



The 2020 Diary of Consumer Payment Choice

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Abstract

This paper describes key results from the 2020 Diary of Consumer Payment Choice (DCPC), the seventh in a series of diary surveys that measure payment behavior through the daily recording of consumer spending and payments in the United States. The DCPC is the only diary survey of US consumer payments with data and results that are available to the public free of charge.

In October 2020, US consumers made most of their payments with debit cards, credit cards, and cash. Together, they accounted for three-quarters of all payments by number and one-third by value. In the pandemic year 2020, consumers' mix of payments changed. Total number of payments in the month declined from 39 in 2019 to 35 in 2020, with purchases declining from 31 in 2019 to 26.1 in 2020. The number of bills paid was stable at 8.4. Online or mobile purchases of goods and services increased from 17 percent of all purchases in 2019 to 24 percent in 2020 (as a share of both in-person and not-in-person purchases). Of purchases not made in person, four in 10 were accomplished via a mobile phone. US consumers generally held more cash in 2020 compared to 2019. The average holding on person was \$76.

JEL Classifications: D12, D14, E42

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Acknowledgments appear on the first page of this report. The primary authors are responsible for any errors in the report.

This paper presents preliminary analysis and results intended to stimulate discussion and critical comment. The views expressed herein are those of the authors and do not indicate concurrence by the Federal Reserve Bank of Boston, the Federal Reserve Bank of Atlanta, the principals of the Board of Governors, or the Federal Reserve System.

This report, which may be revised, is available at www.atlantafed.org/banking-and-payments/consumer-payments/research-data-reports.aspx.

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1. Introduction

The 2020 Diary of Consumer Payment Choice (DCPC) is the seventh official study conducted by the Federal Reserve Banks of Atlanta, Boston, and San Francisco to gain a comprehensive understanding of the cash and noncash payment behavior of adult consumers (ages 18 and older) in the United States.¹ This report contains results for 2020 and includes estimates of the number, value, and average value of payments that all US adult consumers made using various payment instruments. It also includes estimates of cash held on person (pocket, purse, or wallet) and stored cash by denomination of currency.

The DCPC collects data on individual payments from daily records kept by consumers, including the dollar values of payments. Because this daily recording method differs from the recall method used by the Survey of Consumer Payment Choice (SCPC), estimates from the two surveys are not directly comparable. For more information about the SCPC, see Foster, Greene, and Stavins (2019, 2020, 2021).

This report focuses on estimates of the *level* of consumer payment use in 2020—that is, the number and value of consumer payments—and changes from the pre-COVID-19 year 2019. The full data set is [posted online](#); tables 1–9 report results for 2015 through 2020.

- Number and dollar value of payments by payment instrument and by merchant type (tables 1, 2, and 5)
- Number and dollar value of purchases and bills by payment instrument (tables 3 and 4)
- Cash holdings on person and stored elsewhere (tables 6 and 7)
- Consumer characteristics, including income and demographics (tables 8 and 9)

In the 2020 tables, two outlier transactions are omitted. These transactions (a \$34,000 bank account number payment for the purchase of a house and a \$27,000 money order for the purchase of a car [one of nine money orders in the data set]) had an outsize effect on the weighted means calculated for tables 1, 2, 3, and 5. Both transactions are included in the full data sets posted online. Year-to-year results may not be comparable due to questionnaire changes. Due to fewer respondents in 2015 and 2020, we have less power to detect changes when comparing 2015 to later years, when the numbers of respondents

¹ For past reports, see atlantafed.org.

were more similar (table A) or 2020 to earlier years.² In addition, the calendar periods when respondents recorded their payments are aligned for 2016 through 2020 (October), but the 2015 calendar period was different (mid-October to mid-November). Each year’s questionnaire includes modest changes, so exercise caution when interpreting estimates of changes in payment behavior.

Table A: Number of DCPC respondents

<u>Survey year</u>	<u>Number of respondents</u>
2015	1,016
2016	2,848
2017	2,793
2018	2,873
2019	3,016
2020	1,537

All DCPC data, along with technical documentation, are available to the public free of charge. Throughout the paper, small discrepancies in the estimates may exist due to rounding. The data may be revised in the future should important new information or analysis warrant doing so.

The remainder of this report is organized as follows. Section 2 provides an overview of the number and value of payments for 2020 and describes changes relative to pre-COVID-19 year 2019. Section 3 reports estimates of the level of consumer payment use by payment instrument and describes the implied changes in payment instrument use from 2019 to 2020. Section 4 shows how payment instrument choice for purchases differs from choices for bills. Section 5 reports to whom payments were made: consumers, businesses, or government, and describes some changes from 2019. Section 6 focuses on the use of cash and electronic devices, and Section 7 on cash holdings. Section 8 concludes the report. An appendix summarizes the underlying survey methodology.

