Time Use and Eating Patterns of SNAP Participants over the Benefit Month

Ji Yong Lee

Department of Agricultural Economics and Agribusiness, University of Arkansas,
jyl003@uark.edu

Rodolfo M. Nayga, Jr.

Department of Agricultural Economics and Agribusiness, University of Arkansas,
rnayga@uark.edu

Young Jo

Economic Research Service, United States Department of Agriculture,

young.jo@ers.usda.gov

Brandon Restrepo

Economic Research Service, United States Department of Agriculture,

brandon.restrepo@ers.usda.gov

Selected Paper prepared for presentation at the 2019 Agricultural & Applied Economics Association Annual Meeting, Atlanta, GA, July 21 – July 23

Time Use and Eating Patterns of SNAP Participants over the Benefit Month

Abstract

Understanding how SNAP participants spend their time in various activities over the benefit cycle can provide insights into ways to improve the effectiveness of the program and reduce the potential unintended negative effects of program participation. Using data from the 2006-2008 and 2014-2016 American Time Use Survey and Eating and Health Module, we revisit the SNAP benefit cycle issue by investigating if SNAP participants spend less time on eating related activities (i.e., primary eating, food preparation, and grocery shopping) towards the end of the benefit cycle than comparable SNAP nonparticipants. We find that SNAP participants spend less time on food preparation in the 2006-2008 period and less time on grocery shopping in the 2014-2016 period than do comparable non-participants towards the end of the benefit month. Given the importance of time allocation, we then examine how SNAP participants allocate their time across various activities compared to non-participants. We discuss the implications of our results in relation to these time use patterns over the benefit month.

1. Introduction

A well-documented finding about the Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program, is that participants' benefit expenditures tend to be higher within the first or second week of benefit issuance and benefits typically do not last until the next issuance date (e.g., Thompson et al., 1988; Wilde and Ranney, 2000; Shapiro, 2005; Hastings and Washington, 2010; Todd, 2015; Smith et al., 2016; Hamrick and Andrews, 2016; Todd and Gregory, 2018; Dorfman et al., 2018). This suggests that food may be abundant for a household in the days immediately after benefit issuance, and much less near the end of the benefit cycle. This irregular food consumption pattern among SNAP participants, with binge eating immediately after benefit issuance and reduced food consumption at the end of benefit cycle, raises health concerns and the potential risk of food insecurity at the end of the benefit month (Wild and Ranney, 2000; Shapiro, 2005; Todd, 2015).

While the existence of the SNAP benefit cycle is well established by past studies, very little is known about how benefit recipients' behaviors change across the benefit cycles. An analysis of how SNAP recipients change their behaviors over the benefit month can generate potentially long-term implications for health outcomes and other aspects of well-being. For example, understanding behavioral changes in SNAP participants' eating and physical activity over the benefit month would be important for addressing higher obesity rate of SNAP participants. Better understanding of SNAP recipients' behavioral changes could also provide insights to policy makers about the behavioral interventions that could provide incentives to help recipients change their behaviors to reach maximum benefit from the SNAP program.

In this study, we examine how SNAP participants' actual time use behaviors vary over the benefit month relative to comparable non-SNAP participants. We revisit the SNAP benefit

cycle issue by using time use data to investigate if SNAP participants spend less time on eating related activities (i.e., primary eating, food preparation, grocery shopping) relative to comparable non-SNAP participants at the end of the benefit cycle. According to household production theory, individuals/households need sufficient time expenditure to produce enough and healthy meals. The findings of our study could identify the potential mechanism behind the irregular food consumption pattern observed among SNAP participants towards the end of the benefit cycle, which raises food insecurity and health concerns (Wild and Ranney, 2000; Shapiro, 2005; Todd, 2015). We also document how time spent on various activities such as eating food away from home, medical service use, physical activity, working, house work, and leisure varies over the benefit cycle. Time is fundamentally a scarce resource and the major resource of the various activities of the individual living arrangements. Thus, understanding how individuals allocate their time is important for increasing our understanding of individuals' economic activities and also welfare (Hamermesh and Lee, 2007). To our knowledge, this is the first study that attempts to examine changes in time use behaviors of SNAP participants over the benefit month.

Despite the importance of understanding time use behaviors, data limitations have prevented a systematic analysis of how SNAP participants allocate their time over the benefit month. In this study, we fill this gap by using data from the American Time Use Survey (ATUS) and Eating and Health Module (EHM).[1] Our paper builds on a study conducted by Hamrick and Andrews (2016) who, using the 2006-2008 ATUS-EHM, examined the timing of days in which respondents reported no eating occurrences. They found that SNAP participants were

[1] Given the importance of time allocation, there are some other empirical studies that focused on how individuals allocate their time in different economic contexts such as taxes (Gelber and Mitchell, 2012), job search (Mukoyama et al., 2018; Krueger and Mueller, 2010), time allocation during The Great Recession (Aguiar et al., 2013; Nevo and Wong, 2015), substitution between time and money in household production (Aguiar and Hurst, 2007), and employment and health (Cawley and Liu, 2012; Abramowitz, 2016). Our analysis also builds on these previous studies that examine important aspects of time allocation.

increasingly more likely than nonparticipants to report a day with no eating occurrences over the benefit cycle. In our paper, we use both the 2006-2008 ATUS-EHM and the 2014-2016 ATUS-EHM to further examine whether there is evidence that SNAP participants fall short of food at the end of the month as compared to nonparticipants. There is a need to use newer data since the older data that Hamrick and Andrews (2016) used may no longer reflect more current market conditions and they may also not include respondents that were affected by events associated with The Great Recession that began in 2008. It is possible that post-recession patterns may be very different. Moreover, SNAP benefit increases from the American Recovery and Reinvestment Act (ARRA) that started in April 2009 and ended in October 2013 have caused substantial changes to the lingering composition of SNAP participants (Todd 2015), which in turn could have had an impact on the SNAP benefit cycles in 2014-2016.

We first examine whether SNAP participants spend less time on eating related activities at the end of the benefit month relative to comparable non-SNAP participants. We find that SNAP participants have a disproportionate food intake pattern over the benefit month. Specifically, we find that SNAP participants spend less time on eating related activities (i.e., food preparation or grocery shopping) towards the end of the benefit month in both the 2006-2008 and 2014-2016 periods. Specifically, they spend about 19 minutes (about 15 percent of average eating related time at home in a day) less time on eating related activities per day, particularly time for food preparation (about 21 percent of average food preparation time at home in a day), relative to comparable non-SNAP participants in the third and fourth weeks after benefit issuance in the 2006-2008 period. Interestingly, we also find that SNAP participants significantly spend less time on grocery shopping relative to comparable non-participants (about 36 percent of average grocery shopping time in a day) in the 2014-2016 period. Our findings add

further support to the view that SNAP participants have a disproportionate food intake pattern over the benefit month. The findings of our study could also identify the potential mechanism behind the irregular food consumption pattern observed among SNAP participants towards the end of the benefit cycle (Wild and Ranney, 2000; Shapiro, 2005; Todd, 2015). In particular, given less time investment on food preparation and grocery shopping, our study could provide evidence why SNAP participants have lower quality diet at the end of the benefit month.

