



Has COVID Changed Consumer Payment Behavior?

2022 • No. 22-1

Claire Greene, Ellen Merry, Joanna Stavins*

Abstract

The COVID-19 pandemic has caused large changes in consumer spending, including how people make their payments. We use data from a nationally representative survey of US consumers collected before the pandemic in 2018 and 2019 and in 2020 to analyze changes in consumer payment behavior during the pandemic. We find that compared with their payment behavior in 2019, consumers had shifted some of their purchases from in person to online by fall 2020, significantly lowered their use of cash for purchases, and shifted their person-to-person (P2P) payments away from paper (cash and checks). Those changes are consistent with what we might expect, as many people were less able or willing to shop in person. The adoption of electronic P2P increased, especially the use of payment apps such as PayPal, Venmo, and Zelle. Consumers who worked exclusively from home during COVID made significantly higher shares of their payments online or through mobile devices and were less likely to use cash at all compared with those who worked at least partly in person, even after we control for income and education levels. In contrast, payment-behavior changes that took place from 2018 to 2019 were smaller in magnitude and largely insignificant, suggesting that COVID likely accelerated any longer-term trends. Although it is too soon to determine whether these changes will persist for the longer term, we observed them several months after the onset of the pandemic, so they certainly were not just temporary shifts.

JEL Classifications: D12, D14, I12, I18, L81

Key words: consumer payments, consumer surveys, payment behavior, COVID

<https://doi.org/10.29338/rdr2022-01>

*Greene: Federal Reserve Bank of Atlanta, Merry: Federal Reserve Board, Stavins: Federal Reserve Bank of Boston. The views expressed here do not necessarily represent the views of the Federal Reserve. Ken Brevoort, José Fillat, Jeff Larrimore, Joe Peek, and participants at the Board of Governors' DCCA Consumer and Community Research Section meeting and at the Bank of Canada Payments Conference provided helpful comments. Ruth Cohen provided excellent research assistance.

I. Introduction

The onset of the COVID-19 pandemic prompted large and rapid changes in economic activity, including changes in consumer behavior. As COVID-19 infections accelerated and the health crisis was declared a pandemic, offices and businesses closed or faced capacity limits, and many people stayed home and avoided shopping in person. As a result, US consumer spending declined beginning in mid-March 2020, dropped further in April (the trough of the National Bureau of Economic Research business cycle), and then rebounded somewhat during late spring and summer, due in part to the Coronavirus Aid, Relief, and Economic Security (CARES) Act and the federal government's supplement to unemployment insurance payments.

Because of the magnitude and nature of the disruptions, the pandemic affected not only *how much* people spent but also *how they made payments*. In this paper, we examine in detail changes in consumer payment behavior by payment instrument and by payment channel. Using detailed data from the Survey of Consumer Payment Choice (SCPC), we compare consumers' payment behavior before the start of the pandemic with their behavior several months after its onset.

We find that compared with their behavior in 2019, consumers had shifted some of their purchases from in person to online by fall 2020, significantly lowered their use of cash for purchases, and shifted their person-to-person (P2P) payments away from paper (cash and checks). The decline in in-person purchases and increase in online purchases are consistent with what we might expect, as many people were less able or willing to shop in person and so likely shifted to making some purchases online. The change in payment behavior from 2019 to 2020 contrasts with the change from 2018 to 2019, which was not statistically significant. Despite the decline in the fraction of purchases that were in person, the fraction of consumers who made in-person purchases during COVID did not drop significantly—indicating that those making these purchases did so less frequently. The decline in the use of cash was the most notable change involving the payment instruments used for purchases. Since cash payments account for a sizeable share of in-person purchases, the decline in in-person purchases contributed to the decline in cash use. Offsetting this decline, the use of cards for purchases—particularly credit cards—picked up as consumers substituted away from cash.

Unlike purchases from a store (in person or online), P2P payments are transactions between consumers. Adoption of P2P payments rose significantly from 2019 to 2020. However, the share of P2P payments made using paper instruments, such as cash or check, held steady. The increase in adoption of P2P payments was facilitated by a rise in the adoption of electronic P2P, especially the use of payment apps such as PayPal, Venmo, and Zelle.

There was no change in the way consumers paid their bills from 2019 to 2020. Most bills still had to be paid during COVID, including mortgage, rent, utilities, and insurance.¹ Existing bill payment arrangements may have continued to work well for consumers during the pandemic disruptions, as the majority of bill payments already were made using remote channels, including US Postal Service mail and online methods. Also, many bill payments are automated.

Earlier findings demonstrate that payment behavior varies with income and demographic characteristics (Stavins 2016, 2017). We examine differences across consumer socioeconomic cohorts in terms of how their payment behavior changed after the onset of the pandemic. Because some consumers worked remotely, some worked in person, and some stopped working during the pandemic-related recession, we also examine how differences in work status were reflected in differences in payment behavior.

Our analysis includes some caveats. It is not always possible to separate preexisting trends from changes caused by COVID. It is also too soon to determine whether COVID-induced changes in payment behavior are temporary or long lasting. Examining data about payment behavior about six months after the start of the pandemic, when business closures were easing and the economy had started to recover, reduces the likelihood that the observed changes lasted for only a short time. However, even though consumers had time over those months to revert to their earlier payment patterns or to establish new ones, some pandemic-related disruptions were ongoing at the time of the survey. Thus, the patterns we observe could continue to evolve.

Our findings suggest that some longer-term changes in consumer payments accelerated or became more apparent during COVID. Many consumers shifted to remote transactions to avoid physical contact with others, either by choice or because local restrictions forced them to do so.

The rest of the paper is as follows. Section II summarizes the relevant literature. Section III describes the data used in the analysis. Section IV examines changes in consumer payment behavior during COVID, focusing on purchases and P2P payments; we show aggregate changes, as well as changes by demographic and income cohorts and by work status. Section V presents the regressions used in the analysis and summarizes the regression results. Section VI concludes.

¹ A fraction of mortgage payments was affected by forbearance during COVID, but those payments were likely paid remotely, just like most bills in general, and therefore forbearance had no effect on the way that bills were paid.

II. Literature review

Changes in consumer payment behavior over time have been examined in the past (Stavins 2021), but it is typically very difficult to separate demand-side factors from supply-side effects to determine the cause of any observed changes. With the onset of the pandemic, consumers were forced to alter their shopping patterns due to store closures and restrictions on their mobility or chose to limit their in-person interactions, or both. A sizeable share of consumers not only faced a break in their daily routines (work, school), but also experienced significant income changes due to the economic disruptions. The COVID pandemic provides an opportunity to examine the effect of these demand-side shocks on consumer payment behavior.

Consumer spending in the United States declined after the onset of the pandemic.² Changes in the amount consumers spent from before COVID to during the pandemic have been analyzed in the economic literature (Chetty et al. 2020) and described in the media.³ While spending by consumers declined, their payment behavior also changed, both in the United States and elsewhere. Most of the existing studies analyze changes in cash use, although a few address broader changes in payment method use. The latter include Foster and Greene (2021), Kim et al. (2020), Coyle et al. (2021), Chen et al. (2020), Auer et al. (2020), Wisniewski et al. (2021). Cevik (2020) shows that the risk of infection reduced the demand for cash. Using high-frequency transaction data, Ardizzi et al. (2020) find that cash use declined and card use increased in Italy during COVID. Caswell et al. (2020) show that cash use dropped in the United Kingdom during the pandemic. Other studies analyze the effect of COVID on payment behavior internationally, including in the Netherlands (Jonker et al. 2020) and China (Liu et al. 2020).

Consumer behavior did not change uniformly. Eichenbaum et al. (2020) and Fan et al. (2020) show that changes in behavior in response to COVID, such as spending and precautionary choices to avoid the virus, were heterogeneous and varied by age, income, and gender. Differences in spending across groups also reflected the impact of government support payments that disproportionately benefited lower-income families. Grieg et al. (2021) track spending from checking accounts over 2020 and find that spending dropped sharply for all households in April 2020, but it rebounded with the arrival of government stimulus payments beginning in May. By the summer, spending for low-income households surpassed prepandemic levels and remained elevated, while spending for high-income households

² See Bureau of Economic Analysis, "Personal Income and Outlays: April 2020," news release, May 29, 2020, <https://www.bea.gov/sites/default/files/2020-05/pi0420.pdf>.

³ See, for example, Emily Badger and Alicia Parlapiano, "The Rich Cut Their Spending. That Has Hurt All the Workers Who Count on It," *New York Times*, June 17, 2020, <https://www.nytimes.com/2020/06/17/upshot/coronavirus-spending-rich-poor.html>.

remained below prepandemic levels at the end of the 2020. Changes in spending also varied by merchant type. Baker et al. (2020) and Goolsbee and Syverson (2021) find that at the start of the pandemic, government restrictions diverted customers away from visiting “nonessential” businesses, such as restaurants, and toward “essential” businesses, such as grocery stores.

Our paper adds to the literature by analyzing detailed survey data on purchases and P2P payments, allowing us to examine how consumer payment behavior changed during COVID and how employment status during this period affected the way consumers conducted their transactions. We compare changes that took place before COVID with those that occurred after the onset of the pandemic, allowing us to separate longer-term trends from the effect of the pandemic.

III. Data

The Survey of Consumer Payment Choice (SCPC) is a representative survey of US adults that the Federal Reserve has conducted annually since 2008. The SCPC collects data on consumer payment behavior including adoption and holding of bank accounts and payment instruments, as well as payment use by payment instrument and transaction type. The survey also collects consumers’ assessments of payment methods according to a set of characteristics and a rich set of demographic and financial variables. The 2020 SCPC is the 13th in a series of these annual surveys.⁴ Respondents participate in the survey in October of each year. The SCPC was conducted using the RAND Corporation’s American Life Panel until 2014. Since then, it has been conducted using the University of Southern California’s (USC) Understanding America Study (UAS).

Our sample includes 3,153 respondents in 2018; 2,238 in 2019; and 1,909 in 2020.⁵ Of these, 825 respondents completed the survey in both 2019 and 2020. Using the samples from all three years, we track how consumers changed their behavior both before and during the pandemic.

Our payment variables include payment instruments, transaction types, and payment channels. Payment instruments include cash, check, credit and debit cards, and digital

⁴ For a detailed description of the data, see Schuh and Stavins (2014, 2015) and Foster, Greene, and Stavins (2020, 2021).

⁵ Of the full 2019 SCPC sample of 3,372 respondents, 1,134 are excluded because, due to a survey experiment, they have missing values for the “payments in a typical month” variable, which we use to generate the adoption and share variables that constitute the bulk of our analysis. The 2020 SCPC sample is smaller compared with 2019 because the 2020 sample of 3,708 respondents was divided to perform another survey experiment (Foster, Greene, and Stavins 2021).

payments out of a bank account (online banking bill payments, or OBBP, and bank account number payments, or BANP).⁶ The transaction types are purchases, bill payments, and P2P payments, each of which can be conducted via different channels, such as in person or online. For this analysis, purchases are grouped into payment channels—that is, in-person purchases and online purchases—and then into payment instruments. Figure 1 shows this arrangement using shares of purchases for 2018, 2019, and 2020.

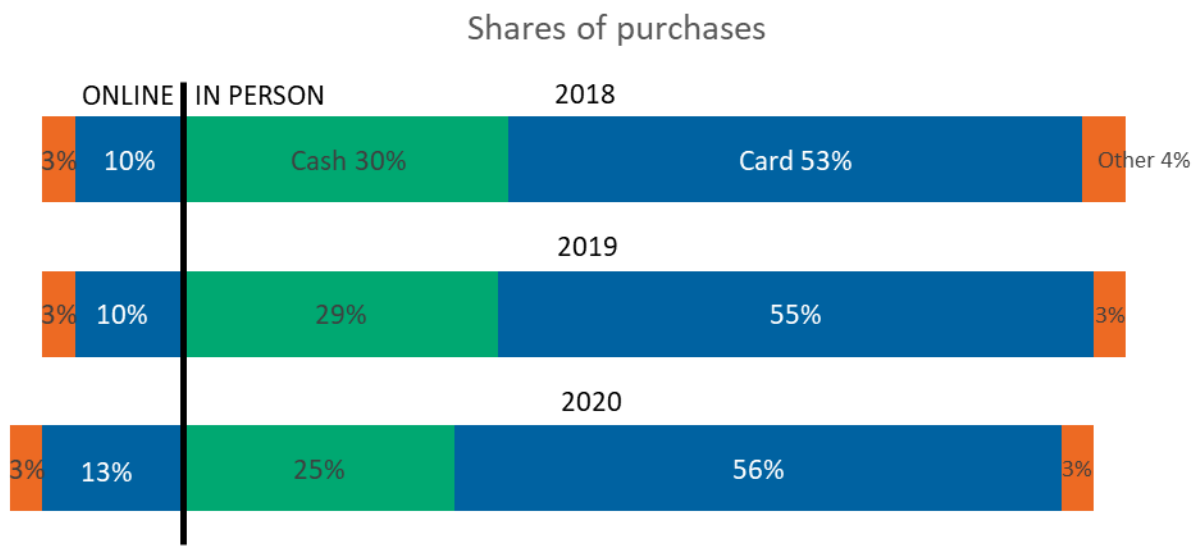


Figure 1. Purchases are analyzed by channel and payment instrument.
Source: SCPC, Federal Reserve Bank of Atlanta

P2P payments are payments to friends and family, gifts, and casual payments, such as to the babysitter or the teenager who cuts your lawn. They include payments to persons for things that are not business related. The transactions might be in cash or check, or they might be account-to-account payments from a payer’s account to another person’s account. P2P payments are grouped into payment instruments: paper payments (cash and checks) and electronic (nonpaper) payments (Figure 2). P2P transactions can be conducted with cash, checks, money orders, digital account transfers, or payment apps, including Zelle, Venmo, and PayPal. Although cards are not typically used directly for P2P transactions, some of the transactions processed through Venmo or PayPal can be charged to credit or debit cards. We include all nonpaper P2P transactions in electronic P2P, whether they are debited from a bank account via an automated clearing house (ACH) or charged to a payment card. The SCPC does not collect information about whether P2P payments are made in person or online.

