

Government Shutdown and SNAP Disbursements: Effects on Household Expenditures *

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Abstract

We test the ability of SNAP eligible households to respond to a temporary change in benefit timing. We exploit the 2018-19 US government shutdown in which all states were federally mandated to pay February SNAP benefits in January. 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. Using a triple differences approach, we show that expenditures are lower in February (relative to other months) 2019 (relative to 2018) for SNAP recipients (relative to near-eligible households). 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. Diff-in-diff estimates show that SNAP eligible households in those states reduced spending. Our findings are inconsistent with the permanent income hypothesis and suggest that the timing of benefits matters for household consumption.

JEL Codes: D12, I3, I38

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1 Introduction

A large literature 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 documenting a sharp increase in household spending on the day that a paycheck or transfer payment arrives. For example, studies use variation in the timing of unemployment insurance ([East and Kuka 2015](#)), taxes and tax withholding ([Parker 1999](#); [Shapiro and Slemrod 1995](#); [Souleles 1999](#)), paychecks ([Carvalho et al. 2016](#); [Gelman et al. 2014](#); [Stephens Jr 2006](#)), social security ([Stephens Jr 2003](#); [Wilcox 1989](#)), SNAP benefits ([Shapiro 2005](#); [Hastings and Washington 2010](#)), and cash transfers ([Angelucci et al. 2021](#)).

This paper investigates households' ability to smooth consumption expenditures using a unique natural experiment that generated an *unexpected* temporary change in the timing of benefits for households eligible for the Supplemental Nutrition Assistance Program (SNAP). The SNAP program provides monthly benefits to households. While states vary in the number of distribution days per month, a given household receives all SNAP benefits on the same day each month as a lump sum. We take advantage of exogenous variation in the timing of benefits generated by the 2018-19 federal government shutdown. The protracted length of which put SNAP recipients at risk to miss transfer payments for the first time since the start of the program ([McCausland 2019](#); [Luhby 2019](#)).¹ To avoid this risk, on January 8, 2019, the USDA mandated that, in 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.² The government shutdown

¹In 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.

²Specifically, 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.

ended on January 25, 2019 and states were able to return to their normal disbursement schedules for the March SNAP benefit.

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 which caused all SNAP eligible households to receive their transfers unexpectedly early. We use a triple differences approach and compare household retail expenditures in February (relative to other months with unchanged disbursement schedules) 2019 (relative to 2018) for SNAP eligible households (relative to near-eligible households, i.e. households just above the SNAP eligibility criteria). Using the Nielsen Homescan data, which provides daily detailed retail expenditures for a national sample of SNAP eligible and near-eligible households, we find that SNAP eligible households reduce spending in February 2019. The decrease in expenditures is concentrated in the latter part of the calendar month when budget constraints are more severe. As a robustness check we show that, when we assume the shutdown occurred a year earlier, we do not observe such an effect.

Second, we exploit state-level variation. All states have pre-existing SNAP disbursement schedules which determine the day that 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, 29 states advanced SNAP benefits in March and April of 2019. This generates a second natural experiment. We compare the change in household expenditures for SNAP eligible households 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 the group of states

with unaltered March and April disbursement schedules. Estimates show a reduction in the end of the month spending of \$10.44 (off a base of \$135.50) in the set of states that advanced benefits compared to states with unaltered distribution schedules. No such response is observed for near-eligible households. These results reinforce our previous finding that a temporary change in the timing of the SNAP benefits influences the timing of consumption.

Our study contributes to the literature of the timing of transfer payments and household wellbeing. Current 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; Byrne and Just 2021; Hamrick and Andrews 2016; Dorfman et al. 2019). 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), at the end of the SNAP distribution cycle, caloric intake decreases (Shapiro 2005), diet quality worsens (Kuhn 2018; Todd 2015), and self-reported food insecurity increases (Gregory and Smith 2019).³ We complement this literature with a novel natural experiment associated with the government shutdown. While our identification is different, our results reinforce this literature's finding of an inability to smooth consumption among SNAP recipients. Moreover, our study speaks to the policy discussion surrounding optimal benefits amount and frequency of benefits (Holt et al. 2009). Some benefits, like the EITC, are annual (thus larger) while others are monthly (thus smaller). Considering that most recurring expenditures have a monthly frequency, this argues that households would benefit from receiving payments at a similar frequency. However, less frequent but larger benefits allow

³The literature also reports lower test scores (Bond et al. 2022), higher rates of domestic violence (Carr and Packham 2020), more emergency room visits (Cotti et al. 2020) and higher rates of property crime (Carr and Packham 2019) just prior to receiving monthly SNAP benefits.

for larger purchases and may require less bandwidth (Aguila et al. 2017). Additionally, recipients prefer lumpier payments (Kansikas et al. 2023). Our findings suggest that bimonthly (thus larger) benefits do not eliminate lumpy consumption, suggesting that larger benefits might not enable households to smooth consumption.

Our study also contributes to the PIH literature by studying the effect of *unexpected* and exogenous changes in SNAP disbursement on household expenditures. While there is a large literature on expected changes in income, less is known about the effects of unexpected changes in the timing of income.⁴ An exception is Baker and Yannelis (2017) who exploit variation in the timing of paychecks that occurred due to the 2013 federal shut-down and show that furloughed government workers experienced temporary decreases in consumption.