We then classify the time allocation of the respondents into nine activity categories to examine how SNAP participation affect time allocation in the entire day relative to comparable non-participants. These results are relevant for today's policy debates about SNAP participation because they provide insights into responses of labor force, education, and other health related activities (i.e., physical activity, medical services, and other non-physical activities) to the program. Understanding these effects is important since SNAP is the largest domestic food assistance program and a large fraction of Americans rely on SNAP.

The rest of the paper is organized as follows. In Section 2, we describe our data. We then revisit the SNAP benefit cycle issue and also examine time allocation across various activities in Section 3. We conclude in Section 4.

2. Data

We used data from both the 2006-2008 and 2014-2016 American Time Use Survey (ATUS) and Eating and Health Module (EHM). The ATUS is a nationally representative cross-sectional data providing detailed information on how individuals allocate their time in a day. Individuals are randomly selected from a subset of households that have completed their 8^{th} and final month of

interviews for the Current Population Survey (CPS). In the ATUS, respondents are asked to identify their primary activities over a 24-hour time period, where they were, and whom they were with for most of the diary activities. Each wave is based on 24-hour time diaries where respondents report in detail the activities undertaken from the previous day and the length of time engaged in each of these activities. Specifically, an individual who is older than 15 is interviewed about his or her activities from 4 am the day before the interview to 4 am of the interview day. Survey personnel then assign the activities reported by the respondents to various categories in the ATUS's classification scheme which includes over 400 detailed time use categories.

The EHM is a supplement to the ATUS that was conducted from 2006 to 2008 and once again from 2014 to 2016. Files on respondents who participated in the EHM can be matched to their core ATUS files, which resulted in 37,832 respondents in the 2006-2008 ATUS-EHM and 32,054 respondents in the 2014-2016 ATUS-EHM. The EHM includes questions on secondary eating and drinking (that is, eating and drinking while doing another activity), grocery shopping preferences and fast food purchases, meal preparation and food safety practices, food assistance participation (i.e., SNAP and WIC), general health, height and weight, self-reported BMI, physical activities, and income. For our sample, we include all ATUS-EHM respondents who are 18 and older and who answered the question about SNAP participation. In total, we have 35,220 respondents with 2,504 SNAP participants in the 2006-2008 ATUS-EHM, and 30,681 respondents with 3,285 SNAP participants in the 2014-2016 ATUS-EHM.

Activity Classification

The ATUS has the advantages of measuring the amount of time spent on each activity in the entire day. To investigate the time allocation on various activities of SNAP recipients across the benefit cycles, we first classified the time allocation of the respondents into broad time use categories which are mutually exclusive and also sum up to the entire time endowment (i.e., 24 hours). We used similar time use categories as those used by Aguiar et al. (2013), but given our interests in eating and other specific activities (i.e., food away from home, medical service, physical activity), we classified the time allocation into nine time use categories: eating related activity at home, eating food away from home, working, child care, house work, leisure, medical service, physical activity, and other. Table 1 describes each time use category.[2]

We treat the time spent on eating related activities at home as a separate category to examine whether SNAP participants have a higher likelihood of not spending time on eating related activities at home at the end of the benefit cycle relative to comparable non-SNAP participants. We include three activities to define eating related activity. The first category includes primary eating as defined in Hamrick and Andrews (2016). The other two are food preparation and grocery shopping since both are important activities for food production.

Previous studies have found that SNAP recipients are more likely to be obese than non-recipients (e.g., Gibson, 2003; Chen et al., 2005; Meyerhoefer and Pylypchuk, 2008; Baum, 2011), and Fox et al. (2004) conjectured that SNAP may be linked to weight status through its effect on food away from home (FAFH). While Hoynes and Schanzenbach (2009) found no significant effect of SNAP benefit on FAFH, Burney (2018) found a significant negative effect of SNAP benefit on FAFH expenditure. We thus treat FAFH as a separate category to check

[2] A full list of time use categories is available in Table A1 in Appendix.

whether SNAP participants allocate their time for eating related activities at home into time for FAFH across the benefit cycles. Previous studies have found that SNAP recipients consume fewer calories and also have lower quality diets at the end of the benefit cycle (Wilde and Ranney, 2000; Shapiro, 2005; Todd, 2015), and they also tend to have higher likelihood of hospital visits (Seligman et al., 2014; Basu et al., 2017). Given higher discretionary income via benefits, SNAP participants could also have higher medical expenditure (Meyerhoefer and Pylypchuk, 2008). Given this, we treat time spent on medical services as a separate category to investigate how SNAP participants spend their time in medical services across the benefit cycles.

While some studies have argued that SNAP participation is positively related to weight status, other studies have either failed to find or have found a negative relationship between SNAP participation and weight status (e.g., Zagorsky and Smith, 2009; Fan, 2010; Schmeiser, 2012; Almada et al., 2016; Hoynes et al., 2016). Hence, the relationship between SNAP participation and weight status is still an open question. One possible reason is that physical activity is not always accounted for in the analyses due to data availability or limitations. Given this, it seems reasonable to check the time spent on physical activities of SNAP participants.[3]

The SNAP benefits have the structure of an income support program. Hoynes and Schanzenbach (2012) found that food stamps can reduce work incentive, especially for single-parent households with a female head while Moffitt (2002) concluded that food stamp has little impact on work incentives. Given the SNAP benefit cycle, some recipients may feel richer in the first few weeks, and much less near the end of the benefit cycle. This indirectly and partly suggests that work incentives can vary across the benefit cycles. We thus include a broad

[3] Augiar et al. (2013) defined that the physical activity as a part of leisure, but in our study, we separate the physical activity from leisure.

category about work activities.[4] Given the tradeoff among working, house work, and leisure, we also treat the time spent on house work and the time spent on leisure as separate categories.

The SNAP benefit cycle may also have a direct impact on how parents spend their time with their children. Faced with less food but with more free time near the end of the benefit cycle, individuals may spend more time caring for their children. On the other hand, given diminishing family wealth at the end of the benefit cycle, individuals may invest more time on activities that generate income instead of spending time with their children. We thus treat time spent on child care as a separate category.

Table 1. Description of Time Use Activities

Category	Description
Eating Activity At Home	This category includes all time spent on primary eating, food preparation, grocery shopping, and the time spent on traveling and waiting related to eating activity.
Food Away From Home	This category includes all time spent on eating outside home and the time spent on traveling and waiting related to food away from home.
Medical Service	This category includes all time spent on health related self-care, medical and care service, and the time spent on traveling related to medical service.
Physical Activity	This category includes all time spent on participating in sports, exercise, or recreation, and the time spent on traveling and waiting related to physical activity.
Working Activity	This category includes all time spent on working in the market sector on main jobs, second jobs, and overtime, including any time spent on commuting to or from work and time spent on work related activities (excluding eating activities). This category includes other income-generating activities and job search. Other income-generating activities includes time spent on activities such as hobbies, crafts, food preparation, and performances that generate income

[4] About 75 percent of SNAP participants in the 2006-2008 and about 78 percent of SNAP participants in the 2014-2016 are not employed or employed as a part time worker. This suggests that SNAP participants may have flexible work schedule that they can change work hours.

	and the time spent on income-generating services such as babysitting and home improvement for pay. Job search includes time spent on searching for job. We include the time spent on commuting associated with job search as part of time spent on job search. This also includes activities such as sending out resumes, going on job interviews, researching details about a job, asking about job openings, or looking for jobs in the paper or on the internet.
Child Care	This category includes all time spent on caring for, helping, or playing with children, and also the time spent on traveling related to child care.
House Work	This category consists of four subcategories: home production, activities related to home ownership, buying goods and services, and care of other adults. Home production includes time spent on doing laundry, ironing, vacuuming, indoor household clearing, clearing or repairing vehicles and furniture, and activities related to the financial management and the organization of the household. Home ownership includes time spent on household repairs, time spent on exterior cleaning and improvements, time spent on the garden, and lawn care. Buying goods and services includes time spent on obtaining goods or services (excluding medical care, education, restaurant meal, and grocery shopping). Care of other adults includes time spent on supervising and caring for other adults, preparing meals and shopping for other adults, helping other adults around the house with cleaning and maintenance, and transporting other adults to doctors' offices and grocery stores.
Leisure	This category includes the remaining time individuals spend that is not on market work, nonmarket work, other income generating activities, child care, eating related activity, food away from home, medical service, or physical activity. Specifically, it includes time spent on watching television, sleeping, socializing, reading, entertainment and hobbies that do not generate income, time spent with pets, and all other similar activities (excluding eating activity, physical activity, or food away from home).
Other	This category includes all the remaining time spent on education, time spent on civic and religious activities.

