise. Because nearly all (98.7 percent) cash transactions are made in person, we restricted the sample for the cash regression to in-person transactions, dropping 11,227 remote transactions, or 27 percent of the sample.

Merchant types. The omitted category is "Hotels, motels, RV parks, campsites" (type 13), as this category has the median value of the probability of being paid in cash. Therefore, all the merchant-type coefficients are relative to that category. Several merchant type coefficients are statistically significant. Person-to-person (type 16) transactions have a 36.0 percent higher probability of being conducted in cash, and rent (type 14) has an 18.8 percent higher probability. Public transportation (type 21); taxis, airplanes, and delivery (type 9); and medical expenses (type 18) have a lower probability of being paid in cash relative to the omitted category.

Dollar value. The probability of using cash decreases significantly with the dollar value of the transaction, even after we control for merchant type and consumer characteristics. A tenfold increase in the dollar value of the transaction decreases the probability that the transaction is paid with cash by 39.3 percentage points.

Year. Relative to the omitted year 2017, the probability of using cash for in-person transactions decreased each subsequent year. In 2019, the probability of paying with cash was 3 percent lower than in 2017, and in 2020 it was 6.3 percent lower. Controlling for transaction attributes and payer characteristics did not diminish the effect of time on cash use, which declined significantly in 2019 and in 2020.

Consumer characteristics. Consumer characteristics are highly significant in the probability of using cash, even after we control for merchant type and dollar value of the transaction. Consumers who are older, less educated, lower income, Black, or Latino are more likely to pay with cash than others. Unemployed consumers are also more likely to pay with cash compared with those who are employed.

Section 5b. Check

The second column in Table 10 shows the results of estimating equation (1) with the dependent variable Y_{ijt} equal to 1 if a transaction is conducted by check, and 0 otherwise.

Merchant types. The omitted category is "General services: hairdressers, auto repair, etc." (type 6), as this category has the median value of the probability of being paid by check. Therefore, all the merchant-type coefficients are relative to that category. Almost all the merchant type coefficients are highly statistically significant. As is the case with the summary statistics results above, building contractors (type 11) and charitable donations (type 17) have the highest probability of being paid by check, each with a 22.5 higher probability than the omitted merchant type. Rent (type 14) and educational expenses (type 20) are also more likely to be paid by check. Most merchant types have a significantly lower probability of being paid by check compared with the omitted merchant category, but the negative coefficients are low in magnitude.

Dollar value and remote. The probability of paying by check increases significantly with the dollar value of each transaction, even after we control for merchant type and consumer characteristics. However, the effect of the dollar value is relatively low in magnitude, because transaction values vary across merchant types, and therefore the merchant dummy coefficients pick up some of the value effect. A tenfold increase in the dollar value of the transaction increases the probability that the transaction is paid by check by 3 percentage points. Remote transactions have a 0.7 percent lower probability of being paid by check compared with in-person transactions.

Year. The probability of paying by check for individual transactions declined over time, albeit more slowly than the probability of paying with cash. Relative to the omitted year 2017, the

probability of paying by check decreased each subsequent year. In 2019, the probability of paying by check was 0.5 percent lower than in 2017, and in 2020 it was 0.7 percent lower. Note that although cash use declined at a faster rate than check use over time, the *level* of cash use was still much higher: Only 6.7 percent of transactions in the sample were paid by check, whereas 27 percent of transactions were paid with cash (and 36 percent of in-person transactions were paid with cash).

Consumer characteristics. Fewer consumer characteristics are significant in the probability of paying by check compared with the probably of paying with cash. Consumers who are older or white are more likely to pay by check than others, but there are almost no significant differences across income or education cohorts. Homeowners are also more likely to use checks.

Section 6. Conclusion

US consumers have been shifting away from using cash and checks over the past several years, but that transformation has not been uniform across merchant types. Some merchants have experienced a large drop in the use of paper instruments for consumer payments, while others' shares of payments with cash or by check have remained steady. Moreover, payment choice varies with the dollar value of transactions and with payer characteristics. Using data from a detailed consumer payments diary collected over the 2017–2020 period, we find that cash use declined at a faster rate than check use, both based on the raw data and in regressions after controlling for transaction and payer attributes. The COVID-19 pandemic accelerated the payments evolution away from paper instruments for some merchant types, as their drop in cash or check payments was much larger during the pandemic than prior to it. Future analysis will show whether the faster pace of those COVID-19–induced trends can be sustained in the long run.