2 SNAP Benefits and Data

The U.S. Supplemental Nutrition Assistance Program (SNAP), formerly called Food Stamps, provides monthly food assistance to eligible households. The program is federally funded. SNAP benefit levels are progressive according to standards that are uniform across the 48 continental United States. SNAP households received on average \$258 per month in 2019 (US Department of Agriculture 2021). SNAP benefits are an important part of household income: for a three member family, with one full time worker earning \$10 per hour, SNAP boosts income by around 22% (Center on Budget and Policy Priorities 2019). While generous, SNAP benefits are nevertheless generally insufficient to cover a household's food expenses (Center on Budget and Policy Priorities 2021). SNAP program participation has been consistently shown to lower food insecurity and to improve household welfare (East 2020). Eligibility for SNAP is broader than for most other U.S. social safety net programs. There are federal eligibility guidelines but some states extend SNAP benefits to house-

⁴More generally, there is a large literature on the timing and frequency of SNAP benefits and cash transfers (e.g. Cotti et al. (2021); Aguila et al. (2017))

holds receiving TANF or MOE funded benefits.⁵ The USDA estimates that in 2018, 43.9 million Americans were eligible to receive SNAP ([Cunnyngham 2021](#)). Households that meet federal guidelines have guaranteed eligibility. The federal guidelines are mostly a function of household income and household size.

The SNAP program is administered at the state level. Eligible households receive benefits once per month. These benefits are disbursed at predetermined times according to the state's idiosyncratic scheduling criteria. There is much state-level heterogeneity in the distribution schedules, with some states distributing to all eligible households on a single day of the month and others distributing over a wide window of days according to some arbitrary household trait (e.g. last name or social security number).

For our analysis we use the 2018 and 2019 Nielsen Homescan Consumer Panel. This dataset contains detailed information about every retail purchase across a large, national sample.⁶ Nielsen contains approximately 1.4 million individually identifiable products in ten 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 Nielsen that occurs in 2018 and 2019. The Nielsen data is commonly used ([Aguiar and Hurst 2007](#); [Broda et al. 2009](#)), but 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 respondent's sex, age, race, household income

⁵Maintenance Of Effort (MOE) refers to federally required state-level funding of TANF related services. A state must spend at least 80% (or 75%, if the state meets the TANF overall and two-parent participation rate requirements) of a state-specific historic expenditure level on TANF eligible families for specific purposes.

⁶The 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 particular, 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](#)).

(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. \(2017\)](#). To help ensure we have a comparable group of households in the federal experiment, we limit the sample to households with annual income below \$60,000. However, results are robust to alternative income thresholds, such as \$50,000 and \$70,000. For each year of the sample we overlay Nielsen’s household income bin and household size data onto the USDA’s gross income limits for household sizes to generate three mutually exclusive categories: SNAP near-eligible, SNAP eligible and SNAP ambiguous.⁷ These categories only capture household eligibility, not participation, therefore our estimates must be considered Intent-To-Treat. “Near-eligible” 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.⁸ 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 for a family of size 2 was \$21,408. Thus, households near the bottom of Nielsen’s

⁷30 states and the District of Columbia opt to increase the number of SNAP eligible households by automatically extending SNAP benefits to households receiving TANF or MOE funded benefits through Broad Based Categorical Eligibility (BBCE) rules. This allows households with incomes well above the federal gross income limit (130% of the poverty line) to receive SNAP benefits. In theory, this is a large expansion to eligibility, but in practice, research suggests that removing the more generous BBCE income guidelines would reduce total federal SNAP disbursements by only one percent. This reflects the fact that households which are BBCE eligible but not federally eligible have higher incomes and therefore lower benefits than non-BBCE households ([Laird et al. 2014](#)). Given the relative unimportance of SNAP benefits to households that gain eligibility via BBCE we do not include them in our main analysis. However, as a robustness check we collected information on the state-specific BBCE income eligibility guidelines from [Aussenberg and Falk \(2019\)](#) and redefined SNAP eligible, SNAP ambiguous, and SNAP ineligible households using state specific income thresholds according to the BBCE rules. We then re-estimated equation 1 with this sample as shown in table A1, our main results are robust to the inclusion of BBCE households.

⁸Some 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. In some states, BBCE rules increase the asset thresholds, increasing the likelihood that households we classify as eligible are indeed eligible.

bin were eligible while those at the top were ineligible. We exclude these “SNAP ambiguous” households from the analysis. As expected, if we include the SNAP ambiguous households, for whom predicted benefits are smaller, in the analysis and classify them as eligible we find effects that are still statistically significant but attenuated (see Appendix Tables [A2](#) and [A3](#)).⁹

Summary statistics for households that participated in the 2018 and 2019 Nielsen samples by SNAP eligibility status are reported in Table 1. Based on the above definitions, 5,063 and 4,889 households are classified as SNAP eligible and 20,701 and 20,389 households are near-eligible in 2018 and 2019 respectively.¹⁰ 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 \$530 per month in retail establishments, thus SNAP benefits cover a large share of monthly retail expenditures. Only about 29% 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. 23% of eligible households are non-white and 8% of them are of Hispanic origin. As expected, SNAP near-eligible households are better off in terms of income, education and employment. Importantly, monthly retail spending is similar across household type: eligible households spent an average of \$530 per month whereas near-eligible households spent \$582.

⁹Conditional 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.

¹⁰Although the Nielsen dataset is a panel, there is significant annual turnover. Only 2,995 unique households appear in the dataset in both years and are eligible for SNAP benefits in both years.

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. Many SNAP recipients received no advance warning of the double payment (Rosenbaum 2019; Kline and Allyn 2019).¹¹ Google Trends key words provides additional evidence that the early disbursement was a surprise to SNAP recipients. Appendix Figure 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.

We compile data on the timing of the altered SNAP disbursements from state departments of health and human services and state and local media announcements. The altered benefit timing is visualized in Figure 1. Prior to the shutdown, households receiving SNAP benefits were always paid on the same 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 benefits between the 1st and the 10th of the month according to the last digit of the head

¹¹For 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).

of household’s social security number. However, 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 2019.¹²

We exploit the fact that no SNAP eligible household received benefits in February 2019 to test households’ ability to smooth consumption expenditures. In order to isolate the causal effect of unexpectedly early SNAP benefits on consumption, we use a triple differences (DDD) estimator which exploits three dimensions of variation in the receipt of SNAP benefit. First, we compare household expenditures in the shutdown year (2019) to expenditures in the prior year (2018). Second, we compare expenditures in February when the SNAP disbursements were issued in January to other months with normal disbursement schedules. Third, SNAP benefits should only impact consumption for SNAP eligible households, so we compare SNAP eligible vs. near-eligible households.