Source: Aguiar et al. (2013)

SNAP Issuance Date

SNAP benefits are issued on a fixed date of each month using an Electronic Benefit Transfer (EBT) card, and they can be redeemed for eligible food items at authorized food retailers. States have varying issuance schedules. Some states issue the benefits on the same day of each month, while other states stagger benefit issuance over multiple schedules. The day on which SNAP benefits are issued could also vary by person. For example, Nevada issues benefits at the first day of the month, whereas Alabama staggers benefit issuance between the fourth day of the month and the 23rd day of the month. Given documented reports in the media of SNAP participants flooding 24-hour retail stores at midnight of their benefit issuance day, many states have now staggered the issuance of SNAP benefits on different days of the month to avoid the rush on retail stores at the beginning of the month. Staggering benefit issuance over multiple days can also help avoid retailers' potential price adjustments to take advantage of demand induced by the SNAP benefit cycle.

In the ATUS-EHM data, we know whether a household receives SNAP benefits in the month before the interview and the date of the respondent's time diary. However, if the respondent lived in a state with multiple issuance schedules, we cannot know from the data when the respondent received a benefit. Following Hamrick and Andrews (2016), we thus used the median of the range of issuance days for respondents who lived in a state with multiple issuance schedule.[5] Given the issuance day and diary day, we calculated individuals' days passed since the benefit issuance. We defined week 1 as 1 to 7 days since the benefit issuance, week 2 as 8 to

[5] The issuance schedules of each state are available at https://www.ers.usda.gov/data-products/snap-policy-data-sets/

14 days since the benefit issuance, week 3 as 15 to 21 days since the benefit issuance, and week 4 as the reminder of days until the next issuance day. To test the robustness of our results from the use of the median of the range, we also re-estimate our model using the 25th and 75th percentile of the range of issuance days.

3. Time Allocation Across the SNAP Benefit Cycle

In this section, we investigate how SNAP participants change their time spent on each activity over the benefit cycle compared to non-SNAP participants.[6] The core equation we estimate is

$$(1) \qquad Activity_{it} = SNAP_i * Week34_t\beta' + Week34_t\delta' + SNAP_i\theta + X_i\mu' + T_t\rho' + S_s\gamma' + \varepsilon_{its}$$

where $Activity_{it}$ is the time spent on each activity defined in Table 1 for individual i in week t; $SNAP_i$ is a binary variable equals to 1 if an individual i is classified as a SNAP participant and 0 otherwise; $Week34_t$ is the indicator for the third and fourth weeks of the benefit month. Given the finding of previous studies that more than 80 percent of SNAP benefits are used within the first two weeks of benefit issuance (Castner and Henke, 2011; Smith et al., 2016), we combined weeks 1 and 2 and used this as the base; X_i is a vector of control variables including individual characteristics (e.g. gender, age, ethnicity, race, education level, and employment status), household characteristics (e.g. household income, household size, presence of a child, and home ownership, area of residence); T_t is time fixed effects; S_s is a row vector of state fixed effects.

[6] SNAP participation could be under-reported since EHM is the self-reported survey. According to Meyer et al. (2018) who, using the 2002-2005 CPS, linked to administrative records in Illinois and Maryland, about 50 percent do not report SNAP receipts in CPS. It is possible that SNAP participants are matched with other SNAP participants who are recorded as non-recipients in our analysis. Given this, our estimates that represent the time use difference across the benefit cycle relative to comparable non-participants could be underestimated.

We exclude any respondent who had any time that could not be able to be classified by the ATUS. Standard errors are clustered at the state level. Here, the coefficient θ denotes the time use difference between SNAP and non-SNAP participants in the first and second weeks of the benefit month, and $(\beta' + \theta)$ represents the time use difference between SNAP and non-SNAP participants in the third and fourth weeks of the benefit month.

The problem in estimating the effects of SNAP participation on the time use activity is that SNAP participation is not assigned at random, and hence, the characteristics of SNAP participants could systematically differ from those of comparable non-SNAP participants. We therefore account for the systematic differences in observable characteristics between SNAP participants and nonparticipants. Matching methods can mitigate the selection bias problem we face with observational data (Rosenbaum, 2002). The basic idea is to construct an artificial comparison group that has similar characteristics to the treatment group. By balancing observable characteristics between the treated group and comparison group, we can reduce the influence of confounding variables and also establish the effect of the treatment given the selection on observables identification strategy. We use a Propensity Score Matching (PSM). The fundamental idea of PSM is to impute the counterfactual outcome for program participants given non-treated individuals with the same propensity score (see Hahn, 1998; Heckman et al., 1998; Abadie and Imbens, 2011). Imbens (2015) argued that PSM is a useful estimation strategy in the case of selection on observables.

The Propensity Score and Balancing Test

The propensity score represents the predicted probability of participating in the program given the observed characteristics. The propensity score can be estimated by the following logit model with the set of matching covariates.

$$(2) \qquad SNAP_i = \alpha + \beta X_i + \varepsilon_i$$

where $SNAP_i$ is a binary variable equal to 1 if individual i participates in SNAP and equal to 0 otherwise; X_i is the set of explanatory variables that are explained in equation (1). We would expect that household income, household size, household structure, home ownership, and employment status are associated with some of the unobserved information about a household's resources. Geographical and seasonal variables and ethnicity can also be correlated with SNAP participation (Fan, 2010).[7]

Table 2 reports the results of the logistic regression for the SNAP participation. Households with higher income and households who owned their house are less likely to participate in SNAP while households with more family members and households with a child are more likely to participate in SNAP. In addition, households who are living in metropolitan area are less likely to participate in the SNAP. Respondents who are employed are less likely to participate in SNAP. The parameters of the results are used to estimate the propensity score, which is used to estimate the conditional probability of participating in SNAP, given its observable characteristics. Given the propensity score, we then match households that participate in SNAP to households that do not participate in SNAP. We employ one-to-one nearest neighbor matching with caliper size of 0.001. Since the choice of the matching algorithm can be important

[7] Descriptive statistics of SNAP participants and lower income SNAP nonparticipants whose household income is less than 185 percent of the poverty threshold in both 2006-2008 and 2014-2016 are available in Table A2 in Appendix.