2. Number and value of payments

US consumers made on average 35 payments for the month,³ or 1.1 payments per day (table 1). On any given day, an average of 50 percent of consumers reported making zero payments (compared to 45 percent in 2019). US consumers made on average \$4,393 worth of payments for the month (median \$151). Consumer *payments* are not the same as consumer (or household) *expenditures*, so the

² The sample size is reduced in 2020 because some panelists were invited to participate in experiments investigating various ways of assisting respondents to reduce respondent burden in lieu of being offered the standard version of the DCPC.

³ All the data reported in this paper refer to October 2020, unless specified otherwise.

estimated value of consumer payments (and its growth rate) should not be compared with data on expenditures. Dividing the value of payments by the number of payments yields an average value per consumer payment of \$126 (table 2).

The number of consumer payments decreased about 10 percent (that is, by four payments) compared with October 2019 (39 payments per consumer per month), a decline that is statistically significant. The 2020 total number of payments is lower than the number of payments reported in October of all the prior years covered by this report, 2015 through 2019. The total value of payments increased by \$156 (4 percent) from \$4,237 in 2019 and exceeds the total values reported for all the prior years of this report. The average dollar value of a payment increased from \$109 in 2019 to \$126 in 2020. The changes in the total dollar value and the average dollar value are not statistically significant.

3. Number and value of payments by instrument

US consumers made more than half of their payments with payment cards (debit, credit, and prepaid): 57 percent, or 20 payments. They used paper instruments (cash, checks, and money orders) for 25 percent, or 9 payments; electronic methods for 12 percent or 4 payments;⁴ and other methods⁵ for 5 percent, or 2 payments (table 1). Compared with 2019, the volume shares of cards and electronic instruments increased and the volume shares of paper instruments declined; only the decline in the share of payments made by paper instruments is statistically significant.

Although cards were used more frequently than electronic payments, the total value of payments made electronically exceeded that of payments made by cards: \$1,476 compared to \$1,269. By value, payments using electronic instruments were 34 percent of the monthly total, compared to 29 percent for cards and 27 percent for paper instruments (table 1). None of the changes in share by dollar value was statistically significant.

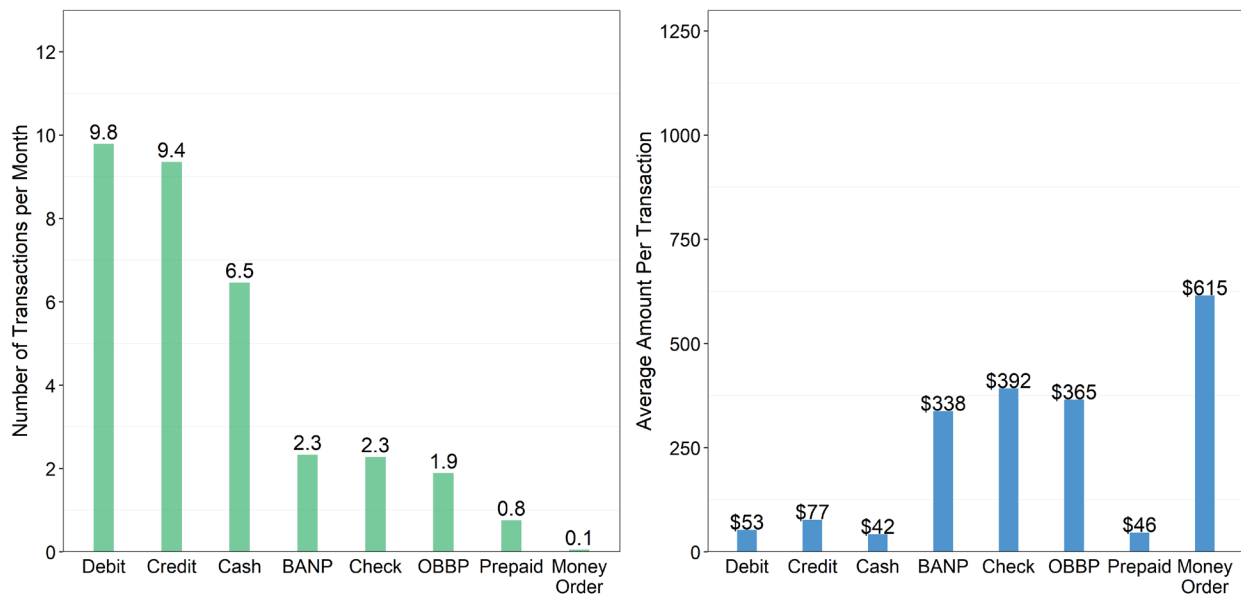
⁴ The electronic payment instruments are defined as follows. Bank account number payment (BANP): a payment made by providing a bank account number to a third party, such as an employer or a utility company. The number can be given on websites, paper forms, and so on. Online banking bill payment (OBBP): a payment made from a bank's online banking website or online mobile app that accesses funds from a customer's checking or savings account to pay a bill or to pay other people. This payment does not require the customer or the bank to disclose his or her bank account number to a third party.