Specifically, we estimate the following model:

$$Y_{emy} = \beta_1 \text{EarlyBenefit}_{emy} + \gamma_e + \delta_m + \zeta_y + \mu_{ey} + \nu_{my} + \xi_{em} + X_{emy} + \epsilon_{emy} \quad (1)$$

Here, e references a household’s SNAP eligibility status, m denotes month and y denotes year. The year is divided into two time periods (m), the month of February and the months with unaltered distribution schedules. We include all calendar 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 Y_{emy} is a measure of a household’s expenditures on food and non-food purchased at retail establishments. We have daily consumption data covering the years 2018 and 2019 for 51,042 households. We aggregate the daily data into weekly/monthly household expenditure.

¹²The only exception would be the handful of households who were newly eligible in February 2019.

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

Our variable of interest is $EarlyBenefit_{emy}$, which takes the value 1 if a SNAP eligible household received that month's SNAP disbursement in the prior month (i.e. an indicator variable for February 2019).¹⁴ β_1 captures all variation in expenditures specific to SNAP-eligible households (relative to near-eligible households) in the month February (relative to other months) in 2019 (relative to 2018). As mentioned earlier, SNAP eligible households did not receive their SNAP disbursement in February 2019, but they received it in January 2019, because of the shutdown. Our coefficient of interest is β_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 include fixed effects for e , m and y as well as all three sets of two-way fixed effects. The variable μ_{ey} allows household expenditures by SNAP eligible households to vary by year. The month by year fixed effects, ν_{my} , account for the fact that expenditures may be different in February than in other months. And, ξ_{em} allows time period patterns in expenditures to differ by SNAP eligibility status. Finally, we control for socio-demographic characteristics, X_{emy} . Included in X_{emy} are age, race, employment, education, type of residence and marital status of head of household (all in bins).¹⁵ 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. Standard errors are clustered at the state level.

¹⁴Alternatively, we could use variation in the number of days between SNAP disbursements as our variable of interest. We do not use this approach for three reasons. First, many states, especially those where the number of days between disbursements would be very long, altered the timing of the March benefits. We take advantage of this variation in section 4. Second, the majority of states have a disbursement window where the exact day of disbursement is determined by the recipient social security number, SNAP ID number, or last name. We lack this information, so for most households we would be unable to precisely measure the gap between disbursements. We are only able to precisely measure the exact gap between the 2019 February disbursement (which arrived in January) and the 2019 March disbursement for 217 households. Finally, if one focuses on the subset of states that did not alter the March benefits, most recipients experienced a similar number of days between SNAP disbursements. The expected February-March gap was between 43.5 and 48.5 days in 9 out of the 13 states that did not alter the March disbursement (See Appendix Table A5).

¹⁵Nielsen collects information on age, employment and education of 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.

A key identifying assumption is that there were no other contemporaneous shocks that affected expenditures in SNAP eligible households relative to near-eligible households. Important for this assumption to hold is the fact that the 2018-2019 shutdown did not impact other government transfer programs such as TANF or SSI.¹⁶ Hence, it is unlikely that our results are confounded by other government transfers.

Given that the literature has established that SNAP benefits tend to be spent in the beginning of the month (16.5% of benefits are spent on the day of distribution and 77.6% are spent within two weeks of distribution [Castner et al. \(2020\)](#)), 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.¹⁷ 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 2 shows the estimates without household-level controls. We find that SNAP-eligible households in the month February in 2019 reduce their total expenditures by \$28.79 relative to near-eligible households in 2018 in 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

¹⁶Federally 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. While some federal employees received delayed paychecks, they are unlikely to be eligible for SNAP.

¹⁷In 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.

5.4% from a baseline of \$529.19 in February 2018. Column (2) adds a rich set of household controls. The coefficients are similar with the exception of the SNAP eligibility fixed effect, which no longer indicates a statistically significant difference in expenditures between eligible and near-eligible households. The fact that the magnitude of the coefficient of interest is unaltered is reassuring as it suggests that changes in household composition across survey years and eligibility groups do not bias the estimate.

Moreover, columns (3)-(5), show that the effect appears to be more pronounced towards the end of the month. Estimates in column (3) show that the receipt of the February 2019 check in mid January is associated with a not-statistically significant \$5.06 decrease in expenditures during the first two weeks of February. However, during the last two weeks of the month (column 4), eligible households decrease their expenditure by \$23.50 (an 8.91% decrease relative to expenditures in February 2018). And in the last week of the month (column 5), expenditures decrease by \$12.58 (or 9.23% relative effect). Our findings in Table 2 suggest that SNAP eligible households do not smooth their consumption when they receive an unexpected, earlier than usual disbursement.¹⁸

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 A4. We decompose household spending into these four categories and

¹⁸Studies 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 (Cunyngham 2021). Thus, our estimates are likely a lower bound 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.

re-estimate equation (1) with each spending group as a separate dependent variable.

Estimates for monthly spending by product category are shown in Table 3. Household monthly expenditures decrease for perishable and non-perishable SNAP eligible goods as well as for unclassified goods (with a relative decrease in expenditure of 5.82%, 4.56%, and 7.62%, respectively). 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 spending decrease on perishable goods is supportive of households' inability to smooth consumption. Finally, there is no statistically significant effect on spending on non-SNAP eligible products. This suggests that there were not transitory changes in economic conditions in February of 2019 that impacted expenditures for SNAP eligible households compared to near-eligible households.