(Heckman et al., 1997; Caliendo and Kopeinig, 2008), we also employ other widely used matching algorithms to check the robustness of the results. Our results are robust to changes in matching algorithm.[8] We also impose the common support condition on matching since it reduces the bias of the matching result (Heckman et al., 1997).

Table 2. Estimates of Propensity Score Equations

	2006-2008 ATUS EHM	2014-2016 ATUS EHM
Gender	-0.33 (0.06)***	-0.45 (0.06)***
Age	-0.21 (0.03)***	-0.11 (0.03)***
Education	-0.18 (0.03)***	-0.10 (0.02)***
Household income	-0.09 (0.006)***	-0.21 (0.01)***
Child(=1)	1.06 (0.09)***	0.82 (0.09)***
Household size	0.09 (0.02)***	0.24 (0.02)***
Home owned(=1)	-1.15 (0.06)***	-0.69 (0.06)***
Employed(=1)	-1.42 (0.07)***	-1.04 (0.07)***
White(=1)	-0.30 (0.06)***	-0.29 (0.06)***
Hispanic(=1)	-0.14 (0.08)*	-0.05 (0.07)
Metropolitan(=1)	-0.27 (0.07)***	-0.10 (0.06)
Midwest	0.15 (0.09)	-0.14 (0.09)
South	0.14 (0.08)*	-0.14 (0.08)*
West	-0.19 (0.10)*	-0.45 (0.09)***
Year2006 or Year2015	-0.06 (0.07)	0.09 (0.06)
Year2007 or Year2016	-0.14 (0.07)**	0.09 (0.07)
Constant	1.06 (0.19)***	1.39 (0.18)***
Observations	9,120	9,206

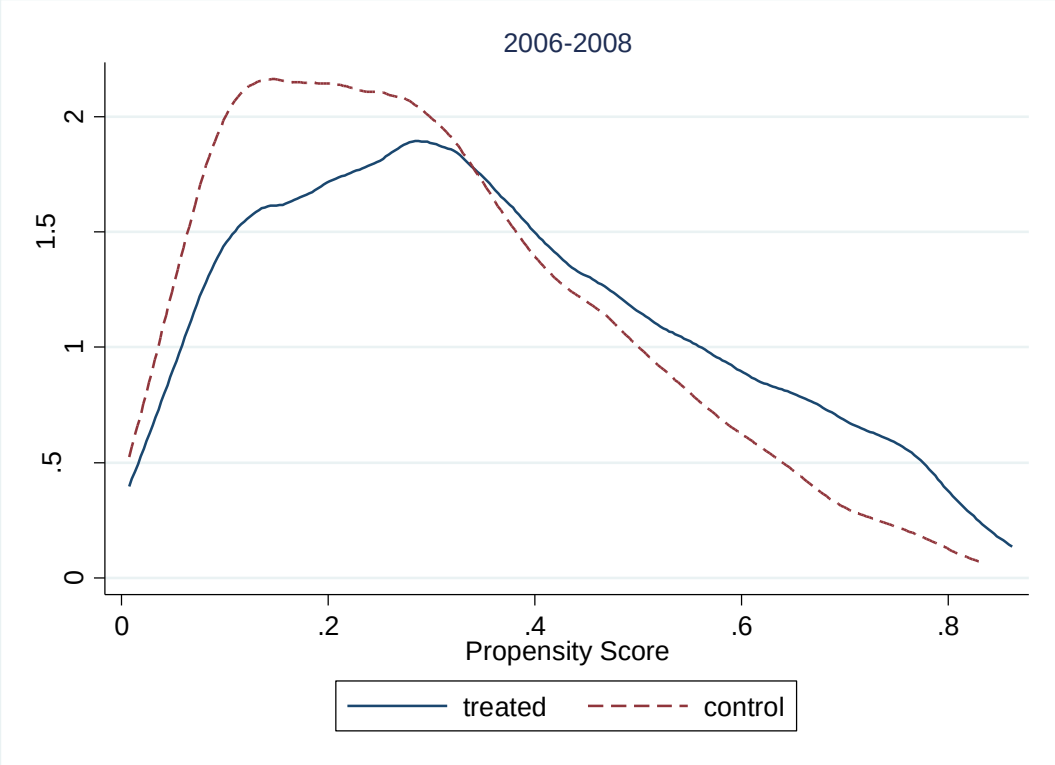
Note: Standard errors are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Since the PSM uses the propensity score to balance the pretreatment characteristics between the treated group and control group, the first thing to check is the overlap of the propensity score between the two groups. Figure 1 shows the distributions of the propensity

[8] The results are available from the authors upon request.

scores after matching in both the 2006-2008 ATUS-EHM and 2014-2016 ATUS-EHM. We used nearest neighbor matching with caliper sizes of 0.001. There is a substantial amount of overlap between the treated group and comparison group in the both periods. This indicates that SNAP participants and comparable non-participants have similar observable characteristics. This is important to estimate reliable effects of SNAP on the time spent on activities across the benefit cycle.

Another practical way to test the balance of the propensity score is to compare the mean of each variable for the treated group with that for the comparison group. We post these comparisons before and after matching in Table A3 in the Appendix. The results show that unmatched samples have a lack of balance in the both periods. The mean differences of all variables except the indicator of ethnicity, the regional indicator for Midwest and the year indicator for 2006 in unmatched samples are statistically significant while the mean differences of household size and the regional indicator for Midwest and South are statistically significant in the matched samples in the 2006-2008 ATUS-EHM. In the 2014-2016 ATUS-EHM, 12 of 17 mean differences are statistically significant in the unmatched samples, while only 1 of the 17 mean differences are statistically significant in the matched samples.