⁶ Payments made with mobile phones are included in the tallies of in-person purchases (mobile at point of service, or POS), online purchases (not in person via app or website), and electronic P2P by payment instrument.

Respondents also report if they used mobile or online banking or made a mobile payment at least once in the preceding 12 months.

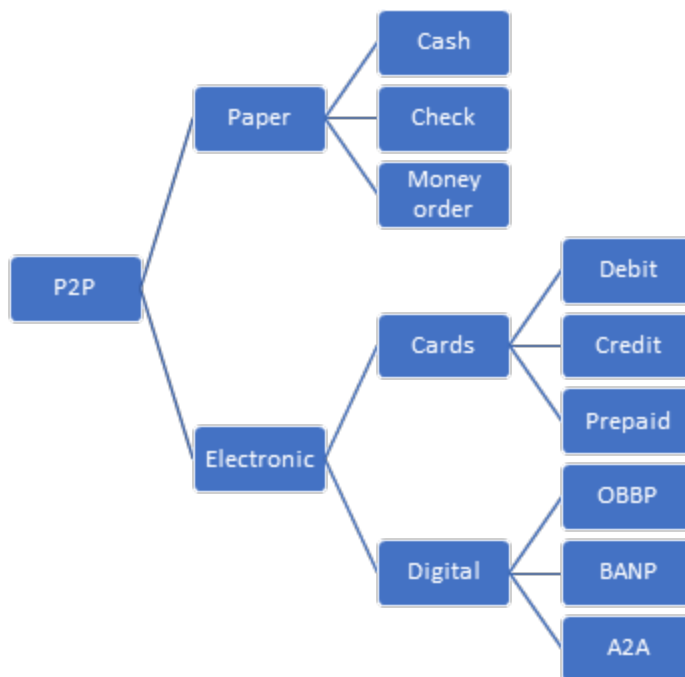


Figure 2. Classification of person-to-person (P2P) payments. OBBP is online banking bill payment (using a bank’s website or mobile app), BANP is bank account number payment (using a bank routing number and account number to pay), and A2A is account-to-account payment (using a service such as Venmo, PayPal, or Zelle).

For each of the variables of interest, we construct measures of adoption and use. Adoption is defined as a consumer making at least one payment in a category in a typical month.⁷ We measure payment use as the share of the number of transactions that are conducted using a particular payment instrument in a typical month. For each individual consumer i , the share of transactions conducted using payment instrument j in year t is:

$$s_{ijt} = \frac{N_{ijt}}{N_{it}},$$

where N_{ijt} = number of transactions by consumer i using instrument j in year t , N_{it} = number of payments by consumer i in year t using all instruments ($N_{it} = \sum_j N_{ijt}$), and s_{ijt} = share of

⁷ This definition varies from that used in the [formal SCPC tables \(https://www.atlantafed.org/banking-and-payments/consumer-payments/survey-of-consumer-payment-choice/2020-survey.aspx?panel=3\)](https://www.atlantafed.org/banking-and-payments/consumer-payments/survey-of-consumer-payment-choice/2020-survey.aspx?panel=3). For transaction types and payment instruments, the SCPC tables refer to using one at least once in a typical month as “incidence of use.” “Adoption” in the SCPC tables is defined as owning or having set up a payment instrument: for example, having a credit card (whether or not it is used at least once in a typical month), having blank checks on hand, and having set up online banking bill pay.

consumer i 's transactions conducted using payment instrument j in year t . Note that j could indicate a specific payment instrument—for example, cash—or a subset of transactions—for example, purchases conducted in person. In the latter case, the share would be interpreted as the fraction of i 's purchases conducted in person.

The SCPC data include demographics (age, education, gender, ethnicity, race) and household income as well as home ownership status. In addition to using the annual SCPC survey data, we merged selected variables from a COVID-related survey that USC administered to the same set of respondents in September 2020. The survey's employment-related variables include whether respondents were employed, and, if employed, whether they worked from home and for how many days per week. Other questions from the COVID-related survey asked whether respondents had gone to a grocery store or to a bar in the preceding seven days and if the government was currently encouraging or requiring limits to nonessential travel in their area. We use these additional variables to test whether differences in employment, lifestyle, and government restrictions affected the way consumers paid during COVID. Among the 2020 SCPC respondents, 154 did not fill out the September COVID survey, reducing the sample used for that part of our analysis to 1,755 respondents.

Local restrictions and business closures might have affected consumer purchasing behavior. For example, consumers living in states with stricter closure policies might have been more likely to shop online compared with consumers living in states with no closures. We capture the effect of local restrictions by using data from the Centers for Disease Control and Prevention (CDC) to measure state-level mask requirements and restrictions or limitations related to bar and restaurant operations in a given state.⁸ The variables include indicators showing mask requirements and whether bars and restaurants were fully open or whether they were open with limitations.

In another specification, we include Google mobility tracking data at the state level. The variables are measured as the average change in time spent on a given activity in October 2020 relative to the median value for the corresponding day of the week during the five-week period from January 3 through February 6, 2020. The variables include time spent at grocery and pharmacy locations, time spent at retail and recreation locations, and time spent at workplaces. While the CDC variables measure state restrictions, the Google mobility measures capture state-level changes in behavior that are due to both government restrictions and individual preferences on how much to avoid pandemic-related health risks.

⁸ The data were collected at <https://covid.cdc.gov/covid-data-tracker/#state-level-covid-policy>.

IV. Payment use during COVID

Most people's lives changed during COVID, even if they were not directly affected by the pandemic. Many employees worked from home instead of working in person; others lost or left their jobs. Travel stopped or diminished drastically, and many people avoided going to stores or restaurants. Needless to say, those changes led to changes in payment behavior. We show how consumers changed the way they paid their bills, paid for their purchases, and made P2P payments, both in person and online. We then focus on three measures of consumer payment behavior: online purchases, electronic P2P payments, and cash purchases.

A. Changes in payment behavior

In this part of the analysis, we compare the average adoption (extensive margin) and use of payment instruments in October 2019, before the start of the pandemic, with adoption and use in October 2020, during the pandemic. We contrast those changes with a comparison between October 2018 and October 2019 to emphasize changes that took place during the pandemic and show how they differ from previous shifts.

Consumer behavior for online purchases changed significantly during COVID. The share of consumers who made at least one online purchase increased significantly from 58.6 percent in 2019 to 65.5 percent in 2020, and the average number of purchases made online increased from 5.5 in October 2019 to 6.3 in October 2020—also a statistically significant change (Table 1). In addition, the share of purchases made online increased significantly from 12.7 percent of all purchases in 2019 to 16.1 percent in 2020, while the share of purchases made in person declined from 87.3 percent to 83.9 percent of purchases during that time. In contrast, both the share of consumers who made online purchases and the share of purchases made online actually declined from 2018 to 2019, albeit insignificantly. Other aspects of in-person purchasing behavior were unchanged. For example, even though consumers were restricted in terms of their mobility during COVID, the share of consumers who made at least one in-person purchase in a typical month did not change significantly from October 2019 (95.1 percent) to October 2020 (93.6 percent). Similarly, the average number of in-person purchases declined from 38.7 to 36.1, which is not a statistically significant drop.

P2P transactions constitute only a small fraction of all consumer payments; in 2020, less than 6 percent of all payments were P2P transactions. The SCPC defines these payments as “payments to friends and family, gifts, and casual payments like payments to babysitters and lawn mowers,” and it defines a person as “somebody who is not a store, company, or other business.” While P2P payments may account for only a relatively small share of all transactions, the percentage of consumers who made P2P payments rose from 47.5 percent in 2019 to 51.8 percent in 2020, and the share of P2P transactions made electronically—

including those charged to a payment card—increased significantly from 38.3 percent to 48.2 percent of all P2P transactions. In contrast to that 10-percentage-point increase, the share of P2P transactions made electronically rose by only 4 percentage points from 2018 to 2019. Most P2P transactions continued to be conducted with paper instruments (cash or check), but that share dropped significantly as the share of electronic P2P rose.

In contrast to how consumers made purchases and P2P payments (which are usually discretionary), the way they paid their bills generally did not change significantly during COVID, likely because paying bills typically does not require any physical contact with others and most bill payments (for example, mortgage, rent, utilities, and insurance) occur every month and did so even during the pandemic. The average number of bills paid by mail did increase significantly, from 7.4 in 2019 to 8.4 in 2020, but other measures for bill payments did not differ year over year. For these reasons, we omit bill payments from further analysis below and focus on purchases and P2P payments.

The decline in the use of cash during COVID was the most notable change involving payment instruments used for purchases, and the change was much greater than during the preceding year. Although consumers continued making in-person purchases during COVID, their payment instrument use changed significantly (Table 2). In particular, the percentage of consumers who used cash at least once during a typical month dropped from 78.4 percent to 69.2 percent from October 2019 to October 2020, and the share of cash purchases declined from 29.3 percent to 24.9 percent. The drop in cash share was offset by an increase in the share of card purchases (credit, debit, and prepaid combined) from 64.5 percent to 68.5 percent. Individually, the shares of debit card payments and credit card payments each exceeded the share of cash payments in 2020.⁹

Although the share of consumers who made P2P payments using paper instruments did not change from 2019 to 2020, the share who made electronic P2P payments not using cards increased significantly from 15.6 percent to 22.7 percent, and the share who made P2P payments using cards increased significantly from 14.7 percent to 19.4 percent. In contrast, the share of consumers making electronic P2P payments actually declined from 2018 to 2019. Among all P2P users, the share of noncard electronic P2P transactions rose significantly during COVID, after remaining unchanged the preceding year.

⁹ The numbers reported in this section are based on micro shares—that is, averages of individual respondents' shares. Although the exact numbers may differ, both micro shares and macro shares (total number of payments of a certain type divided by the aggregate number of payments) changed qualitatively in the same direction, and the statistical significance of those changes was also the same.

B. Mobile banking and payments

The share of consumers who adopted any mobile banking or mobile payment method increased significantly during COVID (Table 3).¹⁰ The adoption of mobile banking increased from 59 percent to 64 percent of consumers, while the adoption of online banking increased from 75 percent to 79 percent. Mobile phone payments became more common during COVID: 46.1 percent of consumers made at least one mobile payment in the 12 months ending in October 2020, up from 37.5 percent in October 2019. The percentage of consumers who adopted any online payment accounts increased from 54.2 percent in 2019 to 61.7 percent in 2020. The most common online payment accounts are PayPal, Venmo, and Zelle, and the percentages of consumers who adopted any of those mobile accounts increased significantly from 2019 to 2020: PayPal from 38 percent to 42 percent, Venmo from 15 percent to 24 percent, and Zelle from 11 percent to 17 percent.¹¹ In contrast, only the adoption of mobile banking increased significantly between 2018 and 2019. The mobile apps were also used more heavily in 2020 than in 2019: the percentage of P2P payments made using an account-to-account payment service almost doubled, increasing from 8.5 percent to 14.8 percent of all P2P payments, after no change from 2018 to 2019 (Table 2).

Figure 3 shows the adoption rates of several forms of technology for banking and payments from 2015 through 2020. While adoption generally trended up over this period, the increases from 2019 to 2020 are significant for all of these technologies, including online banking, which already had high levels of adoption before the pandemic. Although we cannot separately identify the effects of COVID from the time trends, the unique circumstances of the pandemic that motivated the use of remote forms of banking and payment, coupled with the evidence of significant changes in the use of online and mobile channels, suggest that the pandemic could have prompted or accelerated technology adoption.

¹⁰ For this analysis, we are able to use the full 2019 sample of 3,372 respondents because it does not rely on the “number of payments in a typical month” variable.

¹¹ In 2018, the online payment account question did not include the PayPal, Venmo, and Zelle breakdown. Thus, we cannot compare 2018 with the subsequent years.