We also run a robustness check to support the validity of our estimation strategy. Using a placebo treatment variable, we re-estimate equation 1, with Nielsen expenditure data from 2017 and 2018 and assume that the early SNAP disbursement occurred in 2018 instead of 2019. Results in Table 4 replicate Table 2 and suggest that the "fake" early disbursement had no impact on total February 2018 expenditures. For instance the coefficient on *Early Benefit* in column (2), which looks at monthly expenditure, is statistically insignificant and positive. This robustness check supports 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 estimates shown in Table 6.¹⁹ For each subgroup, in addition to the coefficient of interest, we present predicted

¹⁹For 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

benefit amounts for SNAP eligible households using data from the 2018 SNAP quality control database. While estimates in Panels A-C suggest little difference by education or working status and a possible difference by race, coefficients in Panel D suggest that households with children present may be less able to consumption smooth than those without children. Nevertheless, one has to be cautious as predicted benefits are more than twice as large for households with children.²⁰

4 State level disbursement schedule changes

4.1 Identification and Estimation

Our findings suggest that the altered timing of the February 2019 SNAP disbursements, which temporarily increased the number of days between payments, affected households' ability to smooth consumption expenditures. In particular, we observe decreased spending among SNAP recipients when the time gap between benefit receipt and observed spending increases.

Next, we consider a second experiment that leverages preexisting state-level variation in disbursement schedules. In particular, we take advantage of the fact that some states advanced the timing of the March and April 2019 SNAP disbursement - thus increasing the time gap between benefit receipt and observed spending at the end of the calendar month. If households can smooth consumption, known changes in the disbursement schedule should not alter expenditures. However, it is also possible that spending could decrease for households in states where the time gap between benefit receipt and the end of the of the calendar month was exogenously increased. The latter would be consistent with our previous results and much of the SNAP literature.

treatment effects or subgroup heterogeneity.

²⁰An alternative explanation for the larger coefficient on Early benefit is that the take-up rate is much higher for households with children. While the national SNAP participation rate of eligible households is around 82%, it is 96% among households with children [Laufer and Vigil \(2021\)](#). As such there is less attenuation bias for the sample with children.

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 A5, there is heterogeneity in the length of the disbursement window and the final disbursement day.²¹ 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. In order 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 effect of pre-existing disbursement schedules on states' decisions to accelerate March disbursements: Panel A shows the normal last disbursement date for the 15 states that did not advance their March SNAP benefits; and Panel B shows the normal last disbursement date for the 29 states that advanced their March SNAP benefits.²² 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.²³ Thus, whether or not the March disbursement schedule was altered in a given state 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 pre-existing schedule. We find this one characteristic of the preexisting

²¹For 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.

²²We classify Washington as unchanged because it moves the average disbursement by only one day. Results are robust to excluding Washington from the analysis.

²³In 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.

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 2019 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 had returned to their normal disbursement schedule.

Table 7 shows summary statistics for states that accelerated the timing of at least one SNAP disbursement and those that did not. States that left the benefit schedule unchanged have narrower distribution windows and distribute SNAP benefits later in the month. 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 and expenditures are very similar across states that altered their SNAP disbursement 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 that advanced the timing of the SNAP benefits matters for expenditures at the end of the month. Given that households in some states can receive SNAP 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. We use this variation to test the permanent income hypothesis.

In particular, we compare household retail expenditures in states that temporarily advanced the timing of the 2019 March and April SNAP disbursements (relative to states that did not) in 2019 (relative to 2018). We estimate the following differences-in-differences regression using expenditures data for SNAP eligible households from March and April 2018 and 2019:

$$Y_{smy} = \alpha_0 + \alpha_1 \text{Altered Monthly Schedule}_{smy} + \alpha_2 A_y + \alpha_3 B_m + \alpha_4 C_s + X_{smy} + \epsilon_{smy} \quad (2)$$

where Y_{smy} is total household expenditures in the last seven days of the calendar month for a household located in state s in month m and year y . $\text{Altered Monthly Schedule}_{smy}$ is our variable of interest. It is an indicator equal to one if a state distributed SNAP benefits earlier than its normal disbursement schedule in a given month. α_1 estimates the effect, in dollars, of the accelerated SNAP disbursement on consumption expenditures the last seven calendar days of the month. 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_{smy} are the same household controls used in equation (1). Standard errors are clustered at the state level. Our sample for equation (2) considers all SNAP eligible households. As a falsification test, we also estimate this regression for near-eligible households.

4.2 Results

Table 5 reports the estimates for equation (2). Column (1) considers a model without household controls. In March 2018, 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 in states that receive a SNAP payment unexpectedly earlier than usual decrease expenditure in the last week of the month by 8.08% when

compared to states with unchanged distribution schedules. When adding household 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 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*_{sm y} . 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 2019 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 5 shows that moving the SNAP benefit one day earlier than normal lowers end of the month household expenditures by \$1.73. Given that the average household in a state that altered SNAP 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 estimates in Table 5 complement our previous results and suggest that SNAP eligible households are unable to smooth consumption following unexpectedly accelerated benefit disbursements.

Finally, we perform two robustness checks to support the validity of this natural experiment. 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 near-eligible households. Estimates in Panel A of Table 8 show that the effect of living in a state that advanced SNAP benefits is near zero (a decrease of spending of \$2.29) and statistically insignificant.²⁴ This robustness check supports our conclusion that the reduction of expenditures in the last seven days of

²⁴In results not shown we estimate the continuous treatment version of equation 2 for the sample of SNAP near-eligible households and again see no difference in expenditures.

the month is due to the SNAP disbursement changes rather than confounds. Furthermore, Panel B reports the estimates 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. Households in treated states increased their end of month spending by statistically insignificant \$3.16.

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 eligible households which received two SNAP disbursements in January were not able to make their benefits stretch through February. Total household expenditures for SNAP eligible households in February 2019, and particularly expenditures concentrated in the latter part of the month, were lower compared to expenditures during months with normal schedules. These results suggest that moving to larger but less frequent disbursements would not eliminate issues associated with consumption smoothing.

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.

Our findings are consistent with the literature documenting monthly cycles in food consumption and other outcomes among SNAP eligible households and highlight the importance of the timing and frequency of benefit disbursements.