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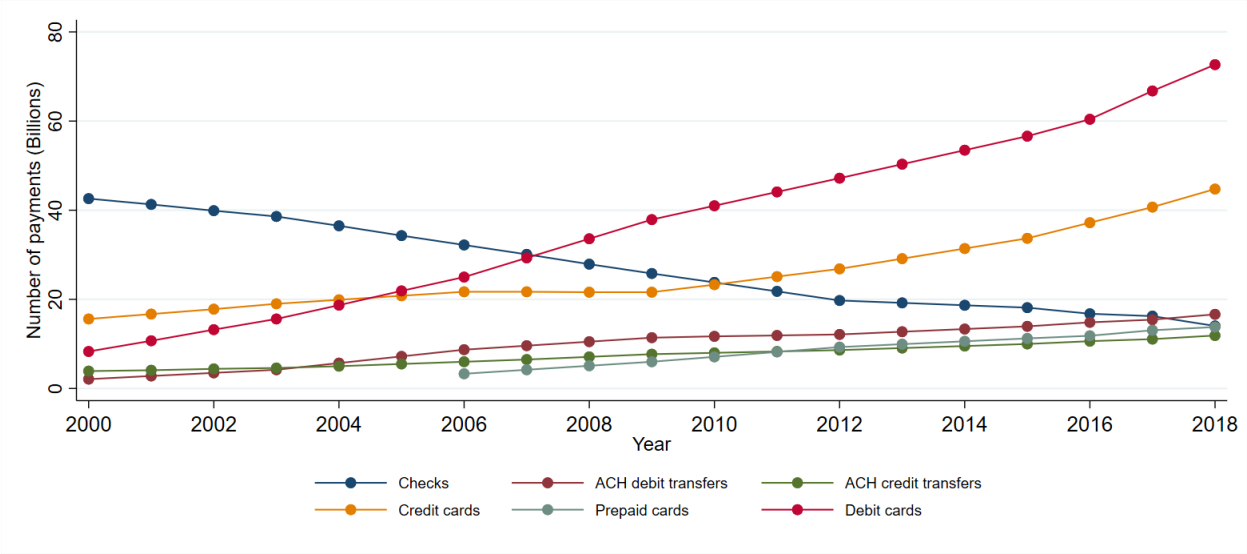
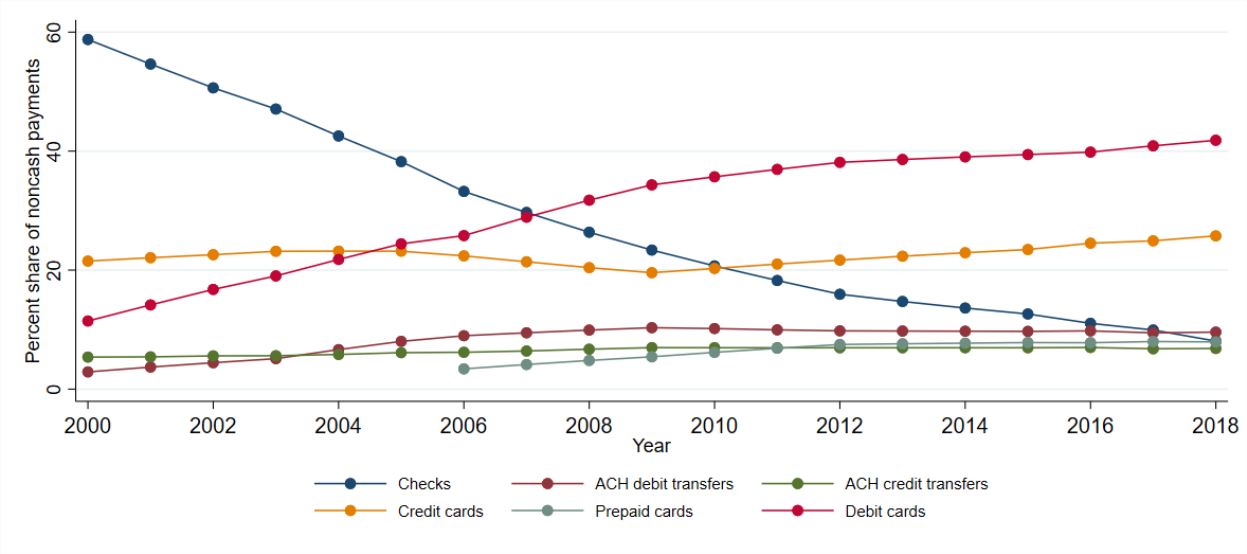
Figure 1a: Annual total number of noncash payments in the United States, 2000–2018



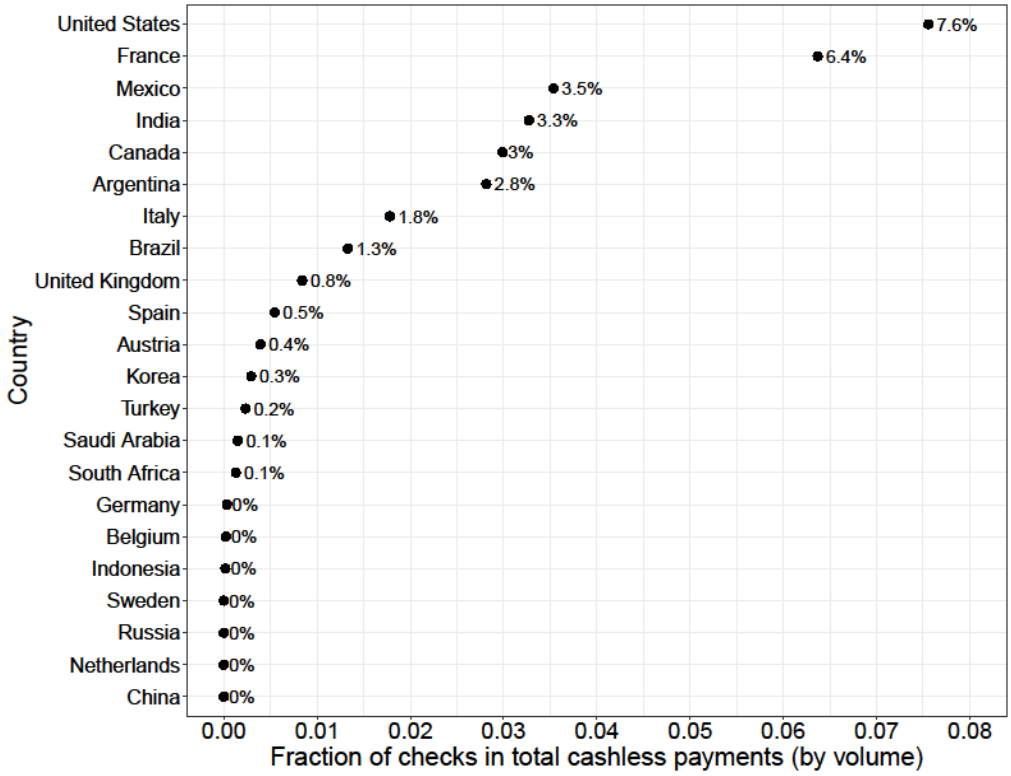
Source: Federal Reserve Payment Study.

