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Heterogeneity in the Marginal Propensity to Consume: Evidence from Covid-19 Stimulus Payments

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We identify 22,461 recipients of Covid-19 Economic Impact Payments in anonymized transaction-level bank account data from Facteus. We use an event study framework to show that in the two weeks following a $1,200 stimulus payment in April 2020, consumers increased spending by $546, implying a marginal propensity to consume of 46%. Consumers used an additional 10% of the stimulus payment to pay off debt. Consumer spending fell to normal levels after two weeks. Stimulus recipients who live paycheck-to-paycheck spent 60% of the stimulus payment within two weeks, while recipients who save much of their monthly income spent only 24% of the stimulus payment within two weeks. Spending patterns are quite similar for the second round of stimulus payments in January, 2021, with consumers spending 39% of their stimulus payments within two weeks and using an additional 14% of their payment to pay off debt. Reweighting our data to match the U.S. population, ignoring equilibrium effects, and assuming a constant MPC for each person, we estimate that the CARES Act's $296 billion of stimulus payments increased consumer spending by $130 billion (44% of total outlays) within two weeks of stimulus receipt. A stimulus bill targeted at individuals with the highest MPCs could have increased consumer spending and debt payments by the same amount at a cost of only $246 billion.

JEL Codes: D04, D12, E21
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Introduction

This paper measures the effect of Covid-19 Economic Impact Payments on consumer spending. The CARES Act, signed into law on March 27th, 2020, provided for payments of up to $1,200 per adult and $500 per child for most Americans in the United States earning less than $99,000 (or $198,000 for joint tax filers). Americans with individual income less than $75,000 (and household income less than $150,000) received the full payment, and payments phased out at higher income levels.[1] The IRS directly deposited the first payments into bank accounts on April 10th, 2020[2] and by May 11th, 2020, people had received more than 130 million stimulus payments (worth $200 billion).[3] The Joint Committee on Taxation projected that these stimulus payments cost a total of $293 billion[4] when the disbursement process was completed by the end of the summer, or roughly $881 per U.S. resident.[5] In January, 2021, the IRS began a smaller second round of payments following similar eligibility rules.[6]

We use a new anonymized transaction-level dataset from Facteus describing spending behavior from tens of thousands of primary bank accounts to precisely measure the immediate effect of Covid-19 Economic Impact Payments on consumer spending and debt payments.[7] We begin by identifying 22,461 active accounts in the Facteus data that received a stimulus payment from the IRS between April 10th and April 15th. In an event-study framework, we show that $1,200 stimulus payments increased average consumer

[1] For more information about the CARES Act, see https://home.treasury.gov/policy-issues/cares.

[2] See additional details here: https://www.wsj.com/articles/u-s-treasury-starts-sending-individual-stimulus-payments-11586566954. Conflicting reports from the IRS and news organizations claim that the first stimulus payments were deposited into accounts on April 11th, but that is not consistent with our data: https://www.cbsnews.com/news/stimulus-checks-irs-deposits-first-wave-of-stimulus-checks-2020-04-12/

[3] See https://www.washingtonpost.com/business/2020/05/11/still-waiting-your-stimulus-check-you-have-until-12-pm-wednesday-give-irs-your-bank-information/

[4] For a full analysis of the costs, see: https://www.jct.gov/publications.html?func=startdown&id=5255. We apply the CARES Act Economic Impact Payment formulas to the 2018 U.S. population using the American Community Survey and independently estimate that the individual payments will total $296 billion, so that is the estimated cost that we use throughout this paper.

[5] This assumes a population in 2020 of 332.6 million, following the Census Bureau's projection for the 2020 U.S. population: https://www.census.gov/content/dam/Census/library/publications/2020/demo/p25-1144.pdf

[6] For more details about the implementation of this second round of payments, see: https://www.irs.gov/newsroom/treasury-and-irs-begin-delivering-second-round-of-economic-impact-payments-to-millions-of-americans

[7] We describe this dataset in further detail in the Data section. Facteus is a private company that works with debit and payroll-card issuers to aggregate and standardize anonymized transaction-level information. Data are available at a one-day lag for the set of accounts in their data.

spending by $546 in the two weeks after the deposit. Consumers spent an additional $122 to pay off debt. Larger stimulus payments increased the consumer spending of recipients proportionally. We find no evidence of anticipatory increases in spending in the days leading up to the stimulus payments. The increase in spending benefits many merchants, with Walmart capturing the largest amount of stimulus-driven spending. Spending at Walmart increased by $94 per person in the two weeks following stimulus receipt, or 16% of the overall increase in consumption following the stimulus payment. But increases in spending were spread evenly over major sectors. We then analyze 37,474 stimulus recipients from the second round of payments in January, 2021, and we find similar spending responses—stimulus recipients spend 39% of their payments in the two weeks following receipt and they use an additional 14% of their payment to pay off debt.

While the average MPC in our sample from the April 2020 stimulus checks is 46%, there is significant heterogeneity in the MPC across our sample of stimulus recipients. In the two weeks following a stimulus payment, 12% of the recipients decrease spending, 9% of the recipients do not change their spending from the prior two weeks, and 10% of recipients spend $1,200 or more in the two weeks following the stimulus payment (relative to the two weeks prior to the payment). The remaining 69% of our sample have spending changes in the two weeks following the stimulus payment that are distributed roughly uniformly between 0 and 1.

We conclude by using the American Community Survey to re-weight our sample of stimulus recipients to be representative of the U.S. as a whole. We use this re-weighted sample to estimate the immediate effect of the stimulus payments on consumer spending. Ignoring equilibrium effects and assuming that each stimulus recipient has a constant MPC, we estimate that consumers used $144 billion of the $296 billion of stimulus payments within two weeks of receiving their payments ($130 billion in increased consumer spending and $14 billion in increased debt payments). A stimulus program of the same size directed at low-income individuals with the highest marginal propensity to consume could increase consumer spending by $158 billion (or 53% of the program cost). Lastly, we show that policymakers could have obtained the same aggregate increase in total consumer spending and debt payments at a cost of $246 billion—instead of the program's actual cost of $296—by offering stimulus payments only to lower-income individuals and households.

A large literature explores the marginal propensity to consume from unanticipated income shocks. For

example, Kan, Peng, and Wang (2017) analyze a $2.6 billion shopping voucher program in Taiwan and find that each dollar of vouchers leads to $0.24 of increased spending. Fagereng, Holm, and Natvik (2019) use lottery winners in Norway to measure the MPC for lottery prizes, which range from around 50% for high-liquidity winners of large prizes to 100% for low-liquidity lottery winners who win small prizes. Gross, Notowidigdo, and Wang (2020) use the removal of bankruptcy flags from credit reports to argue that the MPC from sharp increases in credit card limits is 37%. Agarwal, Liu, and Souleles (2007) use an event study framework to measure how consumer spending responds to the 2001 federal tax rebates. And Ganong et al. (2020) use firm-wide variation in monthly pay to estimate that a $1 increase in income leads to a $0.23 increase in consumption, with significantly lower spending responses for high-liquidity households. In Table A1, we describe results from a selection of papers that measure the MPC in response to anticipated and unanticipated changes in income. Much of the prior literature measures MPCs using monthly or quarterly consumer spending data. Our paper adds to this literature by using high-frequency transaction-level data to measure the effect of stimulus payments on daily consumer spending.

Our estimates of the MPC using transaction-level data closely match survey results. In two recent surveys, Coibion, Gorodnichenko, and Weber (2020), and Drescher, Fessler, and Lindner (2020) survey potential Covid-19 stimulus recipients in the U.S. and Europe and find that respondents have spent or expect to spend 40% of stimulus payments in the U.S. and expect to spend between between 33% and 57% of stimulus payments in Europe, with MPCs decreasing in income. And Kubota, Onishi, and Toyama (2020) find that consumers in Japan spend 49% of Covid-19 stimulus payments within six weeks. There is a large body of literature, typified by Sahm, Shapiro, and Slemrod (2010), that uses data from household surveys in a similar context. Sahm, Shapiro, and Slemrod estimate an MPC of 33% in response to the 2008 tax rebates. In a related paper, Parker and Souleles (2017) compare self-reported MPCs to realized MPCs after Federal stimulus payments in 2008. They find that households spend roughly 50% of the $910 stimulus payment, closely matching our findings. Fuster, Kaplan, and Zafar (2018), survey consumers to identify MPCs in response to hypothetical windfalls. They find that respondents report hypothetical MPCs of only 8%, but among those who expect to spend some of their hypothetical windfall, the average reported MPC is 54%. And in related work, Canbary and Grant (2019) use a survey of households to measure the MPC for households with different socioeconomic statuses, arguing that the MPC ranges from 0.53 for high-

SES households to 0.94 for low-SES households. Chetty, Friedman, and Stepner (2021) use aggregated consumer spending data from Affinity Solutions to estimate that consumers spent around $450 of their $1,200 first round stimulus checks (38%) with minimal heterogeneity by income; and consumers spent $140 of their $600 second round checks (23%) with MPCs ranging from 8% to 23% for zipcodes with different per-household incomes.[8] Lastly, Misra, Singh, and Zhang (2021) use zipcode-level aggregated data from Facteus to estimate an MPC of 50% in response to Covid-19 stimulus payments, focusing on geographic heterogeneity in the MPC.

In the paper that is most similar to ours, Baker et al. (2020) identify a set of 3,197 people who received Covid-19 Economic Impact Payments. These recipients all use a financial app called SaverLife, which encourages users to save money. They find that in the first ten days after a stimulus payment, consumers spent $0.25-$0.35 per dollar of stimulus. The three main advantages of our paper are representativeness, precision, and a comparison of consumer spending responses from multiple rounds of stimulus. SaverLife is an app that encourages saving. Our dataset is also a convenience sample of stimulus recipients from card-issuers who provide data to Facteus, but our sample is not explicitly selected on savings behavior. we also have a broad enough sample of stimulus recipients to re-weight our data to match the U.S. population and investigate the representativeness of our sample. We find a precise average MPC of 0.44 in our panel of individuals who use the debit and payroll cards in our sample and the same MPC when we re-weight our data to match the income, location, and age distribution of individuals in the 2018 ACS. Among individuals with a high savings rate in our sample, we estimate an MPC of 24%, closely matching the results from the SaverLife users in Baker et al (2020). Also, because we track more than 6-times as many stimulus recipients, we have the ability to more precisely estimate the day-by-day effects of stimulus payments on overall consumption and consumption at individual firms.

Our paper is one of many that uses high-frequency data to measure the economic effects of Covid-19-associated policies on consumers. For example, a growing set of papers measure the sharp decline in consumer spending, mobility, employment, and business activity in March and April of 2020. These papers use a variety of alternative data sources from companies like Unacast, Second Measure, Womply, Safegraph,

[8]The $450 and $140 numbers come from the estimated MPC for zipcodes with average household income of $46,000 to $59,000.

ADP, and Burning Glass to track high-frequency measures of consumer behavior. For several relevant examples, see Aaronson et al. (2020); Alexander and Karger (2020); Baker et al. (2020); Carvalho et al. (2020); Chetty et al. (2020); Gupta et al. (2020); and Lewis, Mertens, and Stock (2020). And our evaluation of the short-run effect of Covid-19 Economic Impact Payments on consumer spending complements Granja et al. (2020) and Ganong, Noel, and Vavra (2020) who present descriptive statistics and policy counterfactuals related to the short-run effects of the Paycheck Protection Program and the unemployment insurance component of the CARES Act (respectively). Together, the Economic Impact Payments, the Paycheck Protection Program, and the expansion of unemployment insurance comprise some of the largest-scale federal policy responses to Covid-19.

Data

We use data from a company called Facteus that standardizes transaction-level data from dozens of banks and card-providers from 2012 through 2020. Facteus works with hundreds of card-issuers to aggregate, standardize, and anonymize this information, perturbing transaction amounts, demographic information, and transaction timing by randomly chosen values.[9] Facteus's data describes millions of bank accounts, debit cards, payroll cards, and load cards between 2012 and 2020. We begin by identifying 238,407 accounts in the Facteus panel that received a deposit anytime in April 2020 from a government agency, including the IRS, SSA, or state unemployment insurance offices.

In Figure A1 (Panel A), we overlay the distribution of government payment amounts from two groups of accounts: those receiving a government payment from April 1—April 9, and those receiving a government payment from April 10—April 15. In this figure, we can clearly see the stimulus payments. Before April 10, government payments to the accounts in our sample were distributed smoothly (in value) between $0 and $2,800 with a long right tail. But on and after April 10, the distribution of government payments reflects the lumpiness of the CARES Act's payment amounts. Recall that individuals earning under $75,000 received

[9]For example, transaction values are perturbed by adding a random number chosen uniformly from a small range surrounding that number. Birth date information is perturbed by up to 1-2 years in either direction, and transaction time is perturbed by several hours to avoid identification of individuals. We ignore these perturbations when estimating our event study results.

a $1,200 payment and joint filers received a $2,400 payment. Adults also received a $500 payment for each child in their household (up to a four child limit). Consistent with this payment algorithm, we see large spikes in payment frequency at $1,200, $1,700, $2,200, $2,400, and $2,700. The payment amounts are perturbed in Facteus's data, so the transaction amounts are not exact. But we will use the large mass of accounts receiving a $1,200 payment from the IRS between April 10th and April 15th as our main analysis sample going forward.[10] In Panel B of Figure A1, we show the distribution of government deposits from the second round of stimulus checks in January, 2021.

We filter our main analysis sample in seven steps to ensure that we focus on primary bank accounts for a set of consumers. For a complete description of the filtering process, see the Data Appendix. To summarize the data appendix, we require that accounts record at least ten transactions in January 2020 and meet minimal thresholds for spending and deposit activity. We also exclude accounts with multiple payments from the IRS after April 10th to avoid confounding our estimate of the MPC with consumption responses to contemporaneous tax refunds. These filters leave us with a primary dataset of 20,635 consumers: 13,054 who received a $1,200 payment between April 10th and April 15th, and 7,581 who did not receive any stimulus payment from the IRS after April 10th. Borusyak and Jaravel (2017) recommend the inclusion of a never-treated control group of non-recipients in event studies. This never-treated control group helps to pin down the values of unit and time fixed effects while allowing us to separately estimate days-since-event fixed effects. Our full sample consists of 30,402 consumers: with an additional 5,442 consumers who received a $1,700 payment, 3,333 consumers who received a $2,200 payment, and 632 consumers who received a $2,400 payment from the IRS between April 10th and April 15th. After analyzing the first round of stimulus payments, we then use identical models to measure the effect of the second round of stimulus payments on consumer spending for 37,474 consumers in the Facteus data who use these accounts as primary accounts. In our final analysis sample, we see all bank transactions for these consumers including checks received, fund transfers, ATM withdrawals, and debit card payments.

In Table A3, we present summary statistics describing the 13,054 recipients of $1,200 stimulus payment

[10]We drop accounts in our sample that receive the stimulus payment after April 15th as this date coincides with the release of the online payment tracker tool by IRS. Thus, the payments could be precisely tracked and their arrival can not be assumed to be unanticipated. See https://www.irs.gov/newsroom/treasury-irs-unveil-online-application-to-help-with-economic-impact-payments.

in our data. The average recipient has total monthly deposits of $1,740 from January to March, 2020 and total monthly spending of $1,250 over that time period. Multiplying by twelve, this implies an average annual income of $20,880 and average consumer spending of $15,036. In the summary table, we separate out different transactions marked as ATM Withdrawals, deposits, government deposits, and loads (onto payroll cards), but in the main analysis we combine all types of deposits into an aggregate deposit measure and all types of spending into an aggregate spending measure. In Table A4, we show the same summary statistics, but for our combined group of $1,200 stimulus recipients and the control group described above. The average consumer in our overall sample received payroll and other deposits totaling $1,691 in January—March, 2020, implying an average annual income of roughly $20,300.[11] In Tables A5 - A7, we show the same summary statistics for recipients of $1,700, $2,200, and $2,400 stimulus payment (respectively). And in Table A2 we show summary statistics for non-recipients. In Tables A8 - A11 we show summary statistics for recipients of the second round of stimulus payments.

In Figure A3, we plot changes over time in account deposits, spending, and 2020 savings for all the accounts in our sample. We define 'savings' as cumulative deposits minus cumulative spending and debt payments since January 1st, 2020. We see a linear increase in deposits and spending through the end of March with the exception of a large increase in spending at the end of February, caused by EITC refunds. The time series of spending is smoother than the lumpy time series of deposits because of regular weekly and biweekly direct deposits from employers. On April 15th, when we see the largest number of stimulus payments, we see a sharp increase in aggregate deposits (because of the stimulus payments) and consumer spending. Figure A4 shows a similar pattern when we plot the time-series of aggregate deposits and spending in calendar time.

The data from Facteus has several advantages for our analyses in this paper: first, we can see daily transactions for a large set of accounts, allowing for precise estimation of daily consumer spending. Second, we can disentangle consumer spending, payroll deposits, government deposits, and ATM withdrawals. And third, we have fine-grained geographic features for each transaction.

The one major concern about the Facteus data is representativeness. The only demographic information we have for each consumer is their age and geographic location. We do not see information describing each

[11] Based on their incomes, we expect that these consumers will receive a stimulus payment at a later date.

consumer's gender, household structure, or secondary and tertiary accounts in this data.[12] If a consumer has a credit card, we see when they pay off the credit card, but we do not see the individual credit card transactions. If the consumer has a secondary debit or payroll card, we cannot see deposits or spending from that secondary account if the consumer uses their second account as a main source of deposits and spending. That being said, the consumers in our sample chose the account in Facteus's data to receive a direct deposit from the IRS. And aggregate changes in deposits and spending in Figure A3 imply that consumers use these accounts for a large share of deposits and spending. We view this as evidence that many of these consumers are using this account as a primary bank account. If these stimulus recipients have secondary bank accounts or credit cards from which they spend additional money immediately after receiving a stimulus payment, then our estimate of the average MPC (0.44) is likely a lower bound.

Empirical Strategy

Our main calculation of the average MPC relies on a basic event study framework to measure the effect of stimulus payments on daily consumer spending, in the style of Agarwal, Lui, and Souleles (2007). We begin with a dataset of all consumers described above in the data section. We collapse the transaction-level data to the individual-by-day level. We then analyze four event studies, focusing on the simplest model (Model A) throughout the paper. Models B and C are presented as robustness checks.

