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ABSTRACT

It is well documented that individuals do not spend SNAP benefits smoothly over the month after receipt. Rather, recipients spend a disproportionate share of benefits at the beginning of the benefit month. This has costs for recipients and stores. There is also evidence that other income streams, such as Social Security and paychecks, are not spent smoothly. The presence of these other income streams may bias estimates of the effects of this SNAP cycle on consumption for working SNAP beneficiaries and those who receive other government benefits. We use data from USDA's National Household Food Acquisition and Purchase Survey to explore how the SNAP cycle is affected by accounting for these other income streams. We find suggestive evidence that the cycle is more pronounced for workers who are paid on a weekly or monthly basis, but little evidence that cycles in other income streams mitigate or exacerbate the SNAP cycle.

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1 Introduction

The Supplemental Nutrition Assistance Program (SNAP) accounts for roughly 10% of total U.S. food-at-home (FAH) spending and makes up almost half of food-at-home expenditure for low-income households (Wilde 2012). Prior work has documented that SNAP participants do not behave as neoclassical theory suggests by smoothly spending their predictable SNAP benefits over the benefit month. Rather, participants redeem a large share of benefits immediately upon receipt (Caster and Henke 2011). This phenomenon—where recipients disproportionately spend their SNAP benefits when they are disbursed at the start of the benefit month —is known as the SNAP cycle. Evidence suggests that this "SNAP cycle" is adverse for consumers. The bunching of purchases by SNAP recipients on particular days may impose congestion costs on retailers. For example, they may need to stock certain goods or need more workers on days when SNAP is disbursed.

Most SNAP recipients receive income from other sources but prior work has studied SNAP receipt and food spending in isolation. Here, we focus on several other sources of income: wages, other means-tested safety-net programs, and social-insurance programs. Much like SNAP, paychecks and other government benefits reflect lumpy influxes of resources to the household—though wages and other benefits are not limited to being spent on food. Paychecks arrive at different frequencies across jurisdictions. In fact, a number of states have laws specifying how often some workers must be paid. Berniell

(2018) shows that differences in laws regarding paycheck timing drive differences in aggregate economic activity—low pay frequency states experience more pronounced within-month business cycles.

This leads to our first research question: Does the paycheck cycle mitigate or exacerbate the SNAP cycle? Specifically we ask, does the SNAP cycle look different in states where, by law, paychecks arrive more frequently than in states where paychecks arrive less frequently? Our second research question is motivated by the fact that many SNAP recipients participate in other government programs and these programs also induce cycles in expenditures. We investigate whether the SNAP cycle is affected by household receipt of other means-tested cash welfare or social insurance programs. In addition, we consider whether these payment streams have interactive effects on spending. Finally, we explore whether variables that predict the degree to which SNAP households are economically constrained affect the magnitude of the SNAP cycle.

A priori it is not obvious how SNAP, paycheck, and other benefit cycles interact. Other sources of income might mitigate the SNAP cycle. Earning a paycheck or receiving benefits from other sources loosens the household budget constraint. Further, above a certain level, wages mechanically reduce the value of the SNAP entitlement, which in turn reduces SNAP spending in total and as a share of overall food spending. In this way, earning a wage or getting other welfare or social insurance should reduce the magnitude of the SNAP cycle. If this were the case, then prior work might have underestimated

the true magnitude of the SNAP cycle for some by estimating an average effect over households who receive a paycheck and those who do not. On the other hand, to the extent that the timing of SNAP benefit issuance overlaps with receipt of paychecks, welfare, or social insurance payments, prior estimates of the SNAP cycle may be too large. Further, participants in some social welfare programs—e.g. Supplemental Security Income (SSI)—are likely to have few alternative sources of income, suggesting they may be more economically constrained than are workers.

Prior work ignores these, potentially confounding, income streams. To the best of our knowledge, this is the first paper to explore the interactive effects of SNAP disbursals and paychecks, welfare, and social insurance payments. This is possible because our unique data set—FoodAPS—combines high-frequency daily expenditure data, rather than the weekly or monthly averages used in some previous work, with administrative data on SNAP participation and the exact date of SNAP benefit disbursal. Taken together, these features suggest our work will be less prone to measurement error than prior studies based on monthly spending data or inferred SNAP receipt dates from self-reports of SNAP participation, which is under-reported in many surveys (e.g., Meyer, Mok, and Sullivan 2015).[1]

The paper proceeds as follows. We review some of the prior literature on

[1]Note that with most states staggering benefit disbursal dates in recent years based on variables like the first letter of the last name of the case head, it is unlikely that researchers can correctly assign the timing of a family's SNAP receipt without some access to administrative data which is rare or exact birth dates, which are uncommon in public-use survey data.

expenditure cycles in Section 2. We describe our data on food spending in Section 3. Section 4 presents descriptive preliminary evidence on the SNAP cycle. Section 5 describes our empirical approach and presents our main results. Section 6 concludes.

2 Background

Prior work has found that changes in spending over the SNAP benefit month translate into changes in consumption, with potential health consequences. Wilde and Ranney (2000) and Shapiro (2005) show that expenditure cycles induces comparable cycles in consumption, with calorie intake falling across the SNAP benefit month. Todd (2016) documents the same pattern in more recent data. Hamrick and Andrews (2016) show that SNAP recipients are more likely to report days with no eating at the end of the SNAP benefit month. Finally, Seligman et al. (2014) link being at the end of the benefit month to increased hospitalization for illnesses associated with food intake.

In addition, SNAP disbursal patterns may change the kinds of foods people buy. Forward-looking households who are shopping for an entire month may shift expenditure towards less healthful shelf-stable food and away from healthier but perishable foods such as fresh fruits and vegetables. The once per month SNAP disbursal pattern has also been shown to shift shopping patterns between outlet types. Damon, King and Leibtag (2013) find shifts from grocery stores to convenience stores over the benefit month. Further,

Cheng and Beatty (2016) shows the unit prices paid by SNAP participants decrease over the benefit cycle.

The SNAP cycle—where recipients spend the bulk of their SNAP benefits in the few days after benefits are disbursed—may also impose costs on retailers through increased staffing needs, congestion, and stock-outs. When Illinois reduced the number of days on which benefits were disbursed, retailers complained about shortages.[2] This echoes press accounts during the Great Recession of demand spikes at midnight on the day that SNAP benefits were distributed. In theory, retailers with market power might leverage this to raise prices when benefits are disbursed. However, Hastings and Washington (2010) and Goldin, Homonoff, and Meckel (2018) find little evidence that retailers are extracting profits by raising prices despite predictable increases in expenditure by SNAP recipients at the start of the benefit month.

Concern about the adverse effects of the SNAP cycle has led almost all states to stagger disbursal dates over the course of the month. Individuals are assigned a receipt day during the month related to their case number, birth date, or Social Security number. For example, a state might distribute benefits on the day of the month corresponding to the first or last digit of a household's case number. This may reduce the costs imposed by the presence of the SNAP cycle for retailers but does not address issues faced by recipients. In response, some authors and policy makers advocate for moving to a twice

[2] "New schedule for SNAP disbursement leads to shortages at grocery stores" http://www.sj-r.com/article/20150912/news/150919826.

monthly disbursement cycle (e.g., Just 2006).

Expenditure responses to paycheck arrival have also been documented. Work by Stephens (2006) shows that expenditures increase immediately upon receipt of a paycheck, which translate into increases in expenditure on fresh foods as well as food-away-from-home. In this paper, we leverage exogenous variation in the drivers of the frequency of income receipt. Most states regulate the minimum frequency with which workers must be paid. Appendix Table 2 lists the paycheck timing laws for 2012, using information provided by the Department of Labor. These laws are meant to protect workers. In practice, they mean there are states where workers must be paid at least 2 times a month (bimonthly), once every 2 weeks (biweekly or 26 times a year), or once a week (weekly or 52 times a year). Some states have no laws, and others set frequencies which vary by occupation. We hypothesize that workers receiving SNAP in states with laws requiring more frequent pay will be less constrained by the once-monthly disbursal of SNAP.

Expenditure cycles related to benefit receipt from other social programs, notably Social Security, are also well established. For example, Stephens (2003) shows that expenditure patterns vary according to when benefits are received, with food-away-from-home spending being significantly more likely on the day of Social Security receipt. Berniell (2018) shows this pattern still holds now that the timing of Social Security receipt depends on date of birth. We exploit the fact that the Social Security Administration has a set calendar determining when Social Security Old Age and Disability Insurance

payments and Supplemental Security Income payments are made (and that this varies across months).

3 Data

We use data from the USDA's National Household Food Acquisition and Purchase Survey (FoodAPS). FoodAPS is a nationally-representative survey that collected comprehensive data on American household food purchases and acquisitions. A total of 4,826 households participated in the survey between April 2012 and January 2013. The data contain information on all foods and drinks obtained for at-home consumption (food-at-home—FAH) and meals, snacks, and drinks obtained for outside home consumption (food-away-from-home—FAFH) during a one-week survey period. The FAH data typically include food obtained from grocery stores, farmers' markets, food pantries, and other outlets. The FAFH part includes meals and drinks that were consumed at restaurants, fast-food establishments, schools, working places, and so on. Given our focus on the effects of SNAP disbursal, all of our analysis is done on a sample of SNAP-recipient households.

Through two in-person interviews, the primary respondent for each household—chosen to be the main food shopper or meal planner—provided detailed demographic information for every household member as well as information on household food-shopping. The main food shopper identified the store where their household did their primary food shopping. During the survey week,

households kept a food diary in which they logged each food acquisition, referred to as a food event (e.g., grocery-shopping trip for FAH or a meal eaten out for FAFH). For each event, households were asked to record the location and date as well as the total cost of the food acquired. To capture food-at-home events, households were given hand-held scanners to scan the universal product codes (UPCs) and were asked to keep receipts. When they could not scan the barcodes or a receipt was missing, households were asked to record the information in food diaries. For food-away-from-home events, each adult and child ages 11–17 was given a diary in which to record prices paid (inclusive of tax and tip) and quantities. Parents recorded information for younger children. During post-processing of the data, survey administrators sorted food items into specific food groups using scanned barcodes and product descriptions. FoodAPS assigned food-group codes to individual items. Food-group codes are then used to match the items to USDA nutrient databases. Thus, FoodAPS gathered detailed information for individual food items including package size, price, coupon usage, and food category. FoodAPS also contains geocoded addresses for the food-acquisition events, enabling calculations of the straight line distance to the food outlets for each household.[3] Our analysis combines the households' FAH and FAFH expenditures into daily total expenditures. We include \$0s for days when no food acquisitions for cash or SNAP benefits occurred.

[3]The distances are measured from the interviewee's home to the location of the stores visited, and thus do not represent the actual distance that households traveled, as trips to acquire food may not start from home.

FoodAPS has three features that make it well suited to answering our central question: How does the SNAP cycle interact with other expenditure cycles? First, FoodAPS includes data from a large sample of SNAP-participating households. Households were asked about their current SNAP-participation status during the initial interview. FoodAPS checked self-reported survey responses against state SNAP administrative databases for interviewees who consented to the check—and nearly all consented. Administrative records were used to determine participation status when discrepancies between self-reports and administrative records occurred. For the very small number of households who did not consent, the survey response was used to determine participation status. To avoid biases caused by misclassifying SNAP participation, we retain only those SNAP households whose participation status was confirmed by administrative records.[4] Thus, we rely on an administrative measure that is far less likely to suffer from measurement error than most other studies that use self-reports. During the initial interview (prior to the survey week) households were also asked about the most recent date on which they had received SNAP benefits. For respondents who did not self-report a date of last receipt, or whose date of last receipt was more than a month before the first survey day, FoodAPS filled it in with the information from the state SNAP administrative databases if available. Using this SNAP receipt date and the diary dates, we calculated the number of days since the date of benefit receipt. In this paper, we use day one to

[4]This resulted in omitting 239 households.

indicate the day of benefit arrival and day 31 to indicate the last possible day of the cycle. Our analysis sample consists of 1,388 SNAP households that reported their most recent benefit receipt. Appendix Table 1 reports the December 2012 benefit disbursal schedules for each state.

The second important feature of the restricted version of the FoodAPS data is that we observe a household's state of residence. This allows us to link households to their state's payday requirement laws (U.S. Department of Labor). The US Department of Labor's Division of Wages and Hours reports the presence (if any) of payday rules for each state—these are reported in Appendix Table 2. We classified households into groups with different payday requirements, including monthly payments, semi-monthly payments, biweekly, and no payday requirement as well as a "multiple laws apply" group. Semi-monthly laws require that employees be paid at least twice a month. Biweekly laws require that they be paid at least every other week. "Multiple laws apply" means there is more than one law in place. As noted above, we use this information to explore whether state pay laws affect the SNAP cycle in food acquisition for working households.

Finally, FoodAPS provides rich household and individual demographic data, as well as information on earnings, use of social insurance programs, and cash welfare receipt. This allows us to explore how the SNAP cycle varies for workers and non-workers respectively. FoodAPS also asks workers how frequently they were paid, so we can also see if there is variation in the SNAP cycle according to when workers report being paid. As noted above,

the timing of payment of social insurance benefits and welfare benefits affects expenditures (Stephens 2003; Berniell 2018) and we explore the extent to which the SNAP cycle varies by household receipt of welfare and/or social insurance.