Figure 1b: Annual share of noncash payments in the United States, 2000–2018



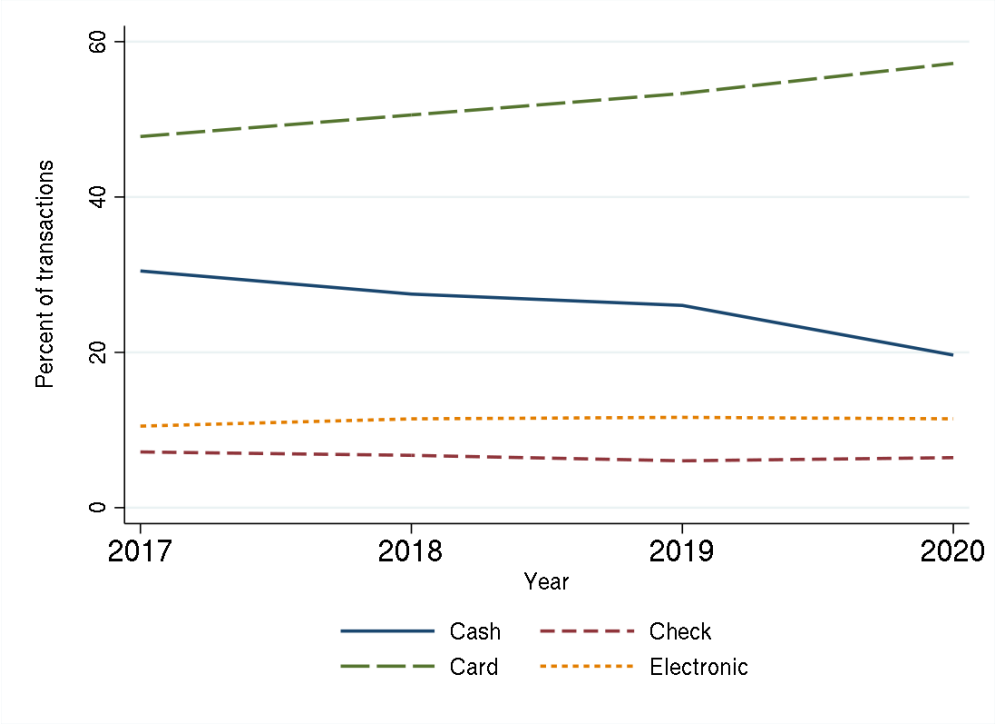
Source: Federal Reserve Payment Study.

Figure 2: Number of checks as a share of all noncash payments in 22 countries in 2019



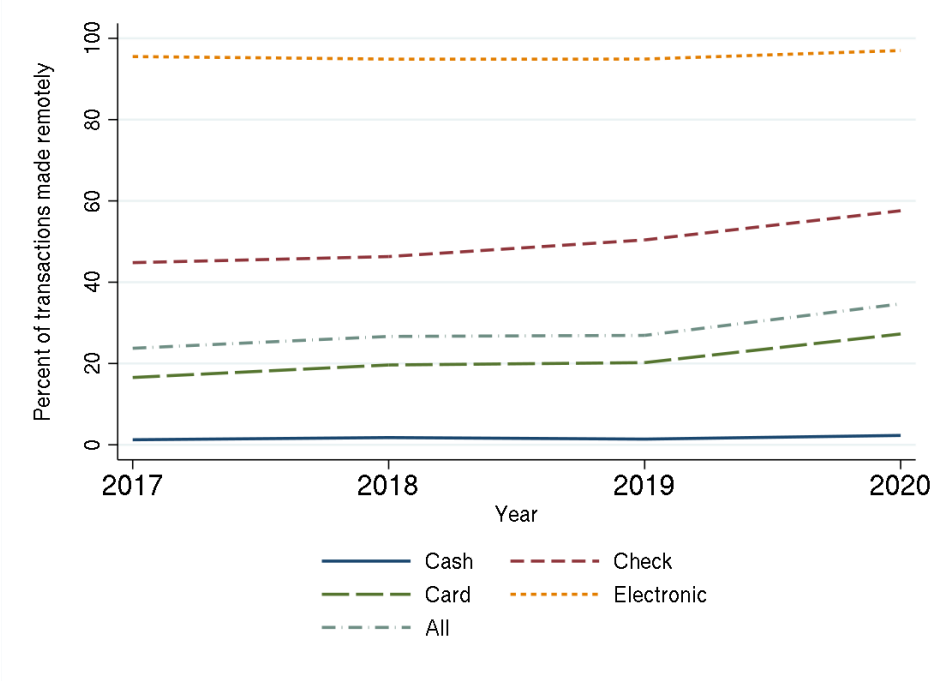
Source: Authors' calculations based on the Bank of International Settlements Redbook, https://stats.bis.org/statx/toc/CPMI.html.

Figure 3: Share of all transactions made by payment instrument



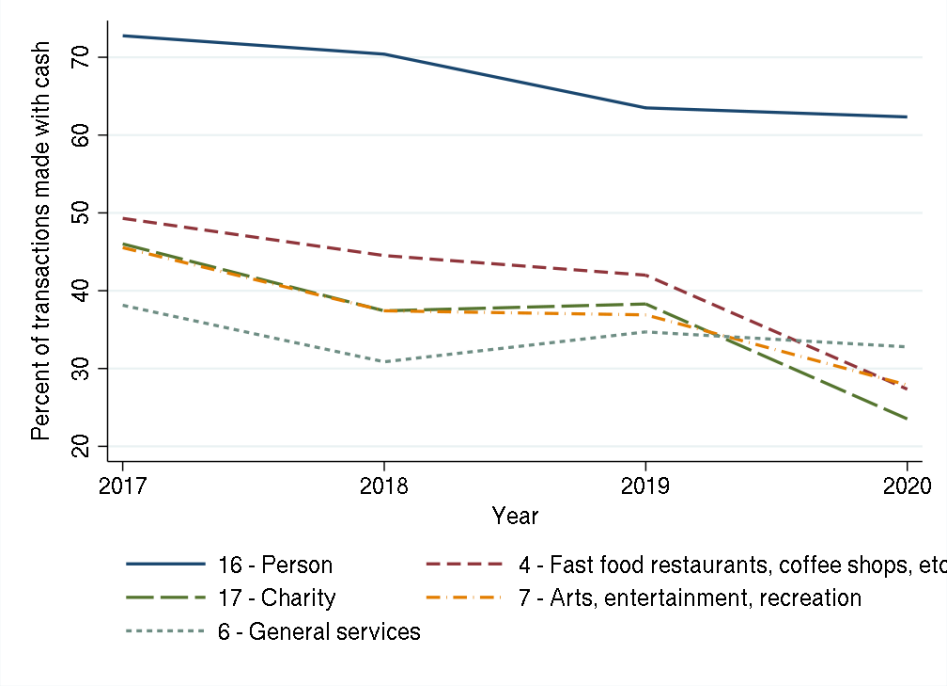
Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 4: Share of transactions made remotely by payment instrument