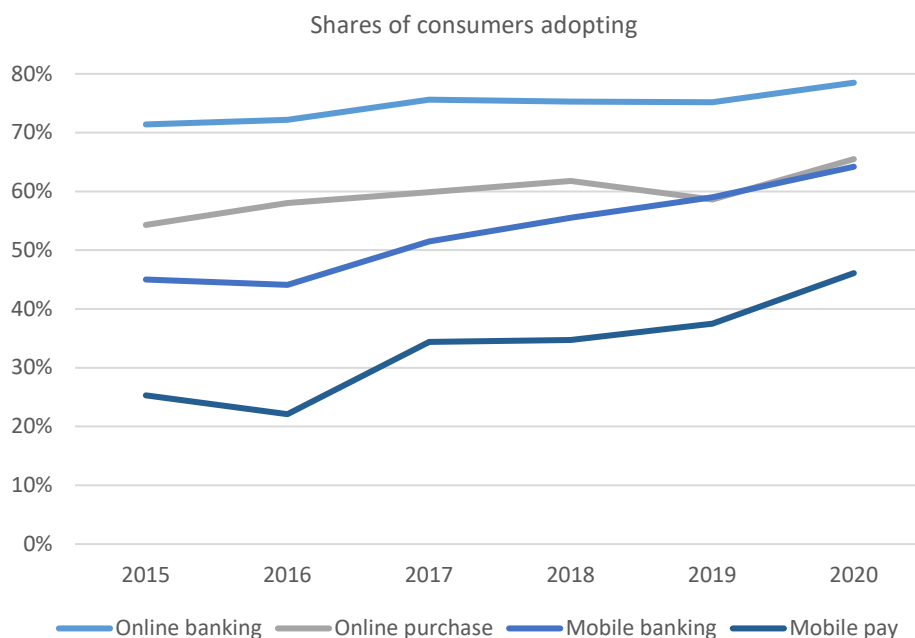


Figure 3. Share of consumers adopting online or mobile banking or payments, by year
Source: SCPC, Federal Reserve Bank of Atlanta

C. Changes in payment behavior by income and demographic cohorts

We focus our analysis on online purchases, electronic P2P payments, and cash purchases, as those payments were most likely to be affected by the pandemic. Both the adoption and use of those three types of payments changed significantly during the pandemic, but the changes were not uniformly distributed among consumers. In this section, we compare changes in behavior across various income and demographic cohorts. Online purchases are shown in Table 4, electronic (nonpaper) P2P in Table 5, and cash purchases in Table 6.

Almost two-thirds of consumers made at least one online purchase in 2020, an increase of nearly 7 percentage points from 2019 (Table 4). Interestingly, consumers with a high school education increased their adoption of online purchases more than any other education cohort, by almost 13 percentage points. The likelihood of consumers with graduate degrees making any online purchases decreased, albeit not significantly.

The average share of purchases made online among those who made any purchases increased significantly during COVID, by 3.4 percentage points. The share was greater for consumers with higher levels of education, although all education cohorts except those consumers with less than a high school education increased their shares of online purchases. Higher-income consumers increased their online purchase shares more than lower-income consumers did

(Figure 4).¹² In contrast, there was almost no difference among income cohorts in the change from 2018 to 2019, and consumers in the top two income cohorts actually lowered their shares of purchases made online from 2018 to 2019. These numbers do not include controls for other factors, such as whether the consumers were employed and whether they worked from home. Below, we analyze payment behavior differences by employment status.

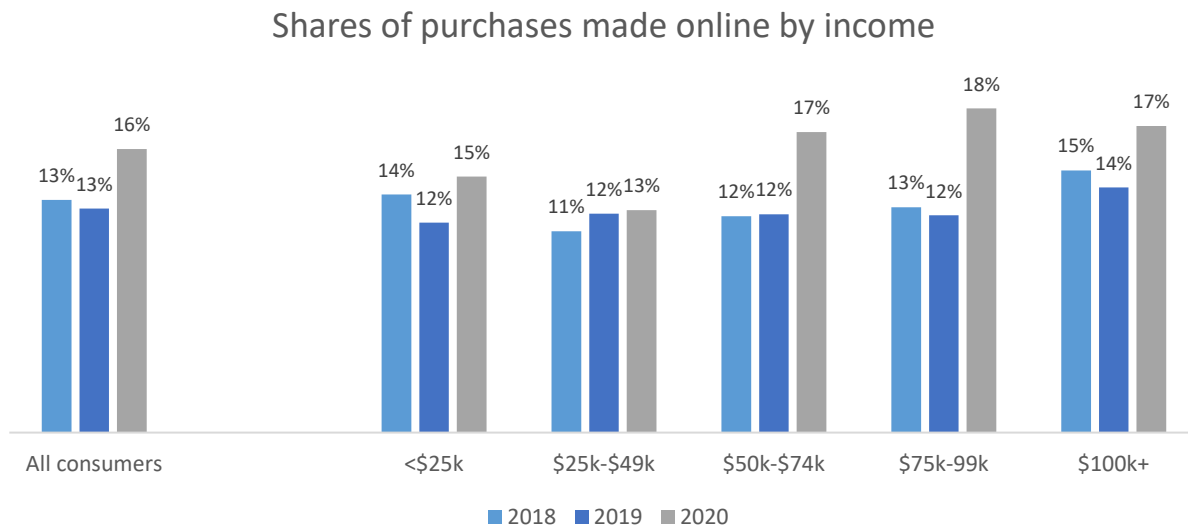


Figure 4. Share of purchases made online in 2019 and 2020, by income cohort
Source: SCPC, Federal Reserve Bank of Atlanta

During COVID, some of the P2P payments that were previously paid with cash or checks were converted to other methods, because either most people had fewer in-person interactions with others or they avoided passing paper payment instruments hand-to-hand to reduce the likelihood of transmitting the virus. Almost one-third of consumers had adopted electronic P2P transactions in 2020, up from less than one-fourth in 2019 (Table 5).

The share of P2P transactions that were conducted electronically increased significantly from 2019 to 2020, by almost 10 percentage points in total, following a much smaller increase the preceding year. Even though the youngest consumers—those under age 25—had the highest rate of electronic P2P adoption in 2019, consumers in middle-age cohorts raised their adoption of electronic P2P payments the most, and those aged 35 to 44 had the highest rate of adoption in 2020 (Figure 5). Adoption rose monotonically with education in both years, but consumers with a high school degree or some college education increased their rates of adoption the most.

¹² Income is measured each year, so a respondent who had a significant income disruption during COVID might be in a lower income cohort in 2020 compared with where they were in 2019.

Shares of consumers adopting electronic P2P

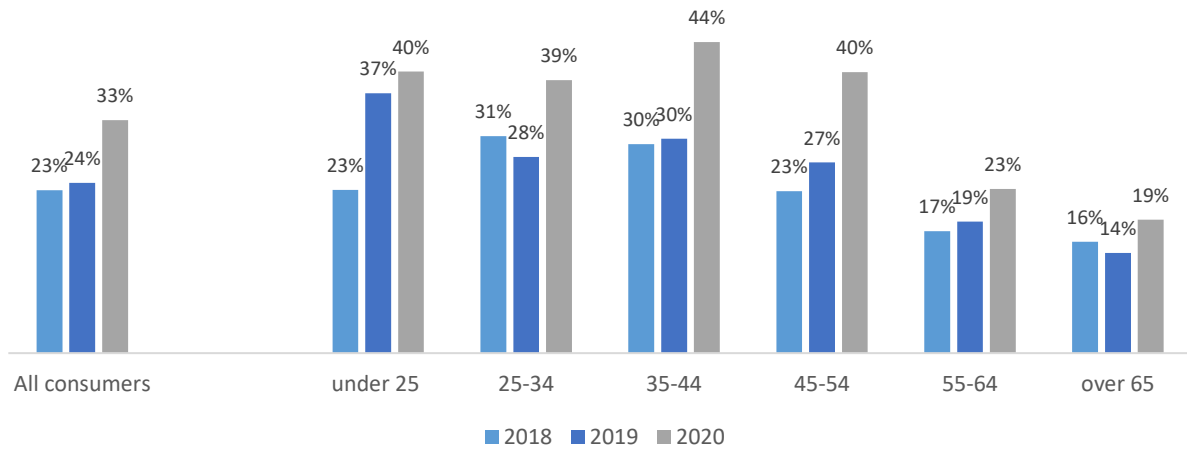


Figure 5. Share of consumers who adopted electronic P2P in 2019 and 2020, by age cohort.
Source: SCPC, Federal Reserve Bank of Atlanta

Most consumers used cash for purchases at least once both before and during COVID. However, the percentage of consumers who used cash at least once declined significantly from 2019 to 2020, by 9.2 percentage points, following a much smaller change the preceding year (Table 2). Highly educated and high-income consumers were more likely to stop using cash for purchases in 2020 (Figure 6). These groups were more likely to work from home during the pandemic and also had lower shares of cash purchases before the pandemic, suggesting they already relied on payment methods other than cash (Table 4 and Figure 7). Women were slightly less likely to make cash purchases in 2019, and their likelihood of making cash purchases during COVID declined by almost twice as much as that of men: 11.5 percentage points compared with 6.8 for men (Figure 6).

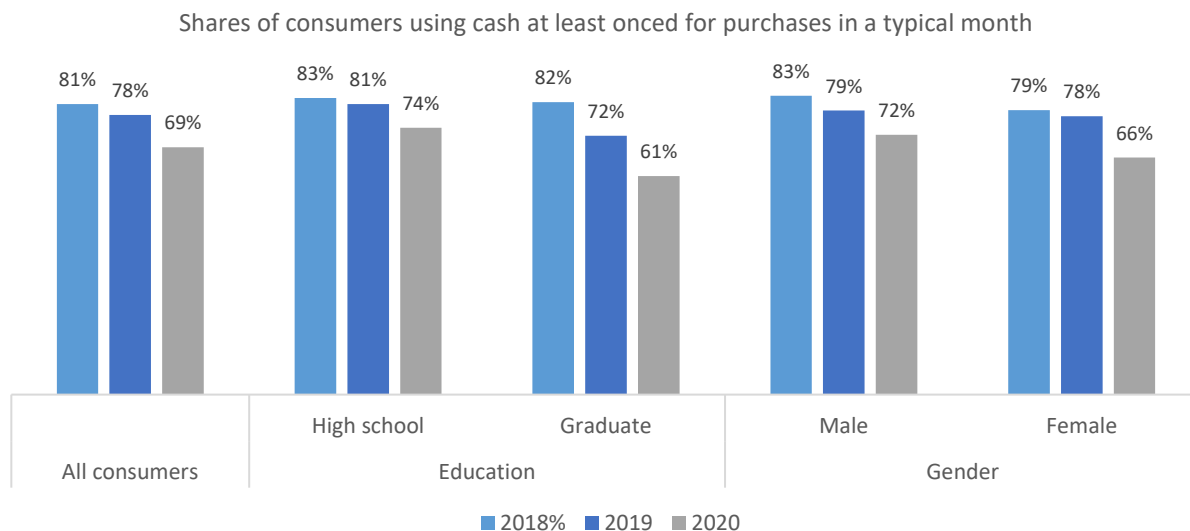


Figure 6. Shares of consumers using cash at least once in 2018, 2019, and 2020, by education (left) and gender (right)

Note: Complete data for five levels of educational attainment are shown in Table 6.

Source: SCPC, Federal Reserve Bank of Atlanta

Turning to our measure of payment use, the share of purchases made with cash among consumers who made any purchases declined from almost 30 percent to less than 25 percent, a significant drop. In contrast, that share declined by only 0.6 percentage point the preceding year (Table 2). Because cash can be used only for in-person purchases, that decline in cash use for purchases is due in part to the shift away from in-person purchases. In addition, the share of in-person purchases made with cash fell from 32.6 percent in 2019 to 28.7 percent in 2020, a statistically significant decline. Less-educated consumers had a higher share of cash purchases compared with more-educated consumers in both years, but those with lower levels of education had a greater decline in cash share compared with those with a college or graduate education. Women reduced their cash share significantly, by 6.6 percentage points, while the decline for men was smaller and insignificant.

D. Payment behavior by work status

During COVID, many people lost their jobs or decided to leave the labor force. Among those who remained employed, a significant fraction worked remotely from home for all or some of the time. It is likely that changes in payment use varied based on individual consumers' work situations. In particular, people who were employed during COVID might have paid differently than those who were not employed, and consumers who worked from home might have paid differently than those who worked in person. For example, many people who stopped going to work in person no longer paid for commuting expenses or bought lunch at work. In this

section, we use data collected in the additional COVID-related survey in September 2020 to analyze differences in payment behavior by consumers' work status.

Table 7 shows the variables of interest. In September 2020, almost 59 percent of the respondents were employed. Among those who were employed, 32.2 percent worked from home on all days, while the rest worked in person at least some of the time.¹³ On average, employed consumers worked from home 35.8 percent of their working days. The vast majority of the respondents—82.3 percent—went to a grocery store or pharmacy in September 2020, but fewer than 12 percent went to a bar or a club. About half of the respondents lived in areas where travel limitations were in place at the time. We cannot compare those numbers with the preceding year's numbers, because those questions were not included in earlier surveys. However, we can test whether people who were employed or those who worked from home during COVID paid differently than the rest of the sample.