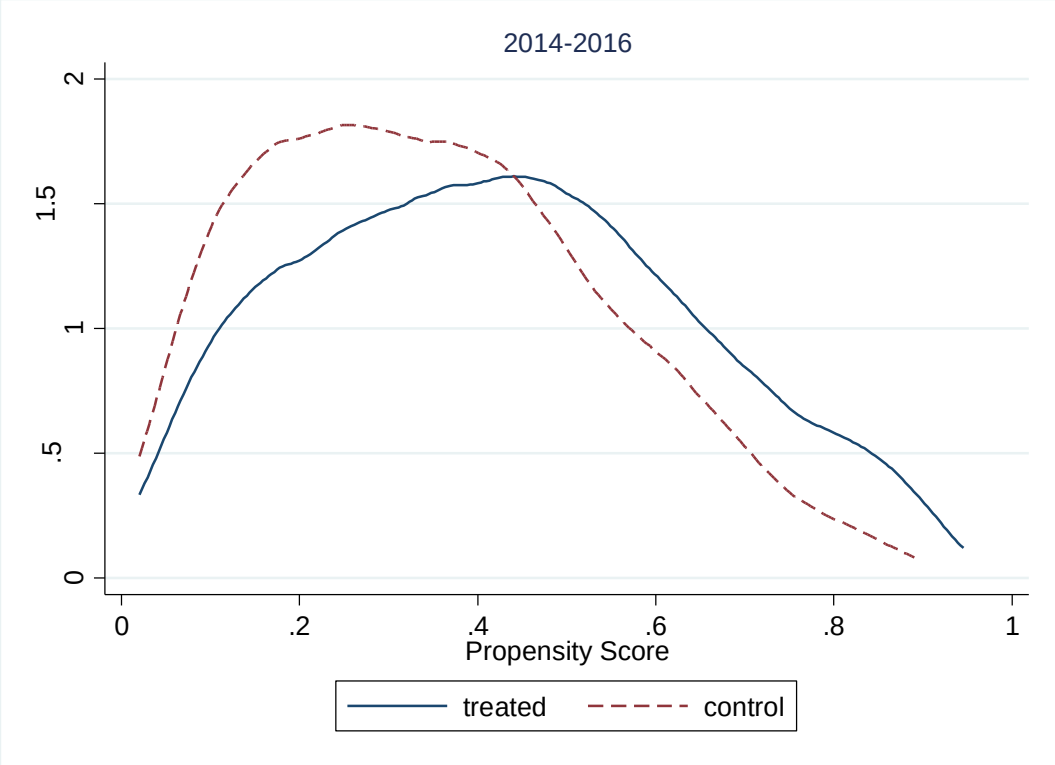


Figure 1. Distribution of Propensity Scores

Time Spent on Eating Activity Across the SNAP Benefit Cycle

We first revisit the SNAP benefit cycle issue by investigating if SNAP participants spend less time on eating related activities relative to comparable non-SNAP participants at the end of the benefit month. Table 3 shows the estimation results of our main equation (1) for eating activity.[9] For brevity, we only post the coefficients of interest. The indicator of the first and second weeks and its interaction with the indicator of SNAP participation are omitted in the model.

Focusing on the 2006-2008 ATUS-EHM, we see that SNAP participants tend to spend more time on eating activity relative to comparable non-participants in the first and second weeks of the benefit month. In particular, they spend significantly more time on grocery shopping relative to comparable non-participants (about 28 percent of average time spent on grocery shopping per day). In the third and fourth weeks of the benefit month, SNAP participants tend to spend less time on all three eating related activities (i.e., primary eating, food preparation, and grocery shopping) compared to non-participants. Especially, they spend significantly less time on food preparation (about 21 percent of average time spent on food preparation per day) during the 3rd and 4th weeks of the benefit month than comparable non-participants.

Turning to the results in the 2014-2016 ATUS-EHM, we also see that SNAP participants spend less time on eating related activity in the third and fourth weeks of the benefit month relative to comparable non-participants.[10] In particular, SNAP participants spend significantly

[9] We check our results without other controls (i.e., demographics, time, and regional controls), and find that our results are robust with and without controls. This is because we balance observable characteristics through matching, so the controls do not change our main results. We also add dummies for states that have multiple issuance schedules in the main regression, and find that our results are robust with/without those dummies.

[10] We reject the hypothesis of equal time spent on eating activity between SNAP and non-SNAP participants in the third and fourth weeks of the month (F-statistic=3.49, $p<0.07$).

less time on grocery shopping compared to non-participants (about 35 percent of average time spent on grocery shopping per day).

In summary, SNAP participants tend to spend less time on eating related activity than do comparable non-participants towards the end of the benefit month. The cyclic time spent on eating activity is more pronounced in the 2006-2008 period than in the 2014-2016 period. Interestingly, compared to non-participants, SNAP participants spend significantly less time on food preparation in the 2006-2008 period and spend significantly less time on grocery shopping in the 2014-2016 period towards the end of the benefit month. While we cannot definitively pinpoint the reason for this finding, Damon et al. (2013) found that SNAP participants tend to shop at grocery stores and eat at home early in the month, but they tend to shop at convenience stores later in the benefit month. Shapiro (2005) also found that SNAP participants are more likely to consume lower quality diets at the end of the benefit month. Contrary to time spent on food preparation and grocery shopping, SNAP participants' time spent on primary eating is relatively smoother in both periods.

Table 3. Time Spent on Eating Activity across Benefit Weeks

	2006-2008 ATUS-EHM				2014-2016 ATUS-EHM			
	Eating Activity	Primary Eating	Food Preparation	Grocery Shopping	Eating Activity	Primary Eating	Food Preparation	Grocery Shopping
SNAP	6.96	-1.59	5.63	2.92	-1.80	-2.82	0.57	0.45
	(4.98)	(2.03)	(3.66)	(1.51)*	(4.32)	(1.82)	(3.17)	(1.34)
Week34	14.25	3.97	7.31	2.96	4.33	1.53	0.68	2.10
	(4.93)***	(2.51)	(3.25)**	(1.97)	(5.82)	(2.97)	(3.98)	(1.65)
SNAP* Week34	-18.64	-4.50	-9.87	-4.27	-6.86	-1.62	-1.37	-3.87
	(6.34)***	(2.92)	(4.76)**	(2.67)	(6.41)	(3.22)	(4.91)	(1.90)**
Obs.	3,596	3,596	3,596	3,596	4,690	4,690	4,690	4,690

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Time Spent on Other Activities Across the SNAP Benefit Cycle

In this section, we examine how SNAP participants allocate their time on other activities over the benefit month. This analysis can provide some clues on the possible reasons why SNAP participants have less time on eating related activities later in the benefit month compared to non-participants. Table 4 shows the results of equation (1) for the various time use activities. In the analysis, the time use activities are mutually exclusive and sum up to the entire daily time endowment (i.e., 24 hours).

Focusing first on the results using the 2006-2008 ATUS-EHM, SNAP participants spend less time on physical activity relative to comparable non-SNAP participants in the first and second weeks of the benefit month. Previous studies found that maintaining constant physical activity is associated with less weight gain (e.g., Fogelholm and Kukkonen-Harjula, 2000; Hemmingsson and Ekelund, 2007; Lee et al., 2010; Hankinson et al., 2010). Given the well-defined negative relationship between physical activity and weight status, the smaller and irregular time investment on physical activity of SNAP participants relative to non-participants could be a potential mechanism to explain the positive relationship between SNAP participation and weight gain. SNAP participants also spend less time on working relative to non-participants over the benefit month.[11] This result is consistent with the labor supply theory, which predicts that an income support program could reduce work incentives and working hours.[12] This effect could partially offset one of the primary goals of SNAP (i.e., enhancing/assisting food consumption). SNAP participants also spend less time on educational activities relative to comparable non-participants in the first and second weeks of the benefit month. Previous studies

[11] For the time spent on working in the third and fourth weeks, we reject the hypothesis of similar time use between SNAP and non-SNAP participants (F-statistic=6.69, $p<0.05$). This indicates that SNAP participants significantly spend less time working relative to non-participants over the month.

[12] We further test whether SNAP participation reduce labor supply on both the extensive (employment) and intensive (working hours conditional on employment) margins in both periods. We found that SNAP participation reduces both employment and working hours conditional on work.

showed that the timing of SNAP payments is associated with academic performance of students (Gassman-Pines and Bellows, 2018; Cotti et al., 2018). Based on our results, the smaller time investment on education could be one possible reason to explain the relationship between SNAP participation and academic performance.

In contrast, SNAP participants spend more time on medical services compared to non-participants in the first and second weeks of the month, perhaps due to higher discretionary income from the availability of SNAP benefits early in the benefit month. Meyerhoefer and Pylypchuk (2008) showed that SNAP participation is highly associated with medical expenditure. Specifically, they found that the effect of SNAP participation on medical expenditure through higher discretionary income is larger than through changes in weight status. Given the tradeoff between working and leisure in the standard labor-leisure theory, SNAP participants significantly spend more time on leisure over the benefit month, with much of the increase in leisure time being devoted to sleeping.