Characteristics of the sample

Table 1 presents household summary statistics for our sample, weighted to be nationally representative. Column 1 shows means and standard deviations for the full sample. The sample consists of all households with at least 1 adult between 18 and 64, who reported the time when they last received SNAP, and for whom the administrative data confirmed they received SNAP benefits. The unit of observation is the household and the characteristics are those of the main shopper if there is more than one adult in the household. Not surprisingly, most respondents are female. The majority of the respondents are black or white, although these categories are not mutually exclusive. Given the data are nationally representative, it is not surprising that there is considerable variation in the respondent's level of education, and in marital status and family type (presence of other adults, children, or seniors in the household). Over half the sample households, 58%, had at least one worker in the household.

Lower panels of the table report the prevalence of pay regulations in our sample. About 21% of the households live in a state with no rules, 21% are in a state with semi-monthly rules, 12% have monthly rules, 4% biweekly

rules, and 42% live in states with a variety of rules. This lines up well with data from the BLS's Current Employment Statistics which collects information about the frequency with which private businesses pay their employees. In 2013, 32.4% paid their employees weekly, 36.5% biweekly, 19.8% semi-monthly, and 11.3% monthly (Burgess 2014). Turning to the self-reports of payment frequency, among 731 households with a worker, 65% report being paid monthly, 7% semi-monthly, 5% biweekly, and 14% weekly. The next panel reports the receipt of any social insurance or safety-net benefits by the household—about half of families get some benefit. Finally, we report distance to the most used store. 53% of the households' distance to their primary store is less than or equal the median distance while 47% are more than the mean distance from their primary store. (Note that the median is estimated on the full sample.)

In our analyses, we use the following demographic characteristics as controls: the number of adults, children, or seniors in the household; and race/ethnicity, gender, and marital status of the primary respondent. In addition, each household member age 16 or older was asked to fill out an income worksheet that gathered income information from all sources. Income information was reported at the individual level by the household's primary respondent with the aid of the income worksheet filled by the individual household members. For a given household, we identified family members who received Supplemental Security Income (SSI), Old Age Social Security Income (OASS), Social Security Disability Income (SSDI), or other retire-

ment and disability income, and attached this variable to the household. We combined this information with food purchase dates and state benefit distribution schedules for those programs and estimated the benefit receipt cycle for those households.[5]

Our final sample includes 1,388 households that purchased any FAH or FAFH during the survey week (excluding missing values) and received SNAP. In all analyses, we aggregated the total expenditures for each FAH and FAFH event by survey day, and include $0 for the day when there were no food events on that day. Our key dependent variables are either the level of spending on a given day or the share of total expenditures that occurred on a given day during the survey.

Our key explanatory variable is a dummy for whether the diary day falls during the first week of the SNAP benefit month ("first week of SNAP cycle"). The omitted category is whether the diary day falls during weeks two through four of the SNAP benefit month. In keeping with prior work documenting a SNAP cycle, we expect acquisition amounts and acquisition shares to be higher during the first week. Columns 2 and 3 of Table 1 report summary statistics for the treated diary days (days during the first week) and control diary days (days during the last 3 weeks). [6] Column 4 reports

[5]We also include household WIC receipt in our measure of households obtaining government benefits but cannot look at WIC cycles due to a lack of information about state rules regarding WIC disbursal.

[6]If a week is split, we allocate the share of the weight for that household to the relevant row. So, if 2 days were during week 1 and 5 during week 2, 2/7 of the household weight would be applied to the observation for constructing the column 2 mean, and 5/7 the column 3 mean.

the p-value for a test of equality of means between the two groups. Our research design depends on the fact that the interview date is quasi-random. We can check this, at least in part, by testing whether the observable characteristics in columns 2 and 3 are statistically significantly different from one another. There do not appear to be systematic differences between households interviewed during either period. The one exception is the share of the sample where the respondent has "some college, less than bachelor degree" is slightly lower for households interviewed during the first week—29% vs 35%—and the difference is statistically significant at the 10% level. This bolsters our faith in the research design.

4 SNAP Cycle by Demographics and Other Characteristics

We begin with simple descriptive graphs of food spending over the benefit month. Figure 1(A) displays expenditures by day of the SNAP benefit month for our main sample using the set of controls described above and a dummy for each day in the cycle. The solid line is the coefficient on the day of the SNAP benefit month and the dashed lines are the lower and upper bounds of the pointwise 95% confidence intervals. Figure 1(B) repeats the exercise where the outcome variable is the share of weekly expenditures by day of the

SNAP cycle.[7] Figures 1(A) and 1(B) show the well-known pattern of food spending over the SNAP cycle in our data. Households spend considerably more on the first day of the cycle—nearly $80 compared to an average that quickly falls to $10 or less after 2 or 3 days. The expenditure share graph tells much the same story. On the first day of the SNAP cycle households spend on the order of 45% of weekly food expenditure, which quickly falls to under 20% although there is a puzzling bump in expenditure around 25 days into the cycle.[8] [9]

Figures 2(A) and 2(B) split the sample into households in which someone works and households in which no one works. The average income for working households is $2,967 while the average income for households where no one works is $1,086. As food is a normal good, it is not surprising that total food spending in working households is higher. However, expenditure pattern is similar, suggesting that the presence of paycheck cycles does not drive the observed SNAP cycle. The SNAP cycles in shares for households with and without workers in Figure 2(B) are even closer to one another those in levels and the qualitative patterns are directly comparable.

Next, we consider how the receipt of various income types affects the cycle.

[7]Note that we observe total food expenditure over a single week—so daily expenditure shares are shares of expenditure over the week long survey period. As a result weekly shares over the month will sum to more than 100%.

[8]We have spent considerable effort trying to understand this spike. It seems to be most prominent among the no-worker households, but none of the other cycle controls we include (not even those for SSI/OASI/SSDI disbursal) seem to explain this spike.

[9]We looked at the households that had their data collection overlap with the day when they received beneftis. We observed a clear jump in both expenditures and expenditure shares on the benefit receipt day.

Figures 3(A) and 3(B) split the sample according to the pay frequency laws in the household's state of residence. First, we note that each sample and both outcomes exhibit the characteristic SNAP cycle. However, when measured in expenditure shares, the spike on the first day is more pronounced in biweekly states than in the monthly or no-pay rule states. Figures 4(A) and (B) split the sample according to the self-reported pay frequency for households with workers rather than using pay frequency laws as above.[10] These figures clearly show that, for working households who are paid biweekly, there is a second spike in expenditures and expenditure shares later in the SNAP cycle - consistent with increased food spending after paycheck receipt.

Finally Figures 5(A) and 5(B) show the SNAP cycles after splitting the data into samples of households with receipt of WIC, SSI, SSDI, or Old Age Social Security and those households without. The SNAP cycle patterns remain similar for these two groups of households. Our final set of descriptive figures cuts the sample by the household's distance to their primary food store. Again, the cycles are remarkably similar.

Next we turn to regression analysis to see if these descriptive patterns are borne out when we systematically assess the SNAP cycle.

[10]Appendix Table 3 shows the correlation between the pay laws and the self-reported pay frequency. It is positive in that people report being paid more frequently when the laws are more stringent, but it is not large.

5 Empirical Strategy

We now formalize the graphical intuition developed above but aggregate our key variable of interest into week of the SNAP cycle—this reduces the dimensionality of the problem and facilitates hypothesis testing. We model either expenditures per day or the expenditure share per day in the following regression equation.

$$y_{id} = \alpha + \beta \cdot \text{SNAPWK1}_{id} + \text{Weekday}_k + \text{Holiday}_l + \text{Day-of-Diary}_d + X_i \cdot \gamma + \epsilon_{id} \quad (1)$$

where y_{id} is either expenditures or expenditure shares for household i on day d of the acquisition data (with days with no purchases included as \$0 or a 0 share). The coefficient of interest is β on the dummy variable SNAPWK1, which is 1 if household i on acquisition day d is in the first week of their SNAP benefit month.

We also control for the day of the week k, for diary day d, for household i, and whether it is a holiday (Holiday_l). Finally, to control for survey fatigue, we include dummies for survey day Day-of-Diary_d (i.e., day 1 through 7 of the food diary).

X_i is a vector of controls for the household including the number of children, adults, and seniors as well as household income. X_i also includes characteristics of the primary respondent such as gender, race, education, and marital status. In some specifications, we choose to include household

fixed effects (although they do not appear in the equation)—in which case we omit the controls X_i. When controls are included, we also include state fixed effects, so comparisons are within state. When the household fixed effects (FE) are included, then the SNAPWK1 dummy is identified off households where some days of their diary week are in the first SNAP week and some are in other weeks. All specifications are at the diary day level and all regression weight each day with the household weight divided by 7 to get nationally representative numbers. Standard errors are clustered at the household level to allow for arbitrary correlations across acquisition days but we note that the results are robust to clustering at the state level as well as at the PSU level (which better reflects the complex sample design).

Above, we showed the observable demographic characteristics are balanced for diary days in the first week and the other weeks. But we also want to show that interview day is uniformly distributed in the data. Appendix Figure 1 shows the empirical distribution of the first day of the diary in our main sample. It is clear from this figure that the first diary day is randomly distributed across days of the month. This provides further justification for our assertion that in our sample, households are observed randomly throughout the benefit month.

Next, we turn to our regression specifications and results. Below, all results tables follow the same pattern. Each column presents the results of a different regression. Columns 1–3 have food expenditures as the dependent variable while columns 4–6 show results for expenditure shares. Columns 1

and 4 include no demographic controls but do control for day of the week, day of the survey, and holidays. Columns 2 and 5 add the household controls and state FE. Columns 3 and 6 include household FE.

Table 2 presents the results of estimating equation (1) on the full sample. Not surprisingly, regression results confirm our graphical intuition and we find robust evidence of a SNAP cycle in food expenditure. This is consistent with a large extant literature. If the day of acquisition is in the first week of the cycle, the average household spends between \$13 and \$15 more, or between 4% more (with and without demographic controls and state FE) and 8% more (in the specifications with household FE).

We now turn to our key research question, does the arrival of income from other sources mitigate or exacerbate the SNAP cycle? We first address this by using specifications that allow the coefficient on the dummy for the acquisition day d to vary according to a set of S mutually exclusive dichotomous household characteristics, H_{is}.

$$y_{id} = \sum_{s=1}^{S} \alpha_s + \sum_{s=1}^{S} \delta_s \cdot \text{SNAPWK1}_{id} \cdot H_{is} + \text{Weekday}_k + \text{Holiday}_l + \text{Day-of-Diary}_d + X_i \cdot \beta_2 + \epsilon_{id} \quad (2)$$

Table 3 presents the results of estimating equation (2), where the mutually exclusive categories H_{is} are households with a worker and households with no worker. We can then test whether the cycle differs for these 2 groups

of households by testing whether the coefficients describing the magnitude of the SNAP cycle in the first week are different. The F-statistic for this test and the associated p-value are reported in the next panel of the table. Below this, we also present the F-statistic for testing whether the intercepts are different from one another. We also report mean spending by group and whether it is the first week or not.

The first column in table 3 shows that there is substantially higher spending by households with workers in the first week of the SNAP cycle as compared to other weeks. They spend \$14 more, compared to baseline spending of \$15 for workers in weeks 2–4. This is also true for households with no worker, who spend \$11 more, compared to a baseline of \$10. However, these coefficients are not statistically different from one another (F-statistics of 1.324, p-value of 0.25), although the means are statistically different (F-statistic of 27.19). The patterns are similar in columns 2 and 3, with no evidence that the SNAP cycle differs with the presence of a worker in the household. The cycle is slightly more pronounced in specification where household fixed effects are included, but the difference is not statistically significant. Columns 4–6 show a similar pattern for the expenditure shares. There is no evidence across any of the columns 4–6 that the cycle is more pronounced for either group.

Table 4 allows the SNAP cycle to vary by the payday regulations in the state of residence. Again, there is some variation in the magnitude of the coefficient on the dummy for the first week of the SNAP cycle across

columns for expenditures, but there is no evidence that these coefficients are statistically different (p-values range from 0.518 to 0.882). In terms of expenditure shares, there is modest evidence of variation in the SNAP cycle. There is little evidence of a pay cycle in the biweekly or multiple payday requirement states—the coefficients for being in the first SNAP cycle week are smaller in magnitude and not statistically significant for households in these states. The p-values for the SNAP cycle coefficients being statistically different from one another are 0.083, 0.106, and 0.101.

Table 5 splits the sample by self-reported pay frequency of households with workers. Here, point estimates suggest that workers who are paid monthly are more constrained by the SNAP cycle. They spend between \$10 and \$14 more in the first week of the cycle, compared to baseline spending that is lower (with no controls) in other weeks than for the other pay periods (semi-monthly, biweekly or weekly). When looking at expenditures, there is evidence that the weekly paid workers also show evidence of a SNAP cycle. However, these findings are not consistent with the results for shares, where the most robust evidence is for a SNAP cycle among those paid semi-monthly.

It seems reasonable to ask whether, among those with self-reported pay dates, the SNAP cycle is more pronounced if paycheck and SNAP receipt occur during the same week and less pronounced otherwise. To investigate this, we run our main specification but interact the dummy for monthly paycheck households and all other households with the "first week of SNAP

month" variable in Appendix Table 4. We found no difference in the effects of receiving both benefits at the same time.