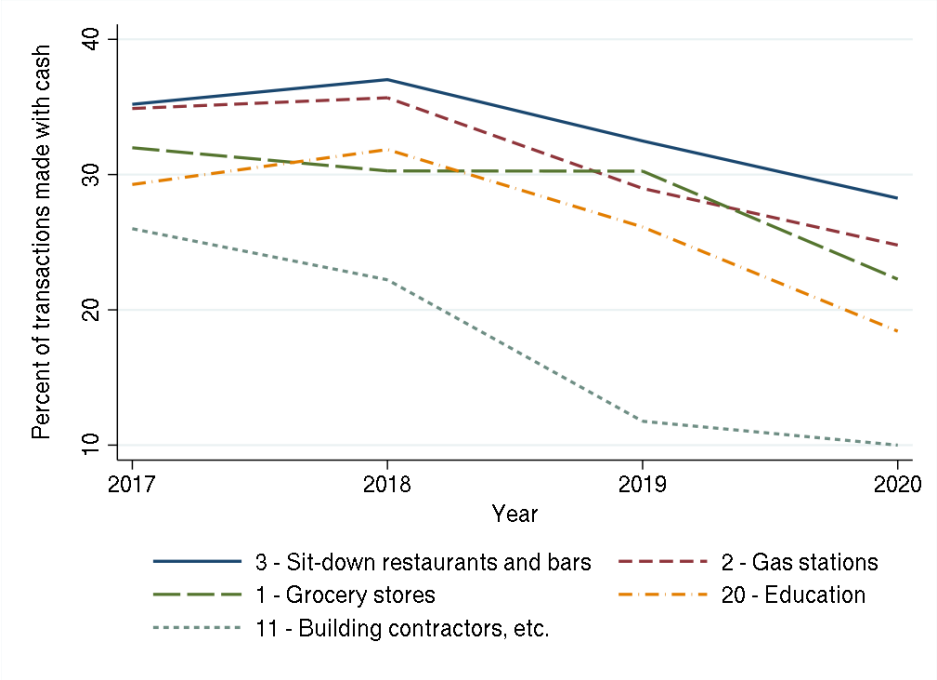
Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 5. Share of transactions made with cash (merchants with 1st–5th highest share in 2017)



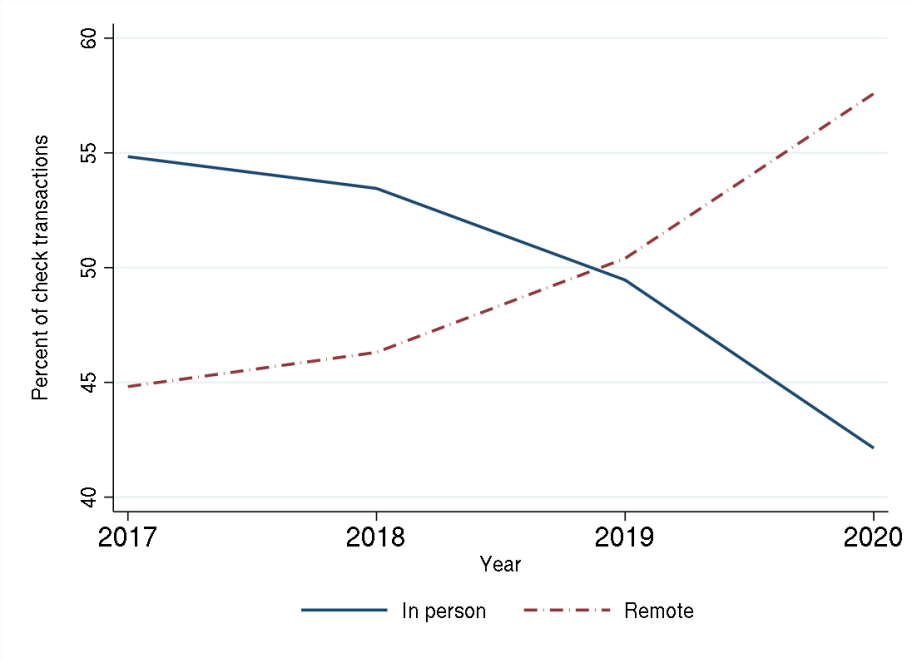
Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 6. Share of transactions made with cash (merchants with 6th–10th highest share in 2017)



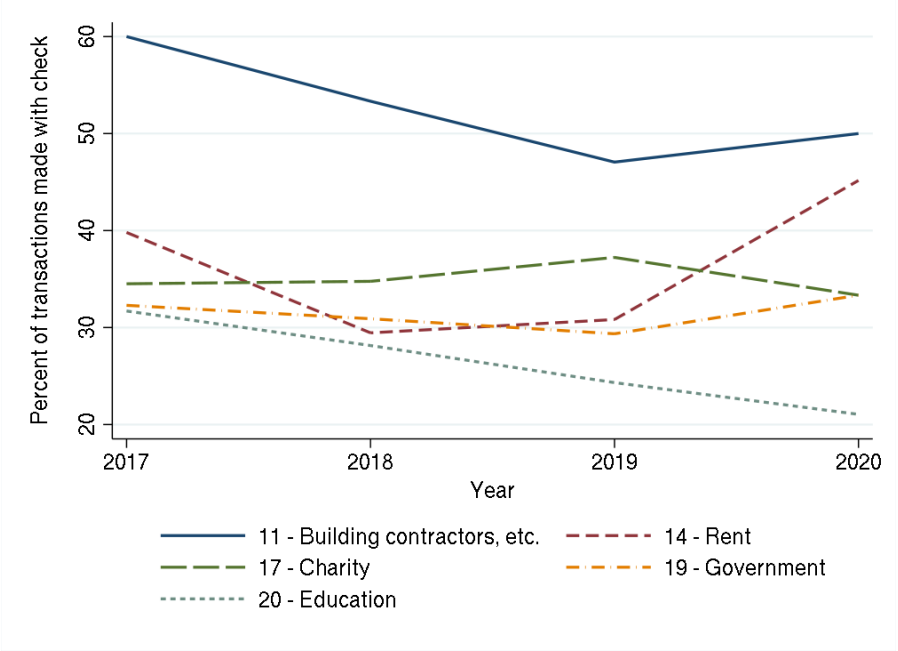
Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 7: Share of check transactions made in person and remotely