Model A. We focus on consumers who receive a stimulus payment from April 10th—April 15th and we require that our individual-by-day panel be balanced by further subsetting our dataset to the two weeks before and after each consumer's stimulus deposit. We estimate our model separately for consumers who receive $1,200, $1,700, $2,220, and $2,400 payments between April 10th - April 15th. Recall that $1,200 recipients represent single adults with no dependents, $1,700 recipients represent adults with a single dependent child, $2,200 recipients represent adults with two dependent children, and $2,400 recipients represent

[12] Although, as we show later, the MPC is not measurably different for adults with no dependent children and adults with one or two children. We identify these three groups of consumers using the exact stimulus payment amount.

married adults with a joint account. We analyze this linear regression:

$$Y_{i,t} = \sum_{s=-14}^{13} \beta_s 1(stimulus\ received)_{i,t+s} + \varepsilon_{i,t}$$

In our analysis, $Y_{i,t}$ is either:

(1) Individual i's total spending on day t.

(2) Individual i's total deposits on day t.

The coefficients of interest, β_s, represent the days-since-event fixed effects for the two weeks before and after the stimulus payment. The indicator variable $1(stimulus\ received)_{i,t+s}$ is 1 if individual i had received a stimulus payment on date $t+s$ and 0 otherwise. Because we do not include additional covariates, this model measures the average level of spending on each day surrounding the stimulus payment relative to an omitted day (in our case, $t-5$). As illustrated in the bottom left panel of Figure 1, the four different groups of recipients have virtually identical trends in pre-stimulus spending, but experience different post-stimulus increases in spending ordered according to the stimulus amount received by each group.

Model B. In our second model, we add a series of controls to our baseline event study framework (Model A). We regress:

$$Y_{i,t} = \sum_{s=-14}^{13} \beta_s 1(stimulus\ received)_{i,t+s} + \delta_{i,t} + \alpha_i + \varepsilon_{i,t}$$

In this model $\delta_{i,t}$ and α_i represents state-by-date and individual fixed effects, respectively. We include the $\delta_{i,t}$ fixed effects as covariates in this event study to absorb regional time-varying features of our data. One worry is that our baseline estimates may be confounded by systematic variation in stimulus timing for different types of individuals. Second, there is significant evidence that the passage of stay-at-home orders causes sharp changes in consumer spending (see Alexander and Karger, 2020). Because of this, we want to ensure that our estimates of the MPC are not confounded by time-varying state policies (like stay-at-home orders) that affect business closures and consumer spending.

We include in our model the never-treated control group of consumers. This never-treated control group helps to pin down the values of unit and time fixed effects while allowing us to separately estimate event-

time fixed effects (as is recommended by Borusyak and Jaravel (2017)). This type of event study can suffer from bias if treatment effects are time-varying. For more information, see Goodman-Bacon (2018) and Sun and Abraham (2020). But the results from Model B are indistinguishable from the results of the more simple averaging exercise in Model A.

Model C. In our third and final model, we address concerns about time-varying treatment effects by estimating an event study model in two steps. First, we regress $Y_{i,t}$ on person-by-day of the week fixed effects during the pre-pandemic period (January 1st, 2020 through March 15th, 2020). We use this regression to calculate a daily residual spending measure for each consumer in our final analysis sample of stimulus recipients. Then, we regress this residual spending measure on days-since-stimulus-receipt fixed effects. This method is similar to one proposed by Goodman-Bacon (2019) who suggests estimating residual outcomes in the pre-period and using those residual outcomes in the main difference-in-difference specification in the post-period. As we show later, our main results are unaffected by our use of Model A (as compared to Model B and Model C).

Results

In Figure 1, we use our baseline event study framework (Model A) to measure the immediate effect of stimulus payments on consumers. Confidence intervals rely on standard errors that are clustered two-way at the state and date level. In Panel A, we plot the β_s values where the outcome is daily aggregate deposits into each account.[13] In the two weeks immediately preceding and following the receipt of the stimulus payment, we see no measurable variation in aggregate deposits. But on the exact date when we identify the stimulus payments, we can see the stimulus payment amounts deposited into each account. In Panel B, we plot the spending response to this unexpected $1,200 payment. Spending increases sharply in the two days following the payment, before slowly returning to baseline levels after two weeks. Overall, stimulus recipients increase spending by $546 in the two weeks following receipt (46% of the stimulus amount). In Panel C, we show that consumers also sharply increase spending on debt payments (bill pay, utility, and rental payments). In

[13] In Figure A7, we show the level change in non-stimulus deposits (relative to day $t-5$) for each group of stimulus recipients.

Panel C we plot daily consumer use of the stimulus payments (spending and debt). In Panel E, we show the cumulative daily spending (relative to $t-5$) from two weeks before the stimulus payments to two weeks after. And in Panel F, we plot these cumulative daily spending amounts as a fraction of the stimulus payment made to individuals in each group. In Panel F, we see that different types of households report similar MPCs in the two weeks after the stimulus payment, with MPCs ranging from 0.40 on average for $2,200 recipients to 0.50 on average for $2,400 recipients.[14]

In Figure 2 we report the same six panels for recipients of the second round of stimulus payments. The most remarkable pattern when comparing Figures 1 and 2 is the striking similarities between consumer spending responses to the first round of stimulus payments in April, 2020 and the second round of payments in January, 2021. Although the second round of payments was ninth months later and included smaller payments, the average MPC ranged from an average of 39% for $600 recipients to an average of 47% for $2,400 recipients.

We can use the same event study framework to calculate each consumer's individual increase in spending in response to the stimulus payment. To do this, we calculate each consumer's abnormal consumption following the stimulus payment as

$$C_i^a = C_{i,r(i)+14}^{14} - C_{i,r(i)}^{14}$$

where $C_{i,t}^{14}$ is consumer i's total spending in the 14 days preceding date t and $r(i)$ is the date when consumer i received their stimulus payment. The individual-level change in consumer spending in the two weeks following the stimulus payment is then $\delta_i = \frac{C_i^a}{1{,}200}$. We calculate these changes in spending using the difference in consumption over a two-week period to account for any constant day-of-the-week effects or biweekly payroll-related spending decisions.

In Panel A of Figure A2, we plot the distribution of spending changes in our sample of $1,200 stimulus recipients, winsorized at -2 and 2. We see significant variation across stimulus recipients. 69% of our stimulus recipients have spending changes ranging uniformly between 0 and 1. 9% of recipients spent ap-

[14] In Figure A8, we plot the main event studies over a 28 day pre- and post-event window to confirm the flat pre-trend and tapering effect of the stimulus payment on consumer spending. The top panel of Figure A9 shows the sharp increase in consumer spending after stimulus receipt is robust to the addition of thee controls in Model B. And the bottom panel of Figure A9 shows the main results from Model C.

proximately none of their stimulus payment. 12% of recipients reduce their spending in the weeks following a stimulus payment (δ_i <0), and 10% of recipients increase their spending by more than $1,200 in the two weeks following the stimulus payment (MPC>1). These negative or large changes in spending represent abnormal spending that is not explained by person or day-of-the-week effects. For example, if an April 15th stimulus recipient decided in March to buy a car on April 20th, that would dramatically increase their measurable spending after the stimulus payment. But this is not in and of itself due to the stimulus payment. Panel B of figure A2 plots the distribution of changes in spending from two weeks before to two weeks after a stimulus payment in our sample of $1,200 recipients in response to a placebo stimulus date, identified as 21 days prior to actual date of stimulus receipt. The symmetric distribution of the MPCs in this panel confirms that our estimated changes in spending in Panel A capture the response to the unanticipated receipt of stimulus payment rather than just the heterogeneity in consumption patterns in the cross-section. In Figure A11 we plot the distribution of changes in spending at the individual-level for recipients of $1,700, $2,200, and $2,400 payments as well. The distributions are quite similar.

To explore sources of this individual-level heterogeneity in the MPC, in Figure 3 we plot the average individual-level MPC as a function of total spending, total deposits, and total savings in January—March 2020, as well as consumer age. We define total savings as the difference between deposits and spending plus debt payments in January—March 2020. We do not see account balances in Facteus's data, so this measure of savings (a 3-month difference in income and spending flows) is the closest we can come to approximating pre-Covid-19 liquidity. We see significant variation in the MPC as a function of the pre-Covid-19 savings rate. Consumers with the highest pre-pandemic savings rate spend only 24% of the stimulus payment on average in the two weeks following receipt. Consumers with low pre-pandemic propensities to save spend 60% of the first stimulus payment in the two weeks following receipt. Age and aggregate spending levels are largely uncorrelated with individual marginal propensities to consume. But aggregate deposits in January—March 2020 (a measure of total income) are also highly correlated with MPCs. There are inimal differences between heterogenetiy in the MPC in the first and second round of payments. Although the second round of payments saw a slightly lower MPC of 39% (vs. an MPC of 46% in the first round), we see similar differences in the MPC for high-income and low-income consumers.

We can further decompose spending for our treatment groups into spending in specific sectors of the

economy using the Merchant Category Code (MCC) attached to each transaction.[15] In Figure 4, we plot spending at merchants in five specific sectors and an 'other' category containing all other transactions. See Table A13 for basic summary statistics about typical monthly spending levels at merchants in each of these categories. Focusing on the $1,200 recipients, we see that spending at groceries, utilities, restaurants, discount stores, and other merchants jump in the two weeks following a stimulus payment. ATM withdrawals also sharply increase. This increase is quite similar across sectors: the increase in spending at grocery stores reflects 43% of typical monthly spending on grocery stores—recipients spend $102 in the two weeks following the stimulus receipt relative to the prior two weeks, and in a typical month, $1,200 recipients spend $236 on groceries. Similarly, withdrawals from ATMs and spending on utilities, restaurants, discount stores, and all other merchants see increases equal to 43%, 41%, 33%, 58%, and 44% of typical monthly spending at merchants in these sectors.

In Figure A13, we go to a more granular level and plot the spending response for eight companies that might be especially salient during the Covid-19 pandemic: Walmart, Amazon, Dollar General, 7-Eleven, AT&T, Verizon, Sprint, and Comcast. In Panel A, we see that Walmart captures a full 16% of the increased spending in our sample due to stimulus payments. The other seven firms also see sharp increases in spending, although those increases are of significantly smaller magnitudes. In Table A12, we show the increase in spending following stimulus payments for all merchants in our data with more than $500,000 of spending from our panel in January–March 2020[16]. Besides for Walmart, Amazon, 7-Eleven, and Dollar General, no other merchant captures more than $5 of each stimulus payment.

To ensure that our results are not being driven by cyclical increases in deposits or spending due to regular paychecks or other bi-weekly or monthly government deposits, in Figure A17, we present our Model A event study where we assume that each stimulus payment was received 21 days before it was actually received. Here, we see that those placebo event studies show no pre-trends or post-receipt increase in deposits or spending, consistent with our argument that the stimulus payments were an unanticipated shock to income that drove changes in personal spending.

[15] MCCs are standardized codes assigned by card issuers to merchants in order to give credit card rewards to cardholders and to meet governmental reporting requirements for specific transactions.

[16] This is approximately equivalent to an average expenditure of $4.5 per individual at a company.

Policy Counterfactuals

One concern with the results presented above is that the Facteus data may not be representative of the U.S. as a whole, which would affect the generalizability of our MPC estimate. We attempt to address this concern by re-weighting our sample of first-round stimulus recipients to match stimulus recipients in the U.S. To perform this re-weighting exercise, we rely on the 2018 individual-level ACS data from IPUMS (Ruggles et al., 2020). For each household, we calculate the number of children aged 16 or younger. We assign the household head and his/her spouse an equal fraction of the household's children. In cases where there is no spouse, we assign children to the household head. And in cases where additional adults live in a given household, we treat each of those adults as an independent household.

Then, we assign each adult member of each household (over 16 years of age) a stimulus payment based on their total income and their assigned dependent children using the income eligibility criteria defined by IRS. We assign all individuals with a personal income of up to $75,000 a stimulus payment of $1,200. For adults with personal income between $75,000 and $99,000, we assign a stimulus payment that is reduced by $5 for every $100 earned over $75,000. We add to each adult's stimulus payment $500 for each child in their household (including 'partial' children, as assigned above). We do not assign any stimulus payment to those individuals whose personal income might be low enough to receive stimulus payment but who have spouses earning more than $150,000. After assigning these stimulus payments to each adult, we estimate that the total cost of Covid-19 Economic Impact Payments will be $296 billion. This is in-line with the Joint Committee on Taxation's estimate of $293 billion,[17] and small discrepancies are to be expected because we rely on data from 2018 to estimate the cost of this 2020 program.

We merge our dataset of individuals from the 2018 ACS onto our dataset of MPCs from the Facteus panel. We estimate MPCs for each adult in the 2018 ACS by regressing the Facteus-based MPC on age fixed effects, state fixed effects, and income ventiles in our Facteus panel. We then use the coefficients from this regression to predict the MPC for each adult in the 2018 ACS. In Table 1, we use this matched dataset to explore the effect of five policies on consumer spending. We first estimate the immediate increase in consumption in response to the first round of Economic Impact Payments. We estimate that consumers used

[17] For a full analysis of the JCT's estimated costs, see: https://www.jct.gov/publications.html?func=startdown&id=5255.

$130 billion of the $296 billion individual stimulus payments. This ignores any equilibrium effect of the stimulus payments on prices, and it also ignores any spillover effects from the initial spending increases.

In rows 2-4 of Table 1, we explore predicted spending responses to more progressive versions of the individual stimulus payments. We keep the overall value of the policy constant, but target lower-income individuals and households. At the most extreme, we evaluate a policy that gives a payment of $3,700 to any individual earning less than $10,000 annually (or $20,000 jointly). A back-of-the-envelope calculation based on the Facteus MPCs implies that this would increase consumer spending by $176 billion. An important assumption here is that the MPC is constant for each person and does not change with the size of the individual payment. In the last row of Panel A of Table 1, we evaluate a policy that would give approximately $1,100 payment to each adult in the United States, independent of income. We argue that this policy would increase spending roughly the same ($136 billion) as the actual CARES Act payments to individuals and households. In other words, while the stimulus bill was means-tested, it will have almost the same effect on consumer spending as a policy that sends a payment to each adult in the United States, irrespective of income.[18] In Panel B of Table 1, we hold total consumer spending (instead of the cost of the stimulus bill) fixed and show that the same increase in consumer spending of $130 billion could have been achieved with a $246 billion bill by distributing the stimulus payment to only low-income individuals.

Conclusion

In this paper, we analyze the short-run effects of Covid-19 Economic Impact Payments on consumer spending. We show that a $1,200 payment from the IRS in April, 2020 caused consumers to spend an additional $546 on average in the two weeks following stimulus receipt and caused consumers to increase debt payments by 46%. These patterns are quite similar to consumer responses to the second round of stimulus payments in January, 2021, where consumers spent 39% of their stimluus payments. Our estimated MPC of 46% masks significant heterogeneity. Consumers who live paycheck-to-paycheck, spending all of the income they receive each month, have an average MPC of 60% while high-income consumers and

[18]Importantly, this last counterfactual policy evaluation relies on the assumption that the highest-income stimulus recipients have MPCs that are representative of non-stimulus recipients—those individuals with individual incomes and household incomes above the CARES Act cutoff.

consumers who generally save a significant fraction of their income have an MPC closer to 24%; and. We show that consumer age, income, and location are only marginally correlated with individual MPCs after controlling for each individual's pre-pandemic savings behavior. Walmart captures much (16%) of the increase in consumer spending due to Covid-19 Economic Impact Payments.

Ignoring equilibrium effects and assuming a constant MPC for each person, we estimate that the $296 billion of payments to individuals from the CARES Act will increase consumer spending by $130 billion (44% of total outlays). A stimulus bill of the same overall size targeted at lower-income individuals earning under $10,000 would have instead increased consumer spending by $158 billion. Consumer spending is not the main goal of most stimulus programs. Instead, governments use stimulus programs to keep households afloat during recessions and times of economic uncertainty. Nonetheless, we hope that our findings provide a precise estimate of how government disbursements (with no strings attached) affect consumer spending during a time of economic uncertainty.

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Data Appendix

We use these seven steps to subset our data to a set of consumers who are likely using the bank account in Facteus as their primary bank account:

1. We subset to accounts (cards) that recorded at least ten transactions in January 2020 to ensure that the consumers in our sample are using their accounts actively before the pandemic.

2. We subset to accounts that recorded at least $1,000 of aggregate spending and $1,000 of aggregate deposits across January—March 2020.

3. We subset to accounts that received at least one deposit from a government agency any time between January 1st and June 8th 2020. This could include a federal tax refund, unemployment insurance, Social Security payments, or an Economic Impact Payment. For the second round of stimulus payments, we subset to accounts that received at least one deposit from a government agency between December 17th, 2020 and January 29th, 2021.

4. We exclude accounts that received multiple IRS deposits between April 10 and June 8 for 1st round of stimulus payment recipients. Similarly, for the second round of stimulus recipients, we exclude accounts that received multiple IRS deposits between December 17th, 2020 and January 29th, 2021. We do this to remove a handful of accounts that received tax refunds and stimulus payments in close proximity and for whom we cannot identify a distinct value of stimulus payment.

5. We exclude accounts that we identify as Walmart employees. These are accounts that receive at least one deposit of value greater than $500 from Walmart in January–March 2020.

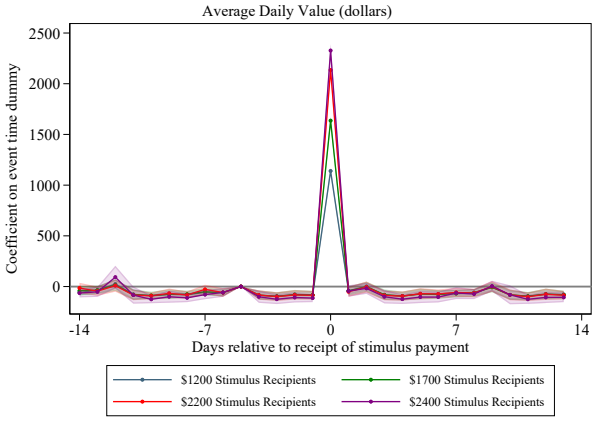
6. We subset to accounts for which we can identify the resident state of the account holder. This is done in two ways. First, for each account we look for a known zip code associated with the account at the time that the IRS or a state government made a deposit into the account in 2020. Second, if the state cannot be identified in this way, we assign each account to the most frequently occurring state associated with all other transactions in their account.