Table 8 shows payment behavior by work status. Employed consumers were significantly more likely to make their purchases online: 69.3 percent of employed consumers made at least one online purchase compared with 60.1 percent of those not employed. Employed consumers also had a higher average share of purchases made online: 17.6 percent compared with 13.9 percent for those who were not employed. Employed consumers were significantly more likely to use their debit or credit cards, and their share of purchases paid with debit or credit was higher than the share for those who were not employed. In contrast, their share of paper instruments was significantly lower: they used cash for 20.1 percent of their purchases, debit cards for 39.1 percent, and credit cards for 32.6 percent, while the corresponding shares for consumers who were not employed were 31.8 percent, 30.1 percent, and 25 percent. Employed consumers also were significantly more likely than nonemployed consumers to conduct electronic P2P transactions in 2020. Nonemployed consumers conducted most of their P2P transactions using paper instruments, while employed consumers used mainly electronic P2P methods. In the regressions below, we test whether employment affected payment behavior when we control for age, as well as income and other demographic attributes.

E. Working from home

Many consumers who remained employed during COVID were advised or required to work remotely in 2020. In the special UAS survey conducted in September 2020, respondents were asked how many days they had worked from home during the preceding seven days.

¹³ The Federal Reserve Board of Governors' Survey of Household Economics and Decisionmaking (SHED) conducted in July 2020 found that 31 percent of employed consumers worked from home (<https://www.federalreserve.gov/publications/2020-update-economic-well-being-of-us-households-employment.htm>).

Consumers spent 35.8 percent of all working days working from home, including those consumers who worked from home partially and those who worked exclusively from home. The majority of employed consumers either worked from home on all days or did not work from home at all. Using those data, we created a dummy variable equal to 1 if a respondent worked from home on all of their working days during the preceding week and 0 otherwise. Respondents who worked outside the home at least some of the time were included in the latter category.

$$WFH_i = \begin{cases} 1 & \text{if worked from home all days} \\ 0 & \text{if did not work from home all days} \end{cases}$$

where i indicates individual consumers who were employed in September 2020. Table 7 shows that among those who were employed in September 2020, 32.2 percent worked from home on all days.

Table 9 shows that consumers who worked only from home were significantly more likely to make purchases online and had a significantly higher share of purchases made online compared with those who worked outside the home. Three-quarters of from-home workers made at least some of their purchases online, compared with two-thirds of those who worked outside the home. From-home workers made 20.7 percent of their purchases online, compared with 15.8 percent for the employed consumers who worked outside the home. Those who worked from home used cash much less frequently and credit cards much more frequently compared with employed consumers who worked outside the home: the share of cash purchases was 13.3 percent among those working from home and 22.3 percent among those who did not work from home, and the corresponding credit card shares were 44.5 percent and 27.6 percent (Figure 7). Only 56.7 percent of employed respondents who worked from home used cash even once in September 2020, compared with 71 percent of employees who worked outside the home at least some of the time.

Shares of purchases by payment instrument, by employment and work-from-home status, October 2020

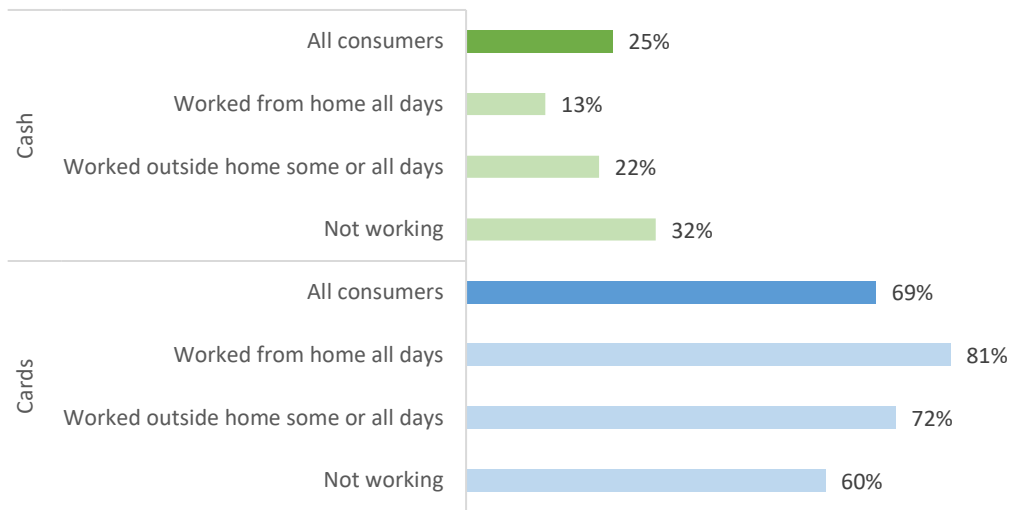


Figure 7. Shares of purchases made with cash and cards in 2020, by working status
Source: October 2020 SCPC and September 2020 COVID survey

Employed consumers who worked from home on all of their working days had a significantly higher probability of adopting mobile payments or any of the online payment accounts—PayPal, Venmo, or Zelle (Table 10 and Figure 8). They were also significantly more likely to adopt online or mobile banking or to use electronic payments rather than paper for their P2P transactions compared with employed consumers who worked outside the home at least part of the time.

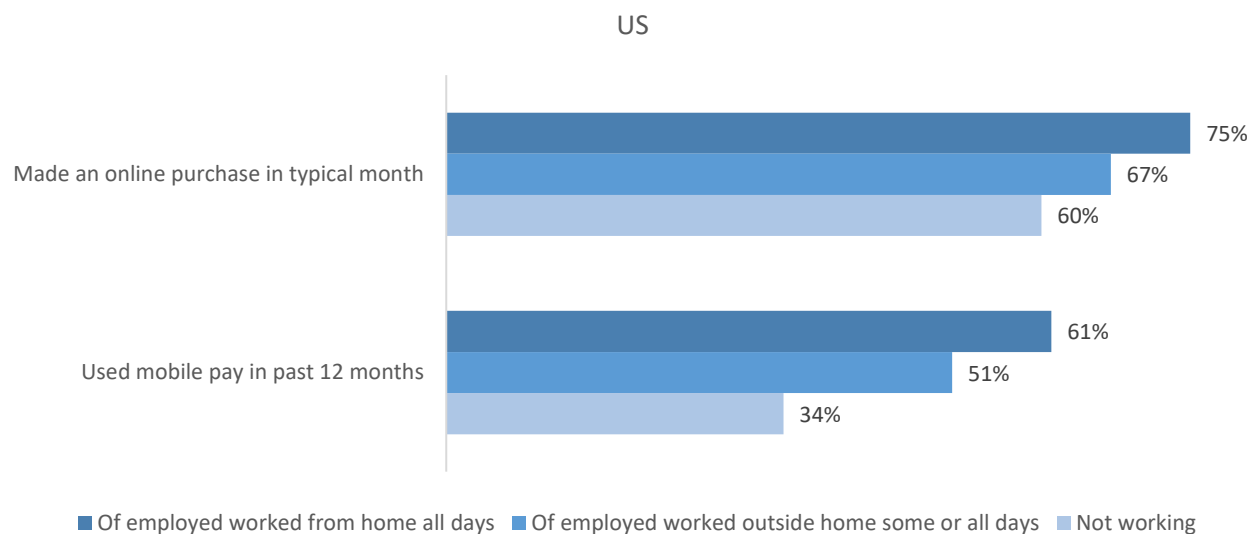


Figure 8. Shares of consumers making purchases online and using mobile pay in 2020, by employment status
 Source: October 2020 SCPC and September 2020 COVID survey

Working from home during COVID was correlated with education and income: highly educated or higher-income consumers were more likely to work from home, while those with lower levels of education or income were more likely to work in person. Table 11 shows correlation coefficients between working from home and education (top row) and income (bottom row).

In regressions below, we control for income and education, as well as age and other demographic attributes, and test whether working from home affected payment behavior.

V. Regressions

Above we showed that consumers changed their payment behavior during COVID in many ways, and consumers who worked from home paid differently than those who worked outside the home. To isolate the effect of COVID from those of employment status, demographics, and income, we estimate regressions of consumer payment behavior. The variables of interest are in-person purchases, online purchases, P2P payments, and cash purchases. For each of those variables, we estimate the effect of COVID and employment status on payment adoption and on payment use. Payment adoption is measured by indicators that are equal to 1 if a consumer conducted a certain type of transaction in a typical month and 0 otherwise. Payment use is measured as the share of transactions of a certain type in a typical month.

For each variable of interest, we estimate the following regression:

$$Y_{ijt} = f(\text{Year}_t, X_{it}, EMP_{it}, STATE_{it}),$$

where Y_{ijt} is a dependent variable of interest for consumer i at time t ($t=2018, 2019, 2020$) and transactions type j ($j =$ in-person purchases, online purchases, P2P payments, cash purchases); $Year_t$ is a set of dummy variables in multiyear regressions equal to 1 in year t and 0 otherwise, except for year 2019 which always has a value of 0; X_{it} is a vector of demographic variables for consumer i at time t (education, age, race, gender, children under age 12 at home); EMP_{it} is income, employment status, and work-from-home status for consumer i at time t ; and $STATE_{it}$ is consumer i 's state of residence in year t .

The regression specified above allows us to measure how payment behavior shifted in 2020 after we control for individual consumers' attributes and to contrast the effect of COVID in 2020 (compared with 2019) with pre-COVID changes that took place from 2018 to 2019. In addition to the pooled 2018–2020 regressions, we estimated cross-sectional 2020 regressions to test whether differences across consumers during COVID in 2020 had significant effects on their payment behavior. The factors of interest in the single-year regressions are differences in employment status, especially working from home, as well as differences in lifestyle, such as whether a consumer visited a grocery store or a bar/club during the preceding seven days. We also estimated specifications that included state-level data on restrictions on activity due to COVID: mask requirements and bar/restaurant closures or restrictions obtained from the CDC. However, the restrictions variables were not significant, and the specifications had a worse fit than did those with state-level fixed effects. In another specification, we included Google mobility tracking data at the state level,¹⁴ but when these measures of local mobility were included in the regressions, almost all of those coefficients were insignificant, and the remaining coefficients remained qualitatively the same.

We used probit to estimate the adoption (extensive margin) regressions, where the dependent variable Y_{ijt} equals 1 if consumer i conducted any transactions of type j at time t , and 0 otherwise. We used tobit to estimate the payment use regressions, where the dependent variable s_{ijt} is the share of consumer i 's transactions in year t that were conducted with type j method. We used tobit because the dependent variable is between 0 and 1 and is therefore left- and right-censored.

¹⁴ The variables are measured as the average change in time spent on a given activity in October 2020 relative to the median value for the corresponding day of the week during the five-week period from January 3 through February 6, 2020. The variables included time spent at grocery and pharmacy locations, time spent at retail and recreation locations, and time spent at workplaces. While the CDC variables measure state restrictions, the Google mobility measures capture state-level changes in behavior due to both restrictions and individual preferences on how much to avoid pandemic-related health risks. The specifications shown in the paper include state-level dummy variables instead of these mobility measures, but the results are available from the authors.

$$\Pr(Y_{ijt} = 1) = f(\text{Year}_t, X_{it}, \text{EMP}_{it}, \text{STATE}_{it})$$

$$s_{ijt} = f(\text{Year}_t, X_{it}, \text{EMP}_{it}, \text{STATE}_{it}),$$

where:

$$Y_{ijt} \equiv \begin{cases} 1 & \text{if consumer } i \text{ has conducted payment type } j \text{ in period } t \\ 0 & \text{otherwise,} \end{cases}$$

$$s_{ijt} = \frac{N_{ijt}}{N_{it}} \text{ and } s_{ijt} \in [0,1],$$

and $j = \{\text{in-person purchases, online purchases, P2P payments, cash purchases}\}$.

We did not employ the two-step Heckman (1979) procedure to estimate the regressions, because the binary choice of whether or not to use a given payment type even once is not separate from the continuous variable measuring the intensity of use. For example, if a consumer uses cash rather than a card for a transaction, that affects their share of transactions that are paid using cash.

About 95 percent of 2020 SCPC respondents made at least one in-person purchase, and there is a lack of variation across states given that such a high proportion of respondents made at least one in-person purchase. In every state, there was at least one consumer in the data with in-person purchases. Therefore, we did not include state fixed effects in the probit regression for in-person purchases.

The regression results are presented as marginal effects at means based on probit or tobit regression coefficients. Pooled 2018–2020 regressions have a much larger sample size than the 2020 cross-sectional regressions. State-level COVID restrictions—mask requirements and bar/restaurant closures or restrictions—did not have a significant effect on payment behavior. Our findings are consistent with those of Goolsbee and Syverson (2021), who conclude that legal shutdown orders accounted for only a very small fraction of the decline in economic activity. Instead, individual consumers' choices were the reason for changes in behavior, which in turn led to changes in payment activity. Similarly, states that repealed their shutdown orders experienced only a small increase in consumer in-person shopping. Alexander and Karger (2021) find that stay-at-home orders did affect mobility, but they use county-level data rather than state-level restrictions.