In the third and fourth weeks of the benefit month, SNAP participants still spend less time working, while they spend more time on leisure compared to non-participants. SNAP participants spend similar time on other activities compared to non-participants except time expenditure on child care. They significantly invest more time on child care relative to comparable non-participants. This partly suggests that SNAP participants mainly substitute their reduced eating related activity hours with time spent on child care in the 2006-2008 period.

Turning to the results using the 2014-2016 ATUS-EHM, SNAP participants spend less time on education while they spend more time on medical services relative to comparable non-participants in the first and second weeks of the month, which is consistent with the results in the 2006-2008 period. SNAP participants also spend more time on care of others (i.e., time spent on

caring for other adults and helping other adults around the house), TV watching, personal care, and child care while they spend less time on eating food away from home and other leisure (i.e., time spent on caring for pets, smoking, listening to music, computer use for leisure) relative to comparable non-participants. Interestingly, in contrast to results using the 2006-2008 data, SNAP participants' time expenditure on working and leisure is similar to comparable non-participants across the benefit month in the 2014-2016 period.

In the third and fourth weeks of the benefit month, SNAP participants significantly invest more time on home production (i.e., time spent on activities related to the management and the organization of the household) and sleeping relative to comparable non-participants. This indirectly suggests that SNAP participants reallocate their reduced eating activity hours to household management and organization, and sleeping.

Table 4. Time Spent on Other Activities across Benefit Weeks

	2006-2008 ATUS-EHM			2014-2016 ATUS-EHM		
	SNAP	Week 34	SNAP* Week 34	SNAP	Week 34	SNAP* Week 34
FAFH	-0.76	-0.63	0.85	-1.88	0.10	-0.14
	(1.15)	(1.16)	(1.53)	(0.95)*	(1.31)	(1.46)
Medical Service	8.85	5.76	-6.66	13.08	4.37	-7.28
	(4.33)**	(5.30)	(5.60)	(3.04)***	(3.98)	(5.14)
Physical Activity	-6.11	-3.60	5.61	-0.32	1.60	-1.98
	(2.26)***	(2.88)	(3.74)	(1.85)	(2.67)	(3.30)
Working	-28.71	-8.49	-0.39	-5.35	3.25	-11.05
	(10.28)***	(12.80)	(15.60)	(8.48)	(10.81)	(13.48)
House Work	-7.19	-3.35	7.72	-6.79	-10.79	13.95
	(8.74)	(10.01)	(12.41)	(7.39)	(7.77)	(9.43)
- Home production	-2.87	-6.43	9.03	-2.31	-12.21	10.53
	(5.04)	(6.27)	(7.94)	(4.57)	(5.54)**	(4.97)**
- Home ownership	-2.47	1.36	0.29	-3.59	0.74	0.32
	(2.16)	(2.45)	(3.45)	(2.22)	(2.90)	(3.27)
- Buying goods and services	-1.82	-0.58	0.43	-5.77	0.52	2.71
	(4.88)	(4.89)	(6.51)	(3.61)	(3.11)	(4.89)
- Care of others	-0.03	2.29	-2.03	4.88	0.16	0.39
	(2.29)	(3.02)	(4.66)	(1.97)**	(1.98)	(3.50)

Leisure	28.28	6.69	-3.15	-1.19	-4.00	16.87
	(13.26)**	(13.47)	(17.66)	(11.59)	(12.11)	(18.51)
- TV watching	14.84	5.84	1.53	25.31	5.05	-5.28
	(10.70)	(12.09)	(12.42)	(9.65)**	(11.32)	(18.87)
- Sleeping	18.56	13.10	-14.04	-12.77	-10.64	20.77
	(6.10)***	(9.47)	(11.14)	(8.63)	(8.34)	(10.48)*
- Socializing	3.76	-3.11	1.51	-2.01	5.58	-10.84
	(6.29)	(9.18)	(11.87)	(7.31)	(10.31)	(11.09)
- Personal care	-0.83	-2.69	0.30	2.98	2.97	-3.61
	(2.57)	(2.17)	(2.90)	(1.78)*	(3.01)	(3.62)
- Other leisure	-8.05	-6.44	7.55	-14.70	-6.96	15.84
	(5.56)	(5.75)	(7.99)	(5.62)**	(6.60)	(8.14)*
Child Care	4.69	-7.44	11.34	13.04	4.98	-6.14
	(6.16)	(4.25)*	(6.24)*	(2.97)***	(4.01)	(5.09)
Other	-6.04	-3.12	3.36	-8.47	-3.61	2.27
	(4.95)	(6.80)	(8.97)	(6.36)	(6.41)	(7.94)
- Education	-7.07	-6.76	7.21	-11.80	-6.67	8.61
	(4.10)*	(5.96)	(6.66)	(5.36)**	(5.30)	(6.66)
- Civic	1.02	3.64	-3.85	3.33	3.06	-6.35
	(3.49)	(4.25)	(5.29)	(3.77)	(3.80)	(5.04)

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Discretionary Time Across the SNAP Benefit Cycle

We then examine whether SNAP participants have sufficient discretionary time relative to comparable non-participants over the benefit month. Discretionary time, which is important for time investment in individuals' eating, health, and human capital, is defined as remaining hours after spending the necessary and committed time (i.e., time spent on working, house work, child care, personal care, and adult care) in a day (Kelenkoski et al., 2011). With insufficient discretionary time, SNAP participants may not be able to spend sufficient time to produce and consume nutritionally adequate food. Kelenkoski and Hamrick (2013) found that individuals who have less discretionary time tend to have different eating patterns compared to those who have enough discretionary time.

Following Kelenkoski and Hamrick (2013), we calculated the discretionary time by subtracting the time spent on personal care, market work (i.e., working), non-market work (i.e., house work), child care, and adult care from the entire time endowment (i.e., 24 hours).[13] Thus, the discretionary time includes individuals' time spent on eating related activities, leisure except personal care, eating food away from home, physical activity, education, and civic activities. Table 5 shows the results of equation (1) with discretionary time as a dependent variable. We also examine whether SNAP participants have a higher likelihood of not having enough discretionary time relative to comparable non-participants over the benefit month. Following Kelenkoski and Hamrick (2013), we defined that an individual has insufficient discretionary time (i.e., time poverty) if one's discretionary time in a day is less than 289.8 minutes. The results show that SNAP participants' discretionary time are constant compared to non-participants across the benefit month in both the 2006-2008 and 2014-2016 periods. This indirectly suggests that SNAP participants would have enough time to invest on food production and consumption.

Table 5. Discretionary Time across Benefit Weeks

	2006-2008 ATUS-EHM		2014-2016 ATUS-EHM	
	Discretionary Time	Probability of Time Poverty	Discretionary Time	Probability of Time Poverty
SNAP	4.62 (14.59)	-0.06 (0.18)	-4.18 (8.71)	0.04 (0.12)
Week34	3.13 (16.57)	0.02 (0.19)	5.87 (10.84)	-0.07 (0.15)
SNAP*Week34	1.73 (21.01)	0.04 (0.24)	-6.64 (13.84)	-0.02 (0.18)
Observation	3,596	3,564	4,690	4,656

Note: Standard errors, clustered at the state level, are reported in parentheses.

Robustness Check

[13] We calculated the discretionary time based on our activity classification in Table 1. We also calculated the discretionary time following Kelenkoski and Hamrick (2013) and checked the robustness of the results. The results, which are available upon request, are robust.