7. We subset to two sets of accounts:

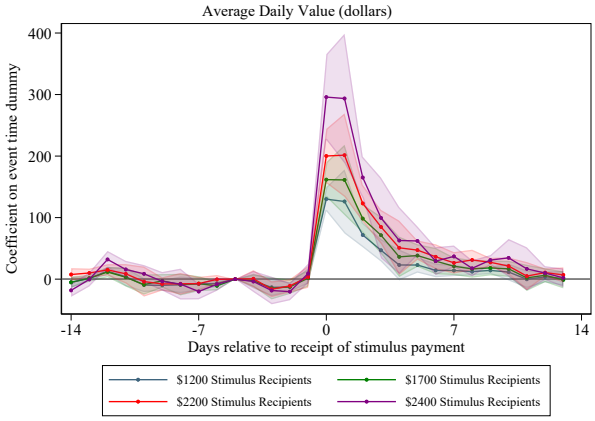
    - Accounts that received an IRS payment of (i) $1,200, (ii) $1,700, (iii) $2,200, (iv) $2,400 between April 10th and April 15th. We consider the accounts that received an IRS payment of $1,200 as our main sample of 'treated' units. We focus on stimulus payments made between April 10th and April 15th because early payments were less likely to be anticipated. In mid- and late-April, the IRS heavily publicized a website where consumers could check the expected timing of their upcoming stimulus payment. For the 2nd round of stimulus payment, we identify accounts that received (i) $600, (ii) $1,200, (iii) $1,800, (iv) $2,400 between December 28th, 2020 and January 4th, 2021. The IRS started sending out the 2nd round of stimulus payments in the last week of December.
    - Accounts that did not receive any IRS payment worth more than $500 after April 10th. This is our main sample of 'control' units who we will include for visual and regression-based comparisons. Based on the reported deposits into these accounts, we expect that most of these people will receive a stimulus payment over the summer.

Figure 1: Effect of 1st Stimulus Payment on Deposits, Spending & Debt: Event Time (Model A)

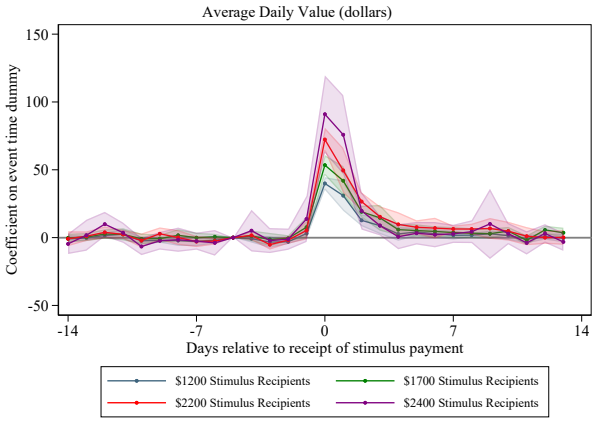
Aggregate Deposits



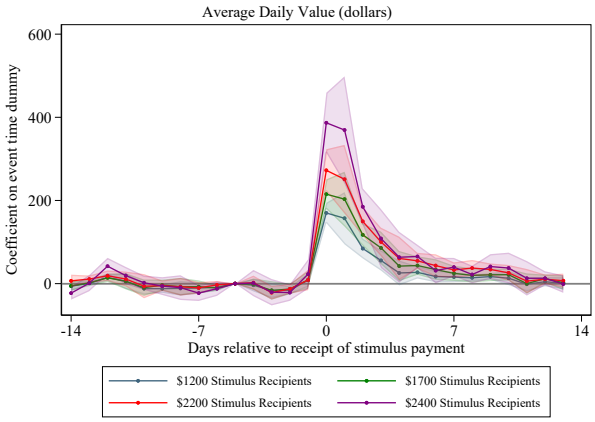
Aggregate Spending



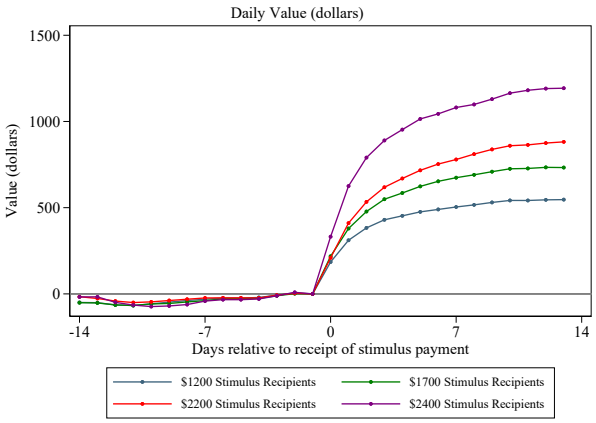
Aggregate Debt



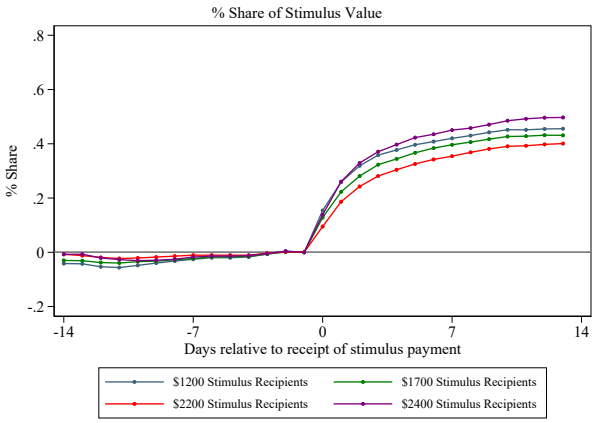
Aggregate Debt and Spending



Cumulative Aggregate Spending

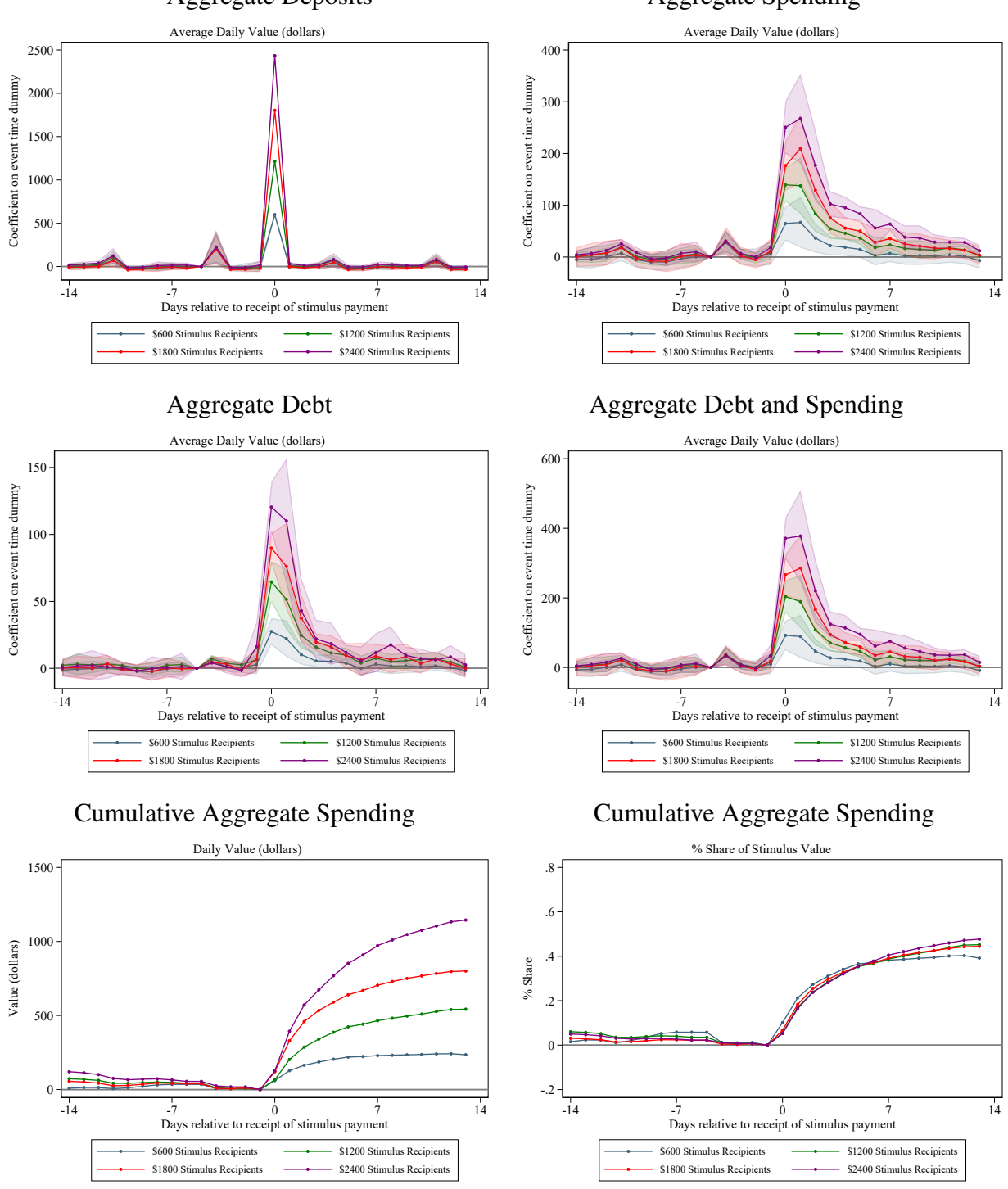


Cumulative Aggregate Spending



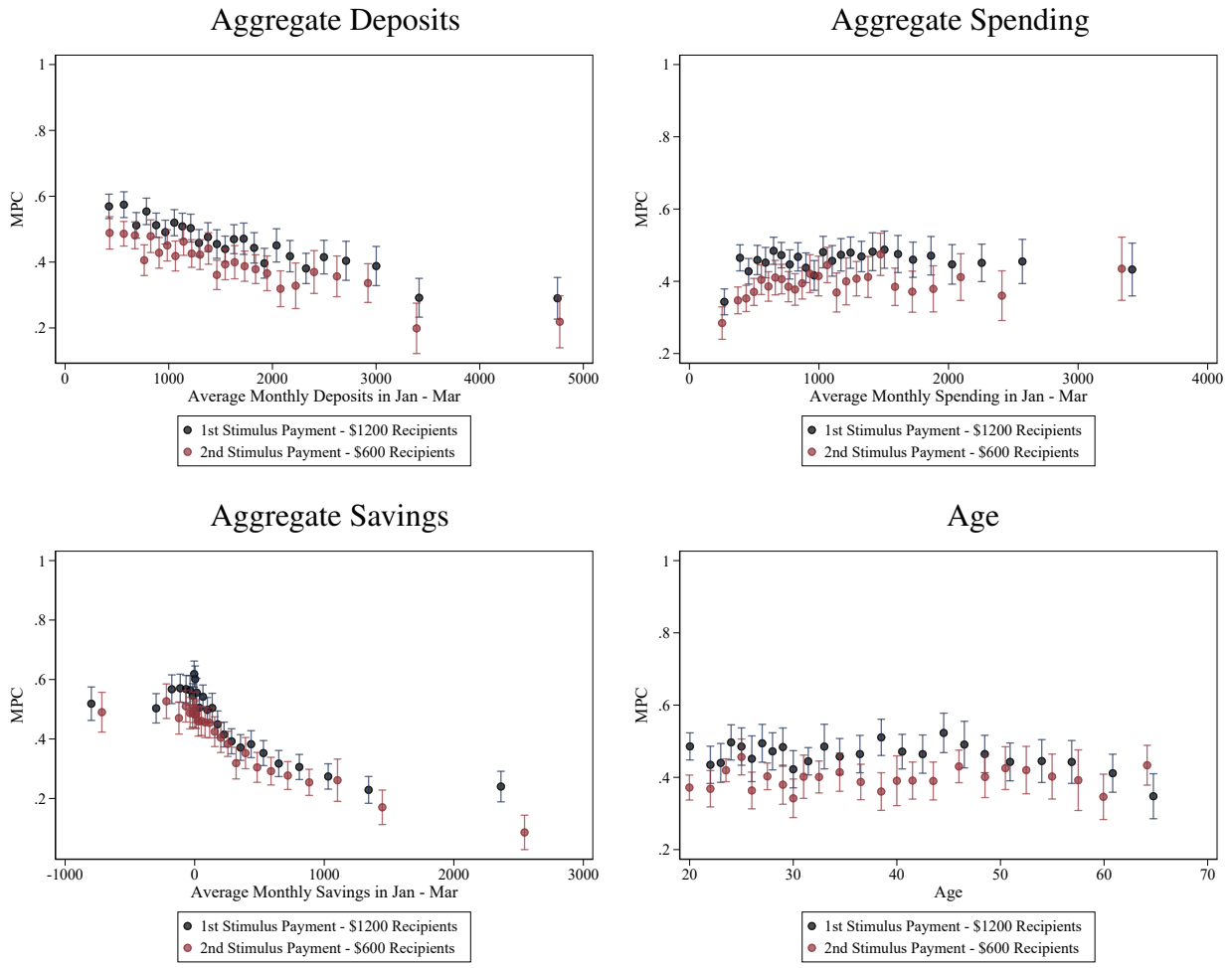
Notes: Data at the account-day level. Panels A & B show plotted coefficients on event time dummies from regression of aggregate deposits and spending on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. Panels C & D plot the same days-since event fixed effects for debt payments and aggregate spending and debt. Panels E & F plot cumulative point estimates from Model A for aggregate spending. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Debt includes transactions labeled as funds transfer, bill pay, or spending transactions with MCC codes associated with utility payments or rental payments. Aggregate Deposits includes transactions labeld as deposits, loads, government deposits and stimulus payment.

Figure 2: Effect of 2nd Stimulus Payment on Deposits, Spending & Debt: Event Time (Model A)



Notes: Data at the account-day level. Panels A & B show plotted coefficients on event time dummies from regression of aggregate deposits and spending on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. Panels C & D plot the same days-since event fixed effects for debt payments and aggregate spending and debt. Panels E & F plot cumulative point estimates from Model A for aggregate spending. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Debt includes transactions labeled as funds transfer, bill pay, or spending transactions with MCC codes associated with utility payments or rental payments. Aggregate Deposits includes transactions labeld as deposits, loads, government deposits and stimulus payment.

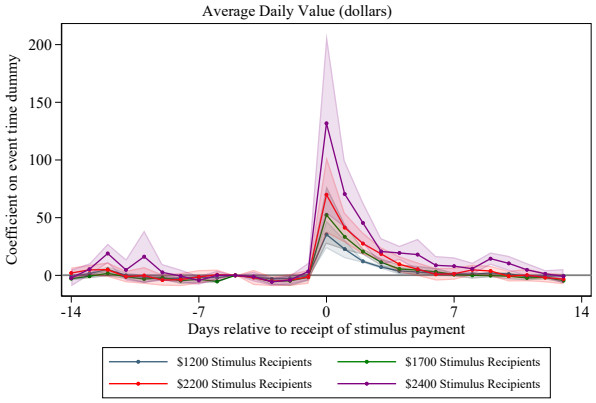
Figure 3: MPC Heterogeneity: 1st and 2nd Stimulus Payment



Notes: Plotted are binned scatterplots showing the distribution of individual level MPCs by spending levels, deposit levels, savings levels, and consumer age for the 1st round of $1,200 stimulus recipients and 2nd round of $600 stimulus recipients in the sample. The bands show the 95% confidence intervals Aggregate spending includes the sum of all transactions labeled as fees, spending and ATM withdrawals in January—March 2020 for each account. Aggregate Deposits includes all transactions labeled as deposits, loads, and government deposits (including stimulus payments) in January—March 2020 for each account. The level of savings is calculated as the difference between aggregate deposits and aggregate spending in January—March 2020.

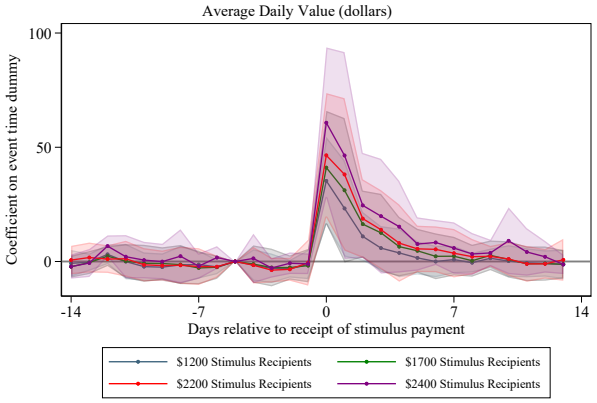
Figure 4: Effect of 1st Stimulus Payment on Spending/Debt by Merchant Category Code

Grocery Stores & Supermarkets



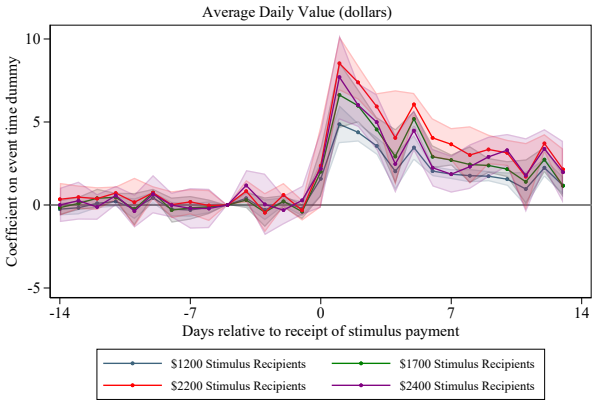
Note: Representative firms include Walmart, Amazon, Costco, Kroger, Target.