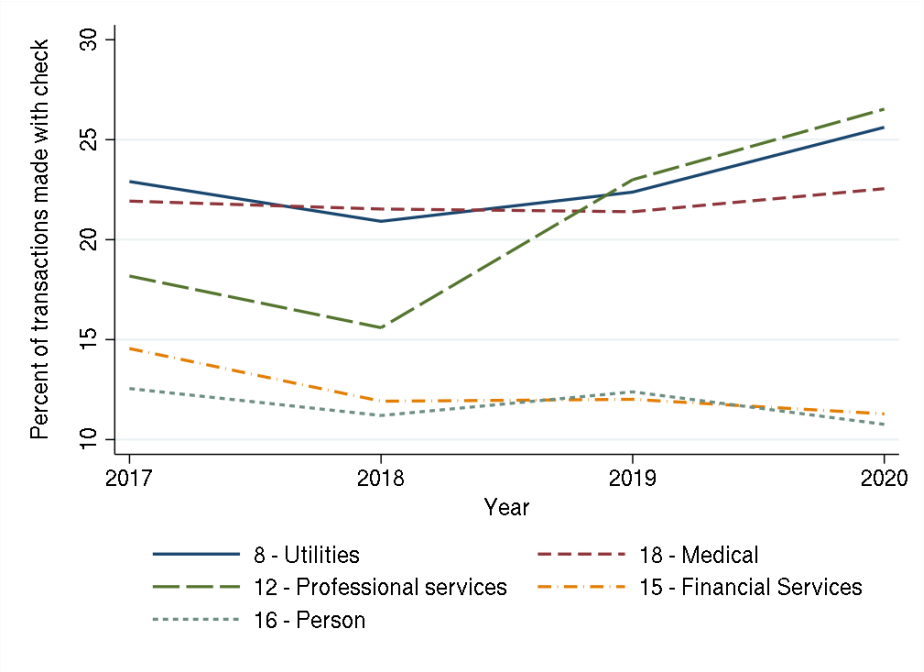
Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 8. Share of transactions made by check (merchants with 1st–5th highest share in 2017)



Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Figure 9. Share of transactions made by check (merchants with 6th–10th highest share in 2017)



Notes: The data are unweighted; weighted numbers are very similar and available upon request.
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 1. Number of respondents and number of repeat respondents, by year

Year	Number of Respondents	Number of Respondents Who Participated in the Previous Year	Number of transactions
2017	2793		12,092
2018	2873	2276	12,455
2019	3028	2401	12,282
2020	1537	989	5,521

Note: The 2020 DCPC sample is smaller compared with earlier years because the 2020 sample was split into two to test different survey designs.
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 2. Number and share of all transactions made to each merchant

Merchant	Number of transactions				Share of transactions				Share of $ value			
	2017	2018	2019	2020	2017	2018	2019	2020	2017	2018	2019	2020
1 - Grocery stores, etc.	2048	2068	2208	1033	16.9	16.6	18.0	18.7	6.8	6.1	6.1	6.0
2 - Gas stations	1333	1337	1239	464	11.0	10.7	10.1	8.4	2.7	2.6	2.4	1.5
3 - Sit-down restaurants and bars	770	805	865	269	6.4	6.5	7.0	4.9	2.1	1.9	2.0	1.4
4 - Fast-food restaurants, coffee shops, etc.	1645	1624	1600	702	13.6	13.0	13.0	12.7	1.6	1.3	1.3	1.3
5 – General stores, online shopping, etc.	1873	1915	1938	970	15.5	15.4	15.8	17.6	12.1	12.2	9.7	14.3
6 - General services	396	392	412	183	3.3	3.1	3.4	3.3	3.5	3.0	3.4	4.2
7 - Arts, entertainment, recreation	325	318	355	104	2.7	2.6	2.9	1.9	1.5	1.1	1.7	0.5
8 - Utilities not paid to the government	454	502	429	242	3.8	4.0	3.5	4.4	4.6	4.6	3.6	3.9
9 - Taxis, airplanes, delivery	62	64	76	13	0.5	0.5	0.6	0.2	1.2	0.6	0.6	0.2
10 - Telephone, internet, cable, etc.	518	554	462	315	4.3	4.4	3.8	5.7	4.8	4.3	3.4	4.3
11 - Building contractors, etc.	50	45	34	20	0.4	0.4	0.3	0.4	1.5	2.5	0.6	2.5
12 - Professional services	77	109	100	49	0.6	0.9	0.8	0.9	1.0	0.9	2.2	1.8
13 - Hotels, motels, RV parks, campsites	43	35	43	20	0.4	0.3	0.4	0.4	0.6	0.6	0.6	0.4
14 - Rent for apartments, homes, etc.	103	129	133	62	0.9	1.0	1.1	1.1	4.9	4.9	7.7	5.0
15 - Financial services	955	1057	1057	505	7.9	8.5	8.6	9.1	33.5	43.1	39.4	42.3
16 - Person-to-person	470	473	452	223	3.9	3.8	3.7	4.0	3.7	3.6	4.3	3.9
17 - Charitable or religious donations	339	302	282	102	2.8	2.4	2.3	1.8	4.1	1.5	1.6	0.9
18 - Hospitals, doctors, dentists, etc.	228	274	229	102	1.9	2.2	1.9	1.8	2.0	1.7	2.6	2.7
19 - Government taxes or fees	96	110	109	48	0.8	0.9	0.9	0.9	3.5	2.1	4.9	1.7
20 - Schools, colleges, childcare centers	123	135	111	38	1.0	1.1	0.9	0.7	4.0	1.2	1.7	1.1
21 - Public transportation and tolls	184	207	148	57	1.5	1.7	1.2	1.0	0.1	0.2	0.1	0.1

Notes: The data are unweighted; weighted numbers are very similar and available upon request. Shares are in percentages (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 3. Share of transactions made with cash by merchant (sorted by 2017 share)