In this section, we provide additional analyses to test the robustness of our main results exhibited in Tables 3 and 4. First, since we used the median of the range of issuance days for respondents in each state, we are concerned about a possible misclassification of issuance week. We address this issue by also using both the 25^{th} percentile and the 75^{th} percentile of the range of issuance days. We present the results in Tables A4 and A5 in the Appendix. The results show that our core results appear to be robust to the changes in calculating the benefit issuance week in both the 2006-2008 and 2014-2016 periods.

Beatty et al. (2019) found that the paycheck cycle could affect cyclic eating patterns. In our data, about 36 percent of SNAP participants in 2006-2008 and about 35 percent of SNAP participants in 2014-2016 are employed as a full time or part time worker. To check the robustness of our findings to this issue, we conduct additional analysis that only includes respondents who are not employed or are not in the labor force. We present the results in Table A6 in the Appendix. The cyclic eating patterns are more pronounced when we only include respondents who do not have a job in the 2006-2008 period. Specifically, SNAP participants spend less time on eating related activities by about 27 minutes in the third and fourth benefit weeks than comparable non-participants. SNAP participants in the 2014-2016 period also tend to spend less time on eating related activity relative to non-participants in the third and fourth benefit weeks. In particular, they significantly reduce the time spent on grocery shopping.

Given that the PSM can be sensitive to different specifications of the propensity score equations (e.g., Heckman et al., 1997; Smith and Todd, 2005), we also provide further robustness analyses for the matching results with different specification of the propensity score equations. Following Rosenbaum and Rubin (1984) and Dehejia and Wahba (2002), we add the second-order terms of non-binary variables to the original propensity score equation in the second

specification to test whether nonlinearity affects our matching results. We present the results in Table A7 in the Appendix. Our core results appear to be robust to the change in matching specification in both periods.

4. Conclusions and Policy Implications

SNAP is the largest domestic food assistance program in the US. There has been a longstanding observation that SNAP benefits do not last until the end of the benefit month, a consumption pattern known as the "SNAP benefit cycle". In this study, we use time use data from the 2006-2008 and 2014-2016 ATUS and EHM to analyze the time use patterns of SNAP participants across the benefit cycle. Specifically, we examined how SNAP participants allocate their time across various activities relative to comparable non-SNAP participants.

We find that SNAP participants spend less time on eating related activities (i.e., sum of the time spent on primary eating, food preparation, and grocery shopping) than comparable non-participants in the third and fourth weeks of the benefit month. This finding is consistent with previous findings from a number of studies suggesting that SNAP participants have a disproportionate food consumption pattern over the benefit month (e.g., Wilde and Ranney, 2000; Shapiro, 2005; Hastings and Washington, 2010; Hamrick and Andrews, 2016; Todd and Gregory, 2018). In particular, compared to the time spent by comparable non-SNAP participants, SNAP participants significantly spend less time on food preparation in the 2006-2008 period and also spend less time on grocery shopping in the 2014-2016 period. According to household production theory, individuals/households would need not only money to purchase food inputs but also time to shop and prepare meals. Our results suggest that SNAP participants would not spend enough time as comparable non-SNAP participants in producing healthy meals at the end

of the benefit month. Hence, this result could lend support to the key finding from past studies (Wild and Ranney, 2000; Shapiro, 2005; Todd, 2015) implying that SNAP participants tend to have a lower diet quality than non-SNAP participants at the end of the benefit month.

Given less time spent on eating related activities towards the end of the benefit cycle, we then examined how SNAP participants allocate their time spent on other activities across the benefit cycle. These results can provide insights into ways to reduce the potential unintended negative effects of program participation. We find that SNAP participants spend more time on medical service relative to non-participants in the first and second weeks after benefit issuance in both 2006-2008 and 2014-2016. With higher discretionary income early in the benefit month, they may focus on medical care use (Meyerhoefer and Pylypchuk, 2008). SNAP participants significantly spend less time on education/training relative to non-participants in both periods. Given the importance of education and training in human capital, it could be associated with their earnings and future well-being. SNAP participants also tend to invest larger portion of their time on TV watching and sleeping with less time spent on physical activity relative to non-participants. These non-activity time use behaviors could be a potential mechanism to explain higher obesity rate of SNAP participants. Interestingly, SNAP participants choose to spend more time on caring their child in 2006-2008, and household management and sleeping in 2014-2016 in the third and fourth weeks of the benefit month. This indicates that SNAP participants reallocate their reduced eating related hours to these activities. Given less time expenditure on food preparation and grocery shopping at the end of the benefit month, SNAP participants are more likely to have lower quality diets than non-participants. They may thus spend more time on caring their household members or saving their energy.

A relevant question to ask is what policy prescription can be taken to help mitigate the cyclic or irregular use of time over the benefit month. The simple commitment way could be educating SNAP participants about the importance of time allocation and guiding them how to plan their time budget over the benefit month, perhaps through the SNAP-Ed program may help reduce irregular time use patterns.

Given sufficient discretionary time across the benefit cycle, the lack of benefits/money towards the end of the benefit month may be the main reason for the cyclic time use in eating related activities. This suggest that as benefits dwindle across the benefit month, SNAP participants who are not working may be more likely to be susceptible to income poverty at the end of the benefit month and it could be associated with more of the SNAP cycle. Our results also support this evidence. We found that the cyclic time use in eating activity was more pronounced in the 2006-2008 period than in the 2014-2016 period. The main difference in time allocation between the two periods was the amount of time spent on work (i.e., time spent on activities that generate income).[14] SNAP participants in the 2006-2008 period spent significantly less time on work than comparable non-participants. Recently, attention has been focused on how the timing of SNAP benefits reduces SNAP participants' cyclic behaviors of eating pattern over the benefit month given the finding that increasing the frequency of benefit payments can reduce cyclic food consumption patterns (Wilde and Ranney, 2000; Shapiro, 2005; Hastings and Washington, 2010). The approach to make bi-monthly or weekly payment of benefits could mitigate SNAP participants' money shortfalls later of the benefit month.

[14] SNAP participants in 2006-2008 spend about 2 percent of average working time per day less compared to SNAP participants in 2014-2016. SNAP participants' weekly earnings in 2006-2008 are also significantly less than in 2014-2016.

References

Abadie, A. and Imbens, G.W., 2011. Bias-corrected matching estimators for average treatment effects. *Journal of Business & Economic Statistics*, *29*(1), pp.1-11.

Abramowitz, J., 2016. The connection between working hours and body mass index in the US: a time use analysis. *Review of Economics of the Household*, *14*(1), pp.131-154.

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

Aguiar, M., Hurst, E. and Karabarbounis, L., 2013. Time use during the great recession. *American Economic Review*, *103*(5), pp.1664-96.

Almada, L., McCarthy, I. and Tchernis, R., 2016. What can we learn about the effects of food stamps on obesity in the presence of misreporting?. *American Journal of Agricultural Economics*, *98*(4), pp.997-1017.

Basu, S., Berkowitz, S.A. and Seligman, H., 2017. The monthly cycle of hypoglycemia. *Medical Care*, *55*(7), pp.639-645.

Baum, C.L., 2011. The effects of food stamps on obesity. *Southern Economic Journal*, *77*(3), pp.623-651.

Beatty, T.K., Nanney, M.S. and Tuttle, C., 2014. Time to eat? The relationship between food security and food-related time use. *Public Health Nutrition*, *17*(1), pp.66-72.