Automated Cash Disbursements



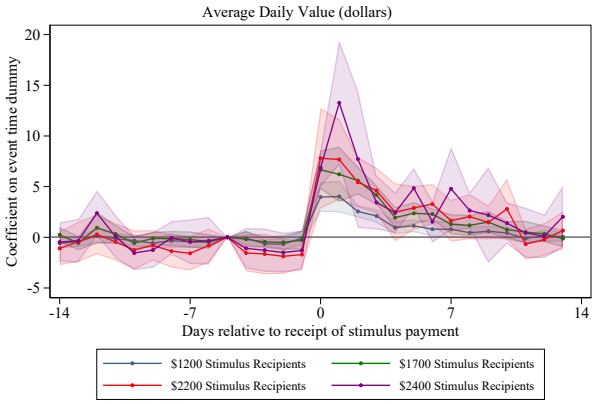
Note: Representative firms include 7/11, Bank of America, Cardtronics PLC, Walmart.

Fast Food Restaurants & Bars



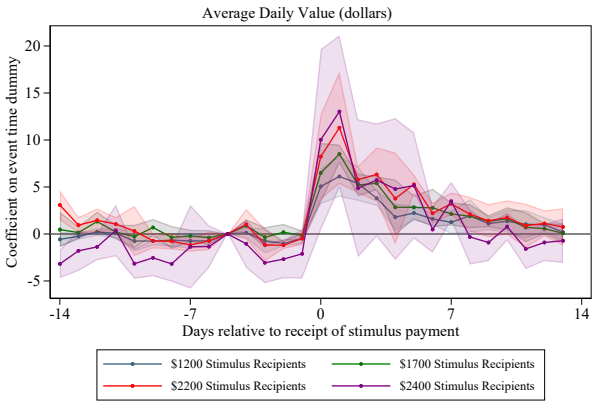
Note: Representative firms include Dunkin Brands, McDonalds, Wendys, Uber Eats, Starbucks.

Discount Stores



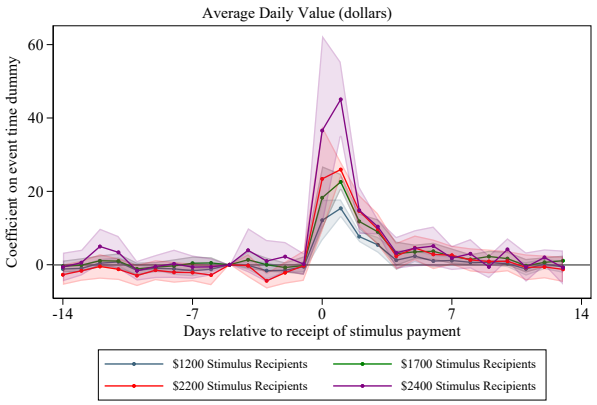
Note: Representative firms include Dollar General, Big Lots, Dollar Tree, Ross Stores.

Automobile Transactions



Note: Representative firms include Automotive Repair and maintenance

Utilities



Note: Representative firms include Netflix, Amazon, Comcast, Sprint, T-Mobile, America Movil.

Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. The aggregate spending in each category (except utilties which we code as aggregate debt) for each account-date observation is identified using Facteus's pre-processed merchant category codes.

Table 1: 1st Stimulus Payment Counterfactuals

Counterfactual	Stimulus Payment	Cost of Stimulus Bill (USD Billions)	Recipients (Millions)	Fraction of Stimulus Spent	Total Consumer Spending (USD Billions)
Panel A : Policy Counterfactual for different groups of recipients					
Actual stimulus bill	1,288	296	230	0.44	130
30K individual income or 60K household income	1,790	296	165	0.48	143
20K individual income or 40K household income	2,309	296	128	0.50	149
10K individual income or 20K household income	3,696	296	80	0.53	158
All adults receive same amount	1,146	296	258	0.42	124
Panel B : Policy Counterfactual for same aggregate consumption effect					
Actual stimulus bill	1,288	296	230	0.44	130
30K individual income or 60K household income	1,650	273	165	0.48	130
20K individual income or 40K household income	2,034	261	128	0.50	130
10K individual income or 20K household income	3,073	246	80	0.53	130
All adults receive same amount	1,215	313	258	0.42	130

Notes: Stimulus payment refers to the payment received by the average adult who received a stimulus payment in each scenario. The cost of the stimulus bill (in USD billions) is the total amount of the stimulus payments distributed amongst the recipient population. The "Recipients" columns records the total number of adults (in millions) in the U.S. who would receive a stimulus payment under each scenario, as per the population weights in 2018 ACS. The 'Fraction of stimulus payment' is the weighted average of the share of stimulus payments that the recipients are expected to spend using the MPC distribution estimated from Facteus data. Total consumer spending is a weighted sum of the stimulus payment multiplied by the fraction of the payment spent by each recipient.

A Appendix

Table A1: MPCs in the Literature

	Citation	Event	Data	MPC
	Unpredictable Windfalls			
1	Bodkin (1959)	Life Insurance Dividends to WWII Veterans	BLS Urban Consumption survey	0.7–0.97
2	Kreinin (1961)	German Restitution Payments	Israeli Survey of Family Savings 1957/58	0.17
3	Johnson, Parker, and Souleles (2006)	2001 Federal Income Tax Rebates	Consume Expenditure Survey	0.33
4	Agarwal, Liu, and Souleles (2007)	2001 Federal Income Tax Rebates	Credit Card Data	0.4
5	Parker et al. (2013)	2008 Economic Stimulus Payments	Consumer Expenditure Survey	0.52
6	Agarwal and Qian (2014)	2011 Growth Dividend Program in Singapore	Properitary Dataset from a bank in Singapore	0.8
7	Broda and Parker (2014)	2008 Economic Stimulus Payments	Nielsen Consumer Panel	0.5–0.75
8	Hausman (2016)	1936 Veterans' Bonus	BLS Expenditure Survey, 1936	0.7
9	Fagereng, Hold and Natvik (2019)	Lottery Prizes in Norway	Norwegian Administrative Panel Data	0.5
10	Baker et al. (2020)	Covid-19 stimulus payments	Transaction Data from SaverLife	0.25–0.35
11	Ganong et al. (2020)	Firm changes in Pay	JP Morgan Chase Institute Data	0.22
	Predictable Income Shocks			
12	Parker (1999)	Changes in Social Security Tax Witholding	Consumer Expenditure Survey	0.2
13	Souleles (1999)	Income Tax Refunds	Consumer Expenditure Survey	0.64
14	Souleles (2002)	Reagan Tax Cuts	Consumer Expenditure Survey	0.7
15	Hseih (2003)	Payments from Alaska Permanent Fund	Consumer Expenditure Survey	0
16	Stephens (2008)	Repayment of Vehicle Loans	Consumer Expenditure Survey	0.2

Table A2: Summary statistics:1st Stimulus Payment, Non- Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	7,581	2.4	0.0	0.0	0.0	40.1	Aggregate Debt
Funds Transfer	7,581	79.3	0.0	0.0	0.0	504.1	Aggregate Debt
Utilites/Rent	7,581	136.3	53.7	0.0	376.8	227.4	Aggregate Debt
Deposit	7,581	171.5	0.0	0.0	509.5	622.8	Aggregate Deposits
Government Deposit	7,581	763.3	508.3	0.0	1,546.1	1,384.1	Aggregate Deposits
Load	7,581	680.8	119.6	0.0	1,962.3	1,064.6	Aggregate Deposits
Atm Withdrawal	7,581	220.6	0.0	0.0	706.5	520.8	Aggregate Spending
Fee	7,581	7.8	4.3	0.0	19.8	14.0	Aggregate Spending
Spend	7,581	860.4	632.4	88.3	1,811.7	915.2	Aggregate Spending
Aggregate Deposits	7,581	1,615.6	1,140.8	237.5	3,158.8	1,812.8	
Aggregate Spending	7,581	1,088.8	822.0	186.6	2,189.5	1,068.6	
Aggregate Debt	7,581	218.1	66.1	0.0	510.0	559.9	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A3: Summary statistics: 1st Stimulus Payment, $1,200 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	13,054	2.7	0.0	0.0	0.0	36.1	Aggregate Debt
Funds Transfer	13,054	52.4	0.0	0.0	0.0	281.0	Aggregate Debt
Utilites/Rent	13,054	145.3	63.4	0.0	380.7	237.3	Aggregate Debt
Deposit	13,054	429.5	0.0	0.0	1,734.7	933.4	Aggregate Deposits
Government Deposit	13,054	221.4	0.0	0.0	933.0	627.1	Aggregate Deposits
Load	13,054	1,084.4	831.1	0.0	2,603.3	1,256.5	Aggregate Deposits
Atm Withdrawal	13,054	286.5	0.0	0.0	925.5	510.0	Aggregate Spending
Fee	13,054	7.3	3.5	0.0	19.4	11.0	Aggregate Spending
Spend	13,054	959.2	735.0	124.0	2,054.9	878.6	Aggregate Spending
Aggregate Deposits	13,054	1,735.3	1,498.3	332.3	3,245.5	1,354.0	
Aggregate Spending	13,054	1,253.1	1,052.0	260.5	2,473.3	970.8	
Aggregate Debt	13,054	200.4	77.5	0.0	508.1	376.2	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A4: Summary statistics: 1st Stimulus Payment, Non-Recipients & $1,200 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	20,635	2.6	0.0	0.0	0.0	37.6	Aggregate Debt
Funds Transfer	20,635	62.3	0.0	0.0	0.0	378.8	Aggregate Debt
Utilites/Rent	20,635	142.0	60.0	0.0	379.8	233.8	Aggregate Debt
Deposit	20,635	334.7	0.0	0.0	1,459.2	842.1	Aggregate Deposits
Government Deposit	20,635	420.5	0.0	0.0	1,180.1	1,010.4	Aggregate Deposits
Load	20,635	936.1	579.1	0.0	2,409.1	1,205.4	Aggregate Deposits
Atm Withdrawal	20,635	262.3	0.0	0.0	851.1	515.0	Aggregate Spending
Fee	20,635	7.5	3.7	0.0	19.6	12.2	Aggregate Spending
Spend	20,635	922.9	692.1	111.9	1,981.2	893.5	Aggregate Spending
Aggregate Deposits	20,635	1,691.3	1,360.1	304.3	3,221.9	1,539.6	
Aggregate Spending	20,635	1,192.7	954.2	232.8	2,397.3	1,011.0	
Aggregate Debt	20,635	206.9	73.6	0.0	508.9	452.5	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A5: Summary statistics: 1st Stimulus Payment, $1,700 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	5,442	3.4	0.0	0.0	0.0	44.7	Aggregate Debt
Funds Transfer	5,442	89.3	0.0	0.0	63.1	423.8	Aggregate Debt
Utilites/Rent	5,442	211.4	101.4	0.0	538.0	339.2	Aggregate Debt
Deposit	5,442	506.6	0.0	0.0	1,832.8	1,349.9	Aggregate Deposits
Government Deposit	5,442	581.8	0.0	0.0	2,652.0	1,634.7	Aggregate Deposits
Load	5,442	1,657.0	1,001.3	0.0	4,817.5	2,455.7	Aggregate Deposits
Atm Withdrawal	5,442	363.6	0.0	0.0	1,100.3	775.6	Aggregate Spending
Fee	5,442	8.7	5.5	0.0	22.1	10.9	Aggregate Spending
Spend	5,442	1,533.1	1,057.8	165.1	3,637.7	1,479.6	Aggregate Spending
Aggregate Deposits	5,442	2,745.5	1,810.2	200.3	6,909.7	2,856.4	
Aggregate Spending	5,442	1,905.4	1,434.6	286.6	4,257.8	1,639.7	
Aggregate Debt	5,442	304.1	125.5	0.0	751.3	556.4	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A6: Summary statistics: 1st Stimulus Payment, $2,200 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	3,333	4.2	0.0	0.0	0.0	44.4	Aggregate Debt
Funds Transfer	3,333	134.4	0.0	0.0	102.3	656.3	Aggregate Debt
Utilites/Rent	3,333	259.1	127.1	0.0	648.4	401.1	Aggregate Debt
Deposit	3,333	570.9	0.0	0.0	1,853.0	1,718.4	Aggregate Deposits
Government Deposit	3,333	761.9	0.0	0.0	1,991.8	2,242.7	Aggregate Deposits
Load	3,333	2,150.1	1,066.8	0.0	7,349.4	2,965.0	Aggregate Deposits
Atm Withdrawal	3,333	416.2	0.0	0.0	1,176.4	963.8	Aggregate Spending
Fee	3,333	9.4	5.8	0.0	24.0	12.0	Aggregate Spending
Spend	3,333	1,980.6	1,303.3	193.8	4,842.5	1,954.6	Aggregate Spending
Aggregate Deposits	3,333	3,483.0	1,947.2	160.6	9,626.7	3,585.8	
Aggregate Spending	3,333	2,406.2	1,721.8	305.1	5,616.3	2,164.4	
Aggregate Debt	3,333	397.8	159.2	0.0	957.9	789.7	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A7: Summary statistics: 1st Stimulus Payment, $2,400 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	632	3.7	0.0	0.0	0.0	31.5	Aggregate Debt
Funds Transfer	632	106.3	0.0	0.0	106.8	540.7	Aggregate Debt
Utilites/Rent	632	225.6	138.2	0.0	556.0	288.5	Aggregate Debt
Deposit	632	481.6	0.0	0.0	2,088.9	1,239.3	Aggregate Deposits
Government Deposit	632	389.3	0.0	0.0	1,322.7	1,029.0	Aggregate Deposits
Load	632	1,370.3	983.2	0.0	3,257.9	1,708.2	Aggregate Deposits
Atm Withdrawal	632	277.4	0.0	0.0	974.4	608.3	Aggregate Spending
Fee	632	7.0	3.0	0.0	19.2	9.5	Aggregate Spending
Spend	632	1,283.0	967.9	175.4	2,724.9	1,255.7	Aggregate Spending
Aggregate Deposits	632	2,241.2	1,818.2	472.7	4,405.9	1,996.8	
Aggregate Spending	632	1,567.4	1,269.7	308.8	3,157.2	1,358.2	
Aggregate Debt	632	335.5	175.8	0.0	768.1	616.9	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A8: Summary statistics: 2nd Stimulus Payment, $600 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	25,859	2.6	0.0	0.0	0.0	34.9	Aggregate Debt
Funds Transfer	25,859	41.2	0.0	0.0	0.0	298.6	Aggregate Debt
Utilites/Rent	25,859	138.9	62.8	0.0	361.4	223.3	Aggregate Debt
Deposit	25,859	461.7	0.0	0.0	1,807.6	937.8	Aggregate Deposits
Government Deposit	25,859	252.2	0.0	0.0	983.6	612.6	Aggregate Deposits
Load	25,859	959.4	666.6	0.0	2,417.4	1,191.0	Aggregate Deposits
Atm Withdrawal	25,859	300.6	21.8	0.0	972.5	530.8	Aggregate Spending
Fee	25,859	7.1	3.5	0.0	18.4	10.1	Aggregate Spending
Spend	25,859	855.0	692.3	142.1	1,733.0	730.9	Aggregate Spending
Aggregate Deposits	25,859	1,673.3	1,436.3	511.9	3,043.6	1,259.7	
Aggregate Spending	25,859	1,162.6	971.5	304.5	2,218.6	870.2	
Aggregate Debt	25,859	182.7	73.8	0.0	446.1	377.5	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A9: Summary statistics: 2nd Stimulus Payment, $1,200 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	6,524	4.4	0.0	0.0	0.0	52.8	Aggregate Debt
Funds Transfer	6,524	73.5	0.0	0.0	0.0	464.7	Aggregate Debt
Utilites/Rent	6,524	197.6	104.2	0.0	500.7	281.4	Aggregate Debt
Deposit	6,524	489.6	0.0	0.0	1,943.6	1,038.8	Aggregate Deposits
Government Deposit	6,524	751.8	0.0	0.0	4,288.1	1,813.7	Aggregate Deposits
Load	6,524	1,232.3	965.2	0.0	2,906.1	1,382.7	Aggregate Deposits
Atm Withdrawal	6,524	369.1	39.6	0.0	1,118.0	718.9	Aggregate Spending
Fee	6,524	6.8	3.1	0.0	17.6	11.6	Aggregate Spending
Spend	6,524	1,220.1	903.4	182.2	2,637.3	1,137.8	Aggregate Spending
Aggregate Deposits	6,524	2,473.6	1,783.4	462.0	6,103.8	2,229.3	
Aggregate Spending	6,524	1,596.0	1,254.5	333.7	3,318.5	1,329.4	
Aggregate Debt	6,524	275.5	121.8	0.0	631.0	554.1	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A10: Summary statistics: 2nd Stimulus Payment, $1,800 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	3,438	4.6	0.0	0.0	0.0	55.1	Aggregate Debt
Funds Transfer	3,438	106.1	0.0	0.0	0.0	610.6	Aggregate Debt
Utilites/Rent	3,438	218.3	119.2	0.0	538.2	321.3	Aggregate Debt
Deposit	3,438	490.5	0.0	0.0	1,940.8	1,087.9	Aggregate Deposits
Government Deposit	3,438	1,116.4	0.0	0.0	6,528.2	2,667.0	Aggregate Deposits
Load	3,438	1,302.4	980.9	0.0	3,041.2	1,538.7	Aggregate Deposits
Atm Withdrawal	3,438	416.8	43.0	0.0	1,185.7	893.7	Aggregate Spending
Fee	3,438	7.2	3.6	0.0	18.2	10.7	Aggregate Spending
Spend	3,438	1,443.4	987.6	198.6	3,311.6	1,450.5	Aggregate Spending
Aggregate Deposits	3,438	2,909.3	1,790.7	396.9	8,444.7	3,069.3	
Aggregate Spending	3,438	1,867.4	1,316.9	332.2	4,249.2	1,753.2	
Aggregate Debt	3,438	329.0	140.5	0.0	710.8	700.1	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A11: Summary statistics: 2nd Stimulus Payment, $2,400 Stimulus Recipients

Transaction Type	No. of Accounts	Avg.	Med.	10th %	90th %	S.D.	Aggregate Category
Bill Pay	1,653	4.3	0.0	0.0	0.0	39.7	Aggregate Debt
Funds Transfer	1,653	107.1	0.0	0.0	0.0	735.3	Aggregate Debt
Utilites/Rent	1,653	250.0	138.5	0.0	587.9	360.3	Aggregate Debt
Deposit	1,653	499.9	0.0	0.0	2,008.3	1,169.9	Aggregate Deposits
Government Deposit	1,653	1,035.6	0.0	0.0	6,092.9	2,721.7	Aggregate Deposits
Load	1,653	1,410.7	1,041.4	0.0	3,285.4	1,701.7	Aggregate Deposits
Atm Withdrawal	1,653	429.0	42.3	0.0	1,231.3	942.0	Aggregate Spending
Fee	1,653	6.9	3.6	0.0	17.6	9.1	Aggregate Spending
Spend	1,653	1,484.0	1,017.0	195.2	3,347.6	1,503.2	Aggregate Spending
Aggregate Deposits	1,653	2,946.2	1,832.6	421.5	8,497.9	3,194.7	
Aggregate Spending	1,653	1,919.9	1,364.8	341.4	4,278.6	1,824.9	
Aggregate Debt	1,653	361.3	163.7	0.0	757.6	833.2	

Notes: Data at account-month level for January–March 2020. The columns report total no. of accounts and monthly mean, median, 10th/90th percentile, standard deviation of transaction values. Deposits and loads refer to income inflows in the form of paycheck deposits or value loads on payroll cards. Government Spending includes any account deposit received from the IRS, SSA, or state unemployment insurance offices. Utilities/Rent refer to spend transactions that are associated with MCC codes 4800 - 4999 or 6531. Funds Transfer refers to transactions associated with ACH outgoing, card to card/bank to card transfer, and visa money transfer.

