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Government Shutdown and SNAP Disbursements: Effects on Household Expenditures

Mindy Marks
Silvia Prina
Roy Gernhardt

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Mindy Marks
Northeastern University

Silvia Prina
Northeastern University and IZA

Roy Gernhardt
Northeastern University

ABSTRACT

Government Shutdown and SNAP Disbursements: Effects on Household Expenditures*

We test the ability of SNAP eligible households to smooth consumption when facing unexpected transitory income shocks stemming from the 2018-19 government shutdown. In response to the shutdown, all states were federally mandated to pay February SNAP benefits on or before January 20th. This created a short-term windfall (two payments very close to each other) followed by a longer than normal gap during which no SNAP disbursements were received. We show that expenditures are lower in the month where benefits where advanced vis-à-vis months with unaltered benefits schedules. We complement this finding by exploiting preexisting state-level differences in disbursement schedules that drove some states to temporarily alter the timing of the 2019 March and April SNAP disbursements. These diff-in-diff results show that households in treated states reduced spending when there was a longer than usual gap between SNAP disbursements. Our findings are inconsistent with the permanent income hypothesis.

Corresponding author:
Silvia Prina
Department of Economics
Northeastern University
310A Lake Hall
360 Huntington Avenue
Boston, MA 02115
USA

E-mail: s.prina@northeastern.edu

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1 Introduction

The permanent income hypothesis (PIH) posits that transitory income changes should not affect consumption. A large literature however, shows that income fluctuations have important effects on households' current consumption (e.g., Jappelli and Pistaferri 2010). Previous studies have traditionally focused on the impact of expected temporary income shocks.[1]

This paper investigates households' ability to smooth consumption expenditures using a unique natural experiment that generated an *unexpected* temporary income shock for households eligible for the Supplemental Nutrition Assistance Program (SNAP). We take advantage of exogenous variation generated by the 2018-19 federal government shutdown. Its protracted length put SNAP recipients at risk to miss transfers for the first time since the start of the program (McCausland 2019; Luhby 2019).[2] To avoid this risk, on January 8, 2019, the USDA mandated that, addition to the normal January disbursement, SNAP recipients would receive the February disbursement on or before January 20, 2019 (US Department of Agriculture 2019). This federal mandate moved 5.1 billion dollars worth of February SNAP benefits into January.[3] The government shutdown ended on January 25, six days before the first SNAP disbursements would have been missed and states were able to return to their normal schedules for the March SNAP benefit.

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[1]The literature has documented households and individuals' inability to smooth consumption using variation in the timing of unemployment insurance (East and Kuka 2015), cash transfers (Angelucci et al. 2021), taxes and tax witholding (Parker 1999; Shapiro and Slemrod 1995; Souleles 1999), paychecks (Stephens Jr 2006), and social security (Stephens Jr 2003; Wilcox 1989) and SNAP benefits (Shapiro 2005; Hastings and Washington 2010).

[2]In the 21 day shutdown of 1995-6, the Department of Agriculture (therefore the food stamp program) was not affected. In the 16 day shutdown of 2013, a mini-appropriations bill protected funding for SNAP benefits.

[3]Specifically, Congress' expired *December 21 Continuing Resolution* allowed programs like SNAP to be funded for 30 days. This created a loophole: as long as February SNAP benefits were paid before January 21, SNAP benefits could be fully funded through February.

The shutdown generated variation in the timing of SNAP benefits first at the national level and then at the state level. We use both of these unexpected changes in the SNAP disbursement schedule as complementary analyses. We first consider the sudden federally mandated change in the benefit timing. Using data from 2018 and 2019 we compare household retail expenditures in February 2019, when all SNAP eligible households received their benefits unexpectedly early, to household expenditures in calendar months with unaltered benefit schedules. Using the Nielsen Homescan panel data, which provides daily detailed retail expenditures for a sample of SNAP eligible households. We find evidence inconsistent with the permanent income hypothesis. Specifically, household spending in February 2019 is about 5.9% lower than months with unaltered SNAP distribution schedules. The decrease in expenditures is concentrated in the latter part of the calendar month when budget constraints are more severe. No such response is observed in households that are just above the SNAP eligibility criteria nor if we assume the shutdown occurred a year earlier.

In our second analysis, we exploit state-level variation. All states have pre-existing disbursement SNAP schedules that determine the time at which each household receives its benefits every month. Some states disburse all benefits entirely within the first half of the month, while other states disburse benefits deep into the latter half of the month. Given these pre-existing disbursement schedules and the federal mandate to provide February SNAP benefits before January 21th, many SNAP recipients would have had a gap as long as 60 days between SNAP disbursements unless their state took action. As such, many states advanced SNAP benefits in March and April of 2019. This generated a natural experiment. We compare the change in household expenditures between 2018 and 2019 in the final week of March and April in the set of states that temporarily advanced the timing of the March and April 2019 SNAP benefits to a group of control states where the March and April benefit schedules were unaltered. The analysis shows that receiving

SNAP benefits one day earlier than usual decreases spending at the end of the calendar month by 1.4%. This result reinforces our previous finding that a temporary change in the timing of the SNAP benefits influences the timing of consumption.

Our study contributes to the PIH literature by studying the effect of *unexpected* and exogenous changes in SNAP disbursement on expenditures. Previous studies have focused on *expected* income changes documenting a sharp increase in household spending on the day that a paycheck or other expected income arrives.[4]

Our paper also relates to the literature on end of cycle SNAP effects. These studies exploit variation in existing differences in the timing of SNAP benefits and show that SNAP eligible households exhaust their benefits before the end of the cycle and are not able to smooth consumption (Shapiro 2005; Wilde and Ranney 2000; Wilde and Andrews 2000; Hastings and Washington 2010). Average daily food expenditures of SNAP households at the end of the benefit cycle are only 57% of the expenditures when benefits are disbursed (Tiehen et al. 2017). While households may be stocking up on food early in the cycle and taking advantage of bulk buying discounts (Zaki and Todd 2021), studies have found that, at the end of the SNAP distribution cycle, caloric intake decreases (Shapiro 2005), diet quality worsen (Kuhn 2018; Todd 2015), and food insecurity increases (Gregory and Smith 2019).[5] While our identification is different, relying on the natural experiment associated with the government shutdown, our results reinforce this literature's finding of an inability to smooth consumption among SNAP recipients.

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[4]Stephens Jr (2003) considers social security recipients; Carvalho et al. (2016) households with an income below $40,000 in the US; Gelman et al. (2014) a sample of US individuals; Stephens Jr (2006) and Huffman and Barenstein (2005) households in the general working population in the UK; Angelucci et al. (2021) cash transfer recipients in Mexico.

[5]The literature also reports lower tests scores (Bond et al. 2022), more emergency room visits (Cotti et al. 2020) and higher rates of property crime (Carr and Packham 2019) just prior to receiving SNAP benefits.

2   SNAP Benefits and Data

The U.S. Supplemental Nutrition Assistance Program (SNAP) provides food assistance to eligible households. The program is federally funded through the USDA and is administered at the state level. Monthly benefits are disbursed by states at pre-determined times according to the state's idiosyncratic scheduling criteria. The USDA estimates that in 2018, 43.9 million Americans were eligible to receive SNAP (Cunnyngham 2021). SNAP households received on average $258 per month in 2019 (US Department of Agriculture 2021). While generous, SNAP benefits are nevertheless generally insufficient to cover a household's food expenses (Center on Budget and Policy Priorities 2021). Eligibility is determined by federal guidelines and is mostly a function of household income and household size. SNAP benefits are an important part of household income: for a 3 member family, with one full time worker earning $10 per hour, SNAP boosts income by around 22% (Center on Budget and Policy Priorities 2019). SNAP program participation has been consistently shown to lower food insecurity and to improved household welfare (East 2020).

We use the 2018 and 2019 Nielsen Homescan Consumer Panel dataset. Nielsen panelists agree to scan the bar codes of all products purchased for personal, in-home use, following each trip to a retail establishment. The data contain a unique shopping trip identification code, household ID, purchase date and total purchase amount for each trip. We observe a total of twenty one million shopping trips for the two-year period of 2018-2019. This information allows us to construct various spending measures for the households in the 46 states considered in our sample.[6]

Nielsen contains approximately 1.4 million individually identifiable products in ten

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[6]The Nielsen data does not include households in Alaska or Hawaii. We also exclude households in Washington DC, Indiana, and Ohio because their response to the advanced February 2019 disbursement contaminates the experiment. In order to minimize the impact of the extended gap between "February" and March disbursements, DC delivered March benefits on February 26 while Indiana and Ohio gave half of the March benefit on February 22 and the remaining half on the normal schedule (FreshEBT 2019).

product categories: dry grocery, frozen foods, dairy, deli, packaged meat, fresh produce, nonfood grocery, alcohol, general merchandise, and health and beauty aids. We use the trip-level expenditure data to construct various spending measures and focus on spending captured by the Nielsen that occurs during the 2018 and 2019 calendar year. While the Nielsen data is commonly used to study household behavior as it contains detailed information about every retail purchase across a large, national sample (Aguiar and Hurst 2007; Broda et al. 2009), there are some limitations. First, non-retail expenditures (e.g., rent payments or utilities) are not captured. Second, as the scanning task is not trivial, the Nielsen data is skewed toward older households and households with at least one non-worker (Einav et al. 2008; Lusk and Brooks 2011).