⁵ Other methods include income deduction, PayPal, account-to-account transfers (using apps such as Zelle and Venmo), and mobile payments.

Debit cards, cash, and credit cards remain the ways to pay used most often,⁶ with debit cards used most by number of payments (table 1). Twenty-eight percent of payments were with debit cards, 27 percent with credit cards, and 19 percent with cash. Altogether, consumers made about three-quarters of their payments using debit cards, cash, and credit cards.

The distribution by value is different. Cash, debit, and credit payments accounted for 34 percent of the value of their payments: 6 percent in cash, 12 percent in debit cards, and 16 percent in credit cards (table 1). The difference between the distribution by volume and by value reflects that consumers tend to use cash and payment cards more often, but for relatively low-value payments, and they tend to use checks and electronic payments less often, but for relatively high-value payments (figures 1 and 2). For example, US consumers on average made fewer electronic-instrument payments than cash payments (four compared with seven), but they used electronic payments for transactions that were higher in average value than cash transactions (\$350 compared with \$42). The average value when using payment cards fell between the two, at \$64 (tables 1 and 2).

Figure 1: Number and average value of payments by instrument, October 2020

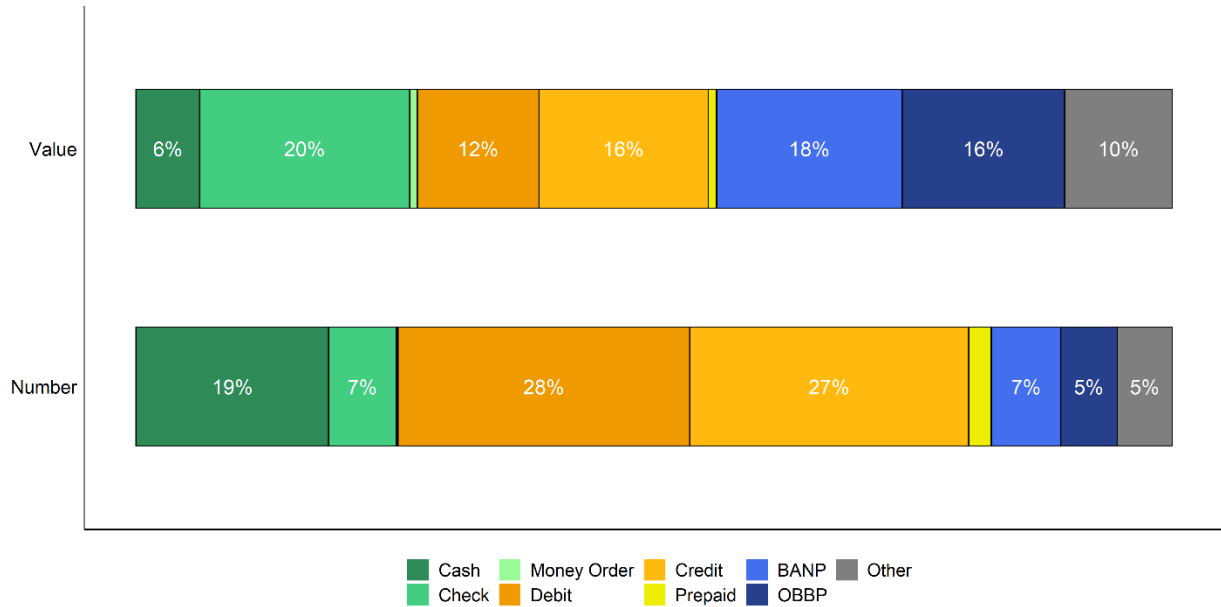


Note: Payment instruments are ranked left to right by number of transactions per month. OBBP: online banking bill pay. BANP: bank account number payment. Other includes PayPal, account-to-account transfers, mobile payments, and deductions from income.

Source: 2020 Diary of Consumer Payment Choice, table 1

⁶ Debit, cash, and credit are also the three most frequently used payment instruments by consumers in the SCPC. See Foster, Greene, and Stavins (2020).