Merchant	2017	Δ	2018	Δ	2019	Δ	2020	Average Annual Change
All	30.5	-3.0	27.5	-1.5	26.0	-6.4	19.7	-3.6
16 – Person-to-person	72.8	-2.4	70.4	-6.9	63.5	-1.2	62.3	-3.5
4 - Fast-food restaurants, coffee shops, etc.	49.3	-4.8	44.5	-2.5	42.0	-14.6	27.4	-7.3
17 - Charitable or religious donations	46.0	-8.6	37.4	0.9	38.3	-14.8	23.5	-7.5
7 - Arts, entertainment, recreation	45.5	-8.1	37.4	-0.5	36.9	-9.0	27.9	-5.9
6 - General services: hairdressers, auto repair, etc.	38.1	-7.3	30.9	3.8	34.7	-1.9	32.8	-1.8
3 - Sit-down restaurants and bars	35.2	1.8	37.0	-4.5	32.5	-4.2	28.3	-2.3
2 - Gas stations	34.9	0.8	35.7	-6.7	29.0	-4.2	24.8	-3.4
1 - Grocery stores, etc.	32.0	-1.7	30.3	0.0	30.3	-8.0	22.3	-3.2
20 - Schools, colleges, childcare centers	29.3	2.6	31.9	-5.7	26.1	-7.7	18.4	-3.6
11 - Building contractors, plumbers, electricians, etc.	26.0	-3.8	22.2	-10.5	11.8	-1.8	10.0	-5.3
21 - Public transportation and tolls	23.4	-3.6	19.8	9.9	29.7	-15.7	14.0	-3.1
19 - Government taxes or fees	22.9	-6.6	16.4	1.1	17.4	-0.8	16.7	-2.1
5 - General merchandise stores, online shopping, etc.	21.7	-3.9	17.9	0.0	17.9	-3.9	14.0	-2.6
9 - Taxis, airplanes, delivery	21.0	-5.3	15.6	-10.4	5.3	17.8	23.1	0.7
13 - Hotels, motels, RV parks, campsites	20.9	-6.6	14.3	4.3	18.6	16.4	35.0	4.7
14 - Rent for apartments, homes, etc.	16.5	3.7	20.2	-4.4	15.8	-1.3	14.5	-0.7
18 - Hospitals, doctors, dentists, nursing homes, etc.	13.6	-4.5	9.1	-1.7	7.4	-2.5	4.9	-2.9
12 - Professional services	10.4	8.0	18.3	-0.3	18.0	-9.8	8.2	-0.7
8 - Utilities not paid to the government	9.5	-2.3	7.2	-3.9	3.3	2.1	5.4	-1.4
10 - Telephone, internet, cable or satellite tv, etc.	3.7	1.0	4.7	-2.1	2.6	-0.4	2.2	-0.5
15 - Financial services	2.7	-1.4	1.3	-0.1	1.2	0.9	2.2	-0.2

Notes: The data are unweighted; weighted numbers are very similar and available upon request. Shares are in percentages (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 4. Share of all transactions made in person vs. remotely by payment instrument

		Year			
		2017	2018	2019	2020
Cash					
	in person	98.7	98.2	98.5	97.6
	remote	1.2	1.8	1.4	2.3
Check					
	in person	54.8	53.5	49.5	42.1
	remote	44.8	46.3	50.4	57.6
Card					
	in person	83.4	80.3	79.7	72.7
	remote	16.6	19.6	20.2	27.3
Electronic					
	in person	3.9	5.0	5.0	2.7
	remote	95.5	94.9	94.9	97.0

Notes: The sum of the in-person share and the remote share should equal 100. However, the total is slightly less than 100 due to a handful of observations each year that are missing values in the data for the in-person vs. remote variable. Card includes debit, credit, and prepaid cards; electronic includes bank account number payments (BANP) and online banking bill payments (OBBP). The data are unweighted; weighted numbers are very similar and available upon request. All entries are percentage shares (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 5. Share of transactions made by check by merchant (sorted by 2017 share)

Merchant	2017	Δ	2018	Δ	2019	Δ	2020	Average Annual Change
All	7.2	-0.4	6.7	-0.7	6.0	0.4	6.4	-0.2
11 - Building contractors, plumbers, electricians, etc.	60.0	-6.7	53.3	-6.3	47.1	2.9	50.0	-3.3
14 - Rent for apartments, homes, etc.	39.8	-10.3	29.5	1.4	30.8	14.3	45.2	1.8
17 - Charitable or religious donations	34.5	0.3	34.8	2.5	37.2	-3.9	33.3	-0.4
19 - Government taxes or fees	32.3	-1.4	30.9	-1.6	29.4	4.0	33.3	0.3
20 - Schools, colleges, childcare centers	31.7	-3.6	28.1	-3.8	24.3	-3.3	21.1	-3.6
8 - Utilities not paid to the government	22.9	-2.0	20.9	1.5	22.4	3.2	25.6	0.9
18 - Hospitals, doctors, dentists, nursing homes, etc.	21.9	-0.4	21.5	-0.1	21.4	1.2	22.5	0.2
12 - Professional services	18.2	-2.6	15.6	7.4	23.0	3.5	26.5	2.8
15 - Financial services	14.6	-2.6	11.9	0.1	12.0	-0.7	11.3	-1.1
16 - Person-to-person	12.6	-1.3	11.2	1.2	12.4	-1.6	10.8	-0.6
10 - Telephone, internet, cable or satellite tv, etc.	11.8	0.1	11.9	-4.8	7.1	1.4	8.6	-1.1
6 - General services: hairdressers, auto repair, etc.	9.8	3.9	13.8	-5.3	8.5	2.4	10.9	0.4
13 - Hotels, motels, RV parks, campsites	9.3	-9.3	0.0	2.3	2.3	-2.3	0.0	-3.1
9 - Taxis, airplanes, delivery	6.5	-6.5	0.0	0.0	0.0	0.0	0.0	-2.2
7 - Arts, entertainment, recreation	5.5	0.1	5.7	-1.4	4.2	-1.3	2.9	-0.9
5 - General merchandise stores, online shopping, etc.	2.5	-0.2	2.2	0.0	2.3	-0.5	1.8	-0.2
1 - Grocery stores, etc.	2.0	-0.1	1.9	-0.8	1.2	-0.3	0.9	-0.4
2 - Gas stations	1.2	-0.4	0.8	-0.3	0.6	-0.1	0.4	-0.3
4 - Fast-food restaurants, coffee shops, etc.	0.7	-0.5	0.2	0.0	0.2	0.1	0.3	-0.1
21 - Public transportation and tolls	0.5	-0.1	0.5	-0.5	0.0	0.0	0.0	-0.2
3 - Sit-down restaurants and bars	0.4	0.2	0.6	0.1	0.7	-0.3	0.4	0.0

Notes: The data are unweighted; weighted numbers are very similar and available upon request. Shares are in percentages (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 6. Share of transactions made by each payment instrument (PI), sorted by cash share in 2017 (top 10 cash merchants)