The data contains information about the panelist's sex, age, race, household income (reported with a two-year lag), household size, age and presence of children, occupation, employment status, and location. The socio-demographic characteristics provide enough detail to impute a measure of SNAP eligibility in a method similar to Castellari et al. (2017). We limit the analysis to households with annual income below $60,000. For each year of the sample we overlay Nielsen's income bin and household size data onto the USDA's gross income limits for household sizes to generate three mutually exclusive categories: SNAP ineligible, SNAP eligible and SNAP ambiguous. These categories only capture household eligibility, not participation, therefore our estimates must be considered Intent-To-Treat. "SNAP ineligible" households have household income above the gross income limits given their household size. "SNAP eligible" households are below the gross income limits given their household size.[7] Finally, there are households we cannot classify because the pertinent eligibility cutoff falls in the middle of the Nielsen income bin. Consider the income bin $20,000-$24,999. In 2018, the annual gross income limit

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[7]Some households that we categorize as eligible will be ineligible for benefits due to other details of the SNAP eligibility formula. In addition to being below the gross income limits, household's net income must fall below a threshold. Households are allowed to deduct some expenses from their income to determine net income. There is also an asset threshold and rules that deny benefits to unauthorized immigrants in some states. These extra rules will lead us to falsely classify some (small number of) households as eligible who are actually ineligible and will attenuate our findings.

for a family of size 2 was $21,408. Thus, households near the bottom of Nielsen's bin were eligible while those at the top were ineligible. We exclude these "SNAP ambiguous" households from the analysis.[8]

Summary statistics for households that participated in the 2018 Nielsen sample by SNAP eligibility can be found in Appendix Table A1. We classify 5,063 household as SNAP eligible. We use administrative data from the 2018 SNAP quality control database to calculate the predicted SNAP benefit amount for each household using household size and binned income. Specifically, we regress the monthly SNAP benefit amount from the administrative dataset on Nielsen income bin and household size then use these coefficients to predict monthly SNAP benefits for each household in our sample. Predicted benefits for the average SNAP eligible household are $225. Eligible households spent an average of $548 per month in retail establishments. Thus SNAP benefits cover a large share of monthly retail expenditures. Only about 28% of SNAP eligible household heads have obtained a college degree and 97% of eligible households in the sample have annual incomes that fall below $35,000. 22% of eligible households are non-white and 8% of them are of Hispanic origin. Over half of SNAP households in the sample have two or more persons living under the same roof. As expected, SNAP eligible households have lower household incomes and lower monthly expenditures than SNAP ambiguous and SNAP ineligible households.

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[8]Conditional on receiving benefits SNAP ambiguous households should receive smaller benefits than SNAP eligible households because they have higher household incomes and SNAP benefits are progressive. The average 2018 monthly benefit received by households we classify as eligible, based on predictions derived from the USDA's administrative dataset on a representative sample of SNAP recipient households is $224.73 while mean monthly benefits for SNAP recipient households we classify as SNAP ambiguous is $95.24. If we add the SNAP ambiguous households to the analysis and classify them as eligible we find effects that are attenuated (see Appendix Tables A8 and A9).

3 Federal disbursement schedules changes

3.1 Identification and estimation

We first exploit the federal mandate that all SNAP eligible households would receive the February 2019 disbursement on or before January 20, 2019. The early SNAP disbursement was an unexpected change to the timing of benefits. No affected households were aware of the upcoming double payment before the USDA announcement on January 8, 2019. A non-trivial proportion of SNAP recipients received no advance warning of the double payment (Rosenbaum 2019; Kline and Allyn 2019).[9] Google Trends key words provides some evidence that the early disbursement was a surprise to SNAP recipients. Appendix Table A1 shows that searches for food stamp, Supplemental Nutrition Assistance Program, and related terms quintupled during the week of January 14 - 21, 2019 when SNAP households received their early February disbursement. Importantly, no other government transfer programs were impacted by the shutdown.[10] Therefore it is unlikely that our results are confounded by other government transfers.

The altered benefit timing is visualized in Figure 1. Before the 2018-19 shutdown, households receiving SNAP benefits were always paid on a set day of the month according to each state's rule. Panel A shows the normal SNAP benefits distribution schedule (e.g. 2018) with the month of February denoted by green hash lines. Each black bar starts on the first disbursement date and ends on the last possible disbursement date within a month. Panel B shows the distribution schedule for early 2019. Red bars indicate the benefits that would have normally been distributed in February but were instead distributed early due to the shutdown. For instance, in a typical month of February, Colorado distributes

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[9]For example, the Pennsylvania Department of Human Services did not begin mailing letters explaining the double payment to SNAP recipients until January 18, two days after the state's early disbursement on January 16 (Lubrano 2019).

[10]Federally funded social welfare programs such as Social Security, Medicare, Medicaid were unaffected because the shutdown only affected funds subject to annual appropriation by Congress. Legislation passed to continue funding for TANF and WIC.

benefits between the 1st and the 10th of the month according to the last digit of the head of household's social security number. However, in February 2019 SNAP benefits were distributed to all households on the 17th of *January*. In fact some households in states such as Alabama and Delaware received their February benefits before their January benefits. As the box with green hash lines shows, no SNAP recipient household in the US received benefits during the month of February 2019.[11]

We exploit the fact that no household received SNAP benefits in February 2019 to test households' ability to smooth consumption expenditures. Specifically, we estimate the following OLS regression to determine whether the movement of the February 2019 disbursement to January 2019 caused SNAP eligible households to decrease their expenditures in February 2019 compared to calendar months with unaltered distribution schedules :

$$Y_{imy} = \alpha_0 + \alpha_1 EarlyBenefit_{imy} + \gamma_m + \zeta_y + X_{imy} + \epsilon_{imy} \tag{1}$$

where Y_{imy} is a measure of total expenditures on food and non-food purchased at retail establishments for SNAP eligible household i during month m and year y. The dummy variable $EarlyBenefit_{imy}$, takes the value 1 if that month's SNAP disbursement occurred in the prior month. γ_m and ζ_y are fixed effects for month and year, respectively. They allow expenditures to vary by calendar month and account for changes in overall economic conditions between the two years in our sample. X_{imy} is a vector of household controls. Included in X_{imy} are age, race, employment, education, type of residence and marital status of head of household (all in bins).[12] Also included are household income and size (also in bins); an indicator for Hispanic origin; an indicator for the presence of children; and state fixed effects.

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[11] The only exception would be the handful of households who were newly eligible in February 2019.

[12] Neilsen collects information on age, employment and education both the female and male household head. For the household head age, education and employment variables we use the female household head when available; for households that lack a female household head we use information for the male household head.

We focus on the years 2018 and 2019 and include all months with the exception of January, March, and April because disbursement timing was also altered during these months in 2019 due to the shutdown.[13] Our coefficient of interest is α_1: a negative coefficient would indicate that households had lower expenditures in February 2019, when the SNAP benefits were distributed unexpectedly early in January 2019 vis-à-vis months with unaltered schedules.

We estimate equation (1) separately for four different time periods: the entire month, the first two weeks of the month, the last two weeks of the month, and the final week of the month.[14] If households are unable to smooth consumption, the effect of receiving February SNAP benefits in mid January should be more pronounced in the latter part of February. Early in the month there may still be unused funds from the double January disbursement, but account balances are likely to be depleted by the end of February.

3.2 Results

We first present results for household expenditures over the entire month. Column (1) of Table 1 shows the estimates where the only additional control variable is calendar month fixed effects. It reports the average impact of unexpectedly receiving the 2019 February SNAP check one month early on household expenditures during the month of February 2019. We find that SNAP eligible households reduce their total expenditures during the month of February 2019 by $31.19 vis-à-vis months with unaltered schedules. This effect is statistically and economically significant. In relative terms, receiving the February 2019 check in January causes SNAP eligible households to reduce monthly expenditures by 5.89% from a baseline of $529.19 in February 2018. Adding a rich set of household-level controls in column (2) does not change the magnitude of the coefficient of interest.

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[13]We use the March and April variation in Section 4.

[14]In order to maintain a consistent number of days in each month, we follow previous literature (Hastings and Washington 2010; Damon et al. 2013) and define a month as the first 28 days of each calendar month. Thus, expenditures that occur between the 21st and 28th day of the month (regardless of which month) will be included in the final week of the month. Results are robust to running the analysis without dropping expenditures past the 28th of the month.

Columns (3)-(5) consider the impact of expenditures over various periods within the month: we expect households to be less able to smooth consumption in the latter part of February when budget constraints are tighter. Indeed, we find evidence in favor of larger impacts concentrated towards the end of the month. Estimates in column (3) show that the receipt of the February check in mid January is associated with only a $9.56 decrease in expenditures during the first two weeks of February and the effect is not statistically significant. However, as the month proceeds, the effect of receiving benefits early on future expenditures becomes stronger. During the last two weeks of the month (column 4), eligible households decrease their expenditure by $21.67 (an 8.22% decrease relative to expenditures in February 2018). And in the last week of the month (column 5), expenditures decrease by $11.46 (or 8.41% relative effect).

Our findings in Table 1 suggest that SNAP eligible households do not smooth their consumption when they receive an unexpected, earlier than usual disbursement. The effect appears to be more pronounced towards the end of the month. Studies have documented that eligible households fail to enroll in SNAP and otherwise eligible recipient households are removed from the program for failure to re-verify eligibility (Gray 2019; Finkelstein and Notowidigdo 2019). According to the latest USDA report, only 82% of nationally eligible households received benefits in 2018 (Cunnyngham 2021). Accordingly, these estimates of the impact of altered benefit timing on expenditures are lower bounds of the true impact for SNAP recipient households. Additionally, the Nielsen data is not rich enough to perfectly define SNAP eligibility and our sample is likely to include households that are ineligible due to changes in income, immigration status, or failure of the asset test. Thus, estimated effects for those households who are actually participating in the SNAP program would be larger.