Figure 2: Percentage shares of payments by number and value, October 2020

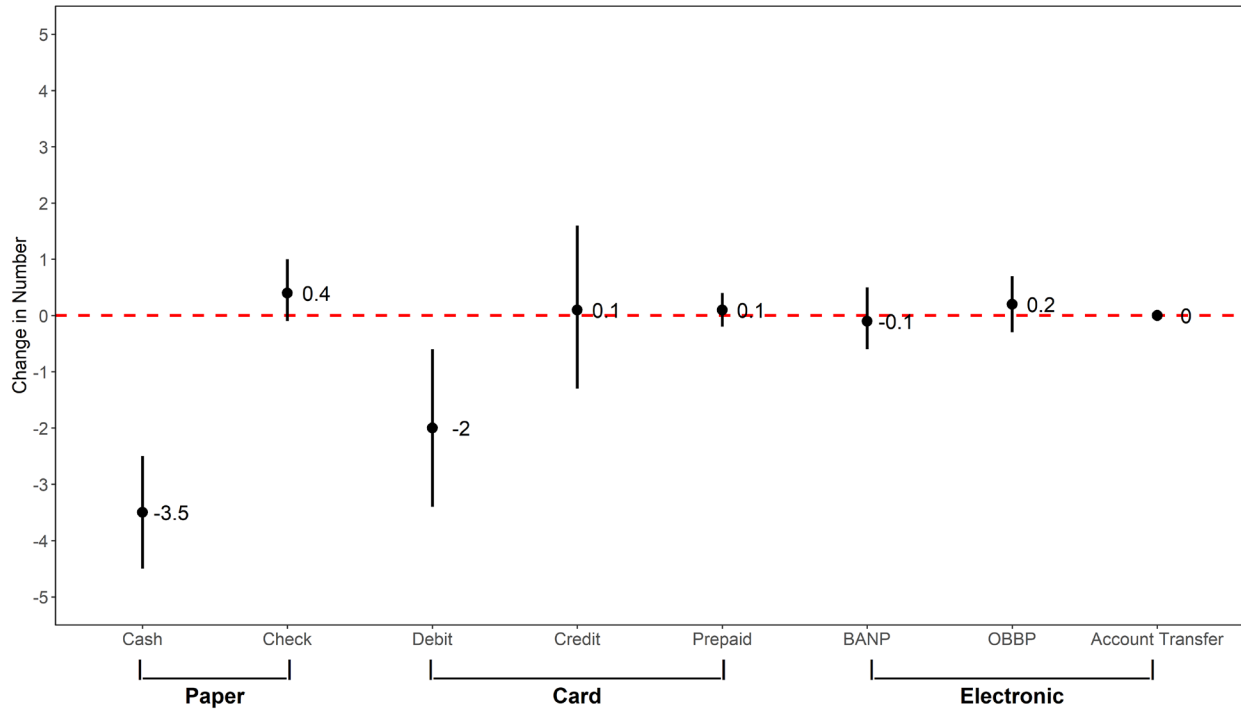


Source: 2020 Diary of Consumer Payment Choice, table 1

Changes in the number and value of payments by instrument

As noted above, the overall number of US consumer payments decreased from 2019 to 2020 while the value increased. The change in the number of all payments and the decrease in the numbers of cash and debit card payments are statistically significant (table 1 and figure 3). No other changes for individual payment instruments are statistically significant. The number of cash payments declined from 10 payments per month to seven, as one might expect during the COVID-19 pandemic, when in-person purchases declined as a share of all purchases (table B). The number of debit card payments declined from 12 to 10.

Figure 3: Changes in the number of payments per month by payment instrument, 2019 to 2020