F. In-person and online purchases

In 2020, consumers had a 1.1-percentage-point lower probability of making even a single in-person purchase compared with 2019, after we control for the demographic and income variables (Table 12, column 1). So, even though the unconditional in-person purchase adoption rate did not change significantly (see Table 1), conditionally it dropped significantly by 1.1 percentage points. The change from 2018 to 2019 was insignificant. The probability of making any online purchases in 2020 was 5.7 percentage points higher than in 2019 following an insignificant drop the preceding year (Table 13, column 1). Although we cannot conclusively identify the effect of COVID from the trend of increasing adoption of online purchases in recent years, this result suggests that COVID induced consumers to shop online. In 2020, the share of in-person purchases was 3 percentage points lower (Table 12, column 3), and the share of online purchases was 3 percentage points higher (Table 13, column 3), compared with 2019, while there were no significant changes from 2018 to 2019.¹⁵

Younger, more educated, higher-income, or White consumers were significantly more likely to make their purchases online compared with their counterparts. Education level and age also had a significant effect on the share of online purchases: younger or more educated consumers had a significantly higher share of online purchases. In the pooled 2018–2020 regression (Table 13, column 3), consumers with less than a high school education had a 5.4-percentage-point lower share of online purchases compared with consumers with graduate degrees, on average. During COVID in 2020, consumers who worked from home all the time had a 3.6-percentage-point higher share of online purchases, even after we controlled for education and income. Education was less significant when we controlled for work status, in part because the 2020 cross-sectional sample is much smaller than the pooled 2018–2020 sample and because working from home during COVID has been correlated with education levels. Not surprisingly, consumers who had gone to a grocery store in the preceding seven days had a 3.4-percentage-point higher share of in-person purchases compared with consumers who had not gone to the store.

G. Person-to-person payments

We showed above that during COVID in 2020, consumers were significantly more likely to adopt payment apps often used for P2P payments, including Zelle, Venmo, and PayPal. Regression results show that even after we control for demographics and income, consumers

¹⁵ Consumers make their purchases either in person or online, so the share of online purchases for each consumer equals 1 minus the share of in-person purchases, and the online share regression results are the opposite of the in-person share results. However, the probability of making any online purchases (extensive margin) is measured separately from the probability of making in-person purchases, as a person can make all of their purchases in person, all online, or a mix of the two.

had a 7.6-percentage-point higher probability of making electronic P2P payments in 2020 than in 2019, following an insignificant change from 2018 to 2019 (Table 15, column 1). Recall that electronic P2P payments include those that are charged to cards as well as those that are directly taken out of an account (Figure 2). There was no significant effect on the probability of making a paper P2P transaction (Table 14, column 1). Younger or higher-income consumers were significantly more likely to adopt electronic P2P payments.

The share of electronic (nonpaper) P2P payments increased significantly, by 9.7 percentage points from 2019 to 2020, even when we control for demographics and income, whereas there was a much smaller change from 2018 to 2019 (Table 15 column 3). Younger or higher-income consumers had significantly higher shares of electronic P2P payments, and women had higher shares than men. Black consumers and Asian consumers had higher shares of electronic P2P payments compared with White consumers.

H. Cash use

During COVID, consumers were constrained in terms of their mobility, with many working from home, not traveling, and not conducting any transactions in person. Cash use declined significantly. In October 2020 versus October 2019, consumers had a 9.2-percentage-point lower probability of using cash even once (Table 2). In the pooled 2018–2020 regression, after we control for many demographic attributes and income, consumers had a 7.5-percentage-point lower probability of using cash even once (Table 16, column 1). That decline followed a much smaller drop from 2018 to 2019 (of 2.8 percentage points), suggesting that COVID may have accelerated the longer-term shift away from cash use. Consistent with earlier research, lower-income consumers and men were more likely to use cash.

The share of cash transactions in 2020 was 4.2 percentage point lower than in 2019, whereas the change from 2018 to 2019 was insignificant, after controlling for demographic and income attributes (column 3). Cash use was significantly higher among less educated, lower-income, Black, male, or nonemployed consumers. Home owners used cash less frequently than renters.

To test whether working from home during COVID had a significant effect on cash use, we estimated a cross-sectional regression using the 2020 sample (Table 16, columns 2 and 4). Employed consumers who worked exclusively from home (WFH = 1) were less likely to use cash even once (column 2). Furthermore, their share of cash transactions was 6.9 percentage points lower compared with consumers who were not employed, a statistically significant difference, and 2.1 percentage points lower compared with consumers who were employed but worked outside the home at least some of the time (column 4). Consumers with children under age 12 at home were not significantly less likely to use cash in 2020 relative to

consumers who did not have young children at home. Having gone to a grocery store or a bar during the preceding seven days increased the probability of using cash and the share of cash transactions, although the grocery-store effect was not significant in the share regression.

VI. Conclusion

In addition to affecting the amount consumers spent, COVID changed the way consumers pay for their purchases and make their P2P payments. Some of the changes were a continuation or acceleration of longer-term trends, including an increase in the adoption and use of online purchasing and in the adoption and use of mobile payment apps. However, we find that many of the changes in consumer payment behavior observed during COVID were larger and more significant than those observed during the preceding year, before COVID.

Consumers varied in their response to the pandemic, with the reaction differing with age, education, income, and gender. Those who worked from home paid for their purchases differently than those who worked outside the home, even after the analysis controls for sociodemographic differences.

It remains to be seen which of these trends continue after employees return to their offices and more consumers are comfortable shopping in person again. On the one hand, cash use may rise again when in-person services and other cash-intensive businesses return to more normal levels, and if consumers believe that handling cash does not increase the likelihood of contracting the virus. On the other hand, it is likely that COVID helped accelerate technology adoption for some consumers. Past shocks have helped spur payment innovation, as the disruptions after the 9/11 attacks did with the implementation of digital checks. In the COVID era, the largest increase in the adoption of electronic P2P payments was by middle-aged consumers, not by younger ones. If new adopters find electronic payments safe and convenient, they may continue using them even after the acute disruptions of the pandemic wane.

Acknowledgment

The project described here relies on data from surveys administered by the Understanding America Study (UAS), which is maintained by the Center for Economic and Social Research at the University of Southern California (USC). The content of this paper is solely the responsibility of the authors and does not necessarily represent the official views of USC or UAS. The collection of the UAS COVID-19 tracking data is supported in part by the Bill & Melinda Gates Foundation and by grant U01AG054580 from the National Institute on Aging, among many others.

References

- Alexander, Diane, and Ezra Karger. 2021. "Do Stay-at-Home Orders Cause People to Stay at Home? Effects of Stay-at-Home Orders on Consumer Behavior." Federal Reserve Bank of Chicago Working Paper 2021-12. <https://www.chicagofed.org/publications/working-papers/2020/2020-12>.
- Ardizzi, Guerino, Andrea Nobili, and Giorgia Rocco. 2020. "A Game Changer in Payment Habits: Evidence from Daily Data during a Pandemic." Bank of Italy Occasional Paper Number 591.
- Auer, Raphael, Giulio Cornelli, and Jon Frost. 2020. "Covid-19, Cash, and the Future of Payments." *Bank for International Settlements BIS Bulletin*. No. 3.
- Baker, Scott R., R.A. Farrokhnia, Steffen Meyer, Michaela Pagel, and Constantine Yannelis. 2020. "How Does Household Spending Respond to an Epidemic? Consumption During the 2020 COVID-19 Pandemic." NBER Working Paper No. 26949. April. <http://www.nber.org/papers/w26949>.
- Caswell, Ellen, Miranda Hewkin Smith, David Learmonth, and Gareth Pearce. 2020. "Cash in the Time of Covid." *Bank of England Quarterly Bulletin*. Q4.
- Cevik, Serhan. 2020. "Dirty Money: Does the Risk of Infectious Disease Lower Demand for Cash?" IMF Working Paper 20-255.
- Chen, Heng, Walter Engert, Kim P. Huynh, Gradon Nicholls, Mitchell Nicholson, and Julia Zhu. 2020. "Cash and COVID-19: The Impact of the Pandemic on the Demand for and Use of Cash." Bank of Canada Staff Discussion Paper 2020-6.
- Chetty, Raj, John Friedman, Nathaniel Hendren, and Michael Stepner. 2020. "The Economic Impacts of COVID-19: Evidence from a New Public Database Built Using Private Sector Data." NBER Working Paper No. 27431.
- Coyle, Kelsey, Laura Kim, and Shaun O'Brien. 2021. "Consumer Payments & the COVID-19 Pandemic: The Second Supplement to the 2020 Findings from the Diary of Consumer Payment Choice." Federal Reserve Bank of San Francisco *FedNotes*. February 9, 2021.
- Eichenbaum, Martin, Miguel Godinho de Matos, Francisco Lima, Sergio Rebelo, and Mathias Trabandt. 2020. "How Do People Respond to Small Probability Events with Large, Negative Consequences?" NBER Working Paper No. 27988.

- Fan, Ying, A. Yeşim Orhun, and Dana Turjeman. 2020. "Heterogeneous Actions, Beliefs, Constraints and Risk Tolerance during the COVID-19 Pandemic." NBER Working Paper No. 27211.
- Foster, Kevin, and Claire Greene. 2021. "Consumer Behavior in a Health Crisis: What Happened with Cash?" Federal Reserve Bank of Atlanta Policy Hub No. 1-2021.
- Foster, Kevin, Claire Greene, and Joanna Stavins. 2021. "2020 Survey of Consumer Payment Choice." Federal Reserve Bank of Atlanta Research Data Report 21-03. <https://www.atlantafed.org/banking-and-payments/consumer-payments/survey-of-consumer-payment-choice/2020-survey.aspx>
- Foster, Kevin, Claire Greene, and Joanna Stavins. 2020. "2019 Survey of Consumer Payment Choice." Federal Reserve Bank of Atlanta Research Data Report 21-01. <https://www.frbatlanta.org/-/media/documents/banking/consumer-payments/survey-of-consumer-payment-choice/2019/2019-survey-of-consumer-payment-choice.pdf>
- Goolsbee, Austan, and Chad Syverson. 2021. "Fear, Lockdown, and Diversion: Comparing Drivers of Pandemic Economic Decline 2020." *Journal of Public Economics*. 193: 104311. <https://doi.org/10.1016/j.jpubeco.2020.104311>
- Grieg, Fiona, Erica Deadman, and Pascal Noel. 2021. "Family Cash Balances, Income and Expenditures Trends through 2021: A Distributional Perspective." JP Morgan Chase & Co. Institute. May. https://www.jpmorganchase.com/content/dam/jpmc/jpmorgan-chase-and-co/institute/pdf/Liquid-Asset-Report_ADA_Remediated.pdf
- Heckman, J.J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica*, 47: 153–161.
- Jonker, Nicole, Carin van der Crujisen, Michiel Bijlsma, and Wilko Bolt. 2020. "Pandemic Payment Patterns." DNB Working Paper No. 701.
- Kim, Laura, Raynil Kumar, and Shaun O'Brien. 2020. "Consumer Payments & the COVID-19 Pandemic: A Supplement to the 2020 Findings from the Diary of Consumer Payment Choice." Federal Reserve Bank of San Francisco FedNotes. July 31.
- Liu, Taixing, Beixiao Pan, and Zhichao Yin. 2020. "Pandemic, Mobile Payment, and Household Consumption: Micro-Evidence from China." *Emerging Markets Finance and Trade* 56(10): 2378–2389.
- Schuh, Scott, and Joanna Stavins. 2014. "The 2011 and 2012 Surveys of Consumer Payment Choice: Summary Results." Federal Reserve Bank of Boston Research Data Reports No. 14-1. <https://www.frbatlanta.org/banking-and-payments/consumer-payments/research-data-reports/2014/the-2011-and-2012-surveys-of-consumer-payment-choice.aspx>.
- Schuh, Scott, and Joanna Stavins. 2015. "The 2013 Survey of Consumer Payment Choice: Summary Results." Federal Reserve Bank of Boston Research Data Reports No. 15-4. <https://www.frbatlanta.org/banking-and-payments/consumer-payments/research-data-reports/2015/the-2013-survey-of-consumer-payment-choice-summary-results.aspx>.

Stavins, Joanna. 2016. "The Effect of Demographics on Payment Behavior: Panel Data with Sample Selection." Federal Reserve Bank of Boston Working Papers No. 16-5.

Stavins, Joanna. 2017. "How Do Consumers Make Their Payment Choices?" Federal Reserve Bank of Boston Research Data Report No. 17-1.

Stavins, Joanna. 2021. "Payments Evolution from Paper to Electronic: Bill Payments and Purchases." Federal Reserve Bank of Boston Working Papers No. 21-5.

Wisniewski, Tomasz Piotr, Michal Polasik, Radoslaw Kotkowski, and Andrea Moro. 2021. "Switching from Cash to Cashless Payments during the COVID-19 Pandemic and Beyond." NBP Working Papers 337, Narodowy Bank Polski, Economic Research Department.