Table 6 looks at households with some WIC, SSI, SSDI, or Old Age Social Security receipt compared to those without. Here again, there is remarkably little difference in the magnitude of the SNAP cycles for households that participate in other parts of the social safety net and those do not. The coefficient on the dummy for being in the first week of the SNAP benefit month is similar for both groups. Table 7 extends this by adding controls for receipt of income from different streams. As in Table 6, there do not seem to be large differences in the SNAP cycle across households receiving income from other programs relative to those who do not.

Our final set of results, reported in Table 8, separates the first week of SNAP month according to whether or not the household is further from the primary store than is the average household. Here, there is a suggestion that those further from their primary store do more shopping—both in absolute terms and relative to their usual spending—than those who are closer, though results are not statistically significantly different.

As noted above, an important advantage of the FoodAPS data is the link to administrative records. SNAP participation is determined administratively for most of our sample. For a smaller share, we also have administrative data on disbursal dates. Where it was possible to obtain an administrative measure of the date of last SNAP benefit receipt, we compared the main findings using the self-reported measure with results that use

the administrative measure. Note that this reduced our sample nearly by half. Most findings were similar for this smaller sample. The sole exception is table 5, where the coefficient on self-reported bi-weekly paycheck receipt is somewhat different. The coefficients are statistically significant at the 1% level when using administrative matched benefit receipt dates, while those are not statistically significant when using self-reported dates. For 89% of the diary days, the self-reported date of receipt and the administrative date of receipt lead to classifying the diary day in the same week of the SNAP cycle.

6 Discussion and conclusion

Our initial graphical analysis suggested differences in how much households spend on food immediately after getting their SNAP benefits according to whether or not households had access to other sources of income and the timing of these sources of income. However, in our regression analysis we find only modest evidence that SNAP cycles are affected by the arrival of income from other sources, be it wage income or income from other government programs.

In sum, looking at the five tables with 15 specifications each testing for a difference in spending in the first week after SNAP benefits were received, only 1 showed statistically significant differences at the 5% level for expenditures (more of a cycle for those paid weekly when household fixed effects

were included), and only 1 showed significant differences at the 10% level for expenditure shares (more of a cycle for those in states with no payday rules, monthly rules, or semi-monthly rules than for those with biweekly or multiple rules when household fixed effects were included). These results suggest that other sources of income neither mitigate nor exacerbate the SNAP cycle.

While theory suggests that less constrained households should experience less of a SNAP cycle, we find no systematic evidence that this is the case. In part, this may be due to limitations of using a single cross-section of some 1400 households. Moreover, differences may be small and difficult to detect given these sample sizes. The significant differences we did find suggest it may be worth using other panel data to consider this question.

Our results are consistent with a growing literature that finds that households differentiate between SNAP and cash (Beatty and Tuttle 2015; Hastings and Shapiro 2018). If benefits were viewed as perfectly fungible the SNAP cycle should be less pronounced in households with diverse income streams. The evidence for a SNAP cycle is remarkably consistent across households with different non-SNAP sources of income and timing of income receipt in the household.

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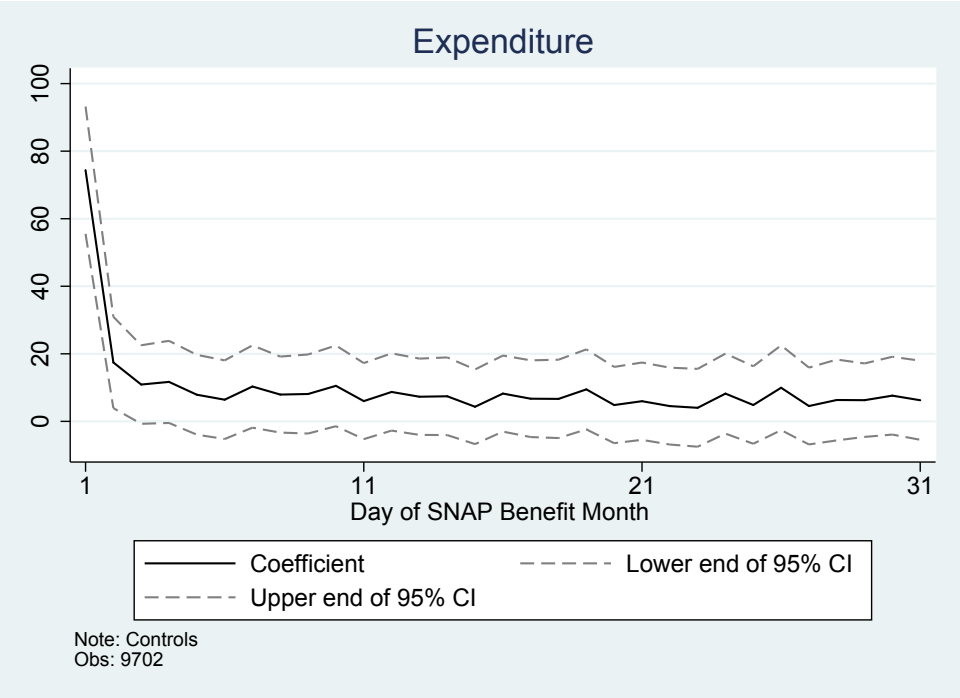
Figure 1 (A): Average daily expenditures over the benefit month among SNAP-Receiving Households



Note: This figure shows average daily expenditure over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. It is the coefficient on each day of the benefit month in a regression that also controls for the day of the week, the day of the food diary (one to seven), whether the day is a holiday. It also controls for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regression also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 1 (B): Average daily expenditure shares over the benefit month among SNAP-Receiving Households

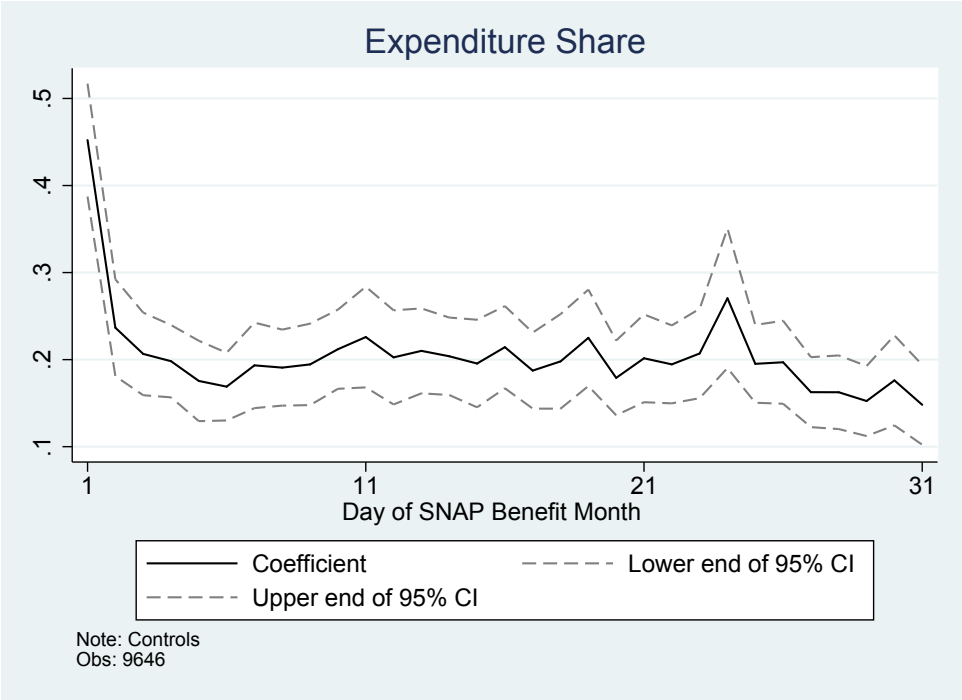


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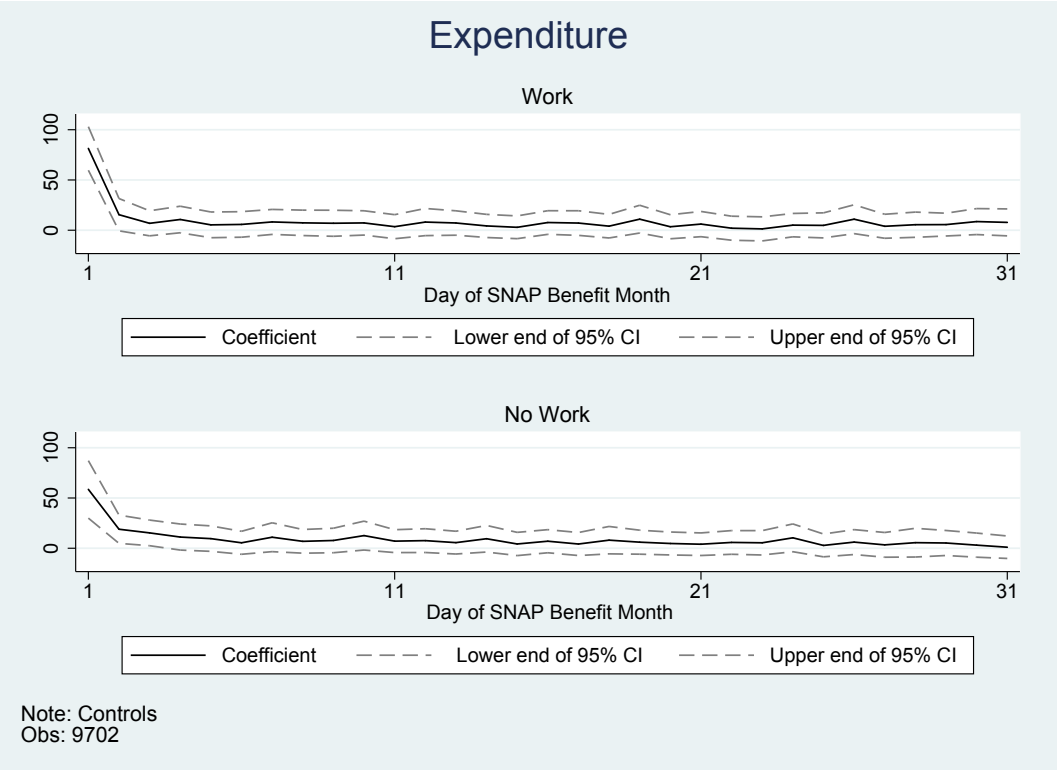
Figure 2 (A): Average daily expenditures over the benefit month by Presence of a Worker in the Household, among SNAP-Receiving Households



Note: This figure shows average daily expenditure over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 2 mutually exclusive samples, households with at least one worker and households with no workers. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 2 (B): Average daily expenditure shares over the benefit month by Presence of a Worker in the Household, among SNAP-Receiving Households