Next, we exploit our data on expenditures by product type. For each shopping trip Nielsen uses bar code data to categorize purchased products into 10 mutually exclusive product categories. We parse the Nielsen data into four mutually exclusive groups: SNAP

eligible perishable goods (e.g. milk, fresh vegetables); SNAP eligible nonperishable goods (e.g. cereal, flour, peanut butter), Non-SNAP eligible goods (e.g. sunglasses, periodicals, toothbrushes), and goods unclassified by Nielsen (30% of spending is not matched to a product category). For more information on the makeup of the product classifications see Appendix Table A2. We decompose household spending into these four categories and re-estimate equation (1) with each spending group as a separate dependent variable. Results for spending over the entire month and expenditures in the last two weeks of the month by product category is shown in Table A3.

The estimates reported in Panel A of Table A3 highlight a decrease in monthly expenditure in all product categories. In particular, spending is lower for both perishable and non-perishable SNAP eligible goods. Monthly expenditures on SNAP eligible non-perishables decreased by 7.18%, and on SNAP eligible perishables by 5.03%. The fact that households reduce spending on perishable goods is inconsistent with the alternative explanation that households might have stocked up in January when they received two payments. Such decrease in perishables is highly suggestive of an inability to smooth consumption. We find similar results when the dependent variable is spending in the last two weeks when affected households would be more budget constrained.

Next, we run two robustness checks to support the validity of this natural experiment. It is possible the changes in consumption we observe are attributable to uncertainty surrounding the shutdown and/or economic shocks that occurred in February 2019. To guard against this we first estimate equation 1 for SNAP ineligible households: those with annual income above the SNAP eligible threshold but below $ 60,000.[15] The estimates in Panel A of Table 2 show no impact on SNAP ineligible households: the point estimate on the variable of interest is small and statistically insignificant. SNAP ineligible households reduce their total February 2019 expenditure by only 0.32%. This suggests that the reduction in February spending which we observed in the SNAP eligible sample is due

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[15]Results are robust to varying this income threshold and performing the tests using expenditures from households with incomes below $50,000 or below $70,000.

to changes in the SNAP program and not confounds. Furthermore, to test the validity of our estimation strategy we perform a second robustness check using a placebo treatment variable. We re-estimate equation 1, using data from 2017 and 2018 and assuming that the early SNAP disbursement occurred in 2018 instead of 2019. Results in Panel B of Table 2 suggest that the "fake" early disbursement had no impact on total February 2018 expenditures. If anything, SNAP eligible households appear to have increased their February 2018 spending by $9.61 but the effect is not statistically significant. These two robustness checks support our main finding that the reduction in household spending is attributable to changes in the timing of the February SNAP benefits.

Finally, we conduct a heterogeneity analysis estimating equation (1) separately by subgroups. In particular, we split our sample by education of the household head (more than high school vs. high school or less) , race (non-white vs. white), working status (at least one worker vs. no workers), and the presence of children under 18. However, since SNAP benefits are an increasing function of household size and a decreasing function of household income, caution should be exercised when interpreting the coefficients. For instance households with children will receive more benefits than similar households without children and we will be unable to determine if any difference in our coefficient of interest is due to differential treatment effects or subgroup heterogeneity.

The results of this exercise are shown in Appendix Table A4. For each subgroup, in addition to the coefficient of interest, we present predicted benefit amounts using data from the 2018 SNAP quality control database. While estimates in Panels A-C suggest little difference by education, race or working status, coefficients in Panel D suggests that households with children present may be less able to consumption smooth than those without children, but predicted benefits are twice as large for households with children.

4 State level disbursement schedule changes

4.1 Identification and Estimation

Our previous analysis suggests that the altered timing of the February 2019 SNAP disbursement affected households' ability to smooth consumption expenditures. In this section we take advantage of the fact that some states altered the timing of the March and April 2019 SNAP disbursements to determine if these unanticipated changes also impact expenditures.

While the SNAP program is federal, states have the authority to determine the features of the SNAP benefit disbursement schedule. States choose both the number of days in the disbursement window and the calendar date when disbursements end. As shown in Panel A of Figure 1 and in Appendix Table A6, there is heterogeneity in the length of the disbursement window and the final disbursement day. For example, in Illinois SNAP benefits are normally distributed between the 1st and the 20th day of each month; whereas every SNAP recipient in New Hampshire receives benefits on the 5th day of the month. Due to this preexisting variation in disbursement timing, the average number of days between a household's early February 2019 disbursement and their scheduled March 2019 disbursement varies across states. Without corrective action in some states, such as Maryland and North Carolina, recipients would have as many as 60 days between the "February" and March disbursement. Hence, to minimize the gap 29 states advanced the timing of the March SNAP benefit. These changes to the timing of the March benefit schedule were announced in early to mid February 2019 (Evich 2019).

Figure 2 illustrates the impact that preexisting disbursement schedules had on a state's decision to accelerate March disbursements: Panel A shows the normal last disbursement date for the 15 states that did not advance their March SNAP benefits;[16] Panel B shows

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[16]We classify Washington as unchanged because it moves the average disbursement by only one day. Results are robust to excluding Washington from the analysis.

the normal last disbursement date for the 29 states that advanced their March SNAP benefits. Among the unchanged states all SNAP recipients receive their benefits before the 10th day of the month under the normal schedule, with the exception of Missouri. The states in Panel B have significantly later normal disbursement schedules: 27 out of 29 states distribute well into the month.[17] Thus, whether or not the March check was altered appears to be a function of preexisting features of the disbursement schedule. To test this we estimate a naive state-level regression: the number of days the March 2019 SNAP disbursement was accelerated on the last disbursement day in a state's preexisting schedule. We find this one characteristic of the preexisting schedule accounts for 57% of the variation in the timing of the March 2019 check.

Additionally, some states that accelerated their March payments would have had a longer than usual gap until their April SNAP disbursement. Thus, seven states also accelerated their April payments. As shown by the darker bars in Panel B of Figure 2, the states that moved April payments are those where the normal SNAP disbursement window falls in the later half of the month. By May of 2019 all states returned to their normal disbursement schedule.

Appendix Table A5 shows summary statistics for states that altered at least one SNAP disbursement and those that did not. The average household in states with altered disbursement schedules received their March SNAP benefit on average 6 days earlier than usual. The states which accelerated payments are more likely to be southern and are ethnically slightly less white than the states which did not accelerate payments. Importantly, household incomes are very similar across states that altered their SNAP disburse schedule and those states where the schedule was unchanged.

We exploit the fact that some states had early March and April disbursements to see if unanticipated temporary changes in the timing of the SNAP benefits matters for expenditures at the end of the month. Given that households in some states can receive SNAP

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[17]In addition to the 5 states excluded in Section 3, we also exclude Florida and Georgia from this analysis because they split the March payments into two installments.

benefits as late as the 23rd day of the month, we focus on the last seven days of the month to isolate a time window in which no household receives a SNAP disbursement. The states that accelerated the March payments appear in bold in Figure 1. The shaded bands indicate the last seven calendar days of March and April in 2018 and 2019. In the states which did not alter SNAP disbursements, the number of days between a disbursement and the beginning of the shaded time window is unaltered. In the states which advanced SNAP payments, households received their benefits earlier than usual, extending the number of days between a SNAP disbursement and the shaded time window.

If the permanent income hypothesis holds, the temporary increase in the timing of SNAP benefits that occurred in some states should not effect households' expenditures. To test this we estimate the following difference in difference regression using expenditures data from March and April 2018 and 2019:

$$Y_{ismy} = \alpha_0 + \alpha_1 AlteredSchedule_{smy} + \alpha_2 A_y + \alpha_3 B_m + \alpha_4 C_s + X_{imsy} + \epsilon_{imsy} \qquad (2)$$

where Y_{imsy} is total expenditures the last seven days of the calendar month for household i in state s in month m and year y. $AlteredSchedule_{smy}$, our variable of interest, is an indicator equal to one if a state is treated in a given month and year i.e. in that month the state distributed SNAP benefits earlier than its normal disbursement schedule. A_y is a dummy for the year 2019, B_m is a dummy for the month of March and C_s is a vector of indicators capturing state fixed effects. X_{imsy} are the same predetermined socio-economic characteristics used as controls in equation (1). α_1 estimates the effect, in dollars, of the accelerated SNAP disbursement on consumption expenditures the last seven calendar days of the month.

4.2 Results

Table 3 reports the results of our estimates for equation (2). Column 1 consider a model without household controls. In normal years, SNAP eligible households spend an average of $135.50 in retail establishments in the final week of the month. Residents of states that advanced the SNAP payments have expenditures in the final week of the month that are $10.95 lower than baseline. Thus, households that receive a SNAP payment unexpectedly earlier than usual decrease expenditure in the last week of the month by 8.08%. When adding controls (column 2), estimates are unchanged, suggesting that differences in the composition of residents across treated and control states are not driving our results.