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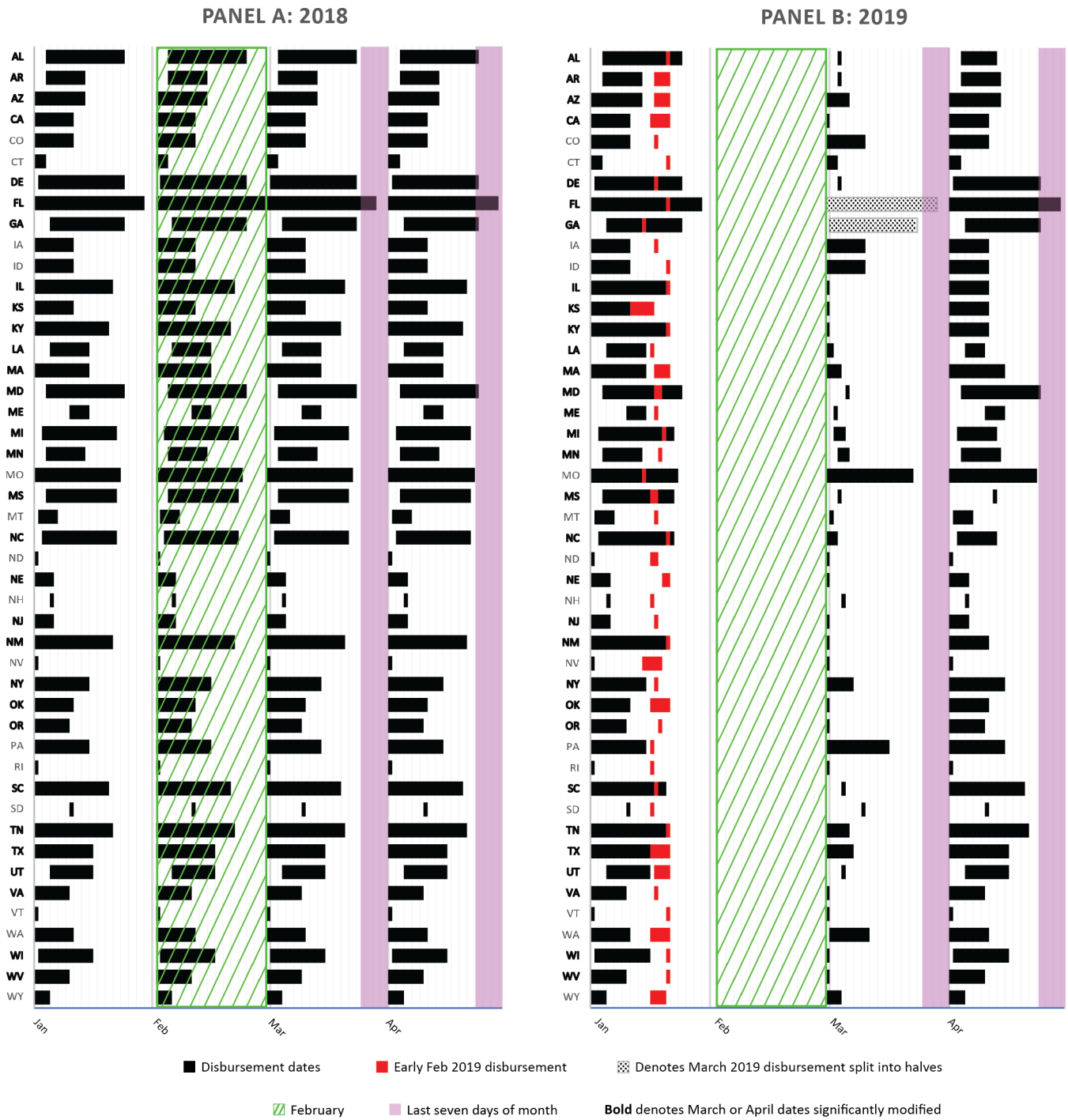
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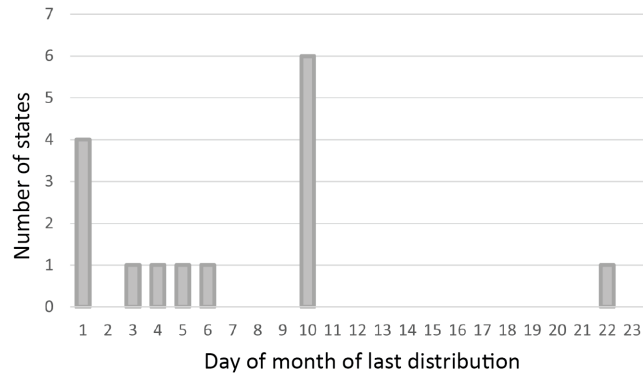
FIGURE 1: SNAP disbursement timing by state and year



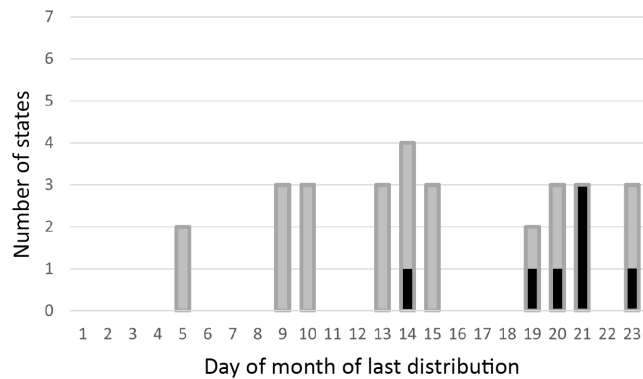
Source: See Data Appendix A5.