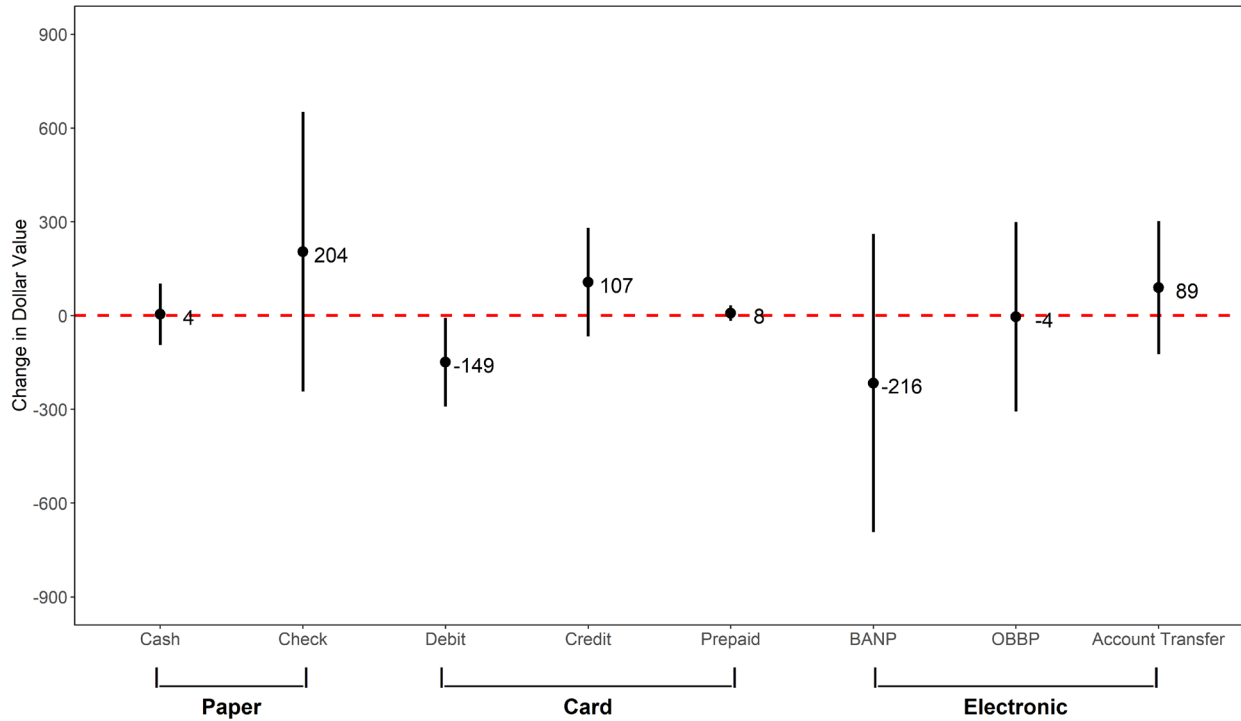
Notes: The vertical lines depict the 95 percent confidence intervals of the changes in the number of payments between 2019 and 2020. The numbered dots depict the point estimates. Confidence intervals that lie entirely above or below the horizontal zero line indicate changes that are statistically significantly different from zero. Money orders are omitted from this figure.

Source: 2019 and 2020 Diary of Consumer Payment Choice

The increase in the total dollar value of payments was not statistically significant from 2019 to 2020.

Examining each payment instrument separately, no payment type showed a significant change in total dollar value from 2019 to 2020 (figure 4).

Figure 4: Changes in the total dollar value of payments per month by payment instrument, 2019 to 2020



Notes: The vertical lines depict the 95 percent confidence intervals of the changes in the total dollar value of payments between 2019 and 2020. The numbered dots depict the point estimates. Confidence intervals that lie entirely above or below the horizontal zero line indicate changes that are statistically significantly different from zero. Money orders are omitted from this figure.

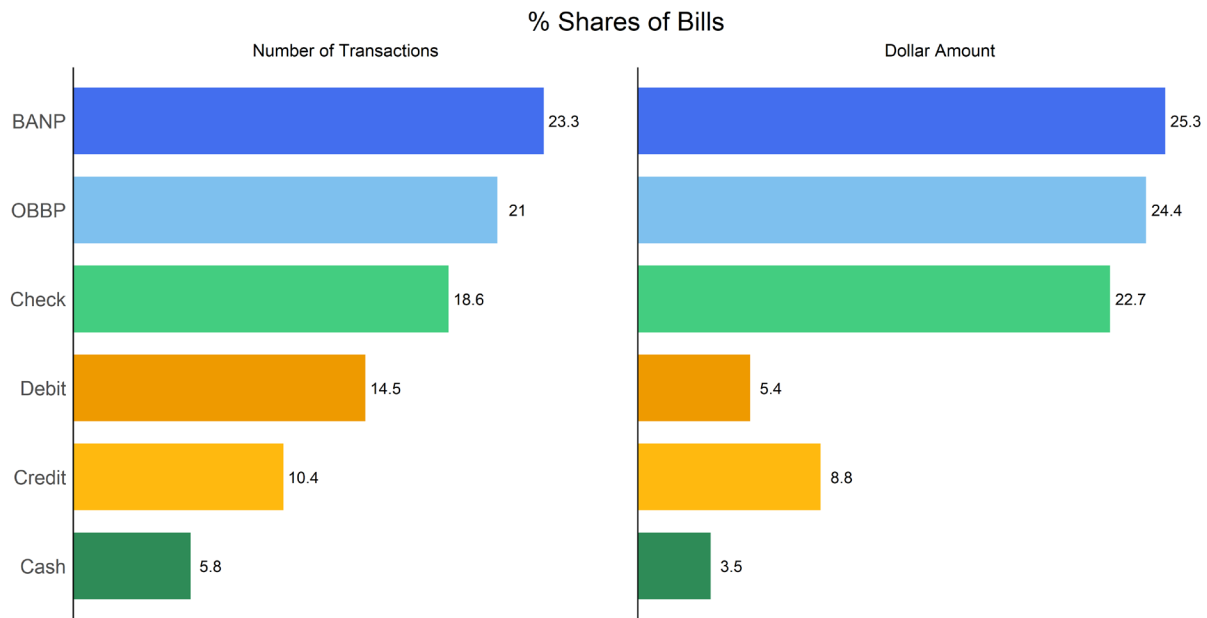
Source: 2019 and 2020 Diary of Consumer Payment Choice