Table A12: Firm-Specific Summary statistics: 1st Stimulus Payment, $1,200 Stimulus Recipients

Company	Average Monthly Spending	Average No. of monthly Transactions	Change in Spending after stimulus receipt	Change in Spending as a fraction of stimulus payment
Walmart	162.51	2.64	93.95	0.08
Kroger	33.59	0.85	4.38	0.00
Seven & i Holdings Co.	26.16	0.77	8.10	0.01
Amazon.com Inc.	25.92	1.05	20.90	0.02
Dollar General Corp.	22.01	1.49	5.12	0.00
AT&T	12.50	0.15	2.67	0.00
Cardtronics, PLC	12.17	0.12	4.85	0.00
Sprint Corporation	10.66	0.15	0.60	0.00
Royal Dutch Shell	9.18	0.72	1.38	0.00
Dollar Tree Inc	8.66	0.57	2.43	0.00
Verizon Communications Inc.	8.37	0.07	2.25	0.00
Yum! Brands Inc.	7.61	0.56	2.38	0.00
McDonald's Corp	7.35	0.75	1.78	0.00
Bank of America Corp	6.48	0.04	2.27	0.00
Apple Inc.	5.79	0.51	2.60	0.00
Comcast	5.48	0.05	0.97	0.00
Food Delivery	5.39	0.21	4.91	0.00
Walgreens Boots Alliance Inc	4.83	0.22	1.73	0.00
JPMorgan Chase Co	4.50	0.02	1.52	0.00
Alimentation Couche-Tard Inc Class B	4.02	0.32	0.59	0.00
Restaurant Brans International Inc	3.50	0.34	0.94	0.00
CVS Health Corp.	2.62	0.14	0.82	0.00
Chevron Corporation	2.50	0.18	0.41	0.00
Starbucks Corp	1.23	0.12	0.17	0.00
Other	860.04	28.40	379.02	0.32

Notes: Data at account-month level. Transaction amounts are averages for January—March 2020. Spending includes the sum of all transactions labeled as bill pay, fees, spending and ATM withdrawals in January—March 2020 for each account.

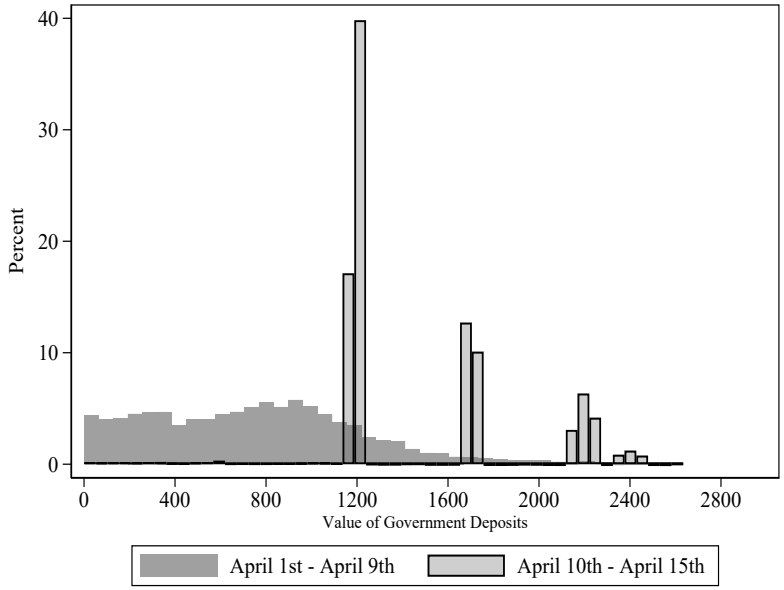
Table A13: Merchant Group Specific Summary statistics: 1st Stimulus Payment, $1,200 Stimulus Recipients

Spending/Debt Category	Average Monthly Spending	Average No. of monthly Transactions	Change in Spending after stimulus receipt	Change in Spending as a fraction of stimulus payment
Grocery Stores & Supermarkets	234.88	5.11	101.18	0.08
Automated Cash Disbursements	224.25	2.88	96.72	0.08
Utilities	133.07	2.24	57.59	0.05
Automobile Transactions	111.84	7.01	40.08	0.03
Fast Food, Restaurants & Bars	102.60	8.40	33.70	0.03
Discount Stores	38.49	1.71	22.53	0.02
Other Spending	541.02	15.33	252.51	0.21

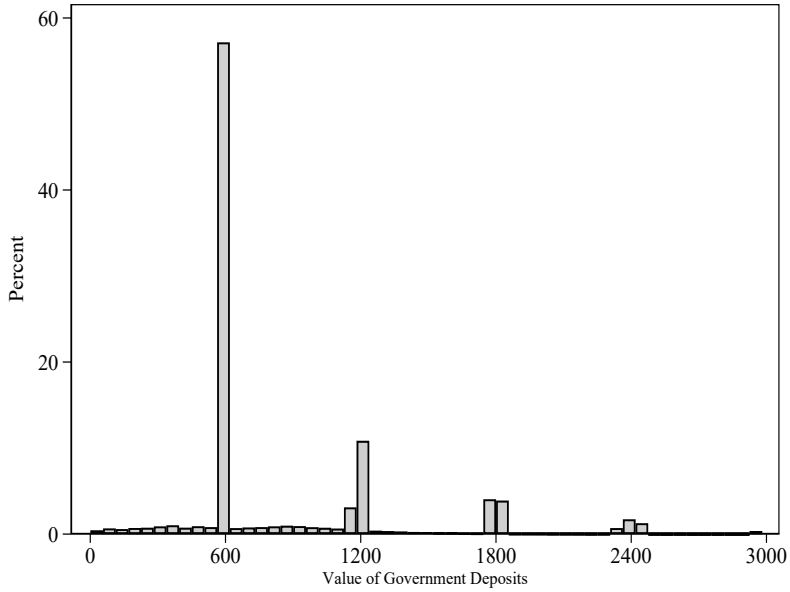
Notes: Data at account-month level. Transaction amounts are averages for January—March 2020. Spending in each category is identified using Facteus's pre-processed merchant category codes. Spending includes the sum of all transactions labeled as fees, spending and ATM withdrawals in January—March 2020 for each account.

Figure A1: Distribution of Government Deposits

1st Stimulus Payment



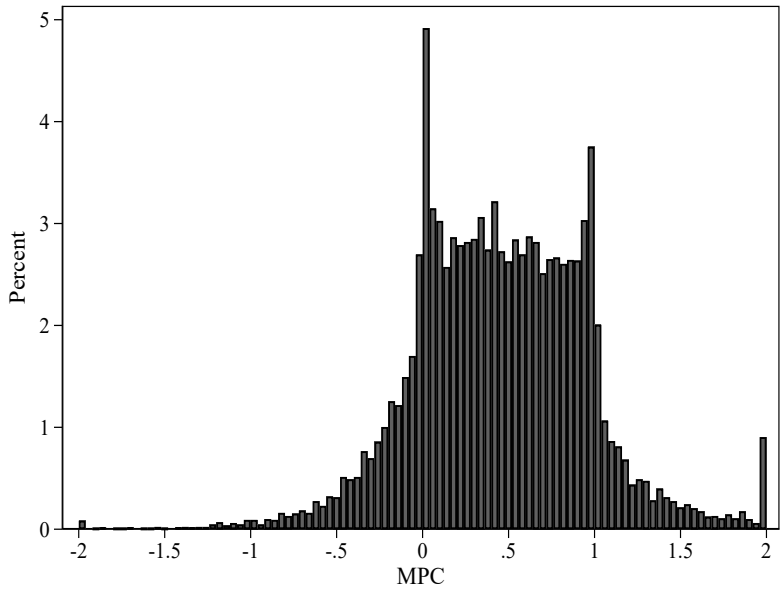
2nd Stimulus Payment



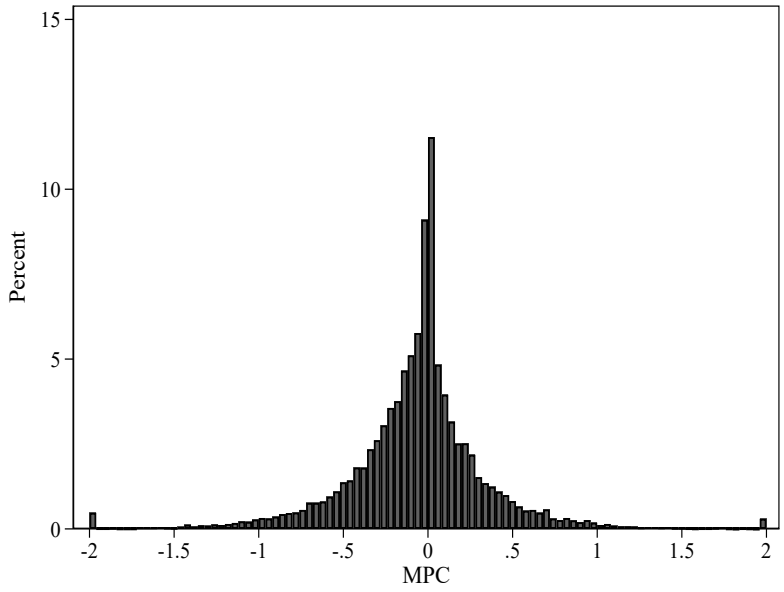
Notes: The graph in panel A shows the distribution of government deposits made between April 10th and April 15th in our sample of accounts from Facteus overlaid on the distribution of government deposits made between April 1st and April 9th. The graph in panel B shows the distribution of government deposits made between December 17th , 2020 and January 29th, 2021. The values shown are trimmed at the 90th percentile of the distribution.

Figure A2: Distribution of Changes in Consumer Spending: 1st Stimulus Payment, $1,200 Recipients

Stimulus Payment

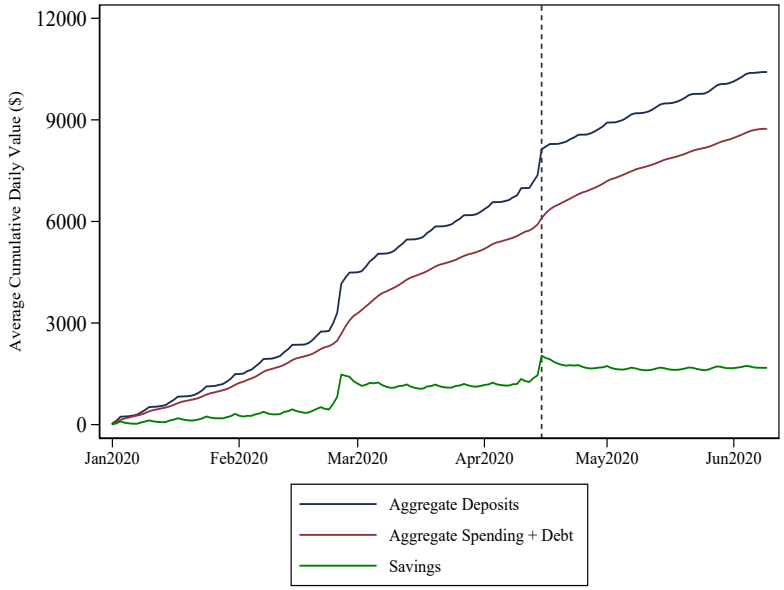


Placebo Stimulus Payment

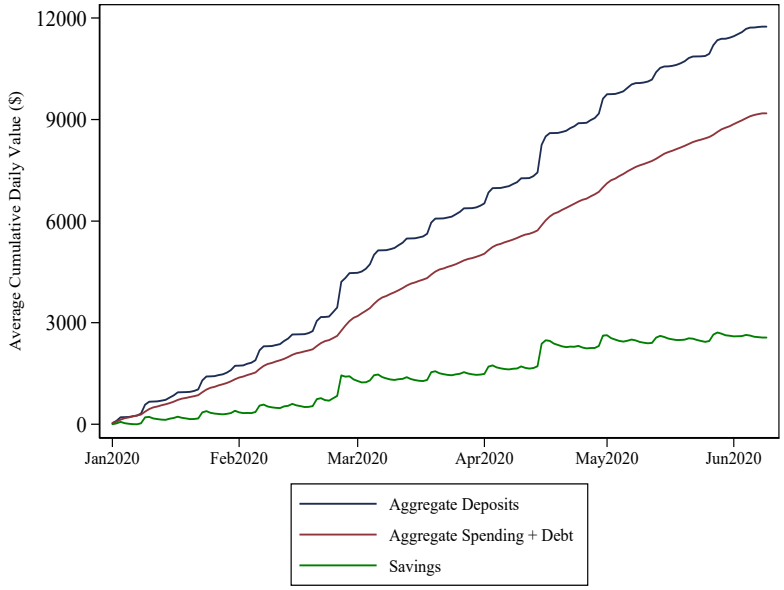


Notes: Histogram shows distribution of changes in consumer spending in the two weeks after stimulus receipt relative to the two weeks before stimulus receipt after winsorizing the values to [-2,2]. Panel A shows MPCs calculated as the difference between total spending in the two weeks following stimulus receipt and the two weeks preceding stimulus receipt for all accounts in our data that received a 1st stimulus payment of $1,200 between April 10th and April 15th 2020. Panel B shows MPCs calculated similarly but relative to the placebo stimulus date identified as 21 days prior to the date of actual stimulus receipt.