Merchant	PI	2017	2018	2019	2020
16 - Person-to-person	Cash	72.8	70.4	63.5	62.3
	Check	12.6	11.2	12.4	10.8
	Card	4.0	5.9	9.3	8.1
	Electronic	2.1	3.4	8.2	1.3
4 - Fast-food restaurants, coffee shops, etc.	Cash	49.3	44.5	42.0	27.4
	Check	0.7	0.2	0.2	0.3
	Card	48.0	54.2	56.1	69.7
	Electronic	0.3	0.1	0.4	0.1
17 - Charitable or religious donations	Cash	46.0	37.4	38.3	23.5
	Check	34.5	34.8	37.2	33.3
	Card	9.1	15.2	13.1	27.5
	Electronic	9.1	9.9	9.9	9.8
7 - Arts, entertainment, recreation	Cash	45.5	37.4	36.9	27.9
	Check	5.5	5.7	4.2	2.9
	Card	37.5	44.0	49.6	55.8
	Electronic	5.8	6.9	7.6	6.7
6 - General services: hairdressers, auto repair, etc.	Cash	38.1	30.9	34.7	32.8
	Check	9.8	13.8	8.5	10.9
	Card	39.4	42.9	43.9	42.1
	Electronic	4.3	4.3	6.3	1.6
3 - Sit-down restaurants and bars	Cash	35.2	37.0	32.5	28.3
	Check	0.4	0.6	0.7	0.4
	Card	62.5	60.4	65.7	70.6
	Electronic	0.0	0.2	0.0	0.0
2 - Gas stations	Cash	34.9	35.7	29.0	24.8
	Check	1.2	0.8	0.6	0.4
	Card	62.4	62.0	68.8	72.4
	Electronic	0.5	0.5	1.0	0.4
1 - Grocery stores, etc.	Cash	32.0	30.3	30.3	22.3
	Check	2.0	1.9	1.2	0.9
	Card	64.3	66.5	67.1	74.9
	Electronic	0.2	0.3	0.5	0.3
20 - Schools, colleges, childcare centers	Cash	29.3	31.9	26.1	18.4
	Check	31.7	28.1	24.3	21.1
	Card	21.1	22.2	18.0	26.3
	Electronic	10.6	14.8	25.2	26.3
11 - Building contractors, etc.	Cash	26.0	22.2	11.8	10.0
	Check	60.0	53.3	47.1	50.0
	Card	10.0	15.6	29.4	40.0
	Electronic	4.0	8.9	11.8	0.0

Notes: Card includes debit, credit, and prepaid cards; electronic includes BANP and OBBP. The data are unweighted; weighted numbers are very similar and available upon request. All entries are percentage shares (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 7. Share of payments at merchant made remotely

Merchant	2017	2018	2019	2020
1 - Grocery stores, etc.	2.8	3.6	3.6	6.4
2 - Gas stations	3.6	3.8	4.8	4.7
3 - Sit-down restaurants and bars	1.8	2.7	1.5	8.6
4 - Fast-food restaurants, coffee shops, etc.	3.5	3.9	3.7	13.7
5 - General merchandise stores, online shopping, etc.	20.2	24.2	26.9	36.4
6 - General services: hairdressers, auto repair, etc.	18.4	18.4	16.7	23.0
7 - Arts, entertainment, recreation	25.8	34.9	37.2	49.0
8 - Utilities not paid to the government	79.1	81.1	84.4	84.3
9 - Taxis, airplanes, delivery	29.0	46.9	55.3	38.5
10 - Telephone, internet, cable or satellite tv, etc.	87.6	85.7	88.7	92.4
11 - Building contractors, plumbers, electricians, etc.	16.0	28.9	52.9	45.0
12 - Professional services	45.5	44.0	39.0	38.8
13 - Hotels, motels, RV parks, campsites	18.6	34.3	25.6	25.0
14 - Rent for apartments, homes, etc.	56.3	48.1	47.4	45.2
15 - Financial services	89.5	89.6	91.8	93.1
16 - Person to person	15.1	17.8	21.9	22.9
17 - Charitable or religious donations	17.1	29.1	34.0	48.0
18 - Hospitals, doctors, dentists, nursing homes, etc.	40.4	43.8	40.6	48.0
19 - Government taxes or fees	44.8	54.5	57.8	54.2
20 - Schools, colleges, childcare centers	39.0	35.6	49.5	68.4
21 - Public transportation and tolls	28.3	33.8	34.5	50.9
All	23.8	26.7	26.9	34.7

Notes: The sum of the in-person share (not shown) and the remote share equals 100. For some merchants, the total is slightly less than 100, due to a handful of observations that are missing values in the data for the in-person vs. remote variable. The data are unweighted; weighted numbers are very similar and available upon request. All entries are percentage shares (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 8. Share of transactions made by each payment instrument (PI), sorted by check share in 2017 (top 10 check merchants)

Merchant	PI	2017	2018	2019	2020
11 - Building contractors, etc.	Check	60.0	53.3	47.1	50.0
	Cash	26.0	22.2	11.8	10.0
	Card	10.0	15.6	29.4	40.0
	Electronic	4.0	8.9	11.8	0.0
14 - Rent for apartments, homes, etc.	Check	39.8	29.5	30.8	45.2
	Cash	16.5	20.2	15.8	14.5
	Card	11.7	14.7	15.0	14.5
	Electronic	22.3	19.4	23.3	17.7
17 - Charitable or religious donations	Check	34.5	34.8	37.2	33.3
	Cash	46.0	37.4	38.3	23.5
	Card	9.1	15.2	13.1	27.5
	Electronic	9.1	9.9	9.9	9.8
19 - Government taxes or fees	Check	32.3	30.9	29.4	33.3
	Cash	22.9	16.4	17.4	16.7
	Card	17.7	25.5	22.9	35.4
	Electronic	11.5	13.6	13.8	8.3
20 - Schools, colleges, childcare centers	Check	31.7	28.1	24.3	21.1
	Cash	29.3	31.9	26.1	18.4
	Card	21.1	22.2	18.0	26.3
	Electronic	10.6	14.8	25.2	26.3
8 - Utilities not paid to the government	Check	22.9	20.9	22.4	25.6
	Cash	9.5	7.2	3.3	5.4
	Card	19.2	23.5	22.1	23.6
	Electronic	44.7	45.4	49.4	42.6
18 - Hospitals, doctors, dentists, etc.	Check	21.9	21.5	21.4	22.5
	Cash	13.6	9.1	7.4	4.9
	Card	48.7	53.3	56.3	62.7
	Electronic	11.0	10.9	11.8	7.8
12 - Professional services	Check	18.2	15.6	23.0	26.5
	Cash	10.4	18.3	18.0	8.2
	Card	49.4	45.0	45.0	53.1
	Electronic	19.5	15.6	12.0	6.1
15 - Financial Services	Check	14.6	11.9	12.0	11.3
	Cash	2.7	1.3	1.2	2.2
	Card	9.0	12.0	12.2	10.7
	Electronic	61.7	63.3	65.3	64.2
16 - Person-to-person	Check	12.6	11.2	12.4	10.8
	Cash	72.8	70.4	63.5	62.3
	Card	4.0	5.9	9.3	8.1
	Electronic	2.1	3.4	8.2	1.3