As an alternative specification we replace the indicator variable $Altered_{smy}$ in equation (2) with a continuous treatment measure. For each state month we compute the expected number of days between the end of the month and the receipt of the last SNAP benefit and call this variable $Days\ Since\ Disbursement_{smy}$. As shown in Figure 1, in some states, such as New Jersey, the average March SNAP disbursement occurred only two days earlier than usual whereas in other states like North Carolina the average SNAP recipient received their March benefit 10 days early. If households cannot smooth consumption, end of month spending should be lower in North Carolina than in New Jersey. Column 3 of Table 3 reports the results from this exercise: moving the SNAP benefit one day earlier than normal lowers end of the month retail expenditures by $1.74. Given that the average household in a state that altered benefits received benefits 6 days earlier than usual the results from the continuous treatment measure align closely with dichotomous measure and suggest little heterogeneity across states in the ability of households to consumption smooth.

Overall the results in Table 3 complement our previous findings and suggest that SNAP eligible households are unable to smooth consumption following accelerated benefit disbursements. As our results are intent to treat estimates, impact on SNAP recipient house-

hold should be even larger.

We perform the same two robustness checks to support the validity of this natural experiment we conducted earlier. It is possible the changes in end of the month expenditures we observe are attributable to other state-level changes that impact low-income households. To guard against this we estimate equation (2) for SNAP ineligible households: those with annual income above the SNAP eligible threshold but below $ 60,000. The results of this exercise can be seen in Panel A of Table A7. As expected, the impacted of living in a state that advanced SNAP benefits on ineligible households is near zero (a decrease of spending of $2.29) and statistically insignificant.[18] This robustness check supports our conclusion that the reduction of expenditures in the last seven days of the month is due to the SNAP disbursement changes rather than confounds. Finally, Panel B reports the results of equation (2) under the placebo assumption that the shutdown occurred in 2017 and all disbursement schedule adjustments were made in 2018. We re-estimate equation (2), using data from 2017 and 2018 assuming that the early SNAP disbursement occurred in 2018 instead of 2019. Results suggest that the "fake" early disbursement had no effect on end of the month expenditures. If anything, SNAP eligible households in treated states appear to have increased their end of month spending by $3.16 but the effect is not statistically significant.

5 Conclusion

Exploiting exogenous variation stemming from the 2018-19 federal shutdown, we study SNAP eligible households' ability to smooth consumption when hit by an unexpected temporary income shock. Estimates suggest that households which received two SNAP disbursements in January were not able to make their benefits stretch through February. Total expenditures in February 2019, and particularly expenditures concentrated in the

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[18]In results not shown we estimate the continuous treatment version of equation 2 for the sample of SNAP ineligible households and again see no difference in expenditures.

latter part of the month, were lower compared to expenditures during months with normal schedules. In addition, we exploit the fact that some states advanced SNAP payments to reduce the length of time between SNAP disbursements. We show household expenditures at the end of the month are lower in states which temporarily advanced SNAP disbursements when compared to states with unaltered benefits schedules.

Robustness checks show that there is no change in consumption for households near eligibility during the same periods. Our findings are consistent with the literature documenting month cyclicality in food consumption among SNAP eligible households and highlight yet again that timing and frequency of benefit disbursements are critical.

References

Aguiar, M. and E. Hurst (2007). Life-cycle prices and production. *American Economic Review 97*(5), 1533–1559.

Angelucci, M., C. Chiapa, S. Prina, and I. Rojas (2021). Transitory income changes and consumption smoothing: Evidence from Mexico. *IZA Discussion Paper*.

Bond, T. N., J. B. Carr, A. Packham, and J. Smith (2022). Hungry for Success? SNAP Timing, High-Stakes Exam Performance, and College Attendance. *American Economic Journal: Economic Policy*.

Broda, C., E. Leibtag, and D. Weinstein (2009). The role of prices in measuring the poor's living standards. *Journal of Economic Perspectives 23*(2), 77–97.

Carr, J. and A. Packham (2019). SNAP benefits and crime: evidence from changing disbursement schedules. *Review of Economics and Statistics 101*(2), 310–325.

Carvalho, L. S., S. Meier, and S. W. Wang (2016). Poverty and economic decision-Making: Evidence from changes in financial resources at payday. *American Economic Review 106*(2), 260–284.

Castellari, E., C. Cotti, J. Gordanier, and O. Ozturk (2017). Does the timing of food stamp distribution matter? A panel-data analysis of monthly purchasing patterns of US households. *Health Economics 26*(11), 1380–1393.

Center on Budget and Policy Priorities (2019). Chart book: SNAP helps struggling families put food on the table. Technical report, CBPP.

Center on Budget and Policy Priorities (2021). A quick guide to SNAP eligibility and benefits. Technical report, CBPP.

Cotti, C. D., J. M. Gordanier, and O. D. Ozturk (2020). Hunger pains? SNAP timing and emergency room visits. *Journal of Health Economics 71*, 102313.

Cunnyngham, K. (2021). Reaching those in need: Estimates of state supplemental nutrition assistance program participation rates in 2018. Technical report, US Department of Agriculture.

Damon, A. L., R. P. King, and E. Leibtag (2013). First of the month effect: Does it apply across food retail channels? *Food Policy 41*, 18–27.

East, C. N. (2020). The effect of food stamps on children's health: Evidence from immigrants' changing eligibility. *Journal of Human Resources 55*(2), 387–427.

East, C. N. and E. Kuka (2015). Reexamining the consumption smoothing benefits of Unemployment Insurance. *Journal of Public Economics 132*, 32–50.

Einav, L., E. S. Leibtag, and A. Nevo (2008). On the accuracy of Nielsen Homescan data. Technical report.

Evich, H. B. (2019). Most states plan to move up food stamp payments due to lingering shutdown pain. https://www.politico.com/story/2019/02/15/states-move-up-snap-payments-shutdown-1180074. Politico. Accessed 2020-02-02.

Finkelstein, A. and M. J. Notowidigdo (2019). Take-up and targeting: Experimental evidence from SNAP. *The Quarterly Journal of Economics 134*(3), 1505–1556.

FreshEBT (2019). How the government shutdown affected EBT and food stamp (SNAP) benefits. www.freshebt.com/blog/government-shutdown-ebt-food-stamp-benefits/. Accessed: 2020-02-02.

Gelman, M., S. Kariv, M. D. Shapiro, D. Silverman, and S. Tadelis (2014). Harnessing naturally occurring data to measure the response of spending to income. *Science 345*(6193), 212–215.

Gray, C. (2019). Leaving benefits on the table: Evidence from SNAP. *Journal of Public Economics 179*, 104054.

Gregory, C. A. and T. A. Smith (2019). Salience, food security, and SNAP receipt. *Journal of Policy Analysis and Management 38*(1), 124–154.

Hastings, J. and E. Washington (2010). The first of the month effect: consumer behavior and store responses. *American Economic Journal: Economic Policy 2*(2), 142–62.

Huffman, D. and M. Barenstein (2005). A Monthly Struggle for self-control? Hyperbolic discounting, mental accounting and the fall in consumption between paydays. *IZA discussion paper 1430*.

Jappelli, T. and L. Pistaferri (2010). The consumption response to income changes. *Annual Review of Economics 2*, 479–506.

Kline, K. and B. Allyn (2019). With the shutdown over - for now - the country's neediest are still scrambling. https://www.npr.org/2019/02/08/692514152/with-the-shutdown-over-for-now-the-countrys-neediest-are-still-scrambling. NPR. Accessed 2020-02-02.

Kuhn, M. A. (2018). Who feels the calorie crunch and when? The impact of school meals on cyclical food insecurity. *Journal of Public Economics 166*, 27–38.

Lubrano, A. (2019). Because of shutdown, February food stamps disbursed on Wednesday. https://www.inquirer.com/news/food-stamps-hunger-federal-government-shutdown-20190116.html. The Philadelphia Inquirer. Accessed 2020-02-03.

Luhby, T. (2019). Millions could lose food assistance, including school lunches, if shutdown drags on. https://www.cnn.com/2019/01/07/politics/food-stamps-government-shutdown/index.html. Cable News Network. Accessed 2020-02-02.

Lusk, J. L. and K. Brooks (2011). Who participates in household scanning panels? *American Journal of Agricultural Economics 93*(1), 226–240.

McCausland, P. (2019). Prolonged shutdown could leave millions without food stamps and hit small businesses. https://www.nbcnews.com/news/us-news/prolonged-shutdown-could-leave-millions-without-food-stamps-hit-small-n955136. NBCUniversal News Group. Accessed 2020-02-02.

Parker, J. A. (1999). The reaction of household consumption to predictable changes in social security taxes. *American Economic Review 89*(4), 959–973.

Rosenbaum, D. (2019). Many SNAP households will experience long gap between monthly benefits despite end of shutdown. *Center on Budget and Policy Priorities*.

Shapiro, J. (2005). Is there a daily discount rate? Evidence from the food stamp nutrition cycle. *Journal of Public Economics 89*(2), 303–325.

Shapiro, M. D. and J. Slemrod (1995). Consumer response to the timing of income: Evidence from a change in tax withholding. *American Economic Review 85*(1), 274–283.

Souleles, N. S. (1999). The response of household consumption to income tax refunds. *American Economic Review 89*(4), 947–958.

Stephens Jr, M. (2003). "3rd of tha month": Do social security recipients smooth consumption between checks? *American Economic Review 93*(1), 406–422.

Stephens Jr, M. (2006). Paycheque receipt and the timing of consumption. *The Economic Journal 116*(513), 680–701.