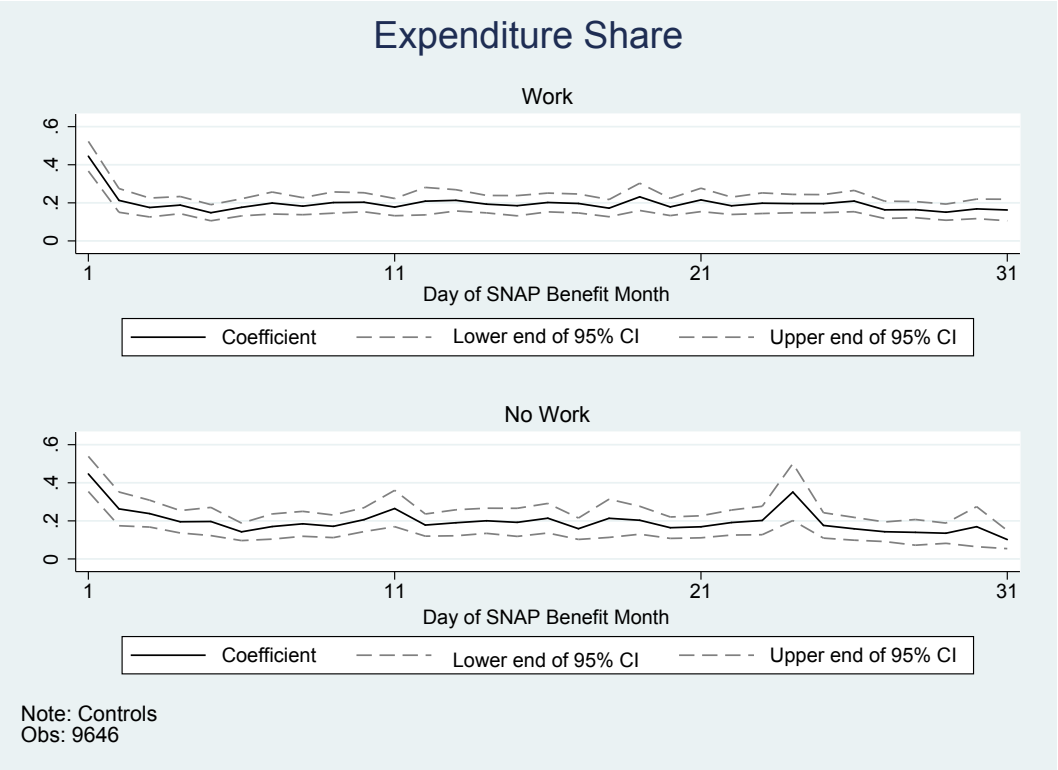


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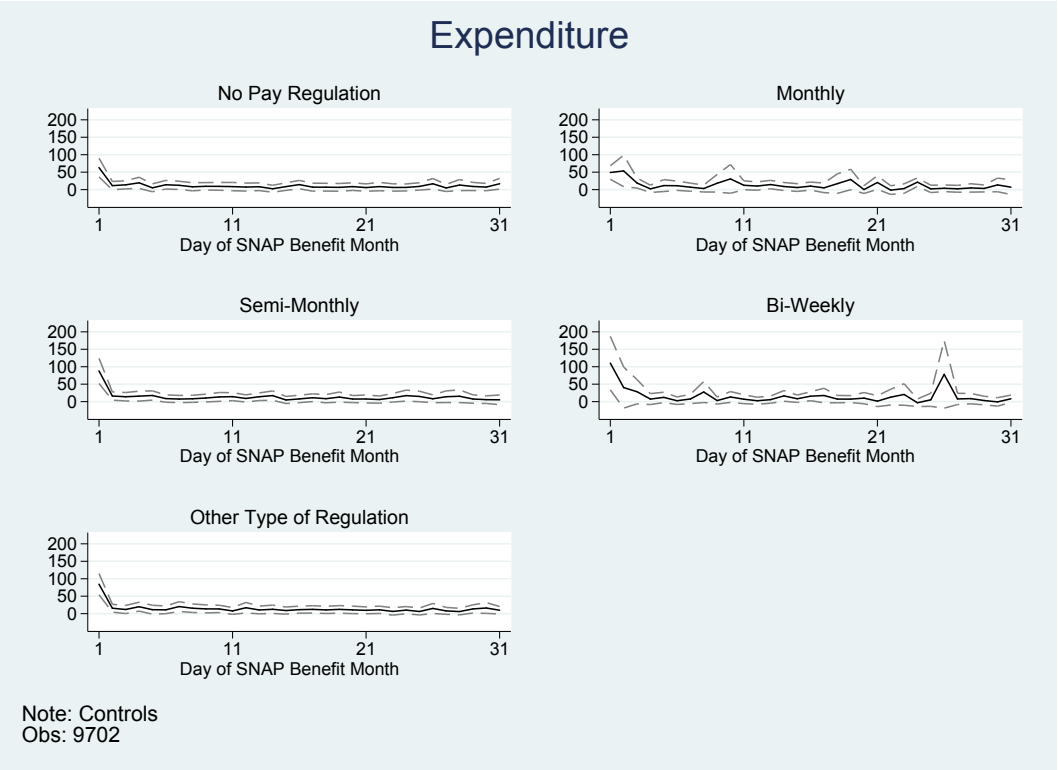
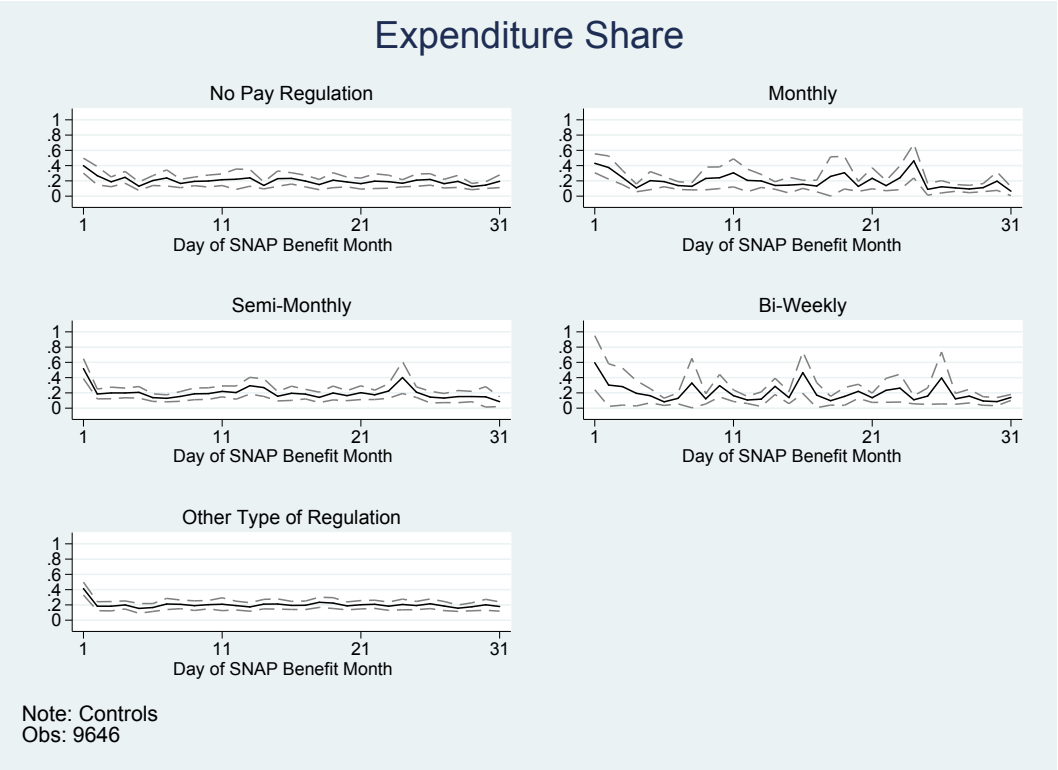
Figure 3 (A): Average daily expenditures over the benefit month by State Pay Regulation, among SNAP-Receiving Households



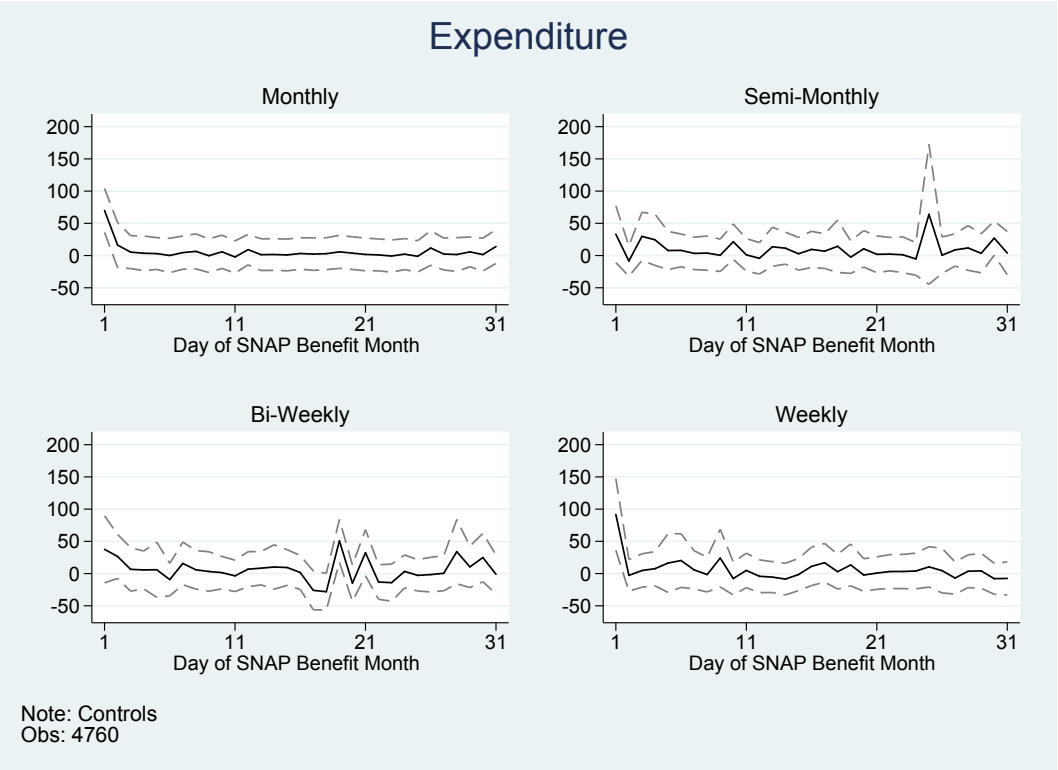
Note: This figure shows average daily expenditures over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 5 mutually exclusive samples. The samples split the households according to the paycheck receipt laws in the state of residence. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 3 (B): Average daily expenditure shares over the benefit month by State Pay Regulation, among SNAP-Receiving Households



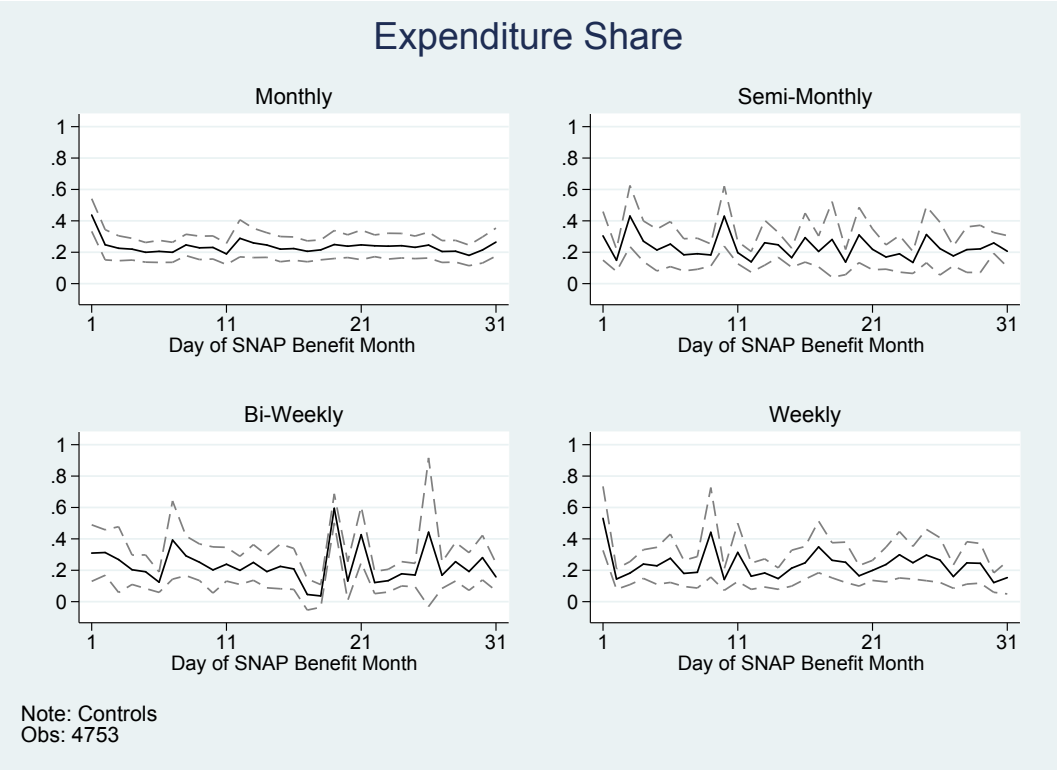
Note: This figure shows average daily expenditure shares over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 5 mutually exclusive samples. The samples split the households according to the paycheck receipt laws in the state of residence. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 4 (A): Average daily expenditures over the benefit month by Self-Reported Payment Frequency, among SNAP-Receiving Households



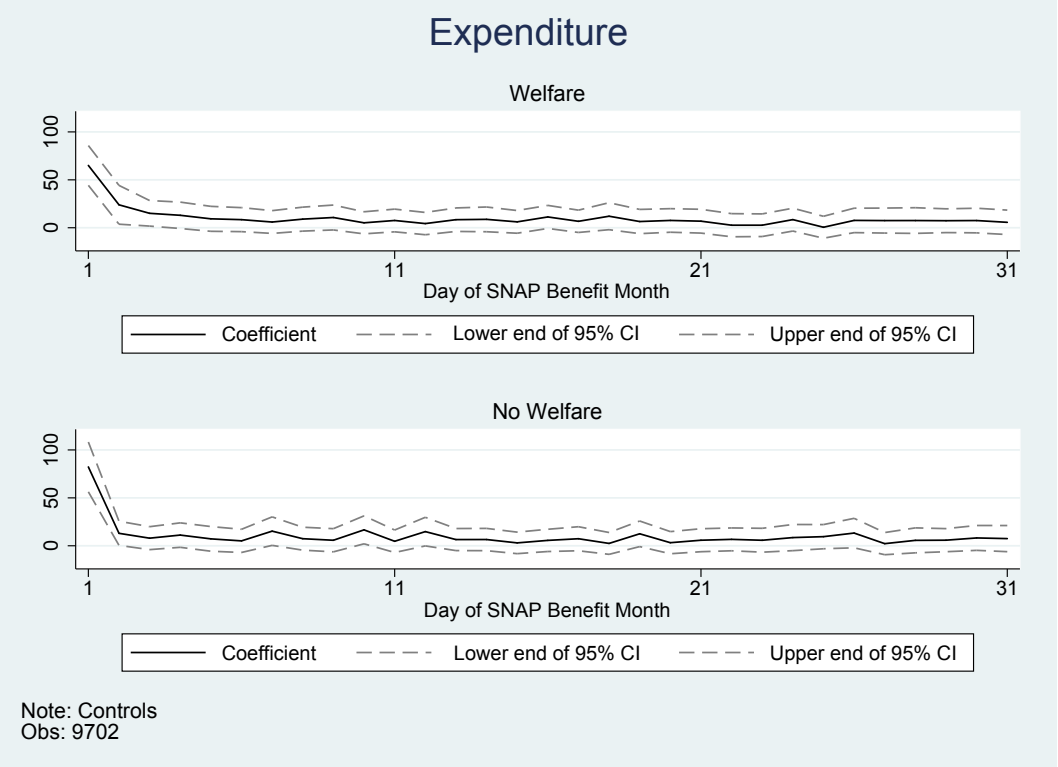
Note: This figure shows average daily expenditures over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 4 mutually exclusive samples. The samples split the households according to self-reported paycheck receipt timing for the sample of workers (monthly, semi-monthly, biweekly, or weekly). Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 4 (B): Average daily expenditure shares over the benefit month by Self-Reported Payment Frequency, among SNAP-Receiving Households