FIGURE 2: Last day of standard disbursement schedule

Panel A: States with unchanged March 2019 disbursements



Panel B: States with altered March 2019 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

TABLE 1: Household descriptive statistics by eligibility

	Eligible	Ambiguous	Near-eligible
Demographics:			
Married	41.0 (49.2)	44.9 (49.7)	51.6 (50.0)
White	77.0 (42.1)	81.2 (39.1)	80.6 (39.6)
Hispanic origin	8.4 (27.7)	7.6 (26.5)	6.8 (25.3)
Household size: 1 member	36.0 (48.0)	35.9 (48.0)	35.5 (47.9)
Household size: 2 members	23.1 (42.1)	32.2 (46.7)	40.0 (49.0)
Household size: 3 members	14.6 (35.3)	12.8 (33.4)	12.1 (32.6)
Household size: 4+ members	26.3 (44.0)	19.1 (39.3)	12.4 (33.0)
Head of household is employed	35.5 (47.8)	38.6 (48.7)	53.7 (49.9)
Household head ≤ high school degree	37.0 (48.3)	35.5 (47.9)	28.3 (45.0)
Household head some college	33.6 (47.2)	35.5 (47.9)	32.6 (46.9)
Household head ≥ college degree	28.6 (45.2)	28.2 (45.0)	38.9 (48.7)
At least a child under 18 present	30.9 (46.2)	23.9 (42.7)	17.4 (37.9)
Head of household age < 35	11.9 (32.4)	9.8 (29.7)	10.3 (30.3)
Head of household age 35-49	27.2 (44.5)	20.5 (40.4)	21.4 (41.0)
Head of household age 50-64	37.7 (48.5)	37.2 (48.3)	36.5 (48.1)
Income and spending:			
Annual income <10,000	27.8 (44.8)	-	-
Annual income 10,000-14,999	32.8 (47.0)	-	-
Annual income 15,000-24,999	26.1 (43.9)	68.1 (46.6)	6.3 (24.3)
Annual income 25,000-34,999	10.7 (30.9)	23.1 (42.2)	23.3 (42.3)
Annual income 35,000-44,999	2.2 (14.7)	07.7 (26.7)	26.8 (44.3)
Annual income >45,000	0.4 (6.0)	1.1 (10.2)	43.6 (49.6)
Monthly retail spending	530.00 (485.26)	542.16 (432.82)	582.19 (463.27)
Predicted benefit amount	224.6	95.4	-
Region:			
Northeast	16.5 (37.1)	16.7 (37.3)	17.0 (37.5)
Midwest	19.3 (39.5)	19.5 (39.6)	20.9 (40.7)
South	44.3 (49.7)	43.0 (49.5)	42.5 (49.4)
West	19.9 (40.0)	20.8 (40.6)	19.6 (39.7)
Number of households in 2018	5,063	2,582	20,701
Number of households in 2019	4,889	2,545	20,389

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 near-eligible households. Standard deviation in parenthesis.

TABLE 2: Impacts of early SNAP disbursement on household expenditures

	Household expenditure				
	Monthly		First two weeks	Last two weeks	Last week
	(1)	(2)	(3)	(4)	(5)
Early benefit	-28.79**	-28.56**	-5.06	-23.50**	-12.58**
	(8.22)	(8.21)	(5.66)	(5.77)	(3.67)
SNAP eligible	-63.17**	-17.85	-3.72	-14.13*	-6.83*
	(6.71)	(12.00)	(7.011)	(5.48)	(2.77)
February	-60.64**	-60.57**	-61.36**	0.79	7.54**
	(2.28)	(2.29)	(1.53)	(1.25)	(.937)
2019	1.17	1.66	3.97*	-2.31 *	-1.93**
	(2.19)	(2.22)	(1.56)	(1.00)	(0.67)
Household controls	No	Yes	Yes	Yes	Yes
February 2018 expenditure	529.19	529.19	265.53	263.65	136.24
Relative effect (% change)	-5.44	-5.40	-1.91	-8.91	-9.23
Observations	454,155	454,155	454,155	454,155	454,155

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 of SNAP eligible households during that period in February 2018 (February 2018 expenditures). All regressions also include pairwise interactions between SNAP eligible, February, and 2019. 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. * and ** mean statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE 3: Impacts on expenditures of early disbursement by product category

	SNAP eligible perishable	SNAP eligible non-perishable	Non-SNAP eligible	Unclassified
Early benefit	-2.52** (0.63)	-11.21** (2.59)	-1.59 (2.37)	-11.51* (5.17)
SNAP eligible	-2.27 (1.45)	-3.99 (3.32)	-3.53 (3.03)	-4.66 (7.28)
February	2.48** (0.26)	9.18** (0.62)	-3.94** (0.87)	-20.82** (1.64)
2019	-0.55* (0.23)	4.62** (0.62)	3.03** (0.83)	-3.80** (1.06)
Household controls	Yes	Yes	Yes	Yes
February 2018 expenditure	55.24	192.76	130.89	151.00
Relative effect (% change)	-4.56	-5.82	-1.21	-7.62

Notes: Perishable goods are products in the Nielsen dairy, 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. February 2018 expenditure is the average household expenditures by SNAP eligible households in February of 2018. Relative effect is calculated by dividing the coefficient on Early benefit by February 2018 expenditure. All regressions also include pairwise interactions between SNAP eligible, February, and 2019. 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. * and ** mean statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE 4: Placebo shutdown robustness check

	Household expenditure				
	Monthly		First two weeks	Last two weeks	Last week
	(1)	(2)	(3)	(4)	(5)
Early Benefit	13.43 (7.59)	13.78 (7.44)	0.96 (4.50)	12.81* (5.63)	4.48 (5.09)
SNAP eligible	-58.77** (7.13)	-4.80 (13.67)	1.77 (8.09)	-6.57 (6.00)	-5.69 (2.94)
February	-56.47** (2.04)	-56.41** (2.04)	-59.01** (1.40)	2.59 (1.80)	5.26** (1.45)
2018	6.80** (2.06)	6.87** (2.11)	4.81** (1.31)	2.06 (1.29)	-1.36* (0.67)
Household controls	No	Yes	Yes	Yes	Yes
Feb 2017 expenditure	517.53	517.53	262.54	254.99	130.9
Relative effect (% change)	2.60	2.66	0.37	5.02	3.42
Observations	467,372	467,372	467,372	467,372	467,372