Tiehen, L., C. Newman, and J. A. Kirlin (2017). The food-spending patterns of households participating in the supplemental nutrition assistance program: Findings from USDA's FoodAPS. Technical report, US Department of Agriculture.

Todd, J. E. (2015). Revisiting the Supplemental Nutrition Assistance Program cycle of food intake: Investigating heterogeneity, diet quality, and a large boost in benefit amounts. *Applied Economic Perspectives and Policy 37*(3), 437–458.

US Department of Agriculture (2019). USDA announces plan to protect SNAP participants' access to SNAP in February. https://www.usda.gov/media/press-releases/2019/01/08/usda-announces-plan-protect-snap-participants-access-snap-february.

US Department of Agriculture (2021). SNAP data tables. https://www.fns.usda.gov/pd/supplemental-nutrition-assistance-program-snap.

Wilcox, D. W. (1989). Social Security benefits, consumption expenditure, and the life cycle hypothesis. *Journal of Political Economy 97*(2), 288–304.

Wilde, P. E. and M. S. Andrews (2000). The food stamp program in an era of welfare reform: Electronic benefits and changing sources of cash income. *Journal of Consumer Affairs 34*(1), 31–46.

Wilde, P. E. and C. K. Ranney (2000). The monthly food stamp cycle: shopping frequency and food intake decisions in an endogenous switching regression framework. *American Journal of Agricultural Economics 82*(1), 200–213.

Zaki, M. and J. E. Todd (2021). Price consciousness at the peak of "impatience". *Journal of Human Resources*, 0121–11411.

FIGURE 1: SNAP disbursement timing by state and year

PANEL A: 2018 **PANEL B: 2019**

Legend:
- ■ Disbursement dates
- ■ Early Feb 2019 disbursement
- ▦ Denotes March 2019 disbursement split into halves
- ▨ February
- ▮ Last seven days of month
- **Bold** denotes March or April dates significantly modified
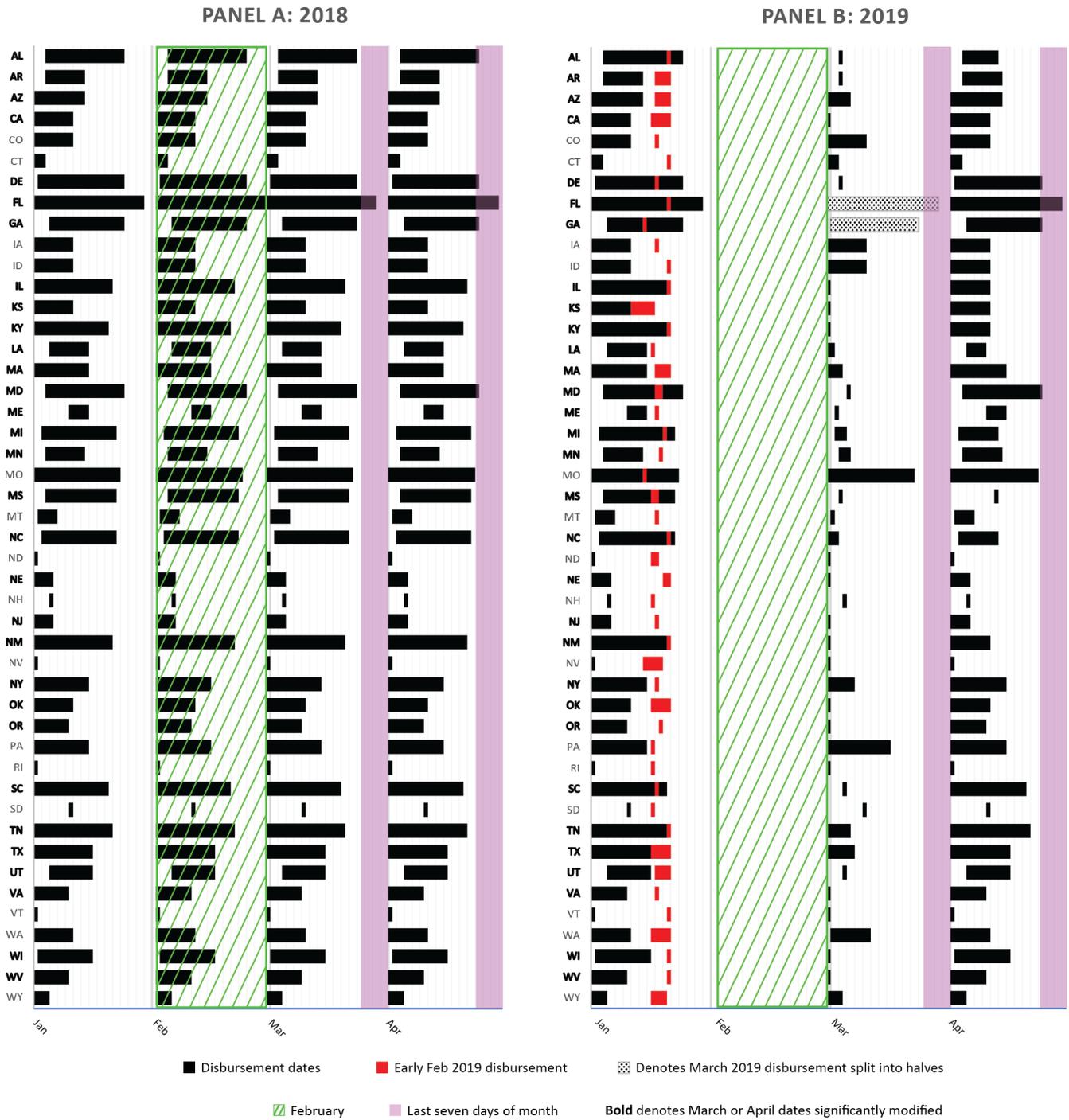
Source: See Data Appendix A6.

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FIGURE 2: Last day of standard disbursement schedule

Panel A: States with unchanged March disbursements

Panel B: States with altered March disbursements
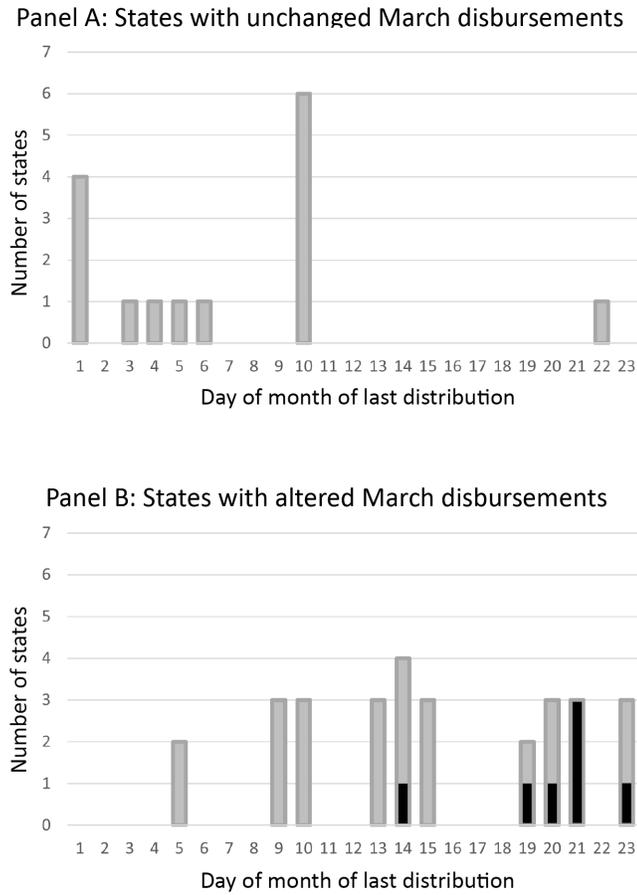
Black bar denotes altered April disbursement.
Unchanged March disbursement states: CO, CT, IA, ID, MO, MT, ND, NH, NV, PA, RI, SD, VT, WA, and WY.
Altered March disbursement states: AL*, AR, AZ, CA, DE, IL*, KS, KY*, LA*, MA, MD, ME, MI*, MN, MS*, NC*, NE, NJ, NM, NY, OK, OR, SC, TN, TX, UT, VA, WI, and WV.
* indicates altered April disbursement as well

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TABLE 1: Impacts of early disbursement on household expenditures

	Household expenditure				
	Monthly		First two weeks	Last two weeks	Last week
	(1)	(2)	(3)	(4)	(5)
Early benefit	-31.19***	-31.23***	-9.56	-21.67***	-11.46***
	(11.11)	(10.66)	(6.69)	(5.66)	(3.51)
2019	19.53***	22.59***	14.59***	8.00***	3.53***
	(3.69)	(3.55)	(2.23)	(1.89)	(1.17)
Household controls	No	Yes	Yes	Yes	Yes
February 2018 expenditure	529.19	529.19	265.53	263.65	136.24
Relative effect (% change)	-5.89	-5.90	-3.60	-8.22	-8.41
Observations	88,278	88,278	88,278	88,278	88,278

Notes: The dependent variable in columns (1) and (2) is total expenditure during the first 28 days of a calendar month. In column (3) the dependent variable is expenditure during the first two weeks of a calendar month, in column (4) expenditure during the last two weeks and in column (5) expenditure during the last week of a calendar month. Relative effect is calculated by dividing the coefficient on *Early benefit* by average expenditure during that period in February 2018. Month fixed effects are included in all columns. Household controls include household income (13 bins), size, an indicator for the presence of children, type of residence (one family house, one family condo/coop, two family house, two family condo/coop, three plus family house, three plus family condo/coop, mobile home or trailer), marital status (married, widowed, divorced/separated, single), race (white, black, asian, other), an indicator for Hispanic origin, employment (not employed for pay, under 30 hours, 30-34 hours, 35 plus hours), education (grade school, some high school, graduated high school, some college, graduated college, post college graduate), and age of head of household (under 25, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-64, 65 plus) and state fixed effects. *, **, *** mean statistical significance at the 90, 95, and 99 percent level.