Table 1: Consumer payment behavior in 2018, 2019, and 2020, by transaction type and payment channel

	Percent of respondents with at least 1 transaction			Average individual share of transactions ¹				Average individual number of transactions					
	2018	2019	2020	2018	2019	2020		2018	2019	2020			
Purchases	96.3%	95.7%	94.6%					47.0	44.2	42.4			
In person	95.7%	95.1%	93.6%	86.8%	87.3%	83.9%	***	41.0	38.7	36.1			
Online	61.8%	58.6%	65.5%	***	13.2%	12.7%	16.1%	***	5.9	5.5	6.3 *		
Bills	94.5%	94.3%	94.3%					21.8	21.3	22.1			
By mail	76.5%	72.3%	**	72.5%	39.9%	36.5%	***	36.3%	8.8	7.4	***	8.4 *	
Online	74.7%	73.7%		75.4%	30.8%	32.1%		33.0%	6.5	6.8		6.8	
Automatic	62.6%	62.5%		62.7%	29.2%	31.4%	*	30.7%	6.4	7.1		6.9	
Person to person ²	46.8%	47.5%		51.8%	**				3.4	2.9	*	3.9 ***	
Paper	36.1%	34.1%		34.4%	65.8%	61.7%	**	51.8%	***	2.0	1.6	**	1.8
Card/Electronic	23.5%	24.0%		32.9%	***	34.2%	**	48.2%	***	1.4	1.3		2.1 ***
Number of respondents	3,153	2,238		1,909		3,153	2,238	1,909		3,153	2,238		1,909

Notes: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between 2018 and 2019 (next to 2019 column) and 2019 and 2020 (next to 2020 column): *p<0.10, ** p<0.05, *** p<0.01.

1. Share of all purchases, share of all bills, or share of all P2P payments.

2. Data on whether a P2P transaction was online or in person were not collected, but reporting those made with paper instruments and those made with electronic methods (the sum of card and digital) seems to be an appropriate approximation.

Source: 2019 and 2020 SCPC

Table 2: Consumer payment behavior in 2018, 2019, and 2020, by transaction type and payment instrument

Payment instrument (PI)	Purchases									P2P										
	Percent of respondents with at least 1 purchase					Average individual share of purchases				Percent of respondents with at least 1 P2P transaction			Average individual share of P2P transactions							
	2018	2019		2020		2018	2019		2020		2018	2019		2020		2018	2019		2020	
Paper instruments	85.6%	82.9%	*	73.9%	***	35.3%	33.8%	***	29.6%	***	36.1%	34.1%		34.4%		65.8%	61.7%	**	51.8%	***
Cash	81.3%	78.4%	*	69.2%	***	29.9%	29.3%	***	24.9%	***	32.0%	29.1%		30.7%		51.5%	46.1%	***	41.0%	**
Check	28.2%	26.9%		23.8%	*	4.3%	3.9%		4.0%		9.6%	10.5%	**	8.1%	**	12.7%	14.1%		10.1%	***
Money order	5.4%	2.7%	***	3.8%		1.2%	0.6%		0.7%		2.4%	2.1%		1.7%		1.6%	1.5%		0.8%	
Payment cards	88.3%	87.8%		88.6%		63.3%	64.5%	***	68.5%	***	12.6%	14.7%	***	19.4%	***	13.5%	17.9%	***	21.7%	**
Debit card	61.4%	61.7%		61.6%		33.9%	35.1%		35.4%		9.7%	10.8%	***	14.9%	***	8.9%	12.7%	***	14.8%	
Credit card	56.5%	58.3%		56.7%		25.6%	26.1%	**	29.5%	**	5.6%	5.2%	**	7.4%	**	4.7%	5.2%		6.9%	*
Prepaid	17.2%	13.3%	***	15.5%		3.8%	3.3%		3.5%		--	--	--	--	--	--	--	--	--	--
Electronic payments	16.4%	16.9%		20.0%	*	1.4%	1.7%		1.9%		16.8%	15.6%	***	22.7%	***	20.6%	20.4%		26.5%	***
BANP	16.4%	16.9%		20.0%	*	1.4%	1.7%		1.9%		9.2%	7.9%		9.8%		9.0%	8.7%		8.1%	
OBBP	--	--	--	--	--	--	--	--	--	--	5.3%	4.1%		5.3%		4.0%	3.3%		3.5%	
Account-to-account payment ^a	--	--	--	--	--	--	--	--	--	--	7.3%	8.0%	***	14.4%	***	7.6%	8.5%		14.8%	***
Number of observations	3,153	2,238		1,909		3,081	2,180		1,843		3,153	2,238		1,909		1,942	1,320		1,208	

Note: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between 2018 and 2019 (next to 2019 column) and 2019 and 2020 (next to 2020 column): * p<0.10, ** p<0.05, *** p<0.01. The number of observations for shares is smaller than for adoption, as respondents who have 0 purchases (or P2P) have a missing value for the share of purchases (or P2P).

^a Account-to-account payments include Venmo, PayPal, and Zelle.

Table 3: Adoption of online and mobile payments in 2018, 2019, and 2020

Share of respondents who adopted	2018	2019	2020	
mobile payments	34.6%	37.5%	46.1%	***
online payment account		54.2%	61.7%	***
PayPal adopted		37.6%	42.2%	**
Venmo adopted		15.2%	23.9%	***
Zelle adopted		11.3%	17.0%	***
online banking	75.3%	75.2%	78.5%	**
mobile banking	55.3%	58.9%	64.0%	***
Number of respondents	3,153	3,372	1,909	

Note: Results are weighted. For this analysis, we are able to use the full 2019 sample of 3,372 respondents, because it does not rely on the “number of payments in a typical month” variables. Stars represent the results of a two-sample t-test for difference in means between 2018 and 2019 (next to 2019 column) and 2019 and 2020 (next to 2020 column): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. Adoption and share of online purchases in 2019 and 2020, by demographics

Demographic	Average adoption				Average share of purchases				
	2019	2020	Δ		2019	2020	Δ		
Total	58.6	65.5	6.9	***	12.7	16.1	3.4	***	
Age	<i>under 25</i>	55.4	54.2	-1.2		15.7	12.8	2.9	
	<i>25-34</i>	62.8	69.7	6.9		15.4	22.2	6.8	***
	<i>35-44</i>	62.1	70.7	8.5	*	13.8	16.3	2.4	*
	<i>45-54</i>	61.5	73.0	11.5	**	11.3	17.5	6.2	***
	<i>55-64</i>	62.6	63.9	1.3		12.9	13.3	0.5	
	<i>over 65</i>	46.6	56.3	9.7	**	9.2	11.5	2.3	*
Education	<i>Less than high school</i>	32.3	35.8	3.5		9.0	7.8	1.2	
	<i>High school</i>	49.3	62.2	12.9	***	10.7	14.9	4.2	***
	<i>Some college</i>	57.6	64.6	7.1		13.3	16.8	3.5	*
	<i>College</i>	69.5	73.7	4.3		13.6	17.5	4.0	***
	<i>Graduate</i>	72.6	69.5	-3.1		16.6	18.0	1.3	
Gender	<i>Male</i>	57.9	64.1	6.2	*	12.3	15.7	3.4	***
	<i>Female</i>	59.3	66.8	7.5	***	13.1	16.5	3.3	***
Income	<i>Less than \$25,000</i>	44.1	54.5	10.3	**	11.9	14.5	2.6	
	<i>\$25,000-\$49,999</i>	51.8	61.4	9.6	*	12.4	12.6	0.2	
	<i>\$50,000-\$74,999</i>	57.4	63.8	6.5		12.4	17.1	4.7	**
	<i>\$75,000-\$99,999</i>	61.8	75.4	13.6	**	12.3	18.4	6.1	***
	<i>More than \$100,000</i>	74.2	71.9	-2.2		13.9	17.4	3.5	***
Ethnicity	<i>Latino</i>	51.4	63.4	12.1	*	11.9	15.9	4.0	
	<i>Non-Latino</i>	59.5	65.8	6.3	***	12.8	16.1	3.3	***
Race	<i>White</i>	61.0	67.1	6.0	***	12.8	16.4	3.7	***
	<i>Black</i>	47.7	56.2	8.5		14.3	13.4	0.9	
	<i>Asian</i>	66.2	64.3	-1.9		11.4	17.2	5.8	
	<i>Other</i>	54.1	70.1	16.0	**	10.9	17.4	6.6	**
Home ownership	<i>Home owner</i>	61.8	68.4	6.6	***	12.2	15.9	3.7	***
	<i>Non-home owner</i>	53.1	63.5	10.4	***	13.1	16.3	3.2	**
Work status	<i>Employed</i>	63.1	69.3	6.2	**	13.8	17.6	3.8	***
	<i>Not employed</i>	52.0	60.1	8.1	**	11.0	13.9	2.9	***

Notes: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between 2019 and 2020: * p<0.10, ** p<0.05, *** p<0.01.

The above analysis treats the data as two separate samples, calculating the mean for each demographic in 2019 and in 2020 and then performing a two-sample t-test for difference in means. There were 2,238 nonmissing respondents in 2019 and 1,909 nonmissing respondents in 2020. However, 825 respondents took both the 2019 and 2020 SCPC and are therefore in both samples in different years. Demographics such as race and ethnicity, of course, remain constant over time; age changes by one year; work status and income have the potential to change substantially.

Example interpretation: The percentage of respondents aged 35 to 44 making any purchases online rose by 8.52 percentage points, from 62.13 percent in 2019 to 70.65 percent in 2020. The average share of purchases made online among 35- to 44-year-olds rose by 2.43 percentage points, from 13.84 percent in 2019 to 16.27 percent in 2020.

Table 5. Adoption and share of electronic P2P in 2019 and 2020, by demographics

Demographic	Average adoption			Average share of P2P transactions				
	2019	2020	Δ	2019	2020	Δ		
Total	24.0	32.9	8.9	38.3	48.2	9.8	***	
Age	<i>under 25</i>	36.7	39.7	3.1	55.7	55.6	-0.1	
	<i>25-34</i>	27.7	38.5	10.8	41.7	58.6	16.9	***
	<i>35-44</i>	30.2	43.9	13.6	46.5	51.9	5.4	
	<i>45-54</i>	26.9	39.7	12.7	34.9	50.8	15.9	***
	<i>55-64</i>	18.5	23.2	4.6	33.8	38.0	4.2	
	<i>over 65</i>	14.1	18.8	4.7	28.1	34.8	6.7	
Education	<i>Less than high school</i>	13.3	21.2	7.9	27.2	31.7	4.4	
	<i>High school</i>	17.9	26.0	8.1	30.8	38.2	7.5	
	<i>Some college</i>	19.2	33.0	13.7	36.2	54.6	18.4	***
	<i>College</i>	30.8	38.2	7.4	42.4	51.4	8.9	**
	<i>Graduate</i>	34.6	40.6	5.9	48.5	57.0	8.5	*
Gender	<i>Male</i>	22.7	31.3	8.5	35.2	45.8	10.6	***
	<i>Female</i>	25.2	34.4	9.2	41.4	50.3	8.9	***
Income	<i>Less than \$25,000</i>	17.7	23.5	5.8	30.1	34.6	4.5	
	<i>\$25,000-\$49,999</i>	14.0	23.5	9.5	32.8	42.8	9.9	
	<i>\$50,000-\$74,999</i>	24.0	29.4	5.3	36.2	48.3	12.1	**
	<i>\$75,000-\$99,999</i>	28.5	37.3	8.8	44.5	49.8	5.4	
	<i>More than \$100,000</i>	33.4	43.7	10.3	43.9	55.4	11.5	***
Ethnicity	<i>Latino</i>	27.3	36.7	9.4	39.0	53.7	14.7	*
	<i>Non-Latino</i>	23.6	32.4	8.8	38.3	47.5	9.2	***
Race	<i>White</i>	22.4	29.7	7.3	35.0	44.8	9.8	***
	<i>Black</i>	23.7	37.2	13.5	44.2	49.7	5.6	
	<i>Asian</i>	42.1	46.5	4.4	58.5	72.9	14.4	
	<i>Other</i>	30.3	43.3	13.0	49.0	56.2	7.2	
Home ownership	<i>Home owner</i>	23.5	32.0	8.5	37.7	46.4	8.7	***
	<i>Non-home owner</i>	25.3	36.1	10.8	39.5	51.4	11.9	***
Work status	<i>Employed</i>	28.0	38.4	10.4	42.1	52.8	10.7	***
	<i>Not employed</i>	18.2	25.0	6.8	31.4	40.4	9.1	***

Notes: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between 2019 and 2020: * p<0.10, ** p<0.05, *** p<0.01.

The above analysis treats the data as two separate samples, calculating the mean for each demographic in 2019 and in 2020 and then performing a two-sample t-test for difference in means. There were 2,238 nonmissing respondents in 2019 and 1,909 nonmissing respondents in 2020. However, 825 respondents took both the 2019 and 2020 SCPC and are therefore in both samples in different years. Demographics such as race and ethnicity, of course, remain constant over time; age changes by one year; work status and income have the potential to change substantially.

Example interpretation: the percentage of respondents aged 25 to 34 making any nonpaper P2P transactions rose by 10.80 percentage points, from 27.71 percent in 2019 to 38.51 percent in 2020. The average share of P2P transaction made with nonpaper PI among 25- to 34-year-olds rose by 16.95 percentage points, from 41.68 percent in 2019 to 58.63 percent in 2020.