Notes: 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 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 of SNAP eligible households during that period in February 2017 (February 2017 expenditures). The regression also includes pairwise interactions between SNAP eligible, February, and 2018. 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. * and ** mean statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE 5: Impacts of altered state disbursement timing on household expenditures

	(1)	(2)	(3)
Altered monthly 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 monthly 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. All regressions include month fixed effects. 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. * and ** denote statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE 6: Impacts of early disbursement on household expenditures by subgroups

<i>PANEL A: Expenditures by education of household's head</i>		
	High school or less	More than high school
Early benefit	-26.67 (15.02)	-30.12** (9.34)
SNAP eligible	-48.75 (28.08)	-7.55 (11.72)
February	-66.58** (5.07)	-58.82** (2.79)
2019	-4.45 (5.37)	3.19 (3.17)
February 2018 expenditure	528.73	529.43
Relative effect (% change)	-5.04	-5.69
Predicted benefit amount	217.89	227.44
Observations	112,928	341,227
<i>PANEL B: Expenditures by race</i>		
	Non-white	White
Early benefit	-18.61 (20.62)	-31.87** (11.69)
SNAP eligible	-22.52 (29.75)	-17.69 (17.46)
February	-56.29** (5.40)	-61.79** (2.81)
2019	13.86* (6.39)	-2.18 (2.41)
February 2018 expenditure	534.33	527.76
Relative effect (% change)	-3.48	-6.04
Predicted benefit amount	256.21	214.90
Observations	105,718	348,437
<i>PANEL C: Expenditures by working status</i>		
	Non-working	Working
Early benefit	-25.95* (11.98)	-35.58** (12.40)
SNAP eligible	-75.43* (29.45)	-22.82 (12.24)
February	-80.65** (4.17)	-49.94** (2.49)
2019	-1.86 (3.78)	2.82 (2.65)
February 2018 expenditure	487.26	576.86
Relative effect (% change)	-5.33	-6.17
Predicted benefit amount	186.21	268.47
Observations	174,507	279,648
<i>PANEL D: Expenditures by presence of children</i>		
	No children	Children
Early benefit	-15.17 (9.30)	-51.19* (20.85)
SNAP eligible	-6.20 (28.71)	-60.53** (21.48)
February	-69.61** (2.19)	-11.49 (6.54)
2019	0.41 (2.66)	6.04 (8.76)
February 2018 expenditure	471.99	667.44
Relative effect (% change)	-3.21	-7.67
Predicted benefit amount	168.98	361.50
Observations	372,812	81,343

Notes: Relative effect is calculated by dividing the coefficient on Early benefit by February 2018 expenditure. All regressions also include pairwise interactions between SNAP eligible, February, and 2019. 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. Refer to Table 2 notes for details on the control variables. * and ** mean statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE 7: 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	41.4 (49.3)	38.4 (48.7)
White	75.3 (43.1)	84.4 (36.3)
Hispanic origin	8.7 (28.2)	5.9 (23.5)
Household size: 1 member	35.2 (47.8)	39.7 (48.9)
Household size: 2 members	23.6 (42.4)	21.2 (40.9)
Household size: 3 members	14.6 (35.3)	14.1 (34.8)
Household size: 4+ members	26.7 (44.2)	25.0 (43.3)
Head of household is employed	36.2 (48.1)	33.1 (47.1)
Household head \leq high school degree	36.0 (48.0)	40.1 (49.0)
Household head some college	34.5 (47.5)	31.6 (46.5)
Household head \geq college degree	28.6 (45.2)	27.9 (44.9)
At least a child under 18 present	31.2 (46.3)	29.6 (45.7)
Head of household age < 35	12.5 (33.1)	10.6 (30.9)
Head of household age 35-49	27.6 (44.7)	26.1 (43.9)
Head of household age 50-64	37.2 (48.3)	39.9 (49.0)
Income and spending:		
Annual income <10,000	27.5 (44.7)	29.1 (45.5)
Annual income 10,000-14,999	32.6 (46.9)	34.1 (47.4)
Annual income 15,000-24,999	26.5 (44.2)	24.0 (42.7)
Annual income 25,000-34,999	10.9 (31.1)	9.8 (29.7)
Annual income 35,000-44,999	2.2 (14.6)	2.5 (15.5)
Annual income >45,000	0.3 (5.6)	0.5 (7.0)
Monthly spending	546.09 (508.69)	545.18 (507.60)
March 2018 spending	590.49 (526.04)	593.65 (505.93)
March 2019 spending	600.11 (620.10)	623.47 (606.92)
Region:		
Northeast	11.6 (32.0)	42.0 (49.4)
Midwest	20.3 (40.3)	26.7 (44.3)
South	48.2 (50.0)	00.0 (00.0)
West	19.8 (39.9)	31.3 (46.4)
Number of households in 2018	3,449	1,047
Number of households in 2019	3,346	988

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.