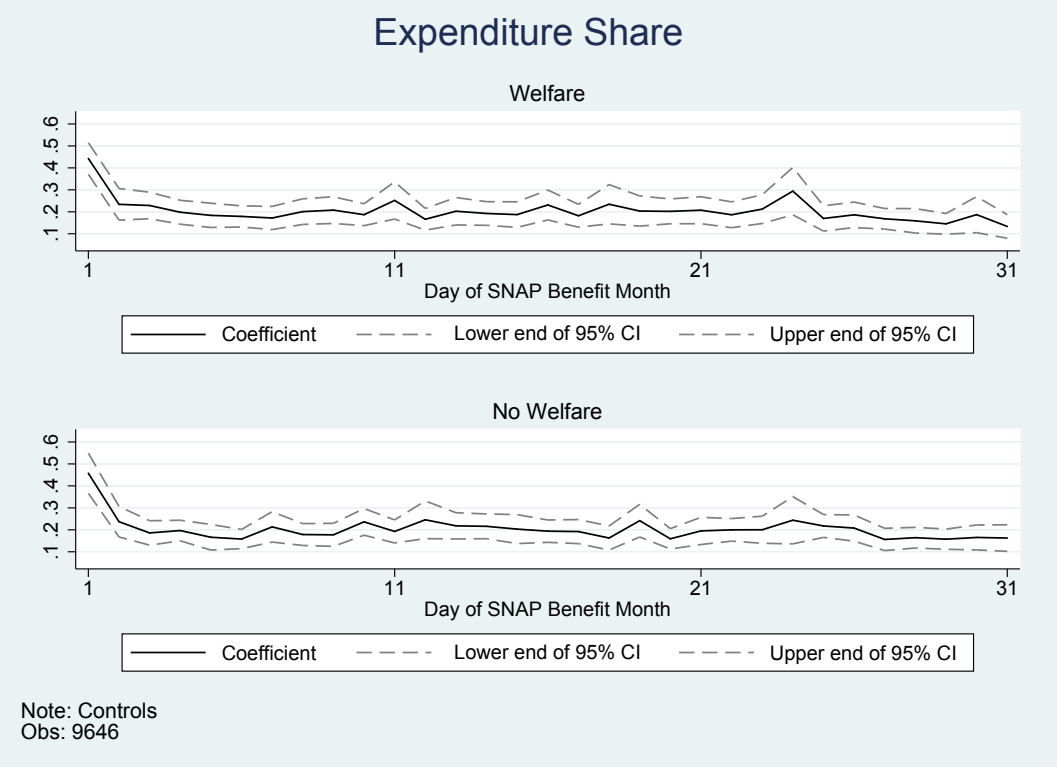
Note: This figure shows average daily expenditure shares over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 4 mutually exclusive samples. The samples split the households according to the paycheck receipt laws in the state of residence. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 5 (A): Average daily expenditures over the benefit month by Whether the Household Received Welfare/Social Insurance (SSA, SSI, SSDI, WIC), among SNAP-Receiving Households



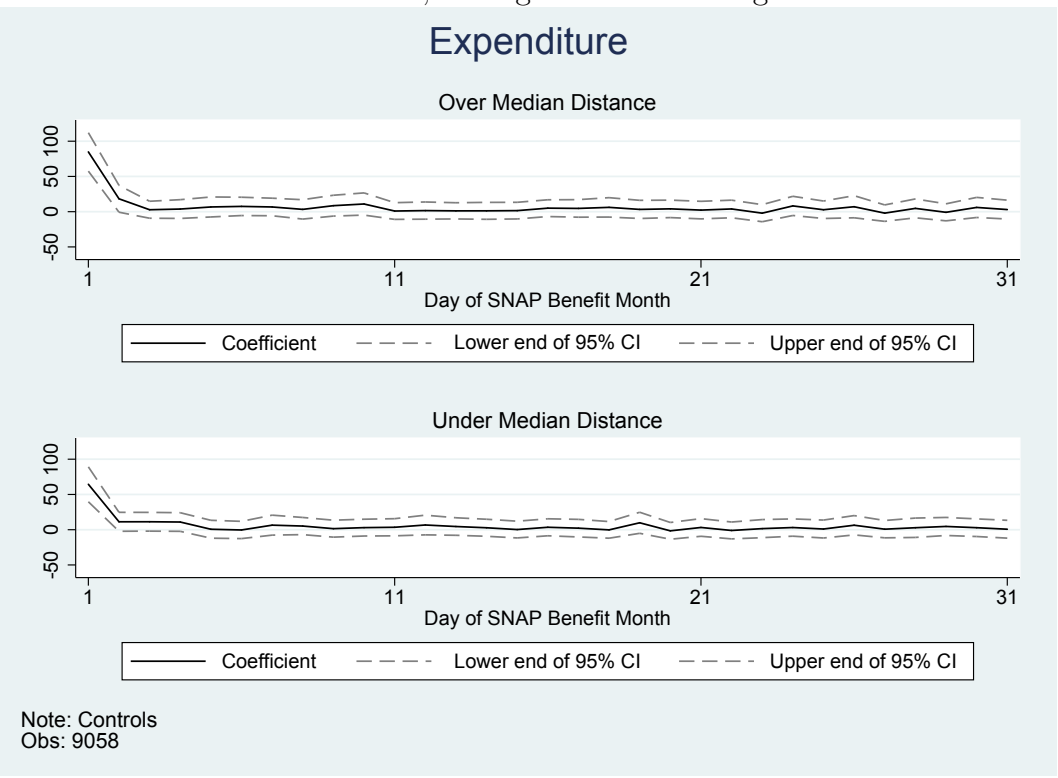
Note: This figure shows average daily expenditures over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 2 mutually exclusive samples. The samples split the households according to whether the household receives some income from WIC, SSI, SSDI, or SSA or the household receives no income from these sources. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 5 (B): Average daily expenditure shares over the benefit month by Whether the Household Received Welfare/Social Insurance (SSA, SSI, SSDI, WIC), among SNAP-Receiving Households



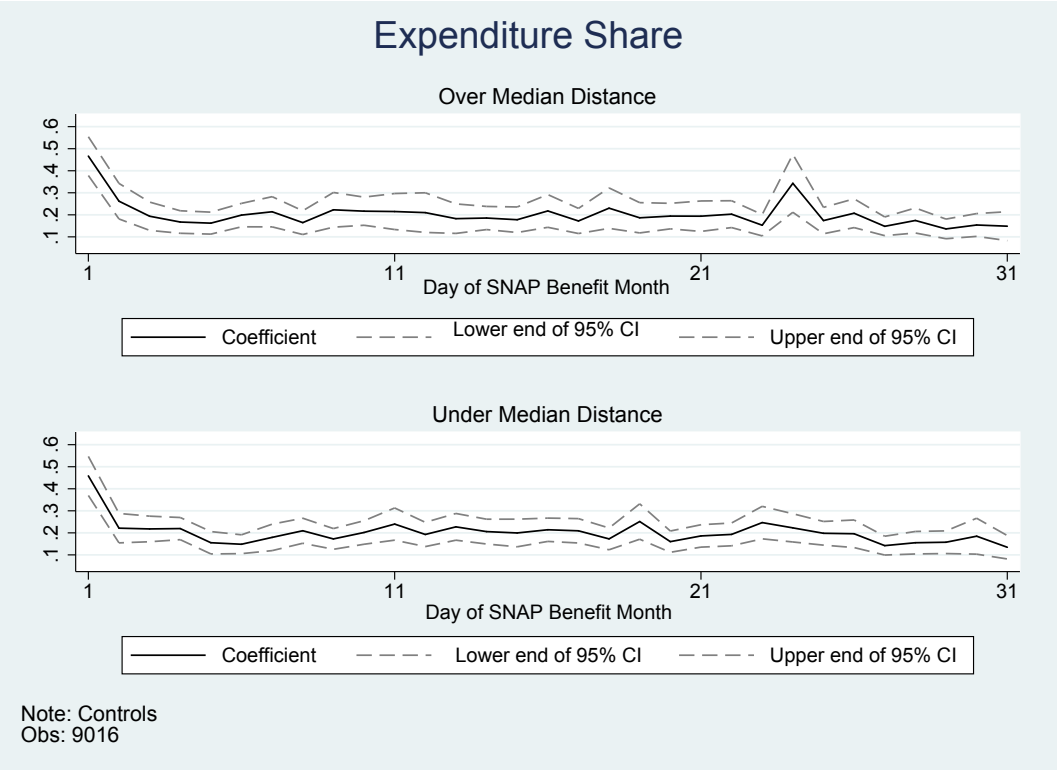
Note: This figure shows average daily expenditure shares over the benefit month, where benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 2 mutually exclusive samples. The samples split the households according to whether the household receives some income from WIC, SSI, SSDI, or SSA or the household receives no income from these sources. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 6 (A): Average daily expenditures over the benefit month by Distance to Main Store, among SNAP-Receiving Households



Note: This figure shows average daily expenditures over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 2 mutually exclusive samples. The samples split the households according to whether the household is closer or further than the median reported distance from the primary store. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Figure 6 (B): Average daily expenditure shares over the benefit month by Distance to Main Store, among SNAP-Receiving Households



Note: This figure shows average daily expenditures over the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates, for 2 mutually exclusive samples. The samples split the households according to whether the household is closer or further than the median reported distance from the primary store. Each point in each panel is the coefficient on each day of the benefit month in regressions that also control for the day of the week, the day of the food diary (one to seven), and whether the day is a holiday. The regressions also control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. The regressions also includes state fixed effects. The confidence intervals are based on standard errors clustered at household level.

Table 1: Summary statistics

	Full Sample	**Week 1**	**Weeks 2-4**	***p*-Value**
Main Shopper Characteristics				
Female	0.737	0.765	0.728	0.20
	(0.440)	(0.424)	(0.445)	
Race/Ethnicity				
White	0.606	0.609	0.605	0.89
	(0.489)	(0.488)	(0.489)	
African American	0.287	0.278	0.289	0.70
	(0.452)	(0.448)	(0.453)	
Hispanic	0.240	0.254	0.235	0.58
	(0.427)	(0.436)	(0.424)	
Highest Level of Education				
High School (incl. GED) or less education	0.582	0.594	0.578	0.63
	(0.493)	(0.491)	(0.494)	
Some college, less than bachelor degree	0.331	0.287	0.345	0.06
	(0.470)	(0.452)	(0.475)	
Bachelor degree or more education	0.087	0.119	0.077	0.12
	(0.282)	(0.324)	(0.266)	
Marital Status				
Married	0.246	0.226	0.252	0.34
	(0.430)	(0.418)	(0.434)	
Widowed	0.052	0.049	0.053	0.76
	(0.222)	(0.217)	(0.224)	
Divorced	0.224	0.253	0.215	0.33
	(0.417)	(0.435)	(0.411)	
Separated	0.098	0.100	0.097	0.88
	(0.297)	(0.300)	(0.296)	
Never Married	0.380	0.371	0.383	0.73
	(0.485)	(0.483)	(0.486)	
Sample Size	1388	341	1047	

Note: This table contains summary statistics for the households in our final sample, weighted to be population representative for the states in FoodAPS. Standard deviations are presented in parentheses. *p*-values reported in column 4 for the test that difference in means in columns 2 (Week 1) and 3 (Weeks 2-4) are statistically significantly different from one another.

Table 1: Summary statistics, Continued

	Full Sample	**Week 1**	**Weeks 2-4**	***p*-Value**
Household Characteristics				
Number of adults ($\geq$ 18 & $\leq$ 65)	1.914	1.955	1.900	0.43
	(1.006)	(1.056)	(0.988)	
Number of children	1.165	1.225	1.145	0.37
	(1.376)	(1.409)	(1.364)	
Number of senior $>$ 65	0.114	0.091	0.122	0.23
	(0.366)	(0.330)	(0.377)	
Income($)	2175.513	2133.659	2189.460	0.78
	(2932.702)	(2470.613)	(3071.313)	
Employment				
At least one individual works	0.579	0.607	0.570	0.23
	(0.494)	(0.489)	(0.495)	
State Pay Regulation				
No Regulation	0.208	0.182	0.216	0.26
	(0.406)	(0.386)	(0.412)	
Monthly	0.122	0.141	0.116	0.37
	(0.328)	(0.348)	(0.320)	
Semi-Monthly	0.215	0.231	0.210	0.54
	(0.411)	(0.421)	(0.407)	
Bi-Weekly	0.038	0.043	0.037	0.46
	(0.192)	(0.202)	(0.189)	
Multiple Payday Requirements	0.416	0.403	0.421	0.63
	(0.493)	(0.491)	(0.494)	
Self-reported Payment Frequency if Working				
Monthly	0.655	0.637	0.661	0.66
	(0.475)	(0.481)	(0.473)	
Semi-Monthly	0.072	0.081	0.069	0.66
	(0.259)	(0.273)	(0.253)	
Bi-Weekly	0.045	0.031	0.049	0.33
	(0.207)	(0.173)	(0.217)	
Weekly	0.145	0.136	0.149	0.66
	(0.353)	(0.343)	(0.356)	
Other	0.083	0.115	0.072	0.36
	(0.276)	(0.319)	(0.258)	
Sample Size	731	178	553	
Welfare/Social Insurance				
Receives Any	0.494	0.463	0.505	0.26
	(0.500)	(0.499)	(0.500)	
Distance to Primary Store				
$\leq$ median distance	0.533	0.560	0.524	0.41
	(0.499)	(0.496)	(0.499)	
Sample Size	1388	341	1047	

Note: This table contains summary statistics for the households in our final sample, weighted to be population representative for the states in FoodAPS. Standard deviations are presented in parentheses. *p*-values reported in column 4 for the test that difference in means in columns 2 (Week 1) and 3 (Weeks 2-4) are statistically significantly different from one another.