Table 6. Adoption and share of cash purchases in 2019 and 2020, by demographics

Demographic	Average adoption				Average share of purchases				
	2019	2020	Δ		2019	2020	Δ		
Total	78.4	69.2	-9.2	***	29.3	24.9	-4.4	***	
Age	<i>under 25</i>	78.9	65.2	-13.6		33.5	35.6	2.1	
	<i>25-34</i>	69.4	60.2	-9.2	*	22.0	20.1	-1.9	
	<i>35-44</i>	80.5	70.2	-10.4	***	27.1	21.9	-5.1	*
	<i>45-54</i>	81.5	71.8	-9.7	**	29.6	21.5	-8.1	***
	<i>55-64</i>	83.2	75.9	-7.3	**	32.6	25.6	-7.0	***
	<i>over 65</i>	80.7	72.3	-8.4	**	35.2	31.7	-3.6	
Education	<i>Less than high school</i>	73.9	75.9	2.0		53.6	49.3	-4.2	
	<i>High school</i>	81.0	74.4	-6.6	*	36.6	31.5	-5.1	**
	<i>Some college</i>	83.3	69.2	-14.1	***	30.8	24.3	-6.5	***
	<i>College</i>	77.1	66.8	-10.3	***	21.4	18.7	-2.7	*
	<i>Graduate</i>	72.2	60.9	-11.3	**	16.7	15.6	-1.1	
Gender	<i>Male</i>	79.2	72.4	-6.8	**	29.8	27.6	-2.1	
	<i>Female</i>	77.6	66.1	-11.5	***	29.0	22.4	-6.6	***
Income	<i>Less than \$25,000</i>	76.9	67.4	-9.4	**	42.1	37.5	-4.6	
	<i>\$25,000-\$49,999</i>	80.3	80.0	-0.3		34.9	30.2	-4.7	
	<i>\$50,000-\$74,999</i>	80.7	68.3	-12.4	***	29.7	24.9	-4.8	*
	<i>\$75,000-\$99,999</i>	80.1	71.5	-8.6	*	24.5	19.0	-5.5	**
	<i>More than \$100,000</i>	76.2	64.6	-11.6	***	18.1	17.3	-0.7	
Ethnicity	<i>Latino</i>	74.3	68.1	-6.2		29.9	28.7	-1.3	
	<i>Non-Latino</i>	78.9	69.3	-9.6	***	29.3	24.4	-4.8	***
Race	<i>White</i>	78.6	70.7	-7.9	***	27.7	24.9	-2.9	**
	<i>Black</i>	78.3	65.1	-13.2	**	38.7	29.9	-8.8	**
	<i>Asian</i>	78.4	62.3	-16.0		25.0	18.0	-6.9	
	<i>Other</i>	76.8	66.4	-10.5		30.0	20.5	-9.5	**
Home ownership	<i>Home owner</i>	77.9	70.5	-7.3	***	25.2	22.1	-3.1	**
	<i>Non-home owner</i>	80.5	70.1	-10.4	***	37.5	29.9	-7.6	***
Work status	<i>Employed</i>	79.1	67.6	-11.5	***	25.9	20.1	-5.7	***
	<i>Not employed</i>	77.4	71.4	-6.0	**	34.7	31.8	-2.9	

Notes: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between 2019 and 2020: * p<0.10, ** p<0.05, *** p<0.01.

The above analysis treats the data as two separate samples, calculating the mean for each demographic in 2019 and in 2020 and then performing a two-sample t-test for difference in means. There were 2,238 nonmissing respondents in 2019 and 1,909 nonmissing respondents in 2020. However, 825 respondents took both the 2019 and 2020 SCPC and are therefore in both samples in different years. Demographics such as race and ethnicity, of course, remain constant over time; age changes by one year; work status and income have the potential to change substantially.

Example interpretation: The percentage of respondents aged 35 to 44 making any purchases with cash fell by 10.36 percentage points, from 80.51 percent in 2019 to 70.15 percent in 2020. The average share of purchases made with cash among 35- to 44-year-olds fell by 5.13 percentage points, from 27.06 percent in 2019 to 21.94 percent in 2020.

Table 7: Employment and work from home (WFH) summary data, 2020 SCPC and COVID survey, based on respondents who were in the 2020 SCPC (percentage of respondents)

	mean	sd	N
Employed	58.7	49.2	1909
share of days worked from home	35.8	46.3	935
worked from home all days	32.2	46.8	935
Visited bar/club past 7 days	11.7	32.1	1748
Visited grocery/pharmacy past 7 days	82.3	38.2	1748
Advised to limit travel	48.5	50.0	1745

Note: Based on the October 2020 SCPC and the September 2020 COVID survey. Results are weighted.

Only employed people who took the COVID survey were asked about work from home.

For respondents who did not take the COVID survey, the employment status variable is from the SCPC. Of the 1,755 respondents in the 2020 SCPC who also took the September COVID survey, 1,742 have nonmissing values for the employment variable in the September COVID survey. Of those 1,742, 935 were employed (and 807 were not). The missing values for employed are filled in by the responses to the My Household Questionnaire, which all UAS survey respondents take quarterly.

Table 8: Average payment behavior in 2020, by employment status

Purchases	Percent of respondents with at least 1 purchase			Average individual percent of purchases		
	Employed	Not employed		Employed	Not employed	
In person	95.0%	91.7%	**	82.4%	86.1%	***
Online	69.3%	60.1%	***	17.6%	13.9%	***
Paper instruments	72.3%	76.2%		24.0%	37.7%	***
Cash	67.6%	71.4%		20.1%	31.8%	***
Check	22.7%	25.3%		3.4%	4.9%	**
Money order	2.4%	5.7%	***	0.5%	1.0%	*
Payment cards	91.2%	85.0%	***	74.2%	60.3%	***
Debit card	67.3%	53.4%	***	39.1%	30.1%	***
Credit card	62.2%	48.9%	***	32.6%	25.0%	***
Prepaid	14.8%	16.5%		2.4%	5.1%	***
Number of observations	1,039	870		1,007	836	

Note: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between employed and not employed: * p<0.10, ** p<0.05, *** p<0.01.

Source: 2020 SCPC

	Percent of respondents with at least 1 P2P transaction			Average individual percent of P2P transactions		
	Employed	Not employed		Employed	Not employed	
Paper instruments	35.3%	33.3%		47.2%	59.5%	***
Electronic	38.4%	25.1%	***	52.8%	40.5%	***
Number of observations	1,039	870		701	507	

Note: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between employed and not employed: * p<0.10, ** p<0.05, *** p<0.01.

Source: 2020 SCPC

Table 9: Average payment behavior variables in 2020, by work from home status (only respondents who were employed based on the 2020 COVID survey)

Purchases	Percent of respondents with at least 1 purchase			Average individual percent of purchases		
	WFH all days	Not WFH all days		WFH all days	Not WFH all days	
In person	95.4%	95.1%		79.3%	84.2%	***
Online	75.2%	66.6%	**	20.7%	15.8%	***
Paper instruments	63.0%	75.6%	***	16.6%	26.3%	***
Cash	56.7%	71.0%	***	13.3%	22.3%	***
Check	18.5%	24.9%	*	3.3%	3.3%	
Money order	1.7%	2.7%		0.1%	0.6%	*
Payment cards	93.5%	91.7%		81.3%	72.1%	***
Debit card	61.1%	71.8%	**	33.9%	42.4%	***
Credit card	77.9%	56.0%	***	44.5%	27.6%	***
Prepaid	19.4%	12.3%	**	2.9%	2.2%	
Number of observations	271	664		264	643	

Note: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between WFH and not WFH: * p<0.10, ** p<0.05, *** p<0.01.

	Percent of respondents with at least 1 P2P transaction		Average individual percent of P2P transactions		
	WFH all days	Not WFH all days	WFH all days	Not WFH all days	
Paper instruments	33.3%	35.2%	40.1%	50.4%	**
Electronic	43.9%	35.1%	59.9%	49.6%	**
Number of observations	271	664	189	439	

Note: Results are weighted. Stars represent the results of a two-sample t-test for difference in means between WFH and not WFH: * p<0.10, ** p<0.05, *** p<0.01.

Table 10: Adoption of online and mobile payments in 2020, by work from home status (only respondents who were employed based on the 2020 COVID survey)

2020 SCPC

Share of respondents who adopted	Work from home all days	Not WFH all days	
mobile payments	60.5%	50.8%	**
online payment account	80.3%	64.9%	***
PayPal adopted	56.1%	43.9%	***
Venmo adopted	45.1%	25.5%	***
Zelle adopted	28.2%	16.8%	***
online banking	91.6%	82.8%	***
mobile banking	81.4%	73.3%	**
Number of respondents	271	664	

Note: Results are weighted.

Table 11: Work from home (WFH) and education, income correlation coefficients

	Education				
	Less than HS	High school	Some college	College	Graduate
All days WFH	-0.08**	-0.14***	-0.14***	0.06*	0.22***

	Annual Household Income				
	< \$25K	\$25K-\$50K	\$50K-\$75K	\$75K-\$100K	> \$100K
All days WFH	-0.11***	-0.06*	-0.10***	0.0044	0.20***

Source: October 2020 SCPC and September COVID survey, respondents employed in 2020

Table 12. In-person purchases

		1 if respondent made any in-person purchases				Share of purchases made in person			
		Probit ¹				Tobit ¹			
		(1)		(2)		(3)		(4)	
Year	2020	-0.011	**			-0.030	***		
	2019	--	--			--	--		
	2018	0.000				-0.003			
Age	<i>under 25</i>	-0.016		-0.003		-0.028	**	-0.033	
	25-34	-0.019	**	-0.024		-0.041	***	-0.051	***
	35-44	-0.005		0.008		-0.041	***	-0.043	***
	45-54	0.005		0.010		-0.024	***	-0.035	**
	55-64	0.009	*	0.022	*	-0.012	**	-0.014	
	<i>over 65</i>	--	--	--	--	--	--	--	--
Education	<i>Less than high school</i>	-0.024	**	0.002		0.054	***	0.063	***
	<i>High school</i>	-0.011		0.001		0.034	***	0.025	*
	<i>Some college</i>	-0.010		-0.017		0.025	***	0.009	
	<i>College</i>	0.007		0.006		0.014	**	0.010	
	<i>Graduate</i>	--	--	--	--	--	--	--	--
Gender	<i>Male</i>	0.002		-0.010		0.015	***	0.013	
	<i>Female</i>	--	--	--	--	--	--	--	--
Income	<i>Less than \$25,000</i>	-0.026	***	-0.036	**	0.016	***	-0.012	
	<i>\$25,000-\$49,999</i>	0.005		0.016		0.023	***	0.012	
	<i>\$50,000-\$74,999</i>	0.006		0.011		0.009		0.005	
	<i>\$75,000-\$99,999</i>	0.004		0.015		-0.001		-0.029	**
	<i>More than \$100,000</i>	--	--	--	--	--	--	--	--
Ethnicity	<i>Latino</i>	-0.026	***	-0.005		0.021	***	0.010	
	<i>Non-Latino</i>	--	--	--	--	--	--	--	--
Race	<i>Black</i>	-0.011	*	0.003		-0.008		0.026	*
	<i>Asian</i>	-0.019		0.000		0.014		0.011	
	<i>Other</i>	0.007		0.024	***	-0.007		0.003	
	<i>White</i>	--	--	--	--	--	--	--	--
Home ownership	<i>Home owner</i>	0.030	***	0.034	***	-0.002		-0.019	*
	<i>Non-home owner</i>	--	--	--	--	--	--	--	--
Work status	<i>Employed</i>	0.003				0.003			
	<i>WFH</i>			-0.001				-0.036	**
	<i>Worked in person</i>			-0.011				0.000	
	<i>Not employed</i>	--	--	--	--	--	--	--	--
Child under 12 in household		0.007	*	0.010		-0.001		-0.008	
COVID -19 lifestyle	<i>Grocery store</i>			0.049	***			0.034	***
	<i>Bar/Club</i>			0.022	***			0.020	
	<i>Advised to limit travel</i>			-0.011				-0.008	
State fixed effects		NO		NO		YES		YES	
Pseudo R-squared		0.117		0.145		0.169		0.199	
Number of observations		7,268		1,728		7,071		1,674	

Notes: 1. Probit and tobit results are reported as marginal effects at means.