Figure A3: Time-Trend in Account Balance
1st Stimulus Payment Recipients

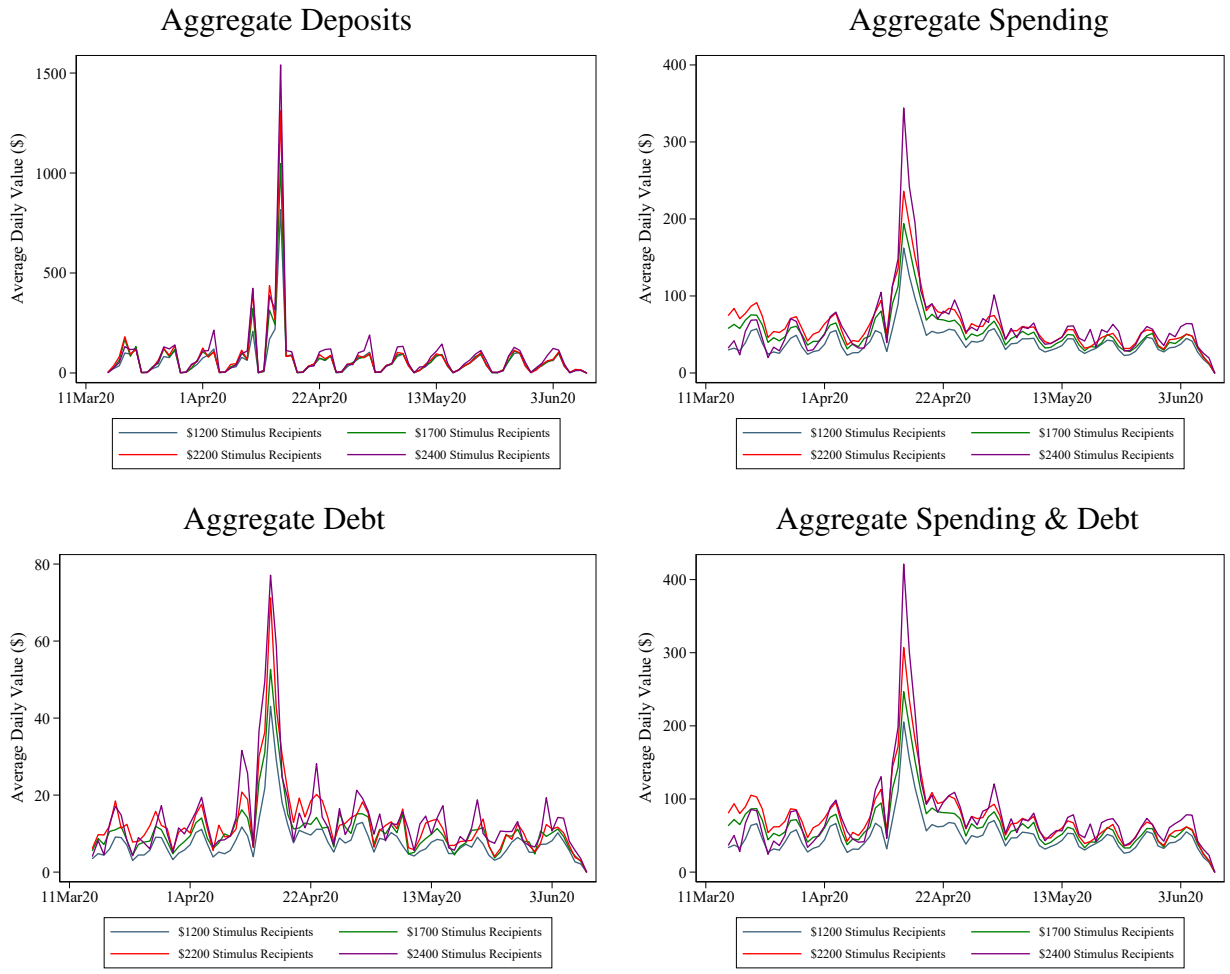


2nd Stimulus Payment Recipients



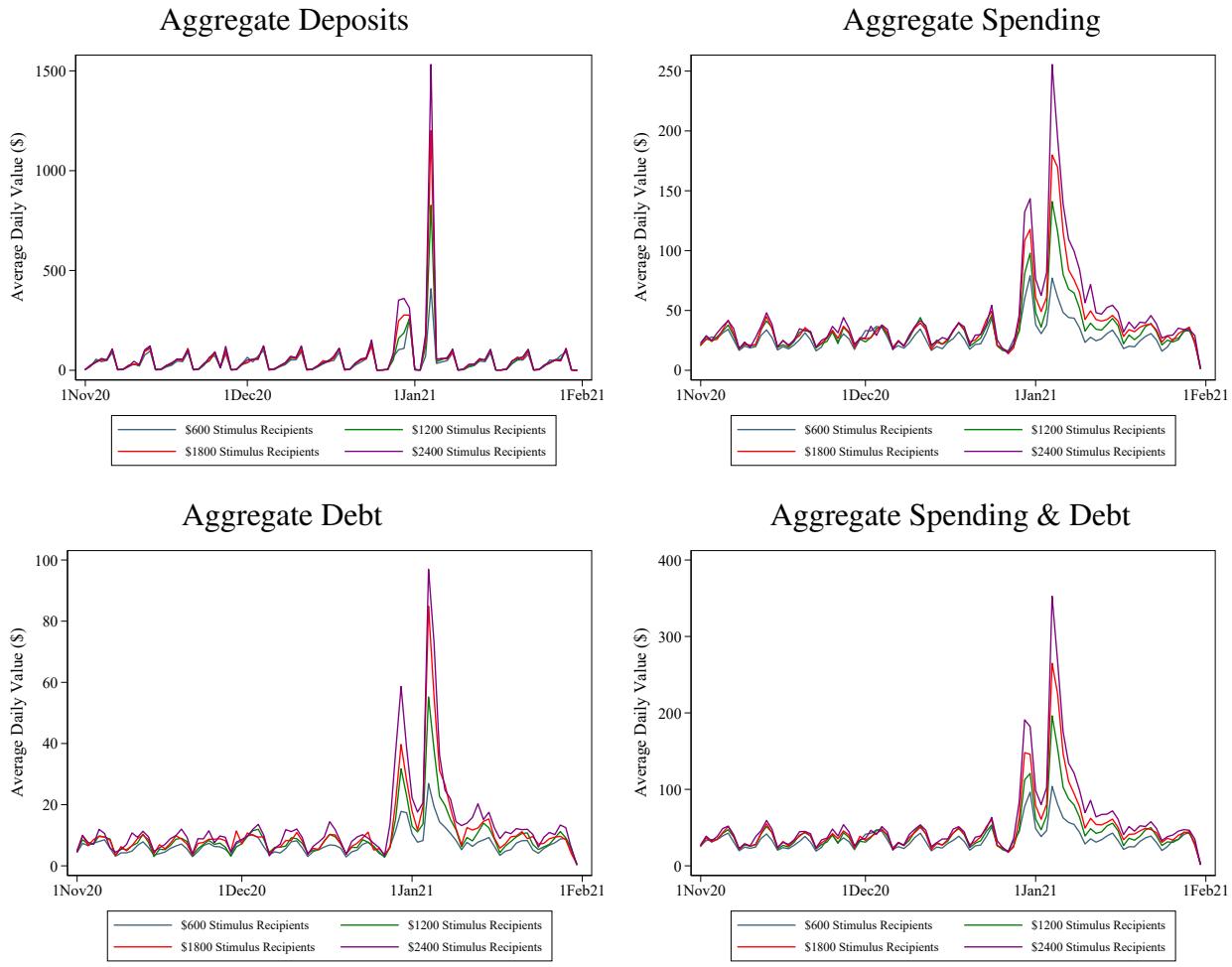
Notes: The vertical line in figure in panel A marks April 15th, 2020 when a majority of the accounts in the sample receive stimulus payment deposit. Out of all the accounts that received a $1,200 stimulus payment between April 10th and April 15th, 60% receive the stimulus payment deposit on April 15th. The large increase in deposits, spending, and savings in February is driven by EITC deposits—the federal PATH Act requires that the IRS wait to deposit EITC tax credits into accounts until February 15th or later, and the deposits take around 10 days to be deposited into bank accounts, so we see large increases in governmental deposits and spending immediately after that date.

Figure A4: Effect of 1st Stimulus Payment on Spending and Deposits: Calendar Time



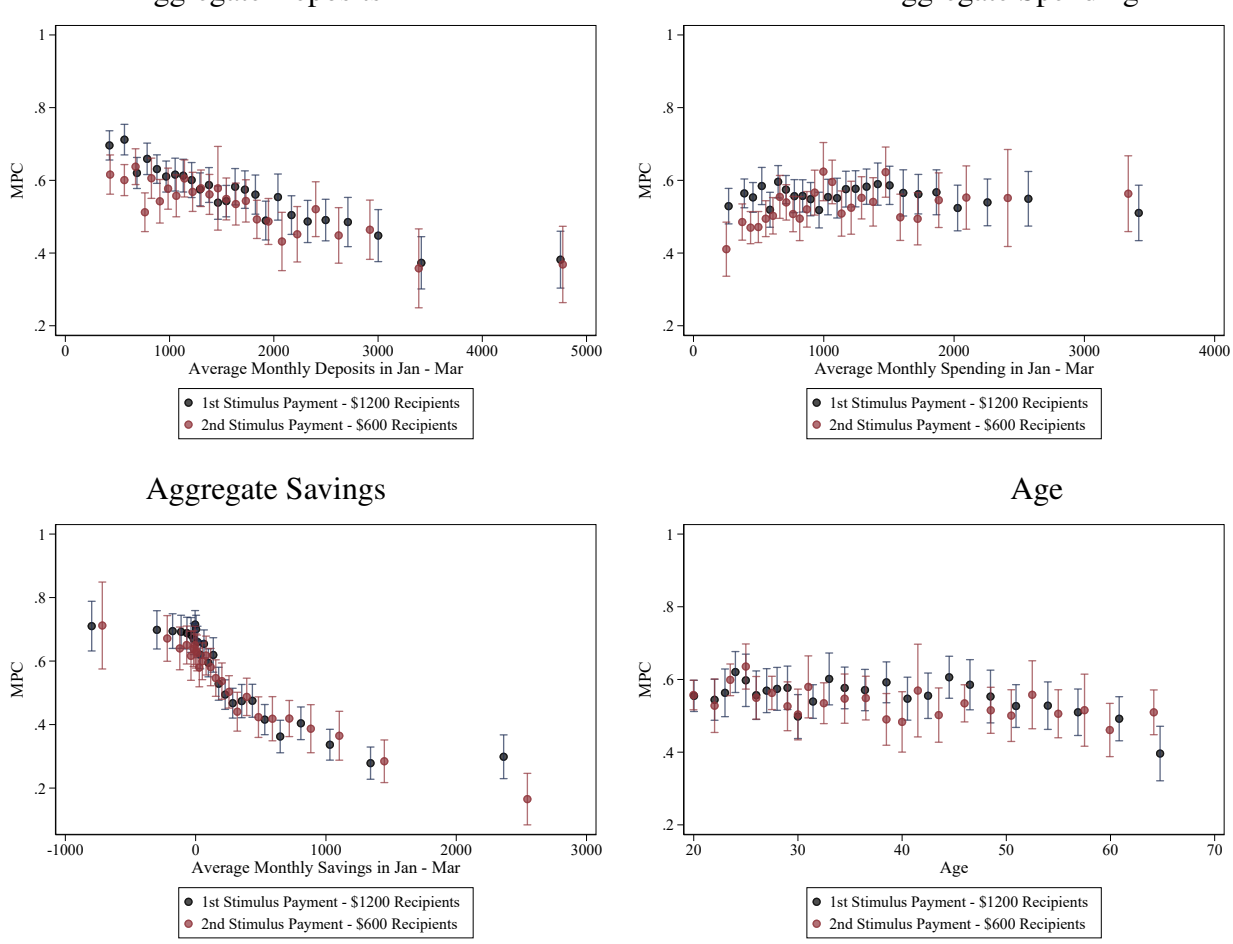
Notes: Plotted are time-series of aggregate per-consumer spending and deposits for March 15th - June 9th, 2020 . We separately plot spending and deposits for $1,200 , $1,700, $2,200, and $2,400 stimulus recipients. The time-series shows post-March 15th data to avoid irregular spending and deposits patterns seen in the data in late February and early March due to EITC and tax refund receipt. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits include all transactions labeled as deposits, loads, and government deposits (including stimulus payments).Aggregate debt includes all transactions labeled as funds transfer, bill pay, or associated with utilities and rental payments.

Figure A5: Effect of 2nd Stimulus Payment on Spending and Deposits: Calendar Time



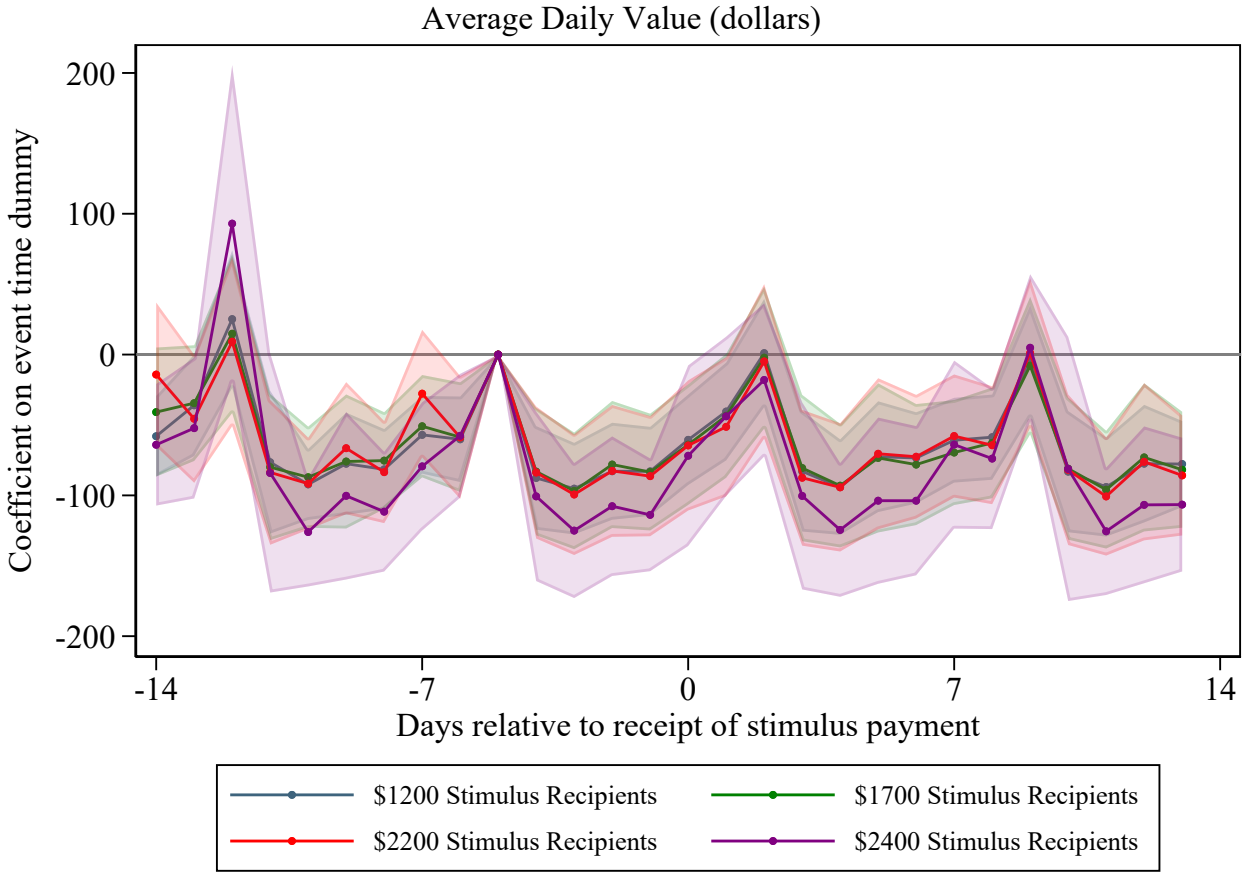
Notes: Plotted are time-series of aggregate per-consumer spending and deposits for November 1st, 2020 - January 31st, 2021. We separately plot spending, deposits, and debt payments for $600 , $1,200, $1,800, and $2,400 stimulus recipients. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits include all transactions labeled as deposits, loads, and government deposits (including stimulus payments). Aggregate debt includes all transactions labeled as funds transfer, bill pay, or associated with utilities and rental payments.

Figure A6: Total Stimulus Use Heterogeneity: 1st and 2nd Stimulus Payment



Notes: Plotted are binned scatterplots showing the distribution of individual level spending and debt payments by spending levels, deposit levels, savings levels, and consumer age for the 1st round of $1,200 stimulus recipients and 2nd round of $600 stimulus recipients in the sample. The bands show the 95% confidence intervals Aggregate spending includes the sum of all transactions labeled as fees, spending and ATM withdrawals in January—March 2020 for each account. Aggregate Deposits includes all transactions labeled as deposits, loads, and government deposits (including stimulus payments) in January—March 2020 for each account. The level of savings is calculated as the difference between aggregate deposits and aggregate spending in January—March 2020.

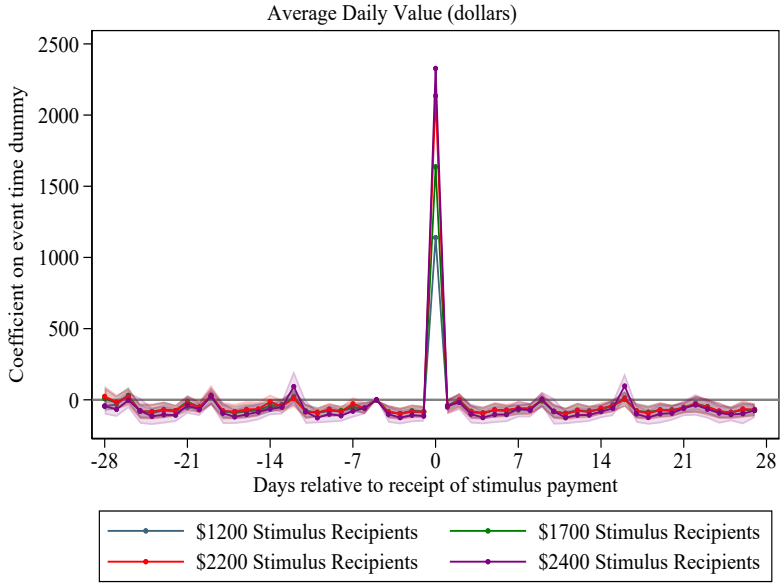
Figure A7: Effect of 1st Stimulus Payment on Deposits, Excluding Stimulus Value : (Model A)



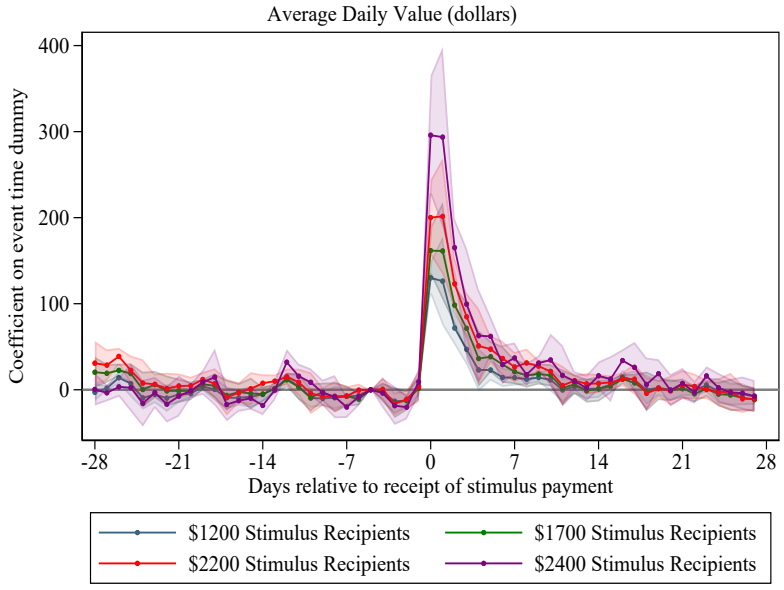
Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits includes transactions labeld as deposits, loads, government deposits and stimulus payment.

Figure A8: Effect of 1st Stimulus Payment on Spending and Deposits: Extended Event Time

Aggregate Deposits



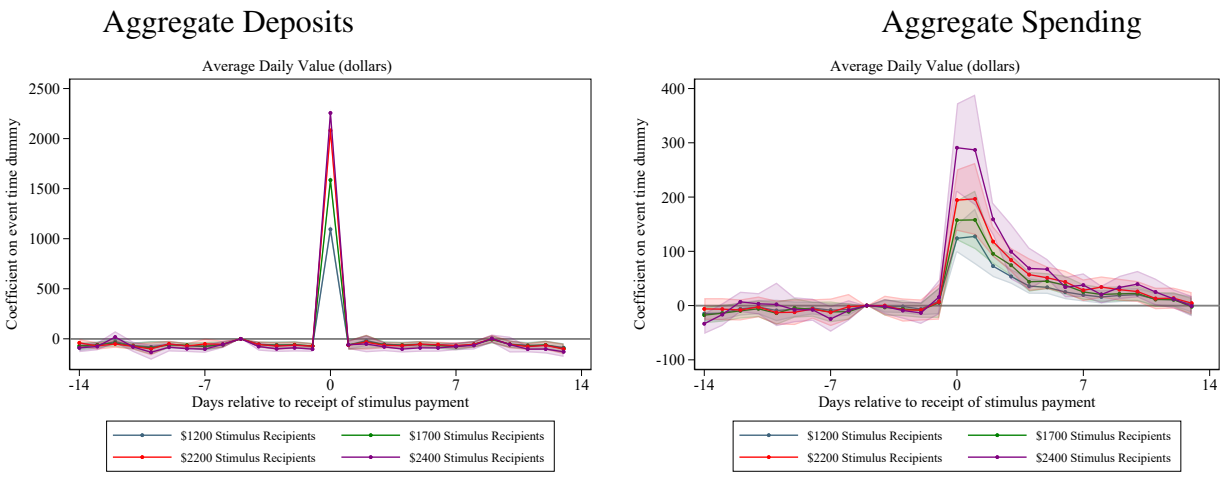
Aggregate Spending



Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). The time - window is extended to 28 days before and after stimulus receipt. Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits includes transactions labeld as deposits, loads, government deposits and stimulus payment.