Table 2: Expenditures and the SNAP Cycle among SNAP-Receiving Households

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week, SNAP Benefit Month	13.13***	12.89***	14.80***	0.0354***	0.0366***	0.0776***
	(1.495)	(1.461)	(2.763)	(0.00621)	(0.00647)	(0.0147)
Constant	18.59***	9.842	23.43***	0.201***	0.201***	0.174***
	(3.139)	(6.121)	(2.671)	(0.0157)	(0.0160)	(0.0173)
Mean Expenditures by						
First Week	26.67	26.67	26.67	0.169	0.169	0.169
Other Weeks	13.22	13.22	13.22	0.134	0.134	0.134
Observations	9,716	9,702	9,716	9,660	9,646	9,660
Households	1,388	1,386	1,388	1,380	1,378	1,380
R-Squared	0.034	0.060	0.165	0.022	0.022	0.028
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variable is a dummy for the food acquisitions taking place during the first week of the benefit month, where the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (4) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$.

Table 3: Expenditures and the SNAP Cycle by Presence of a Worker in the Household, among SNAP-Receiving Households

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By Whether HH Has Worker						
Work	14.23***	14.21***	16.51***	0.0347***	0.0357***	0.0740***
	(2.073)	(2.043)	(3.850)	(0.00719)	(0.00740)	(0.0164)
No Work	10.81***	10.87***	12.07***	0.0365***	0.0381***	0.0835***
	(2.095)	(1.997)	(3.707)	(0.0114)	(0.0119)	(0.0280)
Main Effects, HH Has Worker Or Not						
Work	20.34***	10.31*	22.80***	0.201***	0.200***	0.175***
	(3.096)	(6.195)	(2.870)	(0.0157)	(0.0159)	(0.0176)
No Work	15.38***	10.73*	8.503***	0.202***	0.200***	0.183***
	(3.175)	(6.134)	(2.665)	(0.0160)	(0.0164)	(0.0184)
Mean Expenditures By						
Work–First Week	29.78	29.78	29.78	0.166	0.166	0.166
No Work–First Week	21.86	21.86	21.86	0.173	0.173	0.173
Work–Other Weeks	15.50	15.50	15.50	0.135	0.135	0.135
No Work–Other Weeks	10.19	10.19	10.19	0.134	0.134	0.134
Test, SNAP Cycles The Same For HHs With And Without Workers						
F-Statistic	1.324	1.366	0.683	0.0174	0.0287	0.0844
p-value	0.250	0.243	0.409	0.895	0.865	0.772
Test, Intercepts The Same for HHs With And Without Workers						
F-Statistic	27.19	0.141	52.77	0.0653	0.0191	0.535
p-value	2.12e-07	0.708	0	0.798	0.89	0.465
Observations	9,716	9,702	9,716	9,660	9,646	9,660
Households	1,388	1,386	1,388	1,380	1,378	1,380
R-Squared	0.188	0.205	0.293	0.296	0.296	0.3
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for the food acquisitions taking place during the first week of the benefit month by presence of a worker in the household. The benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 4: Expenditures and the SNAP Cycle by State Pay Regulation, among SNAP-Receiving Households

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By State Pay Regulation						
No Regulation	11.11***	11.84***	14.34***	0.0516***	0.0526***	0.106***
	(2.861)	(2.791)	(4.554)	(0.0135)	(0.0137)	(0.0277)
Monthly	12.17***	10.83***	18.48***	0.0524***	0.0537***	0.134***
	(3.605)	(3.548)	(3.945)	(0.0138)	(0.0142)	(0.0299)
Semi-Monthly	15.39***	16.49***	22.78***	0.0473***	0.0495***	0.105***
	(3.656)	(3.762)	(7.618)	(0.0120)	(0.0128)	(0.0289)
Bi-weekly	10.71	11.28*	13.68	0.0182	0.0181	0.0440
	(7.158)	(6.717)	(15.05)	(0.0393)	(0.0400)	(0.110)
Multiple Payday Requirements	14.07***	12.87***	9.788**	0.0163	0.0169	0.0355
	(2.621)	(2.495)	(4.305)	(0.00994)	(0.0103)	(0.0237)
Main Effects, State Pay Regulation						
No Regulation	18.95***	12.05**	5.925**	0.198***	0.198***	0.178***
	(2.378)	(5.534)	(2.800)	(0.0159)	(0.0163)	(0.0186)
Monthly	19.82***	14.20***	33.88***	0.194***	0.193***	0.150***
	(2.628)	(5.458)	(3.016)	(0.0164)	(0.0167)	(0.0214)
Semi-Monthly	18.61***	13.76**	8.203***	0.196***	0.197***	0.208***
	(2.496)	(5.532)	(2.419)	(0.0156)	(0.0161)	(0.0168)
Bi-weekly	19.56***	14.27**	17.62***	0.204***	0.204***	0.208***
	(3.395)	(5.722)	(2.419)	(0.0182)	(0.0188)	(0.0168)
Multiple Payday Requirements	20.84***	14.98***	25.67***	0.205***	0.206***	0.193***
	(2.294)	(5.366)	(2.911)	(0.0155)	(0.0159)	(0.0190)
Mean Expenditures by State Pay Regulation:						
No Regulation-First Week	23.46	23.46	23.46	0.183	0.183	0.183
No Regulation-Other Weeks	12.39	12.39	12.39	0.132	0.132	0.132
Monthly-First Week	25.28	25.28	25.28	0.178	0.178	0.178
Monthly-Other Weeks	13.29	13.29	13.29	0.129	0.129	0.129
Semi-Monthly-First Week	27.15	27.15	27.15	0.174	0.174	0.174
Semi-Monthly-Other Weeks	12.14	12.14	12.14	0.131	0.131	0.131
Bi-weekly-First Week	24.39	24.39	24.39	0.162	0.162	0.162
Bi-Weekly-Other Weeks	12.70	12.70	12.70	0.135	0.135	0.135
Multiple Payday-First Week	28.57	28.57	28.57	0.157	0.157	0.157
Multiple Payday-Other Weeks	14.20	14.20	14.20	0.138	0.138	0.138
Test, SNAP Cycles The Same For HHs With Different Pay Regulations						
F-Statistic	0.294	0.359	0.811	1.941	1.910	2.069
p-value	0.882	0.838	0.518	0.101	0.106	0.0826
Test, Intercepts The Same For HHs With Different Pay Regulations						
F-Statistic	0.920	1.575	111.6	1.774	1.987	12.34
p-value	0.452	0.179	0	0.132	0.0942	5.76e-08
Observations	9,716	9,702	9,716	9,660	9,646	9,660
Households	1,388	1,386	1,388	1,380	1,378	1,380
R-Squared	0.179	0.202	0.294	0.297	0.297	0.302
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for the food acquisitions taking place during the first week of the benefit month, by the type of pay regulation in the state. The timing of the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 5: Expenditures and the SNAP Cycle by Self-Reported Payment Frequency, among SNAP-Receiving Households with a Worker

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By Pay Frequency						
Monthly	14.03***	12.60***	10.12**	0.0200*	0.0210*	0.0413*
	(2.898)	(2.876)	(4.629)	(0.0104)	(0.0109)	(0.0230)
Semi-Monthly	2.992	5.221	4.881	0.0256*	0.0263*	0.0527*
	(3.626)	(3.468)	(3.834)	(0.0146)	(0.0151)	(0.0318)
Bi-weekly	7.743	9.169	1.617	0.0292	0.0324	0.0672
	(5.895)	(6.281)	(11.52)	(0.0289)	(0.0295)	(0.0693)
Weekly	19.12***	20.61***	29.61***	0.0325	0.0338	0.0696
	(6.436)	(6.086)	(9.926)	(0.0203)	(0.0208)	(0.0446)
Main Effects, Pay Frequency						
Monthly	25.06***	3.872	31.18***	0.230***	0.232***	0.232***
	(4.889)	(12.01)	(3.631)	(0.0230)	(0.0242)	(0.0245)
Semi-Monthly	28.86***	8.195	14.36***	0.227***	0.229***	0.187***
	(5.355)	(11.83)	(5.030)	(0.0232)	(0.0252)	(0.0361)
Bi-weekly	28.66***	5.242	38.70***	0.230***	0.231***	0.184***
	(5.973)	(12.33)	(8.927)	(0.0234)	(0.0246)	(0.0543)
Weekly	24.51***	2.535	21.50***	0.227***	0.229***	0.232***
	(4.811)	(12.22)	(3.631)	(0.0226)	(0.0245)	(0.0245)
Mean Expenditures By Pay Frequency:						
Monthly-First Week	29.06	29.06	29.06	0.156	0.156	0.156
Monthly-Other Weeks	15.12	15.12	15.12	0.138	0.138	0.138
Semi-Monthly-First Week	23.24	23.24	23.24	0.170	0.170	0.170
Semi-Monthly-Other Weeks	18.35	18.35	18.35	0.132	0.132	0.132
Bi-weekly-First Week	28.02	28.02	28.02	0.158	0.158	0.158
Bi-Weekly-Other Weeks	17.73	17.73	17.73	0.140	0.140	0.140
Weekly-First Week	33.32	33.32	33.32	0.158	0.158	0.158
Weekly-Other Weeks	15.72	15.72	15.72	0.138	0.138	0.138
Test, SNAP Cycles The Same For HHs With Different Self-Reported Pay Frequencies						
F-Statistic	2.462	1.771	1.905	0.121	0.123	0.135
p-value	0.0615	0.151	0.127	0.948	0.946	0.939
Test, Intercept The Same For HHs With Different Self-Reported Pay Frequencies						
F-Statistic	1.156	1.586	1.760e+16	0.115	0.113	3.198
p-value	0.326	0.192	0	0.951	0.952	0.0230
Observations	4,767	4,760	4,767	4,760	4,753	4,760
Households	681	680	681	680	679	680
R-Squared	0.210	0.232	0.315	0.330	0.330	0.331
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for the food acquisition taking place during the first week of the benefit month by self-reported payment frequency at a job. The timing of the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 6: Expenditures and the SNAP Cycle by Whether the Household Received Welfare/Social Insurance (SSA, SSI, SSDI, WIC), among SNAP-Receiving Households

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By Whether HH Received Welfare/Social Insurance						
Welfare/Social Insurance	12.55***	12.31***	13.19***	0.0341***	0.0350***	0.0778***
	(1.887)	(1.869)	(3.289)	(0.00909)	(0.00934)	(0.0224)
No Welfare/Social Insurance	13.68***	13.41***	16.14***	0.0367***	0.0381***	0.0774***
	(2.291)	(2.271)	(4.282)	(0.00865)	(0.00907)	(0.0195)
Main Effects, HH Received Any/No Welfare/Social Insurance						
Welfare/Social Insurance	18.91***	9.567	6.204**	0.202***	0.202***	0.185***
	(3.203)	(6.258)	(2.579)	(0.0159)	(0.0164)	(0.0178)
No Welfare/Social Insurance	18.37***	9.682	22.90***	0.200***	0.201***	0.174***
	(3.145)	(6.106)	(2.998)	(0.0156)	(0.0161)	(0.0180)
Mean Expenditures By Whether HH Received Welfare/Social Insurance:						
Welfare/Social Insurance-First Week	26.13	26.13	26.13	0.170	0.170	0.170
Welfare/Social Insurance-Other Weeks	13.30	13.30	13.30	0.135	0.135	0.135
No Welfare/Social Insurance-First Week	27.13	27.13	27.13	0.168	0.168	0.168
No Welfare/Social Insurance-Other Weeks	13.13	13.13	13.13	0.134	0.134	0.134
Test, SNAP Cycles The Same For HHs Receiving Any/No Welfare/Social Insurance						
F-Statistic	0.144	0.136	0.295	0.0409	0.0579	0.000198
p-value	0.705	0.712	0.587	0.840	0.810	0.989
Test, Intercepts The Same For HHs Receiving Any/No Welfare/Social Insurance						
F-Statistic	0.302	0.0158	65.11	0.308	0.127	1.077
p-value	0.583	0.900	0	0.579	0.722	0.300
Observations	9,716	9,702	9,716	9,660	9,646	9,660
Households	1,388	1,386	1,388	1,380	1,378	1,380
R-Squared	0.183	0.204	0.293	0.296	0.296	0.300
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for the food acquisition taking place during the first week of the benefit month by whether the household received other welfare (SSI/WIC) or social insurance (SSDI/SSA). The timing of the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 7: Expenditures and the SNAP Cycle, by Whether the Household Received Welfare or Social Insurance (SSA, SSI, SSDI, WIC), among SNAP-Receiving Households, Controlling for Receipt of SSA/SSI/SSDI that Day