Notes: Card includes debit, credit, and prepaid cards; electronic includes BANP and OBBP. The data are unweighted; weighted numbers are very similar and available upon request. All entries are percentage shares (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 9. Share of check transactions at each merchant made remotely, sorted by share of all transactions made with check in 2017 (top 10 check merchants)

	Year			
Merchant	2017	2018	2019	2020
11 - Building contractors, plumbers, electricians, etc.	13.3	20.8	37.5	40.0
14 - Rent for apartments, homes, etc.	43.9	55.3	34.1	28.6
17 - Charitable or religious donations	13.7	15.2	27.6	29.4
19 - Government taxes or fees	51.6	61.8	62.5	50.0
20 - Schools, colleges, childcare centers	33.3	23.7	33.3	37.5
8 - Utilities not paid to the government	71.2	72.4	70.8	82.3
18 - Hospitals, doctors, dentists, nursing homes, etc.	54.0	67.8	65.3	78.3
12 - Professional services	42.9	35.3	39.1	38.5
15 - Financial services	77.0	68.3	81.9	75.4
16 - Person-to-person	22.0	24.5	32.1	25.0
All	44.8	46.3	50.4	57.6

Notes: The data are unweighted; weighted numbers are very similar and available upon request. All entries are percentage shares (%).
Source: Diary of Consumer Payment Choice, 2017–2020.

Table 10. Probit, 1 if transaction is made with payment instrument (transaction and time variables)

		Cash		Check	
Merchant	*1 - Grocery stores, etc.*	-0.266	***	-0.063	***
	2 - Gas stations	-0.242	***	-0.067	***
	3 - Sit-down restaurants and bars	-0.137	**	-0.070	***
	4 - Fast-food restaurants, coffee shops, etc.	-0.215	***	-0.069	***
	5 - General merchandise stores, online shopping, etc.	-0.291	***	-0.061	***
	6 - General services: hairdressers, auto repair, etc.	-0.049		--	--
	7 - Arts, entertainment, recreation	0.093		-0.032	***
	8 - Utilities not paid to the government	-0.018		0.079	***
	9 - Taxis, airplanes, delivery	-0.332	***	-0.062	***
	10 - Telephone, internet, cable or satellite tv, etc.	-0.135	*	-0.007	
	11 - Building contractors, plumbers, electricians, etc.	0.102		0.225	***
	12 - Professional services	-0.145	**	0.054	***
	13 - Hotels, motels, RV parks, campsites	--	--	-0.064	***
	14 - Rent for apartments, homes, etc.	0.188	***	0.135	***
	15 - Financial services	-0.033		-0.029	***
	16 - Person-to-person	0.360	***	0.021	**
	17 - Charitable or religious donations	0.022		0.225	***
	18 - Hospitals, doctors, dentists, nursing homes, etc.	-0.343	***	0.080	***
	19 - Government taxes or fees	-0.105		0.129	***
	20 - Schools, colleges, childcare centers	0.086		0.191	***
	21 - Public transportation and tolls	-0.401	***	-0.064	***
Log_{10}(dollar value of transaction)		-0.393	***	0.030	***
Remote				--	--
In person				0.007	***
Year	*2017*	--	--	--	--
	2018	-0.009		-0.002	
	2019	-0.030	***	-0.005	**
	2020	-0.063	***	-0.007	***

Table 10, continued. Probit, 1 if transaction is made with payment instrument (demographic variables)

		Cash		Check	
Age	*under 25*	-0.127	***	-0.039	***
	25-34	-0.199	***	-0.035	***
	35-44	-0.125	***	-0.032	***
	45-54	-0.056	***	-0.031	***
	55-64	-0.018	*	-0.017	***
	over 65	--	--	--	--
Education	*Less Than High School*	0.289	***	-0.002	
	High School	0.170	***	0.011	***
	Some College	0.127	***	0.000	
	College	0.055	***	0.001	
	Graduate	--	--	--	--
Gender	*Male*	0.007		-0.002	*
	Female	--	--	--	--
Income	*Less than $25,000*	0.094	***	0.006	
	$25,000-$49,999	0.062	***	0.004	
	$50,000-$74,999	-0.032	**	0.003	
	$75,000-$99,999	0.014		0.000	
	More than $100,000	--	--	--	--
Ethnicity	*Latino*	0.049	***	-0.005	**
	Non-Latino	--	--	--	--
Race	*Black*	0.137	***	-0.017	***
	Asian	-0.021		-0.011	***
	Other	0.086	***	-0.019	***
	White	--	--	--	--
Home Ownership	*Homeowner*	-0.027	***	0.010	***
	Non-homeowner	--	--	--	--
Work Status	*Unemployed*	0.068	***	0.004	
	Retired	0.004		-0.004	**
	Disabled, other	0.052	***	-0.004	**
	Employed	--	--	--	--
pseudo R-Squared		0.206		0.297	
Number of Observations		30,299		41,526	

Notes: Marginal effects at means reported. The merchant with the median average value for the dependent variable was chosen as the reference group for each regression. Because only 1.34 percent of cash transactions in the sample were made remotely (149 of 11,094), we restricted the sample for the cash regression to only in-person transactions, dropping 11,227 remote transactions (27 percent of the sample).
Source: Diary of Consumer Payment Choice, 2017–2020.