TABLE 2: Robustness checks on early disbursement on household expenditures

Panel A: SNAP ineligible households	
Early benefit	-2.42
	(4.86)
2019	1.29
	(1.62)
Feb 2018 monthly expenditure	$ 553.27
Relative effect (% change)	-0.89
Observations	365,877
Panel B: Placebo shutdown	
Early benefit	9.61
	(9.74)
2018	1.72
	(3.25)
Feb 2017 monthly expenditure	$ 517.53
Relative effect (% change)	1.85
Observations	91,765

Notes: Panel A shows results from the estimation of equation (1) for SNAP ineligible households. Panel B shows equation (1) estimated for SNAP eligible households assuming a placebo shutdown occurred in January 2018 and affected payments in February 2018 as opposed to February 2019. The outcome variable is monthly expenditure during the first 28 days of a calendar month. Refer to Table 1 notes for details on the control variables. *, **, *** mean statistical significance at the 90, 95, and 99 percent level.

	(1)	(2)	(3)
Altered schedule	-10.95**	-10.44**	–
	(4.99)	(5.05)	
Days since disbursement	–	–	-1.73**
			(0.72)
2019	5.25	5.81	5.20
	(3.44)	(3.55)	(3.23)
Household controls	No	Yes	Yes
March 2018 weekly expenditure	$135.50	$135.50	$135.50
Relative effect (% change)	-8.08	-7.71	-1.28
Observations	17,494	17,494	17,494

Notes: The dependent variable is total expenditure during the last seven days of the month. *Altered schedule* is an indicator variable equal to 1 if the observation is in a state, month, and year in which SNAP benefits were distributed earlier than the normal disbursement schedule. *Days since disbursement* is the expected number of days between the end of the month and the receipt of the previous SNAP benefit. March 2018 weekly expenditure is the average expenditure during the last week of March 2018. Relative effect is calculated by dividing the coefficient of the interaction term by average expenditure during the last week of March 2018. Refer to Table 1 notes for details on the control variables. *, **, *** denote statistical significance at the 90, 95, and 99 percent level. Standard errors clustered by state in parentheses.
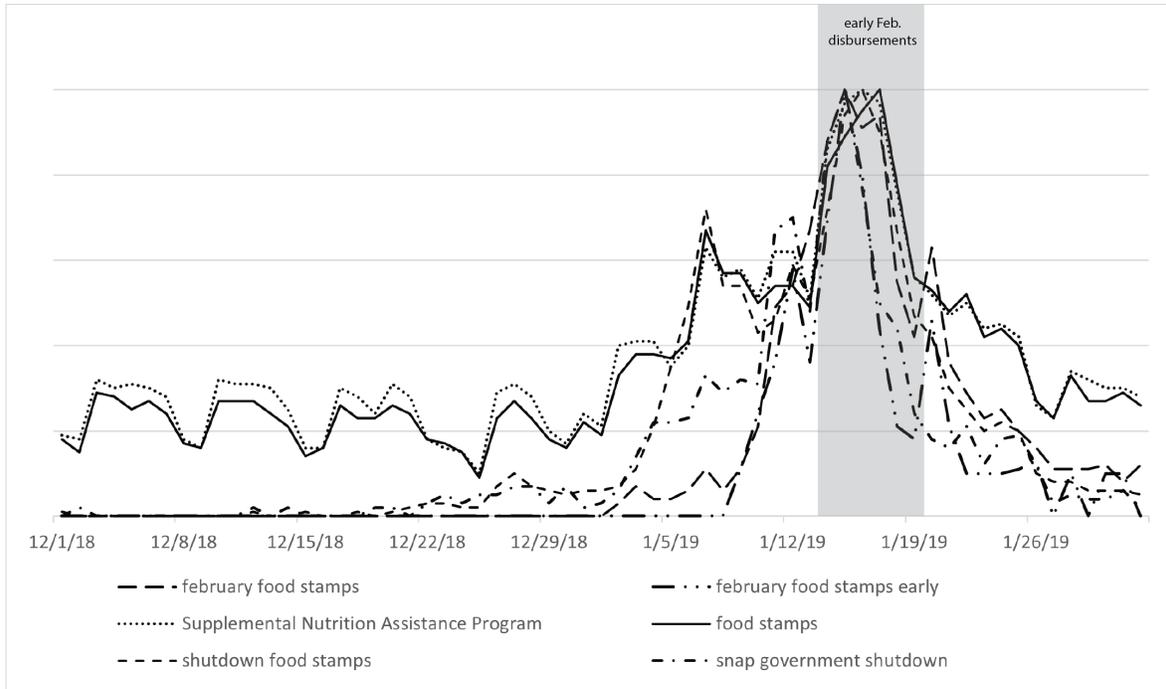
Appendix A

FIGURE A1: US Google search relative volume on keywords

Source: Google Trends.

TABLE A1: Household descriptive statistics by eligibility

	Eligible	Ambiguous	Ineligible
Demographics:			
Married	40.3 (49.1)	45.8 (49.8)	51.4 (50.0)
White	78.2 (41.3)	82.2 (38.3)	81.3 (39.0)
Hispanic origin	7.9 (27.0)	7.4 (26.2)	6.3 (24.2)
Household size: 1 member	37.5 (48.4)	36.0 (48.0)	36.9 (48.2)
Household size: 2 members	22.8 (41.9)	33.4 (47.2)	40.8 (49.2)
Household size: 3 members	14.5 (35.2)	12.4 (32.9)	11.2 (31.5)
Household size: 4+ members	25.2 (43.4)	18.2 (38.6)	11.1 (31.4)
Head of household is employed	34.8 (47.6)	36.7 (48.2)	52.6 (49.9)
Household head ≤ high school degree	33.4 (47.2)	35.0 (47.7)	27.6 (44.7)
Household head some college	33.4 (47.2)	34.9 (47.7)	32.2 (46.7)
Household head ≥ college degree	28.0 (44.9)	26.9 (44.4)	38.2 (48.6)
At least a child under 18 present	29.6 (45.6)	22.4 (41.7)	15.6 (36.3)
Head of household age < 35	10.7 (30.9)	9.2 (28.9)	8.9 (28.5)
Head of household age 35-49	25.7 (43.7)	18.9 (39.1)	19.6 (39.7)
Head of household age 50-64	39.1 (48.8)	37.6 (48.5)	36.9 (48.2)
Income and spending:			
Annual Income < 10,000	27.8 (44.8)	-	-
Annual Income 10,000-14,999	34.3 (47.5)	-	-
Annual Income 15,000-24,999	25.1 (43.3)	69.4 (46.1)	5.9 (46.1)
Annual Income 25,000-34,999	10.4 (30.5)	22.4 (41.7)	23.6 (42.5)
Annual Income 35,000-44,999	2.2 (14.7)	7.0 (25.5)	27.1 (44.5)
Annual Income > 45,000	0.4 (6.0)	1.2 (10.9)	43.3 (49.6)
Monthly Spending	548.4 (482.5)	558.5 (451.9)	607.2 (473.6)
Predicted benefit amount	224.6	95.4	-
Region:			
Northeast	16.0 (36.6)	17.8 (38.2)	17.1 (37.7)
Midwest	19.8 (39.9)	19.4 (39.5)	21.3 (40.9)
South	43.7 (49.6)	42.1 (49.4)	41.9 (49.4)
West	20.5 (40.4)	20.7 (40.5)	19.7 (39.8)
Number of households	5,063	2,582	20,701

Notes: Column (1) shows descriptive statistics in percentage points for SNAP eligible households. Column (2) shows descriptive statistics for SNAP ambiguous households. Column (3) shows descriptive statistics for SNAP ineligible households. Data from 2018 Nielsen Consumer Panel. Standard deviation in parenthesis.