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By Whether HH Received Welfare/Social Insurance						
Welfare/Social Insurance	12.65***	12.42***	13.29***	0.0359***	0.0367***	0.0801***
	(1.885)	(1.869)	(3.294)	(0.00931)	(0.00953)	(0.0227)
No Welfare/Social Insurance	13.66***	13.40***	16.13***	0.0366***	0.0379***	0.0772***
	(2.291)	(2.269)	(4.277)	(0.00866)	(0.00909)	(0.0195)
Main Effects, HH Received Any/No Welfare/Social Insurance						
Welfare	19.04***	9.490	6.685***	0.200***	0.200***	0.188***
	(3.176)	(6.239)	(2.557)	(0.0159)	(0.0165)	(0.0185)
No Welfare	18.38***	9.629	22.89***	0.200***	0.201***	0.174***
	(3.143)	(6.108)	(3.016)	(0.0157)	(0.0162)	(0.0181)
Main Effect for Receipt of Specific Welfare/Social Insurance						
SSA Payment	-21.78***	-21.24***	-11.12	-0.0642	-0.0669	-0.0726
	(5.661)	(5.944)	(7.320)	(0.0763)	(0.0781)	(0.0946)
SSI Payment	16.00***	18.00***	15.19**	0.263**	0.265**	0.305**
	(4.455)	(4.710)	(6.557)	(0.104)	(0.105)	(0.130)
SSDI Payment	-7.182	-1.616	1.065	-0.0253	-0.0259	-0.0352
	(9.457)	(9.283)	(10.65)	(0.0868)	(0.0877)	(0.107)
Mean Expenditures By Whether HH Received Welfare/Social Insurance:						
Welfare/Social Ins.-First Week	26.13	26.13	26.13	0.170	0.170	0.170
Welfare/Social Ins.-Other Weeks	13.30	13.30	13.30	0.135	0.135	0.135
No Welfare/Social Ins.-First Week	27.13	27.13	27.13	0.168	0.168	0.168
No Welfare/Social Ins.-Other Weeks	13.13	13.13	13.13	0.134	0.134	0.134
SNAP Cycles The Same, By Whether HHs Received Any/No Welfare/Social Insurance						
F-Statistic	0.116	0.106	0.275	0.003	0.009	0.010
p-value	0.733	0.745	0.600	0.955	0.923	0.922
Intercepts The Same, By Whether HHs Received Welfare/Social Insurance						
F-Statistic	0.430	0.023	59.510	0.026	0.000	1.408
p-value	0.512	0.880	0.000	0.872	0.990	0.236
Observations	9,716	9,702	9,716	9,660	9,646	9,660
Households	1,388	1,386	1,388	1,380	1,378	1,380
R-Squared	0.184	0.205	0.294	0.299	0.299	0.303
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

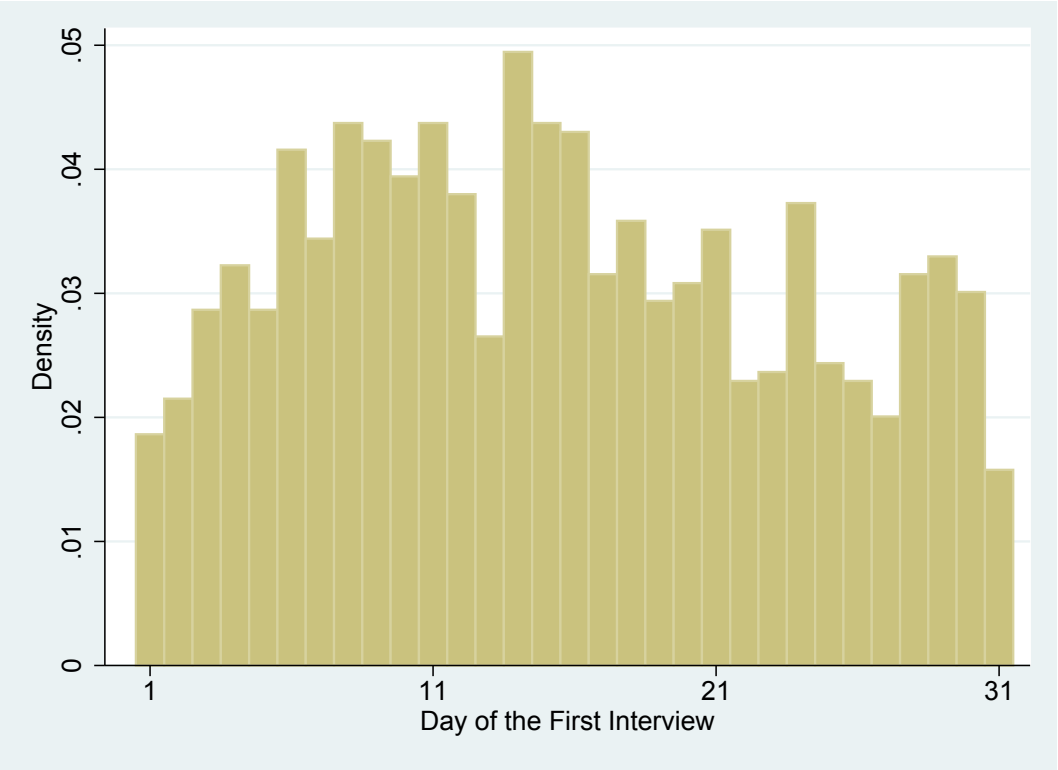
Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for whether food acquisition took place during the first week of the benefit month by whether the household received welfare or social insurance. The timing of the benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. There are also dummies for the probability of receipt of SSA/SSDI/SSI on the day based on federal disbursal schedules. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Table 8: Expenditures and the SNAP Cycle by Distance to Main Store, among SNAP-Receiving Households

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month, By Whether Main Store Closer Than Median Distance Or Not						
$\geq$ Median Distance	15.63***	15.74***	20.75***	0.0465***	0.0480***	0.103***
	(2.538)	(2.485)	(4.627)	(0.00883)	(0.00912)	(0.0197)
Under Median Distance	12.02***	11.70***	11.08***	0.0297***	0.0307***	0.0644***
	(1.965)	(1.951)	(3.690)	(0.00929)	(0.00960)	(0.0220)
Main Effects, Main Store Less Than Median Distance Or Not						
$\geq$ Median Distance	18.33***	7.244	4.799	0.201***	0.200***	0.181***
	(3.351)	(6.285)	(2.988)	(0.0165)	(0.0169)	(0.0182)
Under Median Distance	16.66***	6.782	25.82***	0.205***	0.203***	0.183***
	(3.575)	(6.398)	(2.903)	(0.0164)	(0.0170)	(0.0189)
Mean Expenditures By Whether Main Store Closer Than Median Distance Or Not:						
>= Median Distance-First Week	29.51	29.51	29.51	0.177	0.177	0.177
>= Median Distance-Other Weeks	13.64	13.64	13.64	0.132	0.132	0.132
Under Median Distance-First Week	25.29	25.29	25.29	0.165	0.165	0.165
Under Median Distance-Other Weeks	13.04	13.04	13.04	0.135	0.135	0.135
Test SNAP Cycles The Same, By Whether Or Not Main Store Closer Than Median Distance						
F-Statistic	1.253	1.593	2.673	1.708	1.718	1.723
p-value	0.263	0.207	0.102	0.191	0.190	0.190
Test Intercepts The Same, By Whether Or Not Main Store Closer Than Median Distance						
F-Statistic	2.320	0.199	104.300	1.031	0.884	0.029
p-value	0.128	0.656	0.000	0.310	0.347	0.865
Observations	9,072	9,058	9,072	9,030	9,016	9,030
Households	1,296	1,294	1,296	1,290	1,288	1,290
R-Squared	0.185	0.207	0.293	0.296	0.296	0.3
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for whether the food acquisition took place during the first week of the benefit month by distance to the main store. The benefit month is based on a combination of self-reported last day of SNAP receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) additionally control for the number of children, adults, and seniors in the household, household income, and main respondent demographic characteristics such as female, race, education, and marital status. Columns (2) and (5) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. * p<0.1, ** p<0.05, *** p<0.01.

Appendix Figure 1: Distribution of First Day of Food Acquisition within the Month, FoodAPS Data



Appendix Table 1: SNAP Disbursal Schedule, December 2012

State	First date	Last date	On every day	Day if not every day
Alabama	4	18	Y	
Alaska	1	1	NA	
Arizona	1	13	Y	
Arkansas	4	13	Y	4-5, 9-9, 10-11, 12-13
California	1	10	Y	
Colorado	1	10	Y	
Connecticut	1	3	Y	
Delaware	5	11	Y	
DC	1	10	Y	
Florida	1	15	Y	
Georgia	5	14	N	5, 7, 9, 11, 13, 15, 17, 19, 21, 23
Hawaii	1	5	Y	
Idaho	1	1	NA	
Illinois	1	23	N	1, 3-4, 7-8, 10-11, 14, 17, 19, 21, 23
Indiana	1	10	Y	
Iowa	1	10	Y	
Kansas	1	10	Y	
Kentucky	1	10	Y	
Louisiana	5	14	Y	1, 4
Maine	10	14	Y	
Maryland	6	15	Y	
Massachusetts	1	14	Y	
Michigan	3	21	Y	3, 5, 7, 9, 11, 13, 15, 17, 19, 21
Minnesota	4	13	Y	
Mississippi	5	19	Y	
Missouri	1	22	Y	
Montana	2	6	Y	
Nebraska	1	5	Y	
Nevada	1	1	NA	
New Hampshire	5	5	NA	
New Jersey	1	5	Y	
New Mexico	1	20	Y	
New York Upstate	1	9	Unknown	
New York City	1	15	Unknown	
North Carolina	3	21		1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21
North Dakota	1	1	NA	
Ohio	1	10	Unknown	
Oklahoma	1	10		1, 5, 10
Oregon	1	9	Y	
Pennsylvania	3	14	N	3-7, 10-14
Rhode Island	1	1	NA	
South Carolina	1	19	N	2, 4, 6, 8, 10-11, 13, 15, 17, 19
South Dakota	10	10	NA	
Tennessee	1	20	Y	
Texas	1	15	Y	
Utah	5	15	N	5, 11, 15
Vermont	1	1	NA	
Virginia	1	9	N	1, 4, 7, 9
Washington	1	10	Y	
West Virginia	1	9	Y	
Wisconsin	3	15	N	2, 3, 5-6, 8, 9, 11-12, 14
Wyoming	1	4	Y	

Note: This table contains information on the SNAP disbursal timing for each state, based on a table generously provided by Christian Gregory and Jessica Todd for December 2012.

Appendix Table 2: Paycheck Laws, 2012 and 2013, Department of Labor

State	Weekly	Bi-Weekly	Semi-Monthly	Monthly	Varies occupation	Employer Chooses	Other
Alabama	No laws						
Alaska			X	X			
Arizona			X				
Arkansas			X				
California	X	X	X		X		
Colorado				X			
Connecticut	X						
Delaware				X			
DC			X				
Florida	NA						
Georgia			X				
Hawaii			X	X			
Idaho				X			
Illinois			X	X			
Indiana		X					
Iowa	X	X	X	X			
Kansas				X			
Kentucky			X				
Louisiana		X	X				
Maine			X				
Maryland		X					
Massachusetts	X	X					
Michigan	X	X		X	X		
Minnesota				X			
Mississippi		X	X				
Missouri			X				
Montana							X
Nebraska						X	
Nevada			X	X			
New Hampshire	X						
New Jersey			X				
New Mexico			X	X			
New York	X		X				
North Carolina					X		
North Dakota				X			
Ohio			X				
Oklahoma			X				
Oregon				X			
Pennsylvania						X	
Rhode Island	X						
South Carolina	No laws						
South Dakota				X			
Tennessee			X				
Texas			X	X			
Utah			X				
Vermont	X	X	X				
Virginia		X	X	X			
Washington				X			
West Virginia		X					
Wisconsin				X			
Wyoming			X				

Note: This table contains information on the paycheck laws for each state, based on a table provided by the Wage and Hour Division of the Department of Labor (https://www.dol.gov/whd/state/payday2012.htm).

Appendix Table 3: Correlation between Self-Reported Pay Frequency and State Payment Regulations

		State Pay Regulation	
		Strict State Rule	Any State Rule
Self-Reported Payment Frequency	Monthly	-0.018	-0.008
	Semi-Monthly	0.004	-0.023
	Bi-weekly	0.029	0.014
	Weekly	0.069	-0.020

Note: This table contains the correlation coefficient of the self-reported pay frequency and state pay regulations laws for 681 SNAP households.