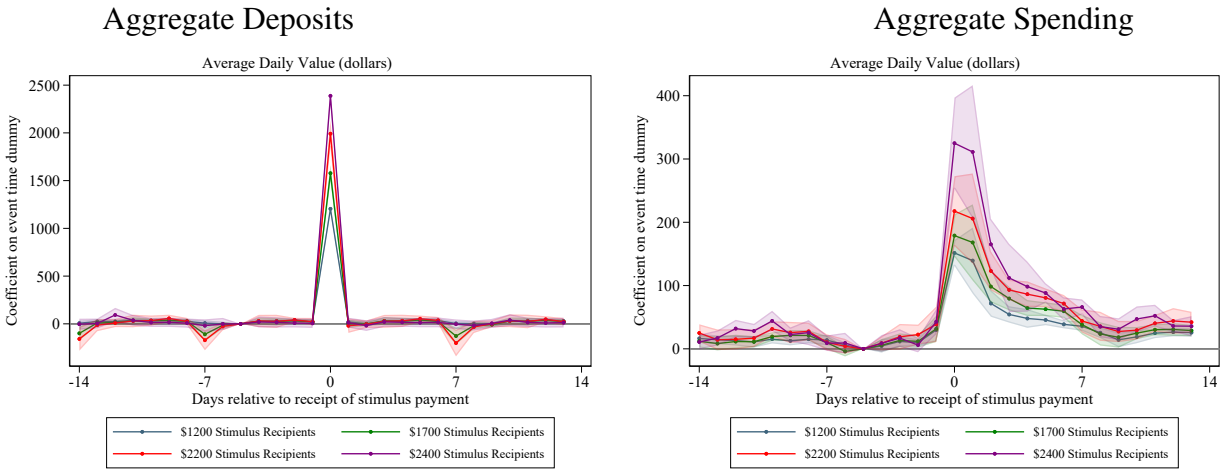
Figure A9: Effect of 1st Stimulus Payment on Spending and Deposits: Event Time (Models B & C)

Model B



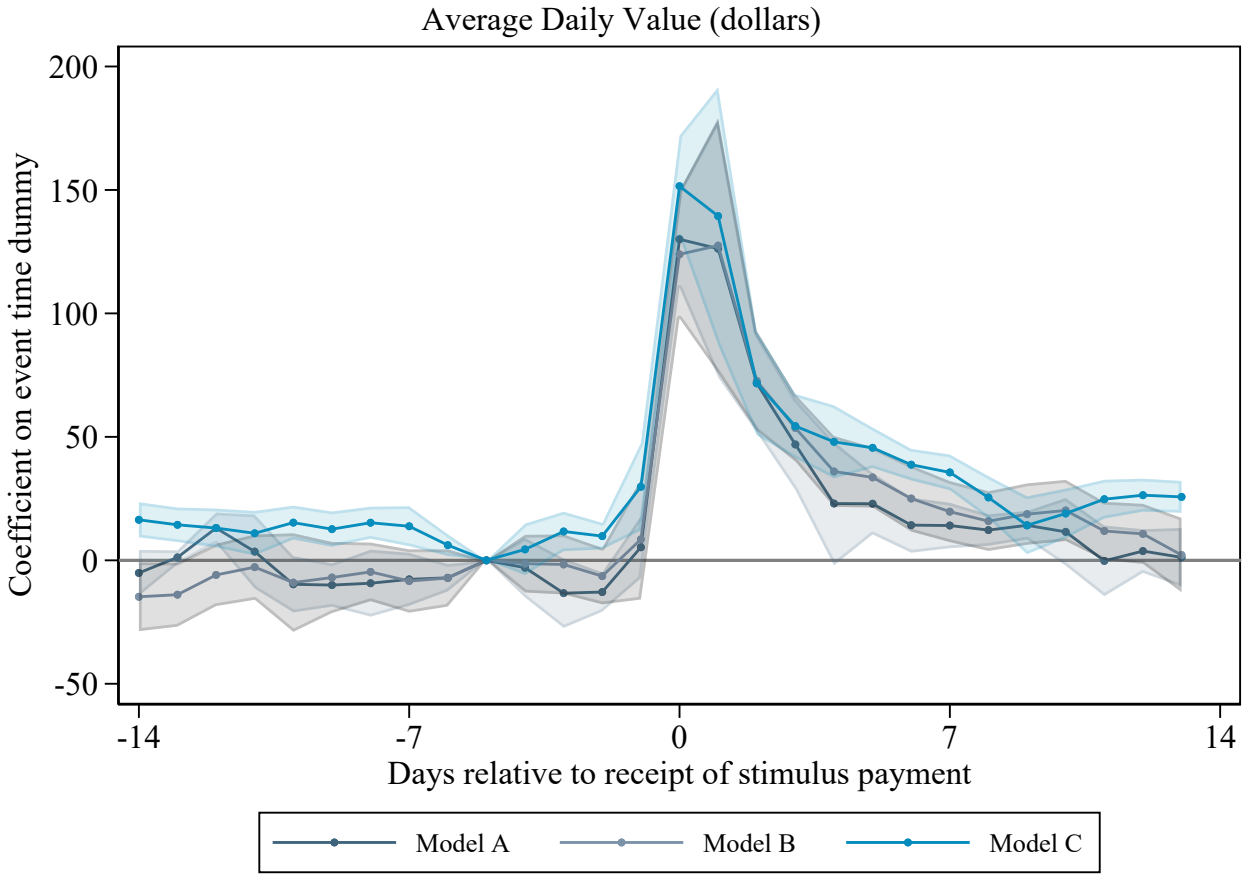
Notes: Data at the account-day level. Plotted are coefficients on event time dummies from a regression which also includes individuals and date-by-state fixed effects (Model B). Standard errors are clustered two-way by state and date. Time 0 in event time is defined as the date on which stimulus payment is received by the account. The shaded regions are 95% confidence intervals. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits includes all transactions labeled as deposits, loads, and government deposits (including stimulus payment).

Model C



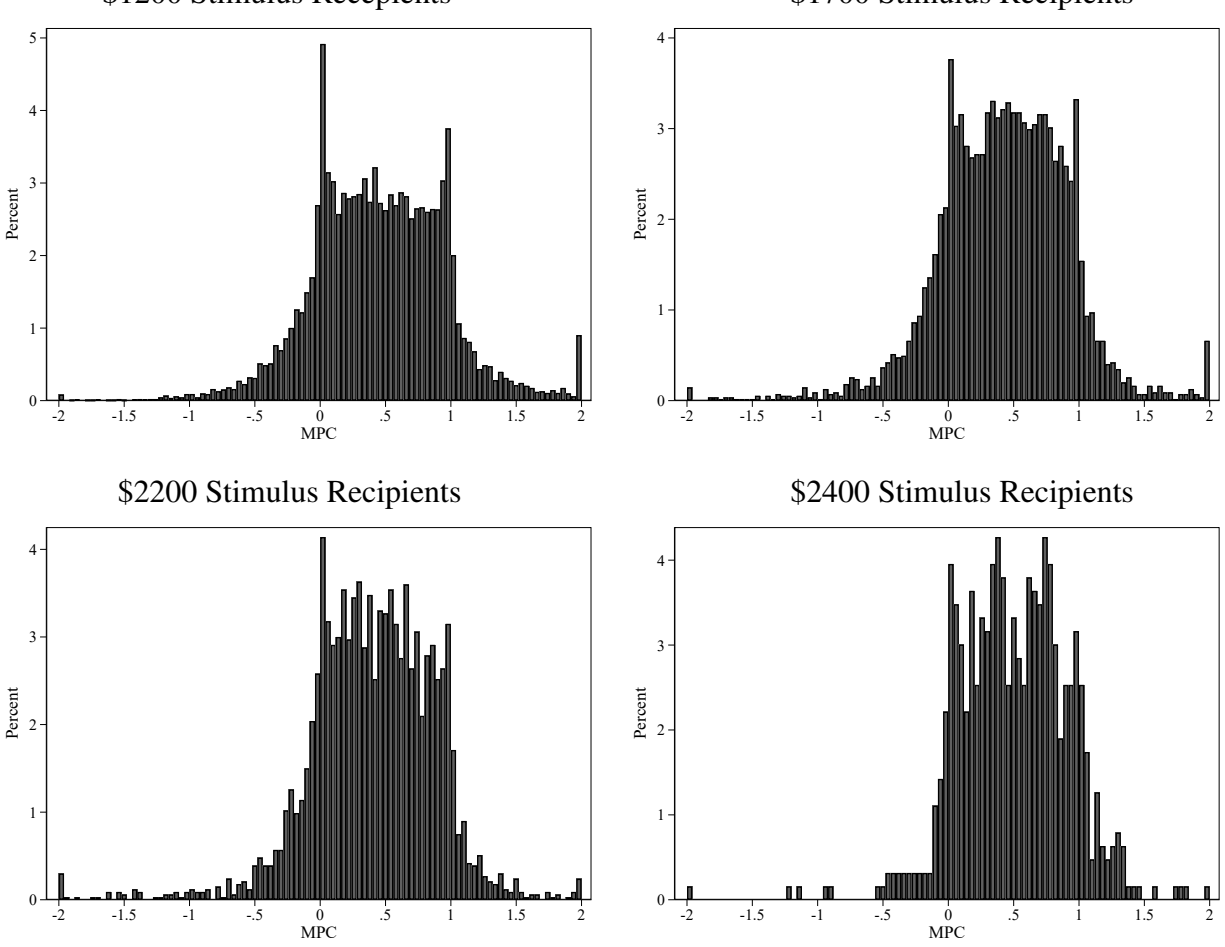
Notes: Data at the account-day level. Plotted are coefficients on event time dummies from a regression of residual spending on days-since-event time (Model C). Residual spending is calculated as the difference between realized consumer spending and predicted consumer spending from a regression of spending on person-by-day-of-the-week fixed effects in January—March, 2020. Standard errors are clustered by state and date. Time 0 in event time is defined as the date on which stimulus payment is received by the account. Aggregate spending includes transactions labeled as bill pay, fees, spending and ATM withdrawals. Aggregate Deposits includes all transactions labeled as deposits, loads, and government deposits (including stimulus payments).

Figure A10: Effect of 1st Stimulus Payment on Aggregate Spending: $1,200 Recipients



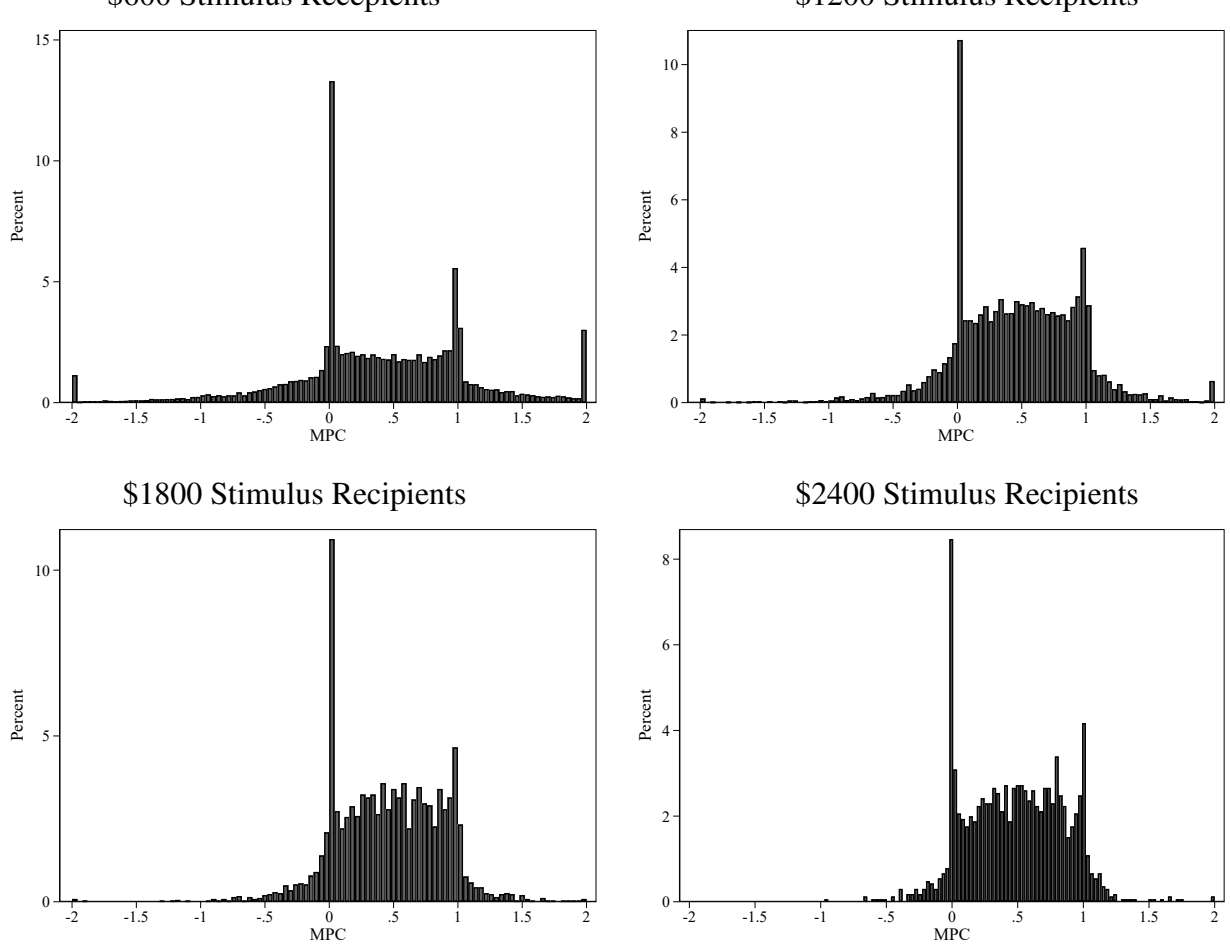
Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending on day-since-event time fixed effects from Models A,B and C. Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals.

Figure A11: Distribution of Changes in Consumer Spending - 1st Stimulus Payment



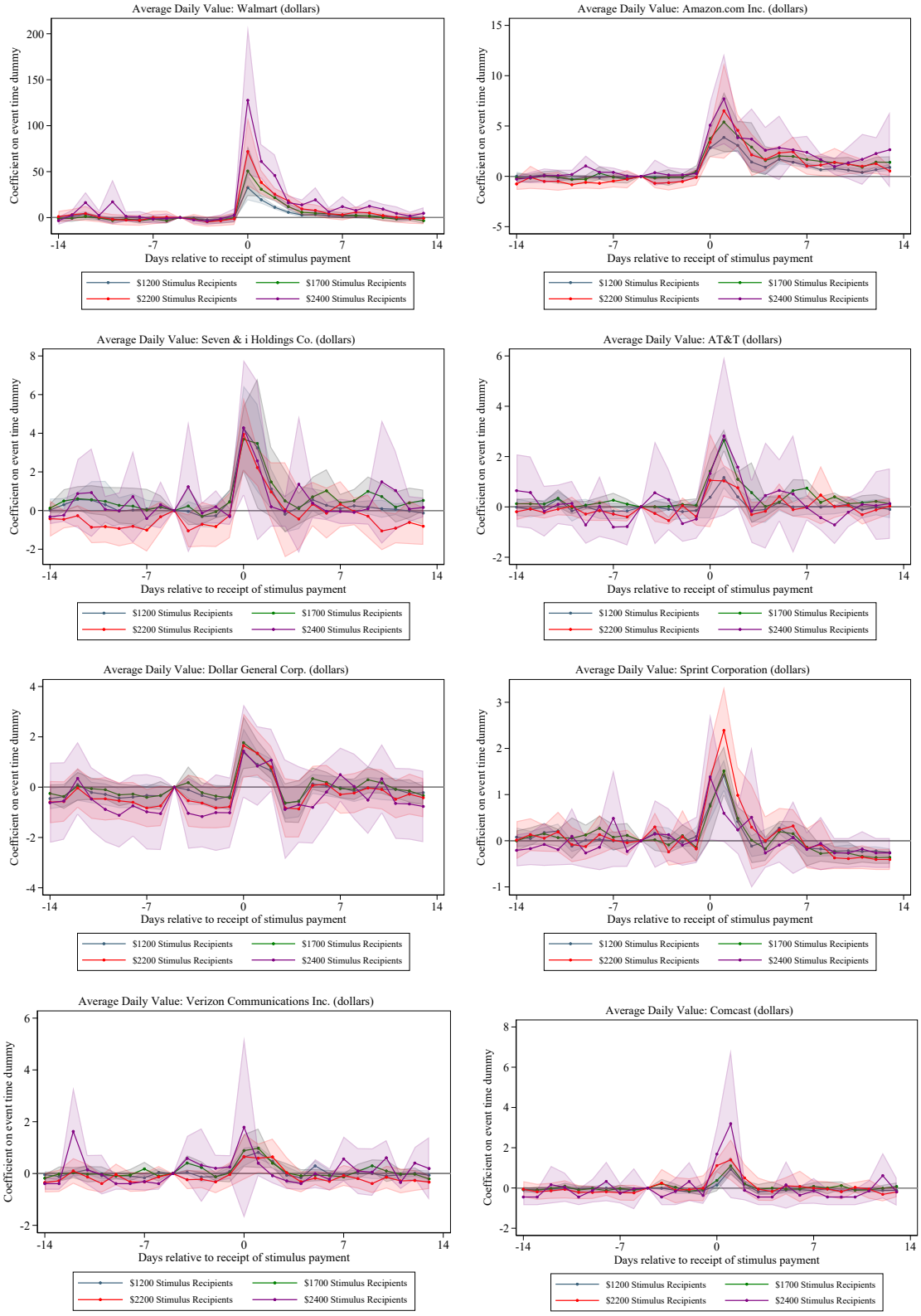
Notes: Histogram shows distribution of changes in consumer spending in the two weeks after stimulus receipt relative to the two weeks before stimulus receipt after winsorizing the values to [-2,2]. MPCs are calculated as the difference between total spending in the two weeks following stimulus receipt and the two weeks preceding stimulus receipt for all accounts in our data that received a stimulus payment between April 10th and April 15th 2020.