TABLE A2: Product classification: select products by category

Category	Nielsen department	Example products
SNAP eligible perishable	Dairy	Milk, cheese, yogurt, butter, eggs, biscuit dough, pudding
	Packaged meat	Lunch meat, hot dogs, sausage, fresh meat, bacon
	Fresh produce	Apples, oranges, herbs, spinach, potatoes, onions, mushrooms
SNAP eligible non-perishable	Dry grocery	Pasta, nuts, dry spices, carbonated beverages, fruit juices, candy, snacks, pet foods
	Frozen foods	Pizza, waffles, prepared entrees, poultry, Breaded seafood, ice cream, desserts, frozen fruits and vegetables
	Deli	Salad dressings, sandwiches, entrees, condiments, ready made salads
Non-SNAP eligible	Health and beauty aids	Toothpaste, perfume, deodorant, cosmetics, shampoos, feminine hygiene, baby needs such as high chairs and car seats
	Non-food grocery	disposable diapers, detergents, soaps, baby wipes, trash bags, aluminum foil, tobacco, pet chews
	Alcohol	Wine, beer, bourbon, rum, gin
	General merchandise	Stationary, school supplies, kitchen gadgets, tools, sporting goods, toys, DVD videos

TABLE A3: Impacts on expenditures of early disbursement by product category

	SNAP eligible perishable	SNAP eligible non-perishable	Non-SNAP eligible	Unclassified
	Panel A: Expenditure full month			
Early benefit	-2.78***	-13.84***	-4.11*	-10.42**
	(0.74)	(2.44)	(2.35)	(4.26)
2019	-0.24	5.52***	7.34***	9.44***
	(0.39)	(1.50)	(1.78)	(2.52)
Household controls	Yes	Yes	Yes	Yes
February 2018 expenditure	55.24	192.76	130.89	151.00
Relative effect (% change)	-5.03	-7.18	-3.14	-6.9
	Panel B: Expenditure last two weeks			
Early benefit	-1.22***	-6.35***	-5.78***	-8.79***
	(0.45)	(1.64)	(1.47)	(3.11)
2019	-0.01	2.50**	3,46***	2.44*
	(0.21)	(0.99)	(0.97)	(1.35)
Household controls	Yes	Yes	Yes	Yes
February 2018 expenditure	26.32	91.74	66.13	79.85
Relative effect (% change)	-4.63	-6.92	-8.74	-11.00
Observations	88,278	88,278	88,278	88,278

Notes: Perishable goods are products in the Nielsen diary, packaged meat, and fresh produce departments. Non-perishables are products in the Nielsen dry grocery, frozen food, and deli departments. Non-SNAP eligible goods are in the health and beauty aids, non-food grocery, alcohol, and general merchandise Nielsen departments. Unclassified goods include all goods without a UPC code description and Nielsen's "Magnet data product" department. An alternative specification classifying deli goods as perishables yields similar results. Relative effect is calculated by dividing the coefficient on *Early benefit* by average expenditure during that period in February 2018. Refer to Table 1 notes for details on the control variables. *, **, *** mean statistical significance at the 90, 95, and 99 percent level.

TABLE A4: Impacts of early disbursement on household expenditures by subgroups

PANEL A: Expenditures by education of household's head	High school or less	More than high school
Early benefit	-26.99	-33.37**
	(19.42)	(13.54)
2019	13.27**	22.81***
	(6.45)	(4.49)
February 2018 expenditure	528.73	529.43
Relative effect (% change)	-5.11	-6.33
Predicted benefit amount	217.89	227.44
Observations	30,016	58,262

PANEL B: Expenditures by race	Non-white	White
Early benefit	-19.83	-34.25***
	(25.94)	(12.20)
2019	33.13***	14.99***
	(8.60)	(4.05)
February 2018 expenditure	534.33	527.76
Relative effect (% change)	-3.85	-6.43
Predicted benefit amount	256.21	214.90
Observations	19,860	68,418

PANEL C: Expenditures by working status	Non-working	Working
Early benefit	-21.91	-41.10**
	(13.86)	(17.78)
2019	4.80	39.50***
	(4.61)	(5.89)
February 2018 expenditure	487.26	576.86
Relative effect (% change)	-4.49	-7.23
Predicted benefit amount	186.21	268.47
Observations	47,515	40,763

PANEL D: Expenditures by presence of children	No children	Children
Early benefit	-14.46	-71.51***
	(12.05)	(24.14)
2019	18.20***	31.44***
	(4.01)	(7.98)
February 2018 expenditure	471.99	667.44
Relative effect (% change)	-3.06	-10.78
Predicted benefit amount	168.98	361.50
Observations	62,961	25,317

Notes: The dependent variable is total monthly expenditure. Relative effect is calculated by dividing the coefficient of *Early Benefit* by average monthly expenditure. Refer to Table 1 notes for details on the control variables. For families with more than one head of household, level of education in panel A is determined as the maximum level of education between the female and the male head. In panel C, we classify households as working if at least one of the household heads works. In panel D, households with children are those where at least a child under age 18 is present at home.

TABLE A5: SNAP eligible households by March 2019 disbursement schedule

	Altered disbursement schedule	Unchanged disbursement schedule
State characteristics:		
March 2019 deviation, days	-5.9 (2.3)	0.1 (0.3)
Normal disbursement spread	14.2 (4.6)	10.0 (6.1)
Normal last disbursement day	15.1 (4.9)	10.3 (5.8)
Number of states	29	15
Demographics:		
Married	39.9 (49.0)	36.9 (48.3)
White	75.5 (43.0)	86.6 (34.0)
Hispanic origin	8.4 (27.7)	5.0 (21.9)
Household size: 1 member	37.6 (48.5)	42.2 (49.4)
Household size: 2 members	23.4 (42.4)	21.2 (40.9)
Household size: 3 members	13.7 (34.4)	13.6 (34.3)
Household size: 4+ members	25.2 (43.4)	22.9 (42.0)
Head of household is employed	35.4 (47.8)	32.0 (46.7)
Household head ≤ high school degree	38.1 (48.6)	41.0 (49.2)
Household head some college	34 (47.4)	31.4 (46.4)
Household head ≥ high school degree	27.9 (44.8)	27.6 (44.7)
At least a child under 18 present	28.7 (45.2)	27.9 (44.9)
Head of household age < 35	10.5 (30.6)	9.4 (29.2)
Head of household age 35-49	26.3 (44)	24.7 (43.1)
Head of household age 50-64	38.5 (48.7)	36.8 (48.2)
Income and spending:		
Annual income <10,000	28.4 (45.1)	28.9 (45.3)
Annual income 10,000-14,999	33.8 (47.3)	36.3 (48.1)
Annual income 15,000-24,999	25.4 (43.5)	24 (42.7)
Annual income 25,000-34,999	10.2 (30.2)	8.5 (27.9)
Annual income 35,000-44,999	1.9 (13.7)	2.0 (13.9)
Annual income >45,000	0.3 (5.5)	0.3 (5.7)
Monthly spending	601.39 (574.68)	610.97 (552.60)
Region:		
Northeast	13.5 (34.1)	38.8 (48.7)
Midwest	20.7 (40.5)	26.5 (44.1)
South	46.2 (49.9)	0 (0)
West	19.6 (39.7)	34.7 (47.6)
Number of households	3,464	913

Notes: Altered disbursement schedule signifies states for which SNAP benefits were distributed earlier than the normal disbursement schedule in March of 2019. Normal disbursement spread is the number of days over which SNAP distributions occur in the given state during normal years. Standard deviation in parenthesis.

TABLE A6: Disbursement timing and sources

State	Normal Dates[a]	Feb 2019 Dates[c]	March 2019 Dates[c]
AL	1	Jan 20	4
AR	4-13	Jan 17-20	4
AZ	1-13	Jan 17-20	1-6
CA	1-10	Jan 16-20	1
CO	1-10	Jan 17	unchanged
CT	1-3	Jan 20	unchanged
DE	2-23	Jan 17	4
FL	1-28	Jan 20	split into two
GA	5-23	Jan 14	split into two
IA	1-10	Jan 17	unchanged
ID	1-10	Jan 20	unchanged
IL	1-20	Jan 20	1
KS	1-10	Jan 16	1
KY	1-19	Jan 14-20	1
LA	5-14	Jan 16	1-2
MA	1-14	Jan 17-20	1-4
MD	4-23	Jan 17-18	6
ME	10-14	Jan 17	3
MI	3-21	Jan 19	3-5
MN	4-13	Jan 18	4-6
MO	1-22	Jan 14	unchanged
MS	4-21	Jan 16-17	4
MT	2-6	Jan 17	2
NC	3-21	Jan 20	1-3
ND	1	Jan 16-17	unchanged
NE	1-5	Jan 19-20	1
NH	5	Jan 16	unchanged
NJ	1-5	Jan 17	1
NM	1-20	Jan 20	1
NV	1	Jan 14-18	unchanged
NY	1-14	Jan 17	1-7
OK	1-10	Jan 16-20	1
OR	1-9	Jan 18	1
PA	1-10	Jan 16	unchanged
RI	1	Jan 16	unchanged
SC	1-19	Jan 17	5
SD	10	Jan 16	unchanged
TN	1-20	Jan 20	1-6
TX	1-15	Jan 15-20	1-7
UT	5-15	Jan 17-20	5-7
VA	1-9	Jan 17	1
VT	1	Jan 20	unchanged
WA	1-10	Jan 16-20	2-11
WI	2-15	Jan 20	1
WV	1-9	Jan 20	1
WY	1-4	Jan 16-19	unchanged

[a]All standard disbursement schedules obtained from United States Department of Agriculture, "Supplemental Nutrition Assistance Program (SNAP) Monthly Issuance Schedule for All States and Territories." Business days are reported here for PA while calendar days are reported for all other states because PA is the only state for which the normal disbursement schedule is based on the number of business days elapsed rather than calendar days.

[b] Authors infer early February disbursement dates for 12 states (KS, KY, LA, MN, MO, MS, ND, NH, NV, RI, SD, and TX) from historical Google search volume on the terms "SNAP", "Food Stamps", and "EBT" for the state in question. A spike in search interest on these terms consistently accompanies known early disbursement dates in other states. If the upper bound is not clear in the published record, we base it on the federal stipulation that all February benefits must be paid on or before January 20th.

AL: Gore, Leada. "Alabama Paying Food Stamp Benefits Early." AL.com, 15 Jan. 2019

AR: Briggs, Zack, and Associated Press. "Arkansas to Issue February Food Stamps Early Due to Shutdown." KATV, 15 Jan. 2019

AZ: Radwany, Sam. "Arizona Food Stamps to Be Issued Early amid Shutdown." KGUN, 14 Jan. 2019.