4. Bills and purchases

US consumers on average made 8 bill payments and 26 purchases per month (tables 4 and 3a). The number of bill payments per month was constant from 2019 at eight.⁷ Bill payments accounted for 24 percent of all payments by number and 63 percent by value. Electronic payment methods and checks are most commonly used for bill paying: 23 percent of bills by number were paid by BANP, 21 percent by OBBP, and 19 percent by check, totaling 6 in 10 of all bill payments for the three methods (table 4 and figure 5). In addition, 15 percent of bill payments were made with a debit card. Half of the value of all bills (51 percent) was paid using electronic payments (BANP and OBBP).

⁷All payments, including bill payments, include only payments made by the individual survey respondent and exclude any payments made by other members of the household.

Figure 5: Payment instrument use for bills, shares by number and value



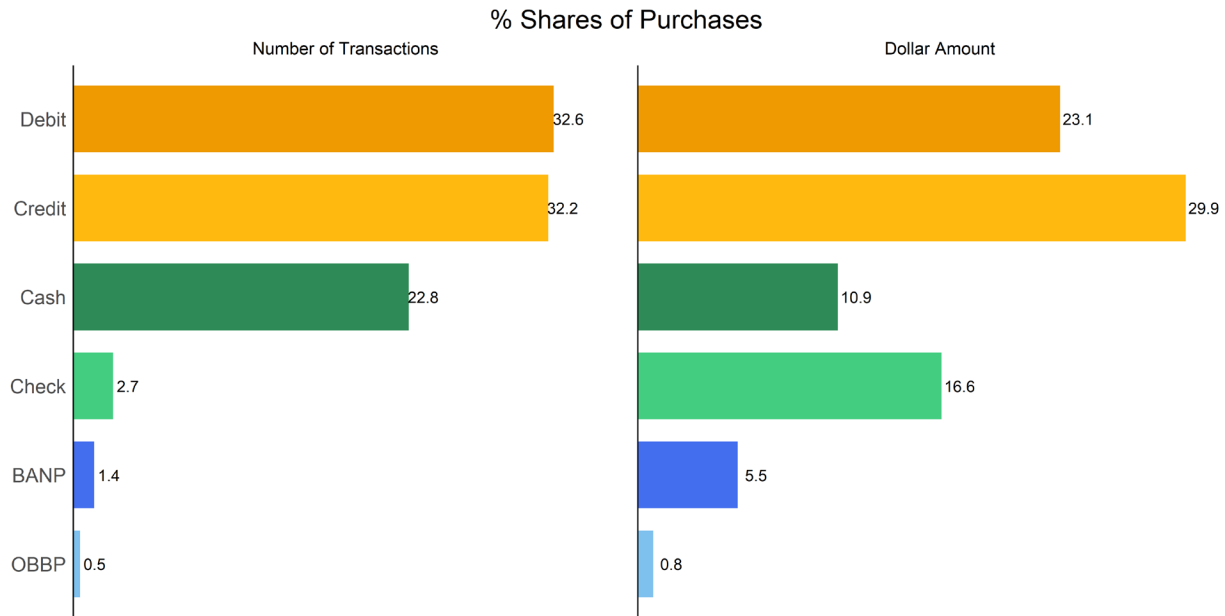
Note: Shares do not sum to 100 because less common payment instruments are omitted.

Source: 2020 Diary of Consumer Payment Choice

All the decline in the total number of payments from 2019 to 2020 occurred in purchases (including P2P), which dropped from 31 to 26, a statistically significant change. Tables 3a and 3b include goods and services bought in person and online as well as payments to another person—for example, as a gift or allowance. The total value of purchases increased from \$1,560 in 2019 to \$1,583, not statistically significant. Purchases (both online and in person and including P2P) accounted for 80 percent of all payments by number in 2019 and 75 percent in 2020. They were 37 percent by value in 2019 and 36 percent in 2020. The average dollar value of purchases, \$50 in 2019, increased 22 percent to \$61 in 2020.

Debit card was the most used payment method for purchases, accounting for 33 percent of purchases by number, closely followed by credit cards (32 percent) and cash (23 percent) (tables 1 and 3 and figure 6). In terms of dollar value, half of all purchases were with cards, 30 percent with credit cards and 23 percent with debit cards. The dollar-value relationship to payment instrument choice described above pertains here: average dollar values for cash, debit card, and credit card purchases were, respectively and in ascending order, \$29, \$43, and \$56 (table 3a).

Figure 6: Payment instrument use for purchases, shares by number and value



Note: Shares do not sum to 100 because less common payment instruments are omitted.