Appendix Table 4: Expenditures and the SNAP Cycle by Whether Household Reported Receiving a Monthly Paycheck, among SNAP-Receiving Households with a Worker

	Expenditure			Expenditure Share		
	(1)	(2)	(3)	(4)	(5)	(6)
First Week of SNAP Benefit Month by whether Pay Was Monthly						
Monthly	13.97***	12.58***	10.09**	0.0199*	0.0209*	0.0413*
	(2.897)	(2.869)	(4.622)	(0.0104)	(0.0109)	(0.0230)
Other Pay Schedules	12.46***	14.35***	17.95***	0.0297**	0.0311**	0.0638**
	(3.888)	(3.680)	(6.315)	(0.0126)	(0.0131)	(0.0277)
Main Effects, Monthly Pay or Not						
Monthly	25.10***	4.162	30.96***	0.230***	0.230***	0.232***
	(4.866)	(11.66)	(3.622)	(0.0231)	(0.0239)	(0.0244)
Other Pay Schedules	26.45***	4.806	2.931	0.228***	0.228***	0.177***
	(4.851)	(11.75)	(6.078)	(0.0226)	(0.0242)	(0.0321)
Mean Expenditures By						
Monthly–First Week	29.06	29.06	29.06	0.156	0.156	0.156
Other Pay Schedules—First Week	29.33	29.33	29.33	0.164	0.164	0.164
Monthly—Other Weeks	15.12	15.12	15.12	0.138	0.138	0.138
Other Pay Schedules—Other Weeks	17.81	17.81	17.81	0.135	0.135	0.135
Test, SNAP Cycle The Same For HHs With Monthly Paychecks and Others						
F-Statistic	0.0933	0.135	1.008	0.353	0.345	0.387
P-value	0.760	0.714	0.316	0.553	0.557	0.534
Test, Intercept The Same for HHs with Monthly Paychecks and Others						
F-Statistic	0.785	0.251	26.81	0.206	0.273	5.305
P-value	0.376	0.617	2.96e-07	0.650	0.602	0.0216
Observations	4,767	4,760	4,767	4,760	4,753	4,760
Households	681	680	681	680	679	680
R-Squared	0.209	0.231	0.313	0.330	0.330	0.331
Household Fixed Effects	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are total expenditures/expenditure shares and the main independent variables are dummies for the food acquisition taking place during the first week of the benefit month by self-reports of whether the paycheck was received monthly or on another schedules. The benefit month is based on self-reported last day of receipt and administrative dates. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (4) additionally control for the number of children, adults, and seniors in the household, household income, and primary respondent demographic characteristics such as female, race, education, highest level of education, and marital status. Columns (2) and (4) also include State fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Appendix Table 5: Additional Food Acquisition Variables and the SNAP Cycle by Self-Reported Payment Frequency, among SNAP-Receiving Households with a Worker

	Total Daily Food Calories (Kcal)			Total FAH (Kcal)			Total FAFH Calories (Kcal)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Week of SNAP Benefit Month, by Pay Frequency									
Monthly	6,842***	6,266***	5,710**	7,001***	6,497***	6,059***	-159.2	-231.7*	-348.9**
	(1,415)	(1,403)	(2,279)	(1,421)	(1,410)	(2,297)	(117.1)	(118.9)	(154.5)
Semi-Monthly	1,584	2,224	2,330*	1,805	2,182	2,476**	-220.9	41.53	-146.2
	(1,588)	(1,377)	(1,286)	(1,647)	(1,374)	(1,217)	(492.6)	(479.5)	(520.5)
Bi-weekly	3,643*	4,585**	113.0	3,076	4,266**	2,721	566.7	319.3	-2,608
	(2,090)	(2,168)	(4,140)	(2,005)	(1,836)	(3,056)	(775.1)	(801.8)	(2,319)
Weekly	9,236***	9,854***	13,586***	9,386***	9,911***	13,712***	-149.9	-56.58	-126.3
	(2,555)	(2,433)	(3,556)	(2,495)	(2,377)	(3,460)	(252.3)	(265.7)	(313.0)
Main Effects, Pay Frequency									
Monthly	9,453***	3,709	11,777***	8,072***	4,258	10,206***	1,382***	-548.9	1,571***
	(2,027)	(5,195)	(1,711)	(1,962)	(5,199)	(1,702)	(353.3)	(700.1)	(198.0)
Semi-Monthly	10,697***	5,197	5,334**	8,748***	5,214	4,770**	1,949***	-16.88	564.5
	(2,231)	(5,106)	(2,182)	(2,155)	(5,105)	(2,163)	(633.0)	(775.4)	(516.8)
Bi-weekly	11,332***	4,673	17,632***	9,537***	4,609	13,915***	1,795***	64.20	3,717**
	(2,487)	(5,317)	(3,382)	(2,388)	(5,309)	(2,721)	(522.3)	(676.2)	(1,657)
Weekly	9,148***	3,053	13,547***	7,868***	3,716	12,982***	1,280***	-663.2	564.5
	(1,964)	(5,264)	(1,711)	(1,874)	(5,268)	(1,702)	(386.5)	(753.4)	(198.0)
Test, SNAP Cycles The Same for HHs With Different Self-Reported Pay Frequency									
F-Statistic	3.071	2.818	3.394	3.212	3.086	3.392	0.293	0.331	0.497
P-value	0.0273	0.0383	0.0176	0.0225	0.0267	0.0177	0.831	0.803	0.685
Test, Intercepts The Same for HHs With Different Self-Reported Pay Frequency									
F-Statistic	1.005	1.372	18.90	0.482	0.655	14.84	0.916	1.258	3.378
P-value	0.390	0.250	0	0.695	0.580	0	0.433	0.288	0.0347
Observations	4,767	4,760	4,767	4,767	4,760	4,767	4,767	4,760	4,767
Households	681	680	681	681	680	681	681	680	681
R-Squared	0.162	0.180	0.262	0.132	0.148	0.236	0.186	0.208	0.412
Household Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variable are listed as column names and the main independent variables is the first week of the benefit month where the SNAP cycle is based on self-reported last day of receipt. The dependent variables are total daily food calories acquired for columns 1-3, food at home daily calories acquired for columns 4-6, and food away from home daily calories acquired for columns 7-9. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) and (8) additionally control for the number of children, adults, and seniors in the household, household income, and primary respondent demographic characteristics such as female, race, education, highest level of education, and marital status. Columns (2) and (5) and (8) also include state fixed effects. Columns (3) and (6) and (9) include household fixed effects. Standard errors clustered at household level in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Appendix Table 6: More Additional Outcome Variables and the SNAP Cycle by Self-Reported Payment Frequency, among SNAP-Receiving Households with a Worker

	FAH Expenditures			FAFH Expenditures			FFV Expenditures		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Week of SNAP Benefit Month, by Pay Frequency									
Monthly	14.25***	13.10***	11.86**	-0.225	-0.497	-1.744**	0.851***	0.772***	0.323
	(2.862)	(2.857)	(4.642)	(0.639)	(0.610)	(0.798)	(0.265)	(0.261)	(0.373)
Semi-Monthly	4.893	5.995*	5.936	-1.901	-0.773	-1.054	0.138	0.401	0.811
	(3.860)	(3.355)	(3.874)	(1.766)	(1.853)	(2.692)	(0.710)	(0.634)	(1.003)
Bi-weekly	6.883	9.011**	9.299	0.860	0.158	-7.682	1.194*	1.164**	-0.472
	(5.070)	(4.584)	(7.703)	(2.722)	(2.953)	(5.935)	(0.687)	(0.542)	(1.445)
Weekly	20.67***	21.77***	30.65***	-1.549	-1.159	-1.035	0.788*	0.754*	1.126**
	(6.267)	(5.976)	(9.629)	(1.155)	(1.132)	(1.291)	(0.451)	(0.409)	(0.530)
Main Effects, Pay Frequency									
Monthly	17.30***	3.975	20.88***	7.760***	-0.103	10.30***	0.972**	3.011**	1.409***
	(4.371)	(11.55)	(3.545)	(1.961)	(4.035)	(0.782)	(0.417)	(1.386)	(0.407)
Semi-Monthly	18.60***	5.947	11.25**	10.26***	2.248	3.111	1.531***	3.344**	0.859
	(4.899)	(11.45)	(5.060)	(2.299)	(4.111)	(2.537)	(0.510)	(1.316)	(0.996)
Bi-weekly	20.13***	3.975	25.46***	8.532***	1.267	13.23***	1.007**	2.978**	7.588***
	(5.370)	(11.81)	(6.446)	(2.089)	(4.106)	(4.288)	(0.475)	(1.362)	(1.123)
Weekly	17.37***	3.296	18.71***	7.143***	-0.761	2.791***	1.126***	3.080***	1.349***
	(4.217)	(11.79)	(3.545)	(2.004)	(4.150)	(0.782)	(0.430)	(1.397)	(0.407)
Test, SNAP Cycles the Same by Pay Frequency									
F-Statistic	2.236	1.955	1.880	0.665	0.120	0.440	0.372	0.279	0.711
P-value	0.0829	0.119	0.132	0.574	0.948	0.724	0.773	0.840	0.546
Test, Intercepts the Same by Pay Frequency									
F-Statistic	0.300	0.350	4.529	1.730	2.193	5.097	0.876	0.266	18.13
P-value	0.825	0.789	0.0111	0.159	0.0876	0.00635	0.453	0.850	0
Observations	4,767	4,760	4,767	4,767	4,760	4,767	4,767	4,760	4,767
Households	681	680	681	681	680	681	681	680	681
R-Squared	0.141	0.158	0.248	0.251	0.278	0.467	0.106	0.131	0.235
Household Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variable are listed as column names and the main independent variables are the first week of the benefit month where the benefit month is based on self-reported last day of receipt. The dependent variables are food at home expenditures for columns 1-3, food away from home expenditures for columns 4-6, and fresh fruit and vegetable expenditures for columns 7-9. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (5) and (8) additionally control for the number of children, adults, and seniors in the household, household income, and primary respondent demographic characteristics such as female, race, education, highest level of education, and marital status. Columns (2) and (5) and (8) also include state fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.

Appendix Table 7: Even More Additional Outcome Variables and the SNAP Cycle by Self-Reported Payment Frequency, among SNAP-Receiving Households with a Worker

	Shopped at supermarkets			Shopped at big box stores			Shopped at convenience Stores		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
First Week of SNAP Benefit Month, by Pay Frequency									
Monthly	0.0431*	0.0343	0.0248	0.0523**	0.0465**	0.0469	-0.0237**	-0.0283**	-0.0233
	(0.0221)	(0.0224)	(0.0362)	(0.0244)	(0.0234)	(0.0379)	(0.0115)	(0.0120)	(0.0196)
Semi-Monthly	0.0879*	0.119**	0.106	-0.0874*	-0.0541	-0.0269	0.0160	0.0139	-0.0154
	(0.0496)	(0.0532)	(0.0852)	(0.0464)	(0.0402)	(0.0314)	(0.0560)	(0.0515)	(0.0603)
Bi-weekly	0.0717	0.0964	0.171*	0.0779	0.0741	0.0183	0.0369	0.0407	0.0723
	(0.0717)	(0.0732)	(0.0885)	(0.0605)	(0.0676)	(0.146)	(0.0320)	(0.0304)	(0.0557)
Weekly	0.0294	0.0473	0.140***	-0.00923	-0.0120	-0.0269	-0.0322**	-0.0279*	-0.0350
	(0.0368)	(0.0368)	(0.0441)	(0.0396)	(0.0393)	(0.0620)	(0.0155)	(0.0157)	(0.0325)
Main Effects, Pay Frequency									
Monthly	0.126**	-0.0761	0.578***	0.309***	0.222*	0.107***	0.0839***	-0.0196	0.0464**
	(0.0541)	(0.112)	(0.0278)	(0.0449)	(0.130)	(0.0323)	(0.0235)	(0.0800)	(0.0188)
Semi-Monthly	0.185***	-0.0231	-0.0839	0.329***	0.230*	0.130***	0.0977***	0.00504	0.0596
	(0.0638)	(0.116)	(0.0787)	(0.0633)	(0.134)	(0.0433)	(0.0333)	(0.0823)	(0.0587)
Bi-weekly	0.115**	-0.110	0.170**	0.294***	0.185	0.380***	0.0620*	-0.0347	-0.00524
	(0.0513)	(0.113)	(0.0692)	(0.0570)	(0.136)	(0.106)	(0.0329)	(0.0838)	(0.0426)
Weekly	0.141***	-0.0799	0.150***	0.318***	0.234*	0.107***	0.0809***	-0.0236	0.0464**
	(0.0515)	(0.112)	(0.0278)	(0.0490)	(0.134)	(0.0323)	(0.0249)	(0.0840)	(0.0188)
Test, SNAP Cycles the Same by Pay Frequency									
F-Statistic	0.339	0.846	1.792	2.769	1.906	0.818	1.401	1.743	1.009
P-value	0.797	0.469	0.147	0.0409	0.127	0.484	0.241	0.157	0.388
Test, Intercepts the Same by Pay Frequency									
F-Statistic	0.914	1.078	61.22	0.170	0.514	2.525	0.301	0.561	0.876
P-value	0.434	0.358	0	0.916	0.673	0.0566	0.825	0.641	0.417
Observations	4,767	4,760	4,767	4,767	4,760	4,767	4,767	4,760	4,767
Households	681	680	681	681	680	681	681	680	681
R-Squared	0.191	0.205	0.349	0.218	0.236	0.373	0.097	0.115	0.311
Household Fixed Effects	No	No	Yes	No	No	Yes	No	No	Yes
Controls	No	Yes	No	No	Yes	No	No	Yes	No

Note: This table contains the results obtained when the dependent variables are listed as column names and the main independent variables is the first week of the benefit month where the benefit month is based on self-reported last day of receipt. All regressions control for the day of the week, the day of the survey, and holidays. Columns (2) and (4) additionally control for the number of children, adults, and seniors in the household, household income, and primary respondent demographic characteristics such as female, race, education, highest level of education, and marital status. Columns (2) and (4) also include State fixed effects. Columns (3) and (6) include household fixed effects. Standard errors clustered at household level in parentheses. $*p < 0.1$, $**p < 0.05$, $***p < 0.01$.