CA: Bloom, Tracy. "California Advances February Payment of CalFresh Benefits Due to Government Shutdown." KTLA, 15 Jan. 2019

CO: Arapahoe County, CO. "Important Notice for Food Recipients: - Official Website." Arapahoe County, CO - Official Website, 16 Jan. 2019.

CT: "How Does the Government Shutdown Affect Federal Programs?" CTLawHelp, Jan. 2019. DC: "Federal Government Shutdown: Frequently Asked Questions for SNAP Customers." DC Department of Human Services, 18 Jan. 2019.

DE: Kuang, Jeanne. "Government Shutdown over, but SNAP Recipients in Delaware Feel Lingering Effects." Delaware News Journal, 23 Feb. 2019.

FL: Florida Department of Children and Families. "SNAP Partial Shutdown FAQs."

GA: "DFCS Issues Monthly Food Stamp Benefits Early during Partial Federal Government Shutdown." Division of Family & Children Services | Georgia Department of Human Services, 14 Jan. 2019.

IA: Flesher, Charles. "Iowans' Food Assistance Arriving Early Because of Shutdown." Des Moines Register, 17 Jan. 2019.

ID: Dimico, Nick. "Idaho, Other States Release Food Stamps Early amid Shutdown." KHQ Right Now, 17 Jan. 2019.

IL: KHQA Newsroom. "Illinois SNAP Benefits Coming Early Thanks to Government Shutdown." KHQA, 16 Jan. 2019.

IN: Associated Press. "Indiana Issuing Food Stamps Early Due To Government Shutdown." CBS Chicago, 11 Jan. 2019.

MA "January 17, 2019 Update from the Department of Transitional Assistance on February SNAP Program Impact Due to Partial Federal Government Shutdown." Mass.gov, 17 Jan. 2019.

MD: "Government Shutdown Puts Federal Food Stamp Program In Jeopardy." NPR, 22 Jan. 2019.

ME: WGME. "Gov. Mills Says Shutdown Is Negatively Impacting Maine Families." 15 Jan. 2019.

MI: 13 On Your Side staff. "Michigan Officials Plan to Issue February Food Stamps Early Due to Shutdown." WZZM, 14 Jan. 2019.

MS: Gagliano, Steven. "SNAP Benefits to Be Issued Early Due to Shutdown." News Mississippi, 14 Jan. 2019.

MT: "Montana to issue February SNAP food benefits early due to partial government shutdown." Montana DPHHS, 15 Jan. 2019.

NC: "Federal Government Shutdown." NCDHHS.

NE: Zozaya, José. "Nebraska DHHS: February SNAP Benefits Will Be Issued Jan. 20." KETV, 16 Jan. 2019.

NJ: Mbasalik. "Department of Human Services: N.J. SNAP Recipients Receive February Benefits." NJ Department of Human Services, 18 Jan. 2019.

NM: Governor Michelle Lujan Grisham, Secretary David R. Scrase, M.D., "All SNAP food assistance benefits for March will be issued Feb. 28, 2019" New Mexico Human Services Department, February 18, 2019.

NY: "New York State Announces February SNAP Benefits Being Issued Early Due to Federal Government Shutdown." New York State Office of Temporary and Disability Assistance, 14 Jan. 2019.

OH: Evich, Helena Bottemiller, and Eric Wolff. "States Warn Food Stamp Recipients to Budget Early Benefit Payments Due to Shutdown." POLITICO, 15 Jan. 2019.

OK: Associated Press. "Oklahoma Joins States Issuing February Food Benefits Early during Shutdown." Oklahoman, 15 Jan. 2019.

OR: Miner, Colin. "Oregon Food Stamps Arriving Early Because Of Government Shutdown." Portland, OR Patch, 14 Feb. 2019.

PA: Lubrano, Alfred. "Because of Shutdown, February Food Stamps Disbursed on Wednesday." The Philadelphia Inquirer, 16 Jan. 2019.

SC: "South Carolina Issuing March SNAP Benefits Early" South Carolina Department of Social Services, 19 Feb. 2019.

TN: Stoneking, Mary Grace, and Russ Overby. "Federal Shutdown May Leave More than 900,000 Hungry in Tennessee: Opinion." The Tennessean, Nashville Tennessean, 16 Jan. 2019.

UT: Associated Press. "Food-Stamp Recipients Urged to Ration as Shutdown Continues." Daily Herald, 17 Jan. 2019.

VA: O'Connor, Katie, et al. "Virginia SNAP Recipients to Receive February Benefits Early Due to Government Shutdown." Virginia Mercury, 15 Jan. 2019.

VT: Tan, Tiffany, and Bennington Banner. "Vermont to Issue February Food Benefits Early Due to Shutdown." The Bennington Banner, 14 Jan. 2019.

WA: Groover, Heidi. "Food assistance benefits will arrive early for Washington residents due to government shutdown." The Seattle Times, 17 Jan. 2019.

WI: WSAW Staff. "March FoodShare Benefits not impacted by government shutdown." WSAW Fox 7, 8 Feb. 2019.

WV: "Early Payment of SNAP Benefits" WV Department of Health & Human Resources, 15, Jan. 2019.

WY: Dixon, Kayla. "SNAP benefits for February will be distributed early." Wyoming News Now, 15 Jan. 2019.

[c]All adjusted March and April disbursement schedules obtained from "How the Government Shutdown Affected EBT and Food Stamp (SNAP) Benefits." Fresh EBT, 29 Apr. 2019, www.freshebt.com/blog/government-shutdown-ebt-food-stamp-benefits/.

TABLE A7: Robustness checks on altered state disbursement timing on household expenditures

Panel A: SNAP ineligible households	
Altered schedule	-2.29
	(2.48)
2019	-2.71
	(1.91)
March 2018 expenditure	$148.41
Relative effect (% change)	-1.5
Observations	72,033
Panel B: Placebo shutdown	
Altered schedule	3.16
	(4.50)
2018	7.57**
	(2.95)
March 2017 expenditure	$120.25
Relative effect (% change)	1.80
Observations	18,239

Notes: The dependent variable is total expenditure during the last seven days of the month. Panel A shows estimates of the effects for SNAP ineligible households with incomes less than $60,000. Panel B shows diff-in-diff regression estimates for SNAP eligible households using data from 2017 and 2018, assuming a placebo shutdown occurred in January 2018 and affected payments in February 2018 as opposed to February 2019. *Altered schedule* is an indicator variable equal to 1 if the observation is in a state, month, and year in which SNAP benefits were distributed earlier than the normal disbursement schedule. March 2018 weekly expenditure is the average expenditure during the last week of March 2018. Relative effect is calculated by dividing the coefficient of the interaction term by average expenditure during the last week of March 2018. Refer to Table 1 notes for details on the control variables. *, **, *** denote statistical significance at the 90, 95, and 99 percent level. Standard errors clustered by state in parentheses.

TABLE A8: Impacts of early disbursement on SNAP eligible and SNAP ambiguous household expenditures

	Household expenditure				
	Monthly		First two weeks	Last two weeks	Last week
	(1)	(2)	(3)	(4)	(5)
Early benefit	-26.08***	-26.08***	-8.19*	-17.89***	-12.94***
	(8.08)	(7.79)	(4.59)	(4.52)	(2.78)
2019	10.73***	14.23***	9.20***	5.03***	3.82***
	(2.69)	(2.60)	(1.53)	(1.51)	(0.93)
Household controls	No	Yes	Yes	Yes	Yes
February 2018 expenditure	517.68	517.68	259.38	258.30	133.47
Relative effect	-5.04	-5.04	-3.16	-6.93	-9.69
Observations	135,756	135,756	135,756	135,756	135,756

Notes: The dependent variable in columns (1) and (2) is total expenditure during the first 28 days of a calendar month. In column (3) the dependent variable is expenditure during the first two weeks of a calendar month, in column (4) expenditure during the last two weeks and in column (5) expenditure during the last week of a calendar month. Relative effect is calculated by dividing the coefficient on *Early benefit* by average expenditure during that period in February 2018. Refer to Table 1 notes for details on the control variables. *, **, *** mean statistical significance at the 90, 95, and 99 percent level.

TABLE A9: Impacts of altered state disbursement timing on SNAP eligible and ambiguous household expenditures

	(1)	(2)	(3)
Altered schedule	-6.35	-6.29	–
	(3.83)	(3.95)	
Days between disbursements	–	–	-1.08**
			(0.54)
2019	-0.54	0.37	0.12
	(2.58)	(2.71)	(2.62)
Household controls	No	Yes	Yes
March 2018 weekly expenditure	$133.98	$133.98	$133.98
Relative effect (% change)	-4.74	-4.70	-0.81
Observations	26,750	26,750	26,750

Notes: The dependent variable is total expenditure during the last week of the month. *Longer wait* is an indicator variable equal to 1 if the time between disbursements for the average SNAP recipient was more than two days greater in 2019 than 2018. Δ *days between disbursements* is the expected number of days between SNAP disbursements in 2019. March 2018 daily expenditure is the average daily expenditure during the last week of March 2018. Relative effect is calculated by dividing the coefficient of the interaction term by average expenditure during the last week of March 2018. Refer to Table 1 notes for details on the control variables. *, **, *** denote statistical significance at the 90, 95, and 99 percent level. Standard errors clustered by state in parentheses.