Figure A12: Distribution of Changes in Consumer Spending - 2nd Stimulus Payment



Notes: Histogram shows distribution of changes in consumer spending in the two weeks after stimulus receipt relative to the two weeks before stimulus receipt after winsorizing the values to [-2,2]. MPCs are calculated as the difference between total spending in the two weeks following stimulus receipt and the two weeks preceding stimulus receipt for all accounts in our data that we identify as receiving a 2nd stimulus payment between December 28th, 2020 and January 4th, 2021.

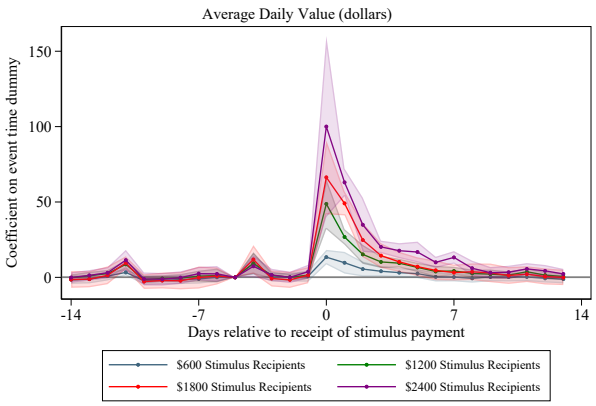
Figure A13: Effect of 1st Stimulus Payment on Spending at Specific Companies: Event Time



Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. The aggregate spending at each merchant for each account-date is identified using Facteus's pre-processed merchant tickers. The biggest companies are identified as firms at which the aggregate spending in January–March 2020 by all accounts in the sample exceeds $500,000.

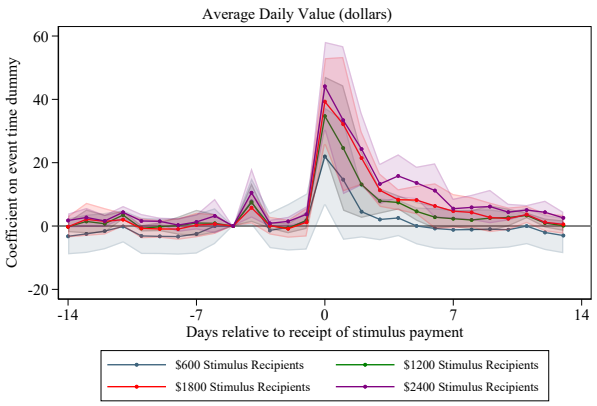
Figure A14: Effect of 2nd Stimulus Payment on Spending/Debt by Merchant Category Code

Grocery Stores & Supermarkets



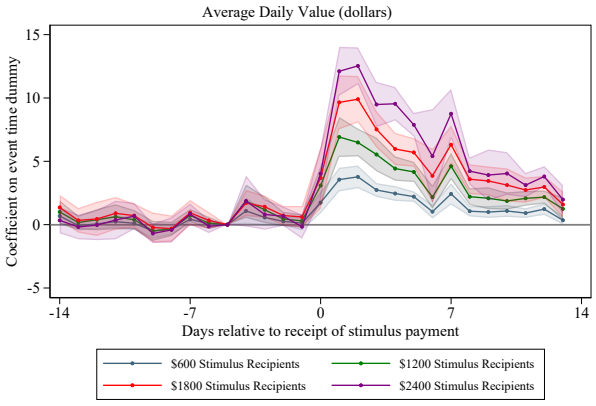
Note: Representative firms include Walmart, Amazon, Costco, Kroger, Target.

Automated Cash Disbursements



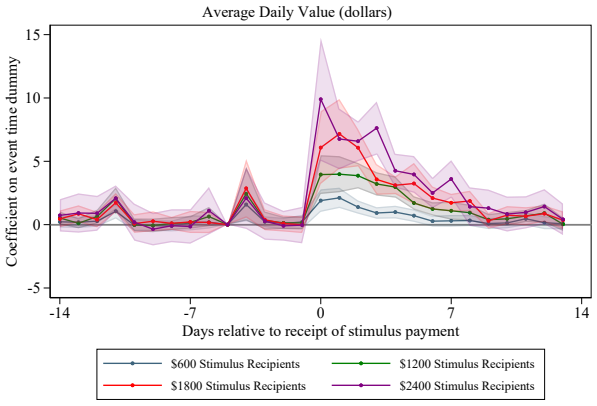
Note: Representative firms include 7/11, Bank of America, Cardtronics PLC, Walmart.

Fast Food Restaurants & Bars



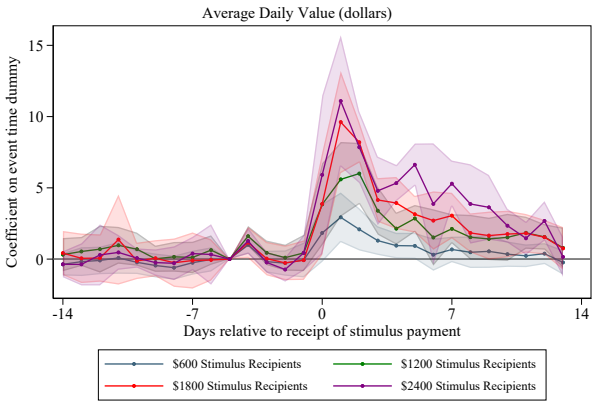
Note: Representative firms include Dunkin Brands, McDonalds, Wendys, Uber Eats, Starbucks.

Discount Stores



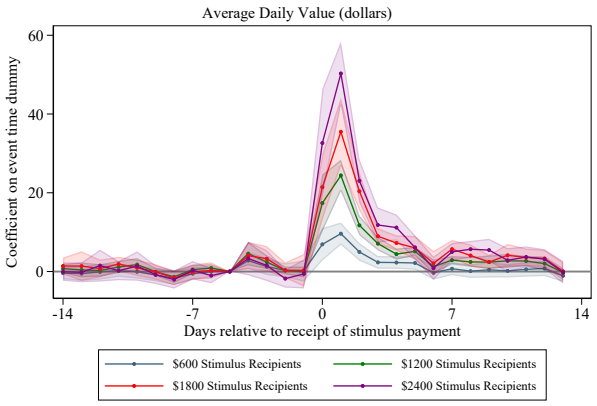
Note: Representative firms include Dollar General, Big Lots, Dollar Tree, Ross Stores.

Automobile Transactions



Note: Representative firms include Automotive Repair and maintenance

Utilities

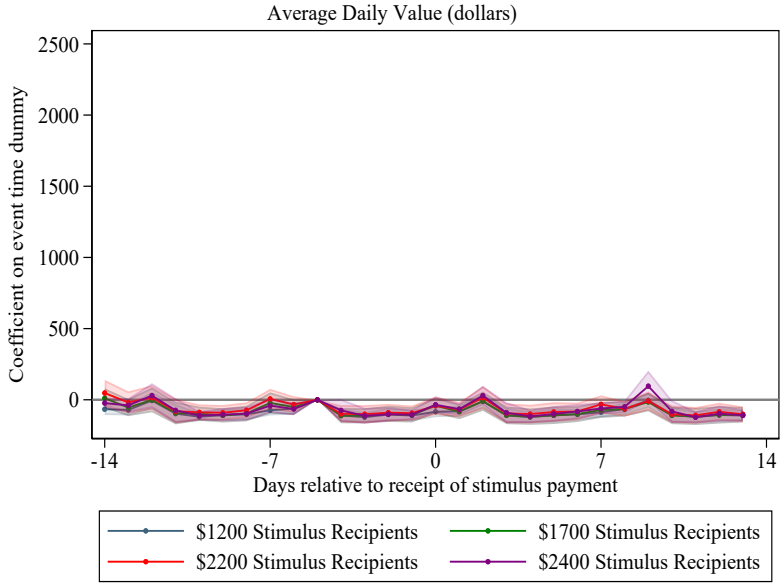


Note: Representative firms include Netflix, Amazon, Comcast, Sprint, T-Mobile, America Movil.

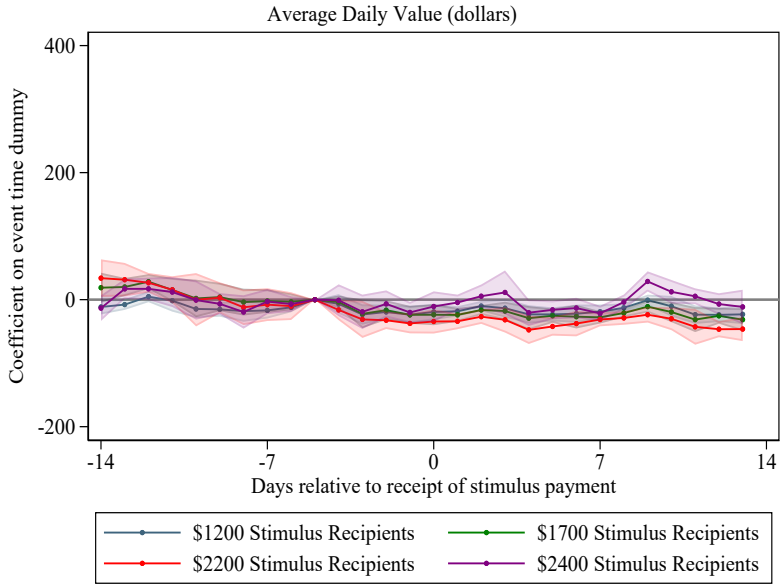
Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. Time 0 in event time is defined as the date on which the account received a stimulus payment. The shaded regions are 95% confidence intervals. The aggregate spending in each category (except utilties which we code as aggregate debt) for each account-date observation is identified using Facteus's pre-processed merchant category codes.

Figure A15: Effect of 1st Stimulus Payment on Spending and Deposits: Placebo Event Time

Aggregate Deposits

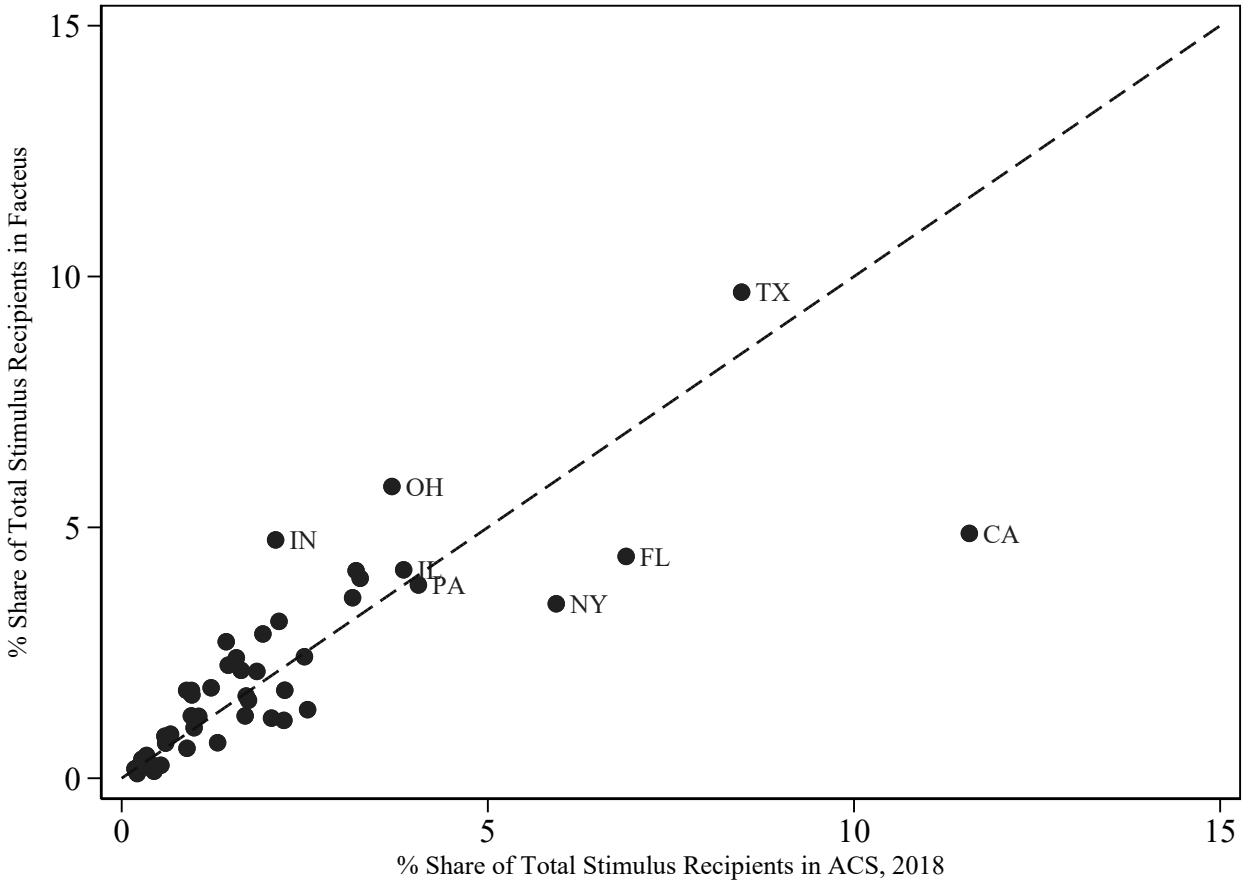


Aggregate Spending



Notes: Data at the account-day level. Plotted are coefficients on event time dummies from regression of aggregate spending or deposits on day-since-event time fixed effects (Model A). Standard errors are clustered two-way by state and calendar date. The shaded regions are 95% confidence intervals. Time 0 in placebo event time is defined as 21 days before date on which the account received a stimulus payment. We avoid using an earlier placebo stimulus date to avoid confounding the results with spending responses to EITC and tax refund receipt in late February and early March. Aggregate spending includes transactions labeled as fees, spending and ATM withdrawals. Aggregate Deposits includes transactions labeld as deposits, loads, government deposits and stimulus payment.

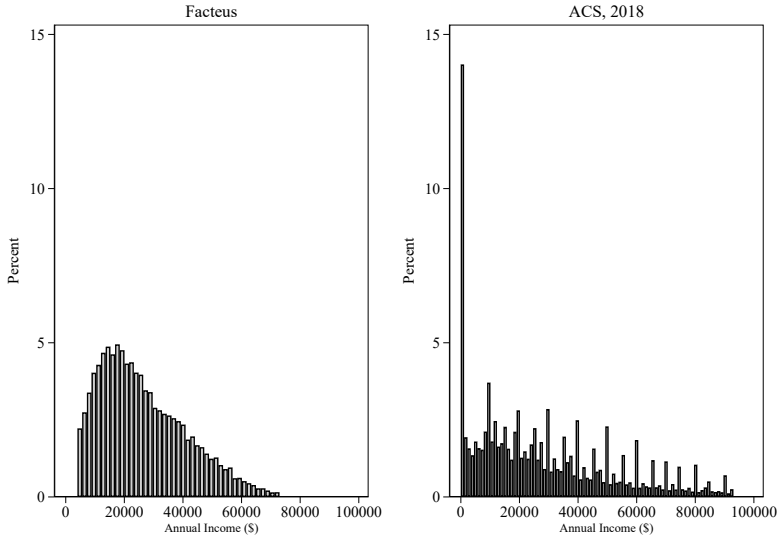
Figure A16: Geographic Distribution of 1st Stimulus Payment Recipients in Facteus vs. ACS



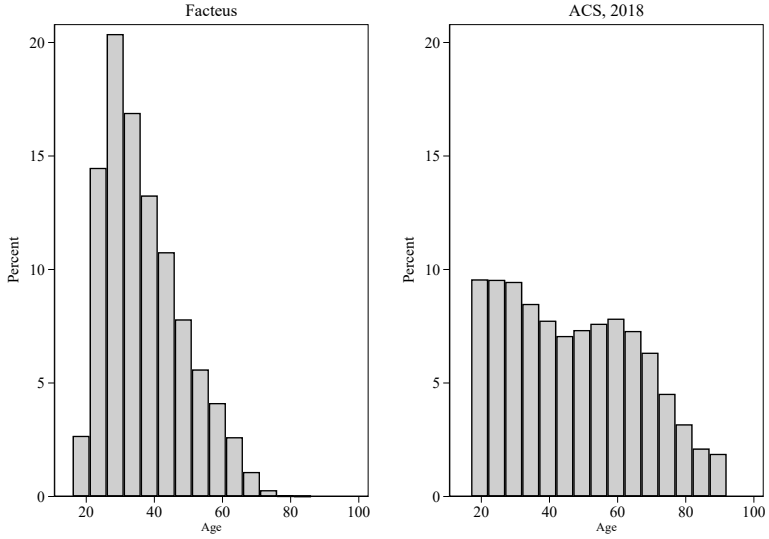
Notes: The scatterplot shows the % of share of total 1st stimulus payment recipients in each state in the Facteus sample vs. ACS, 2018. The stimulus recipients in ACS are identified using total personal income and the IRS income eligibility criteria for receipt of stimulus payment.

Figure A17: Age & Income Distribution of 1st Stimulus Payment Recipients: Facteus vs. ACS

Income Distribution



Age Distribution



Notes: The histograms show the distribution of age and income of 1st stimulus payment recipients in Facteus vs. ACS, 2018.The stimulus recipients in ACS are identified using total personal income and the IRS income eligibility criteria for receipt of stimulus payment. The histogram plots the weighted total personal income of the identified stimulus recipients in ACS. To calculate the total personal income of stimulus recipients in the Facteus sample, we multiply the total aggregate deposits value for January–March,2020 for each account by four to get a value for annual income.