Source: 2020 Diary of Consumer Payment Choice

In October of the pandemic year 2020, consumers reported a change in the mix of purchases made in person and not in person (that is, remotely) (table B). As a share of all purchases and excluding P2P payments, in-person purchases declined from 87 percent in 2019 to 80 percent in 2020. Four in 10 not-in-person purchases were conducted via a mobile phone. Slightly less than 4 percent of in-person purchases were made using a mobile phone.

Table B: Average number of purchases by location, 2016–2020

	2016	2017	2018	2019	2020
All purchases	32.6	30.8	31.1	29.1	26.1
In person	31.0	28.9	28.9	26.5	20.9
Not in person	1.6	1.9	2.3	2.6	5.2

Note: P2P omitted.

Source: 2020 Diary of Consumer Payment Choice

5. Payees

Of the average 35 payments per month that US consumers reported, 12 were for everyday purchases (groceries, pharmacies, stores, and online shopping); six were for food consumed away from home (including restaurants, bars, and fast food, down from eight in 2019); three were at gas stations; and three were related to financial services companies (including insurance; IRA and mutual funds; credit card, mortgage, and other loan payments) (table 5).

The remaining payments were for services related to housing (rent, utilities, communications), for medical and education expenses, for other services and recreation, and for charitable donations. Consumers made two payments per month to another person, defined in the questionnaire as “friends, family, co-workers, or a person you pay for goods or services.”

By number, shopping (including grocery stores, convenience stores, pharmacies, and other physical stores as well as online shopping) represented 34 percent of all payments; by value, 17 percent (table 5). Similarly, the purchase of food consumed away from home was 18 percent of payments by number (down from 21 percent in 2019) and just 4 percent by value, reflecting the relatively low average dollar value of such payments. In contrast, payments to financial services companies, which include loan repayments, transfers to another account, and purchases of financial assets, are 10 percent of all payments by number and 45 percent by value, the greatest share of any payee type. Shy (2020) examines the payment instruments consumers used in October 2019 to pay the different payee types.

6. Use of cash and electronic devices

Consumer payment diaries make it possible to track detailed use and management of cash, transaction by transaction, over the course of a day. The DCPC reflects two important differences between cash and other payment methods. First, cash payments account for a relatively large proportion of the *number* of payments, as mentioned above. Of the total number of payments, 19 percent on average involved cash. A second difference is that cash payments account for a relatively small proportion of the *value* of payments. Of a consumer’s total payment value, only 6 percent on average was funded using cash. The average value of a cash payment was \$42, compared with \$146 for the average value of all other payments, and the average cash *purchase* was even lower in value, at \$29 (tables 2 and 3). (For more on cash use in 2020, Kim et al. 2020 [2], Coyle et al. 2020, and Foster and Greene 2021.)

Of course, it is not possible to make cash payments with electronic devices (computer, tablet, mobile phone), so we could consider these electronic means of making payments the alternative means to paying with cash. In 2020, 31 percent of all payments were made using electronic devices; 14 percent of all payments were made using a mobile phone.

7. Cash holdings

The DCPC obtains data on consumers’ holdings of cash on their person (pocket, purse, or wallet) and stored elsewhere (home, car, office, and such). The data on cash holdings were collected every night during the diary recording period; the data on stored cash were collected on the first and last nights. For both measures, respondents were asked to count the exact number of bills held by denomination, and

the online questionnaire automatically summed the dollar values of cash holdings by denomination and in total. Respondents did not report holdings of coins.

A US consumer carried \$76 in cash each day on average, a statistically significant increase from 2019. By value, about half of the cash on person was in the form of \$20 bills and one-quarter was in \$100 bills (table 6). About 80 percent of consumers carried at least \$1 at the beginning of at least one of their diary days. Consumers' pandemic-era holdings of cash were reported and discussed in Kim et al. 2020(2), Coyle et al. 2020, and Foster and Greene 2020.

Fewer consumers store cash elsewhere; 42 percent of consumers had at least \$1 stored elsewhere. For all consumers, the average value of cash stored elsewhere was \$308, increased from \$264.

8. Conclusion

Data from the 2020 Diary of Consumer Payment Choice show that consumers use debit cards, credit cards, and cash for most of their payments by number. Debit cards and credit cards are the most commonly used payment instrument by number for purchases, accounting for about one-third of purchases each. Electronic methods linked to a bank account are used for almost half of bill payments by number. In the pandemic year 2020, online or mobile purchases of goods and services increased to 24 percent of all purchases (as a share of in-person and not-in-person) from 17 percent. Of purchases not made in person, four in 10 were accomplished via a mobile phone.

Appendix A: Overview of survey methodology

This section provides a brief overview of the key elements of the DCPC methodology for 2020. [Angrisan, Foster, and Hitczenko \(2018\)](#) contains technical information about the DCPC.