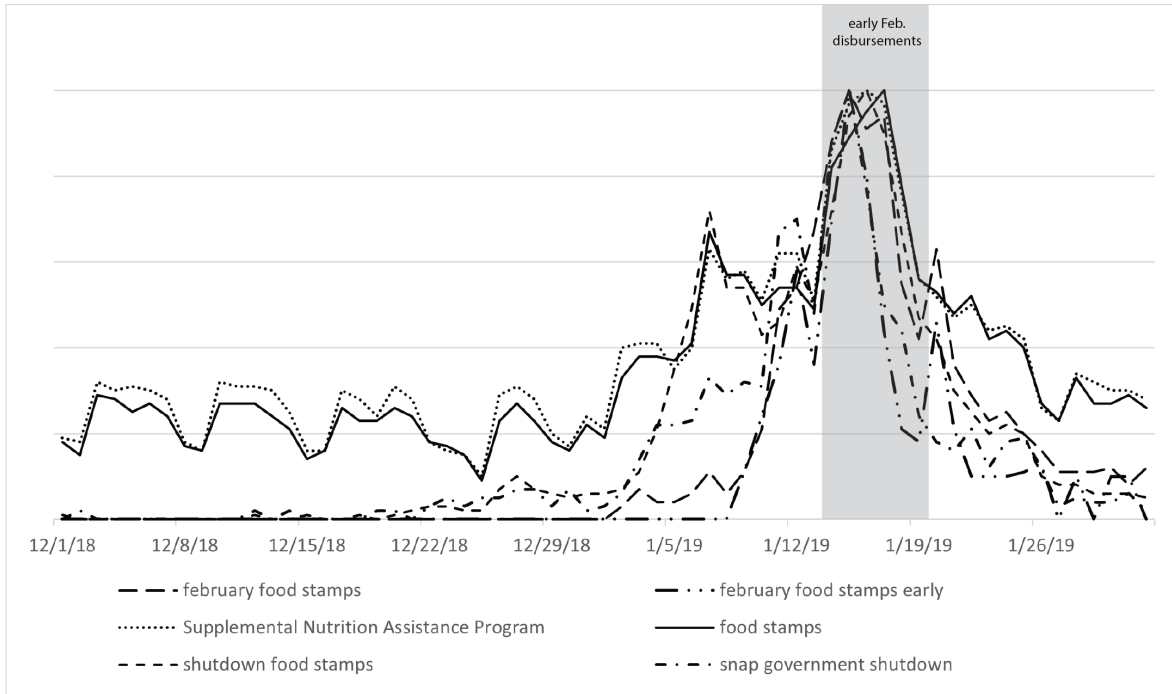
TABLE 8: Robustness checks on altered state disbursement timing on household expenditures

Panel A: SNAP near-eligible households	
Altered monthly 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 monthly 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 near-eligible 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 monthly 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 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 2 notes for details on the control variables. * and ** denote statistical significance at the 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: Impacts of early disbursement on expenditures of SNAP eligible households including households made eligible through state specific BBCE rules

	Household expenditure				
	Monthly		First two weeks	Last two weeks	Last week
	(1)	(2)	(3)	(4)	(5)
Early benefit	-32.77**	-32.55**	-8.19	-24.36**	-13.59**
	(7.83)	(7.89)	(4.26)	(5.66)	(3.40)
SNAP eligible	-42.87**	-34.36**	-15.00**	-19.37**	-10.84**
	(5.60)	(8.80)	(5.45)	(3.73)	(2.13)
February	-65.36**	-65.31**	-62.54**	-2.77*	5.14**
	(2.24)	(2.28)	(1.37)	(1.32)	(0.99)
2019	0.62	1.08	3.42*	-2.34 *	-2.06**
	(2.40)	(2.37)	(1.71)	(1.00)	(0.68)
Household controls	No	Yes	Yes	Yes	Yes
February 2018 expenditure	553.72	553.72	275.86	277.86	144.81
Relative effect (% change)	-5.92	-5.88	-2.97	-8.77	-9.38
Observations	452,077	452,077	452,077	452,077	452,077

Notes: Data on state-specific BBCE income thresholds come from [Aussenberg and Falk \(2019\)](#). 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 of SNAP eligible households during that period in February 2018. 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. * and ** mean statistical significance at the 95 and 99 percent level.

TABLE A2: 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	-23.84**	-23.62**	-3.84	-19.78**	-12.31**
	(7.02)	(7.04)	(4.16)	(4.98)	(2.98)
SNAP eligible	-59.23**	-23.80**	-9.62*	-14.19**	-7.24**
	(5.61)	(7.29)	(3.99)	(3.62)	(1.84)
February	-60.64**	-60.56**	-61.35**	0.79	7.54**
	(2.28)	(2.29)	(1.53)	(1.25)	(0.94)
2019	1.17	1.68	3.99*	-2.31 *	-1.92 **
	(2.19)	(2.22)	(1.55)	(1.00)	(0.68)
Household controls	No	Yes	Yes	Yes	Yes
February 2018 expenditure	517.68	517.68	259.38	258.30	133.47
Relative effect (% change)	-4.61	-4.56	-1.48	-7.66	-9.22
Observations	499,722	499,722	499,722	499,722	499,722

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 of SNAP eligible households during that period in February 2018. 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. * and ** mean statistical significance at the 95 and 99 percent level.

TABLE A3: Impacts of altered state disbursement timing on SNAP eligible and ambiguous household expenditures

	(1)	(2)	(3)
Altered monthly schedule	-6.35 (3.83)	-6.29 (3.95)	-
Days between disbursements	-	-	-1.08* (0.54)
2019	-0.54 (2.58)	0.37 (2.71)	0.12 (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. Altered monthly 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 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. All regressions also include pairwise interactions between SNAP eligible, February, and 2019. 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. *, ** denote statistical significance at the 95 and 99 percent level. Standard errors clustered by state in parentheses.

TABLE A4: 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 A5: Disbursement timing and sources

State	Normal Dates ^a	Feb 2019 Dates ^c	March 2019 Dates ^c	Feb-Mar Gap
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	47.5
CT	1-3	Jan 20	unchanged	41
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	47.5
ID	1-10	Jan 20	unchanged	44.5
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	56.5
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	43.5
NE	1-5	Jan 19-20	1	-
NH	5	Jan 16	unchanged	48
NJ	1-5	Jan 17	1	-
NM	1-20	Jan 20	1	-
NV	1	Jan 14-18	unchanged	44
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	48.5
RI	1	Jan 16	unchanged	44
SC	1-19	Jan 17	5	-
SD	10	Jan 16	unchanged	53
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	40
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	44

Feb-Mar Gap is the average number of days between the disbursement day for the 2019 February disbursement, which arrived in January, and the 2019 March disbursement calculated for states which did not change the March disbursement timing. For states that distributed their early February disbursement over multiple days, we used the median disbursement date when determining the Feb-Mar Gap. For states with normal SNAP disbursement schedules that span multiple days, we use the average March disbursement date when computing the Feb-Mar Gap.

^aAll 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.

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

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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.

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

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

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^cAll 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/.