Table 13. Online purchases

		1 if respondent made any online purchases				Share of purchases made online			
		Probit ¹				Tobit ¹			
		(1)		(2)		(3)		(4)	
Year	2020	0.057	***			0.030	***		
	2019	--	--			--	--		
	2018	0.012				0.003			
Age	<i>under 25</i>	0.057		0.073		0.028	**	0.033	
	<i>25-34</i>	0.093	***	0.095	*	0.041	***	0.051	***
	<i>35-44</i>	0.097	***	0.140	***	0.041	***	0.043	***
	<i>45-54</i>	0.090	***	0.129	***	0.024	***	0.035	**
	<i>55-64</i>	0.070	***	0.096	***	0.012	**	0.014	
	<i>over 65</i>	--	--	--	--	--	--	--	--
Education	<i>Less than high School</i>	-0.228	***	-0.164	**	-0.054	***	-0.063	***
	<i>High school</i>	-0.154	***	-0.074	*	-0.034	***	-0.025	*
	<i>Some college</i>	-0.107	***	-0.023		-0.025	***	-0.009	
	<i>College</i>	-0.039	**	0.005		-0.014	**	-0.010	
	<i>Graduate</i>	--	--	--	--	--	--	--	--
Gender	<i>Male</i>	-0.030	**	-0.018		-0.015	***	-0.013	
	<i>Female</i>	--	--	--	--	--	--	--	--
Income	<i>Less than \$25,000</i>	-0.134	***	-0.052		-0.016	***	0.012	
	<i>\$25,000-\$49,999</i>	-0.099	***	-0.029		-0.023	***	-0.012	
	<i>\$50,000-\$74,999</i>	-0.055	***	-0.044		-0.009		-0.005	
	<i>\$75,000-\$99,999</i>	0.007		0.075	**	0.001		0.029	**
	<i>More than \$100,000</i>	--	--	--	--	--	--	--	--
Ethnicity	<i>Latino</i>	-0.091	***	0.036		-0.021	***	-0.010	
	<i>Non-Latino</i>	--	--	--	--	--	--	--	--
Race	<i>Black</i>	-0.026		-0.095	**	0.008		-0.026	*
	<i>Asian</i>	-0.076	*	-0.080		-0.014		-0.011	
	<i>Other</i>	-0.002		0.015		0.007		-0.003	
	<i>White</i>	--	--	--	--	--	--	--	--
Home ownership	<i>Home owner</i>	0.032	**	0.066	**	0.002		0.019	*
	<i>Non-home owner</i>	--	--	--	--	--	--	--	--
Work status	<i>Employed</i>	-0.010				-0.003			
	<i>WFH</i>			0.012				0.036	**
	<i>Worked in person</i>			-0.048				0.000	
	<i>Not employed</i>	--	--	--	--	--	--	--	--
Child under 12 in household		0.039	**	0.036		0.001		0.008	
COVID -19 lifestyle	<i>Grocery store</i>			0.056	*			-0.034	***
	<i>Bar/Club</i>			0.025				-0.020	
	<i>Advised to limit travel</i>			0.032				0.008	
State fixed effects		YES		YES		YES		YES	
Pseudo R-squared		0.052		0.057		0.170		0.199	
Number of observations		7,244		1,716		7,071		1,674	

Notes: 1. Probit and tobit results are reported as marginal effects at means.

Table 14. P2P made with paper payment instruments (PI)

		1 if respondent made any P2P transactions with paper PI		Share of P2P transactions made with paper PI			
		Probit ¹		Tobit ¹			
		(1)	(2)	(3)		(4)	
Year	2020	0.014		-0.098	***		
	2019	--	--	--	--		
	2018	0.027	**	0.025	*		
Age	<i>under 25</i>	0.048	0.026	-0.142	***	-0.261	***
	<i>25-34</i>	0.002	-0.007	-0.145	***	-0.240	***
	<i>35-44</i>	0.079	***	0.158	***	-0.089	***
	<i>45-54</i>	0.065	***	0.050	-0.063	***	-0.135
	<i>55-64</i>	0.036	**	0.056	-0.032	*	-0.070
	<i>over 65</i>	--	--	--	--	--	--
Education	<i>Less than high school</i>	0.020	0.055	0.056	*	0.128	*
	<i>High school</i>	-0.014	0.039	0.055	***	0.079	*
	<i>Some college</i>	-0.034	*	-0.003	-0.003	-0.023	
	<i>College</i>	-0.002	0.026	0.021	0.021	0.064	*
	<i>Graduate</i>	--	--	--	--	--	--
Gender	<i>Male</i>	-0.015	-0.004	0.045	***	0.056	**
	<i>Female</i>	--	--	--	--	--	--
Income	<i>Less than \$25,000</i>	0.004	0.047	0.127	***	0.179	***
	<i>\$25,000-\$49,999</i>	-0.068	***	-0.038	0.085	***	0.053
	<i>\$50,000-\$74,999</i>	-0.019	0.011	0.037	**	0.033	
	<i>\$75,000-\$99,999</i>	0.026	0.063	0.040	**	0.009	
	<i>More than \$100,000</i>	--	--	--	--	--	--
Ethnicity	<i>Latino</i>	0.050	**	0.037	-0.032	-0.077	
	<i>Non-Latino</i>	--	--	--	--	--	--
Race	<i>Black</i>	0.060	***	0.022	-0.058	**	-0.051
	<i>Asian</i>	-0.020	0.013	-0.124	***	-0.125	*
	<i>Other</i>	-0.009	0.063	-0.061	**	0.009	
	<i>White</i>	--	--	--	--	--	--
Home ownership	<i>Home owner</i>	-0.007	-0.003	0.020	0.020	0.015	
	<i>Non-home owner</i>	--	--	--	--	--	--
Work status	<i>Employed</i>	-0.004		-0.025	*		
	<i>WFH</i>		0.003			-0.069	*
	<i>Worked in person</i>		0.018			-0.012	
	<i>Not employed</i>	--	--	--	--	--	--
Child under 12 in household		0.055	***	0.029	0.012	0.043	
COVID -19 lifestyle	<i>Grocery store</i>		0.040			0.016	
	<i>Bar/Club</i>		0.056			-0.037	
	<i>Advised to limit travel</i>		0.040			-0.027	
State fixed effects		YES	YES	YES	YES	YES	
Pseudo R-squared		0.019	0.048	0.047	0.047	0.089	
Number of observations		7264	1717	4446	4446	1081	

Notes: 1. Probit and tobit results are reported as marginal effects at means.

Table 15. P2P made with electronic (card or digital) payment instruments (PI)

		1 if respondent made any P2P transactions with nonpaper PI		Share of P2P transactions made with nonpaper PI	
		Probit ¹		Tobit ¹	
		(1)	(2)	(3)	(4)
Year	2020	0.076 ***		0.097 ***	
	2019	-- --		-- --	
	2018	-0.005		-0.025 *	
Age	<i>under 25</i>	0.148 ***	0.234 ***	0.127 ***	0.203 **
	<i>25-34</i>	0.121 ***	0.199 ***	0.142 ***	0.240 ***
	<i>35-44</i>	0.102 ***	0.205 ***	0.088 ***	0.146 ***
	<i>45-54</i>	0.090 ***	0.146 ***	0.064 ***	0.137 ***
	<i>55-64</i>	0.023 *	0.083 ***	0.033 *	0.074 *
	<i>over 65</i>	-- --	-- --	-- --	-- --
Education	<i>Less than high school</i>	-0.034	-0.041	-0.057 *	-0.127 *
	<i>High school</i>	-0.032 *	-0.026	-0.055 ***	-0.083 *
	<i>Some college</i>	-0.008	0.025	0.002	0.017
	<i>College</i>	0.002	-0.021	-0.021	-0.066 *
	<i>Graduate</i>	-- --	-- --	-- --	-- --
Gender	<i>Male</i>	-0.034 ***	-0.039 *	-0.046 ***	-0.056 **
	<i>Female</i>	-- --	-- --	-- --	-- --
Income	<i>Less than \$25,000</i>	-0.109 ***	-0.156 ***	-0.127 ***	-0.183 ***
	<i>\$25,000-\$49,999</i>	-0.126 ***	-0.136 ***	-0.085 ***	-0.061
	<i>\$50,000-\$74,999</i>	-0.058 ***	-0.066 *	-0.037 **	-0.036
	<i>\$75,000-\$99,999</i>	-0.033 *	0.021	-0.041 **	-0.007
	<i>More than \$100,000</i>	-- --	-- --	-- --	-- --
Ethnicity	<i>Latino</i>	0.046 **	0.090 *	0.032	0.080
	<i>Non-Latino</i>	-- --	-- --	-- --	-- --
Race	<i>Black</i>	0.080 ***	0.070	0.058 **	0.051
	<i>Asian</i>	0.085 **	0.117	0.119 ***	0.112
	<i>Other</i>	0.037 *	0.023	0.061 **	-0.013
	<i>White</i>	-- --	-- --	-- --	-- --
Home ownership	<i>Home owner</i>	-0.009	0.016	-0.021	-0.021
	<i>Non-home owner</i>	-- --	-- --	-- --	-- --
Work status	<i>Employed</i>	0.005		0.024 *	
	<i>WFH</i>		0.046		0.061
	<i>Worked in person</i>		0.011		0.011
	<i>Not employed</i>	-- --	-- --	-- --	-- --
Child under 12 in household		0.006	-0.010	-0.012	-0.040
COVID -19 lifestyle	<i>Grocery store</i>		0.028		-0.016
	<i>Bar/Club</i>		0.093 **		0.044
	<i>Advised to limit travel</i>		0.070 ***		0.028
State fixed effects		YES	YES	YES	YES
Pseudo R-squared		0.058	0.099	0.048	0.091
Number of observations		7,264	1,702	4,446	1,081

Notes: 1. Probit and tobit results are reported as marginal effects at means.

Table 16. Cash purchases

		1 if respondent made any purchases with cash				Share of purchases made with cash			
		Probit ¹				Tobit ¹			
		(1)		(2)		(3)		(4)	
Year	2020	-0.075	***			-0.042	***		
	2019	--	--			--	--		
	2018	0.028	**			0.008			
Age	<i>under 25</i>	-0.021		-0.053		0.004		-0.002	
	<i>25-34</i>	-0.060	***	-0.100	**	-0.050	***	-0.046	**
	<i>35-44</i>	-0.015		0.045		-0.019	*	0.008	
	<i>45-54</i>	0.028	*	0.041		0.006		0.015	
	<i>55-64</i>	0.032	**	0.049		0.009		0.004	
	<i>over 65</i>	--	--	--	--	--	--	--	--
Education	<i>Less than high school</i>	0.010		0.082		0.192	***	0.202	***
	<i>High school</i>	0.020		0.077	*	0.083	***	0.082	***
	<i>Some college</i>	0.025		0.040		0.058	***	0.022	
	<i>College</i>	0.019		0.030		0.015	*	0.008	
	<i>Graduate</i>	--	--	--	--	--	--	--	--
Gender	<i>Male</i>	0.040	***	0.043	*	0.041	***	0.046	***
	<i>Female</i>	--	--	--	--	--	--	--	--
Income	<i>Less than \$25,000</i>	0.016		0.011		0.111	***	0.093	***
	<i>\$25,000-\$49,999</i>	0.058	***	0.101	***	0.083	***	0.059	***
	<i>\$50,000-\$74,999</i>	0.028	*	0.014		0.038	***	0.027	
	<i>\$75,000-\$99,999</i>	0.029	*	0.031		0.013		0.004	
	<i>More than \$100,000</i>	--	--	--	--	--	--	--	--
Ethnicity	<i>Latino</i>	-0.030		0.016		0.028	**	0.022	
	<i>Non-Latino</i>	--	--	--	--	--	--	--	--
Race	<i>Black</i>	0.004		-0.027		0.050	***	0.044	**
	<i>Asian</i>	-0.040		-0.018		-0.018		-0.026	
	<i>Other</i>	-0.002		0.008		-0.008		-0.025	
	<i>White</i>	--	--	--	--	--	--	--	--
Home ownership	<i>Home owner</i>	-0.004		0.028		-0.047	***	-0.028	**
	<i>Non-home owner</i>	--	--	--	--	--	--	--	--
Work status	<i>Employed</i>	0.007				-0.015	**		
	<i>WFH</i>			-0.065	*			-0.069	***
	<i>Worked in person</i>			-0.021				-0.048	***
	<i>Not employed</i>	--	--	--	--	--	--	--	--
Child under 12 in household		0.027	**	-0.008		0.000		-0.008	
COVID -19 lifestyle	<i>Grocery store</i>			0.058	*			0.020	
	<i>Bar/Club</i>			0.120	***			0.038	**
	<i>Advised to limit travel</i>			-0.019				-0.007	
State fixed effects		YES		YES		YES		YES	
Pseudo R-squared		0.040		0.064		0.179		0.199	
Number of observations		7,230		1,716		7,071		1,674	

Notes: 1. Probit and tobit results are reported as marginal effects at means.

Notes for Tables 12 through 16:

Samples used in each regression

Specification #	Sample
1, 3	2018, 2019, and 2020 SCPC, pooled cross sections
2, 4	Respondents who took both 2020 SCPC and September COVID survey

Of the 1,755 respondents who took the 2020 SCPC and the COVID survey, some had missing observations for some of the COVID variables (work status and lifestyle), bringing the total number included in regressions down to 1,739.

The inclusion of state fixed effects caused some observations to be dropped due to perfect prediction of the outcome variable.

The number of observations in column 3 is smaller than the number in column 1 due to the change from adoption to use. The share variables are missing if a respondent makes zero purchases or P2P payments. The total number of observations drops to 4,020 for the purchase share variables and drops to 2,525 for P2P share variables.