Sampling frame and samples

The 2020 DCPC was implemented with representative samples from the Understanding America Study (UAS), managed by the University of Southern California (USC) Dornsife Center for Economic and Social Research (CESR) (table C).

Table C: Overview of samples, 2015–2019

	2015	2016	2017	2018	2019	2020
UAS available panel	2,140	4,776	4,759	4,718	5,228	5,267
Number of unique respondents*	1,087	3,047	2,871	2,992	3,154	1,748
Respondents completing all DCPC days**	1,016	2,848	2,793	2,873	3,016	1,537
Number of longitudinal panelists***	--	799	2,226	2,276	2,388	1,146

Notes: Part of the 2020 sample of 3,708, or 1,909 panelists, received the 2020 DCPC. The other part, 1,799 respondents, received an experimental survey that combines the Survey with the Diary of Consumer Payment Choice. Longitudinal panelists participate in multiple years. *Completed at least one day. **Completed at least four days (“night before” plus three diary days). ***Participated in at least one previous DCPC.

Source: Federal Reserve Bank of Atlanta

The sample size is reduced from 2019 because some panelists were invited to participate in experiments investigating various ways of assisting respondents to remember transactions and to reduce respondent burden for the SCPC and DCPC. Part (1,909) of the full sample of 3,708 received the traditional combination of SCPC and DCPC; the other part (1,799) completed an experimental combination in which the SCPC section asking respondents to recall their transactions in a “typical” month is eliminated in favor of the DCPC method of reporting specific individual transactions in detail: dollar value, date, time, payee, etc. A report on this survey experiment is forthcoming; the experimental questionnaires are [posted online](#).

Questionnaires

The DCPC is an online survey administered to diary respondents (“diarists”) over three consecutive days. It also includes a pre-diary online survey. Diarists can record their payments, cash management, and related information for each assigned day. In years before 2020, the survey vendor provided respondents long-form and short-form paper memory aids and a receipt bag. Due to the COVID-19 pandemic, these additional recording materials were not sent to respondents in 2020. Some prior experiments, with some respondents receiving the recording materials and other not, made us confident that this would not materially affect responses. Diarists enter the data into a 10- to 15-minute online survey each night. Most of the online questionnaire collects information about payments and

related data. Each day, it also includes questions specific to that day, such as income received, cash withdrawals and deposits, and so forth. Together, the whole process is expected to take no more than 30 minutes per day to complete, and respondents receive a \$20-per-day incentive. The pre-diary online survey takes about 10 minutes, and respondents receive \$10, for a total incentive of \$70 per diarist.

Prior to starting the DCPC, all diarists are required to take the 30-minute online Survey of Consumer Payment Choice (SCPC), for which they receive an incentive of \$20 upon completion. A respondent may complete the SCPC any time from its release in the middle of September to the first day of the assigned diary period. For 2017, the DCPC questionnaire was changed to help respondents in reporting the payee and identifying bill payments. These changes mean that results for the breakdowns of bills and purchases are not comparable between 2016 and 2017–20. All questionnaires are [posted online](#).

Diary implementation

Diarists are randomly chosen to begin participating in the DCPC each day throughout the defined sample period for the year. Thus, each diary day contains a small sample of respondents (an average of 180 per day in 2020) that is, on average, representative of all US consumers. Diary waves are staggered to start two days before the official beginning of the DCPC and end two days after the official end date. This way, each day contains approximately one-third of respondents who are completing each day of the diary (one, two, or three), and every day-specific group of questions occurs on each day of the month. As a result of this implementation strategy, DCPC data provide aggregate estimates that are representative of all US consumers on average for each day of the sample period (day-of-the-month weights) and, under certain assumptions about temporal trends, for the sum of all days in the sample period (monthly weights), usually the month of October.

In addition, the data provide strong evidence that payment behavior is heavily influenced by a weekly cycle, with different behaviors on different days of the week. As a result, a hybrid approach for the estimates generates estimates for each day of the week by pooling across the relevant monthly data and then aggregates these to generate estimates for any particular period of time. (Also see Angrisani, Foster, and Hitczenko [2017]; Angrisani, Foster, and Hitczenko [2018].)

Data preprocessing

All DCPC survey responses reported here have been analyzed for errors, inconsistencies, and influential outlier effects. Where necessary, the DCPC data have been cleaned and adjusted using statistical methods similar to methods used previously and reported in earlier SCPC and DCPC technical appendices. Because consumer payments and cash management behavior exhibit significant day-of-the-week effects, and calendar months can vary notably across years in their composition of days of the week, the raw data contain seasonal fluctuations. The results for this report use revised sampling

weights that attempt to adjust for differences in consumer payment behaviors across days of the week within each year.

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