Becker, G.S., 1965. A Theory of the Allocation of Time. *The Economic Journal*, 125, pp.493-517.

Beatty, T.K., Bitler, M.P., Cheng, X.H. and Van der Werf, C., 2019. *SNAP and Paycheck Cycles* (No. w25635). National Bureau of Economic Research.

Burney, S., 2018. In-kind benefits and household behavior: The impact of SNAP on food-away-from-home consumption. *Food Policy*, *75*, pp.134-146.

Caliendo, M. and Kopeinig, S., 2008. Some practical guidance for the implementation of propensity score matching. *Journal of Economic Surveys*, *22*(1), pp.31-72.

Castner, L. and Henke, J. Benefit Redemption Patterns in the Supplemental Nutrition Assistance Program, U.S. Department of Agriculture, Food and Nutrition Service, Office of Research and Analysis, Project officer: A Singh, Alexandria, VA: February 2011. Available: http://www.fns.usda.gov/benefitredemption-patterns-supplemental-nutrition-assistance-program.

Cawley, J. and Liu, F., 2012. Maternal employment and childhood obesity: A search for mechanisms in time use data. *Economics & Human Biology*, *10*(4), pp.352-364.

Chen, Z., Yen, S.T. and Eastwood, D.B., 2005. Effects of food stamp participation on body weight and obesity. *American Journal of Agricultural Economics*, *87*(5), pp.1167-1173.

Cotti, C., Gordanier, J. and Ozturk, O., 2018. When does it count? The timing of food stamp receipt and educational performance. *Economics of Education Review*, *66*, pp.40-50.

Davis, G.C. and You, W., 2011. Not enough money or not enough time to satisfy the Thrifty Food Plan? A cost difference approach for estimating a money–time threshold. *Food Policy*, *36*(2), pp.101-107.

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

Darko, J., Eggett, D.L. and Richards, R., 2013. Shopping behaviors of low-income families during a 1-month period of time. *Journal of Nutrition Education and Behavior*, *45*(1), pp.20-29.

Dehejia, R.H. and Wahba, S., 2002. Propensity score-matching methods for nonexperimental causal studies. *Review of Economics and Statistics*, *84*(1), pp.151-161.

Dorfman, J.H., Gregory, C., Liu, Z. and Huo, R., 2018. Re-Examining the SNAP Benefit Cycle Allowing for Heterogeneity. *Applied Economic Perspectives and Policy*.

Fan, M., 2010. Do food stamps contribute to obesity in low-income women? Evidence from the National Longitudinal Survey of Youth 1979. *American Journal of Agricultural Economics*, *92*(4), pp.1165-1180.

Fox, M.K., Hamilton, W. and Lin, B.H., 2004. Effects of food assistance and nutrition programs on nutrition and health. *Food Assistance and Nutrition Research Report*, *19*(3).

Fogelholm, M. and Kukkonen-Harjula, K., 2000. Does physical activity prevent weight gain–a systematic review. *Obesity Reviews*, *1*(2), pp.95-111.

Gassman-Pines, A. and Bellows, L., 2018. Food Instability and Academic Achievement: A Quasi-Experiment Using SNAP Benefit Timing. *American Educational Research Journal*, *55*(5), pp.897-927.

Gibson, D., 2003. Food stamp program participation is positively related to obesity in low income women. *The Journal of Nutrition*, *133*(7), pp.2225-2231.

Gelber, A.M. and Mitchell, J.W., 2011. Taxes and time allocation: Evidence from single women and men. *The Review of Economic Studies*, *79*(3), pp.863-897.

Hahn, J., 1998. On the role of the propensity score in efficient semiparametric estimation of average treatment effects. *Econometrica*, pp.315-331.

Hamermesh, D.S., 2008. Direct estimates of household production. *Economics Letters*, *98*(1), pp.31-34.

Hamermesh, D.S., Frazis, H. and Stewart, J., 2005. Data watch: The American time use survey. *Journal of Economic Perspectives*, *19*(1), pp.221-232.

Hamrick, K.S. and Andrews, M., 2016. SNAP participants' eating patterns over the benefit month: a time use perspective. *PloS One*, *11*(7), p.e0158422.

Hankinson, A.L., Daviglus, M.L., Bouchard, C., Carnethon, M., Lewis, C.E., Schreiner, P.J., Liu, K. and Sidney, S., 2010. Maintaining a high physical activity level over 20 years and weight gain. *Jama*, 304(23), pp.2603-2610.

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

Heckman, J.J., Ichimura, H. and Todd, P., 1998. Matching as an econometric evaluation estimator. *The Review of Economic Studies*, *65*(2), pp.261-294.

Heckman, J.J., Ichimura, H. and Todd, P.E., 1997. Matching as an econometric evaluation estimator: Evidence from evaluating a job training programme. *The Review of Economic Studies*, *64*(4), pp.605-654.

Hemmingsson, E. and Ekelund, U., 2007. Is the association between physical activity and body mass index obesity dependent?. *International Journal of Obesity*, *31*(4), p.663.

Hoynes, H., Schanzenbach, D.W. and Almond, D., 2016. Long-run impacts of childhood access to the safety net. *American Economic Review*, *106*(4), pp.903-34.

Hoynes, H.W. and Schanzenbach, D.W., 2009. Consumption responses to in-kind transfers: Evidence from the introduction of the food stamp program. *American Economic Journal: Applied Economics*, *1*(4), pp.109-39.

Imbens, G.W., 2015. Matching methods in practice: Three examples. *Journal of Human Resources*, *50*(2), pp.373-419.

Kalenkoski, C.M. and Hamrick, K.S., 2012. How does time poverty affect behavior? A look at eating and physical activity. *Applied Economic Perspectives and Policy*, *35*(1), pp.89-105.

Kalenkoski, C.M., Hamrick, K.S. and Andrews, M., 2011. Time poverty thresholds and rates for the US population. *Social Indicators Research*, *104*(1), pp.129-155.

Krueger, A.B. and Mueller, A., 2010. Job search and unemployment insurance: New evidence from time use data. *Journal of Public Economics*, *94*(3-4), pp.298-307.

Lee, I.M., Djoussé, L., Sesso, H.D., Wang, L. and Buring, J.E., 2010. Physical activity and weight gain prevention. *Jama*, *303*(12), pp.1173-1179.

Moffitt, R.A., 2002. Welfare programs and labor supply. *Handbook of Public Economics*, *4*, pp.2393-2430.

Mukoyama, T., Patterson, C. and Şahin, A., 2018. Job search behavior over the business cycle. *American Economic Journal: Macroeconomics*, *10*(1), pp.190-215.

Meyerhoefer, C.D. and Pylypchuk, Y., 2008. Does participation in the food stamp program increase the prevalence of obesity and health care spending?. *American Journal of Agricultural Economics*, *90*(2), pp.287-305.

Meyer, B.D., Mittag, N. and Goerge, R.M., 2018. *Errors in survey reporting and imputation and their effects on estimates of food stamp program participation* (No. w25143). National Bureau of Economic Research.

Nevo, A. and Wong, A., 2015. *The elasticity of substitution between time and market goods: Evidence from the Great Recession* (No. w21318). National Bureau of Economic Research.

Rosenbaum, P.R. and Rubin, D.B., 1984. Reducing bias in observational studies using subclassification on the propensity score. *Journal of the American Statistical Association*, *79*(387), pp.516-524.

Rosenbaum, P.R., 2002. Observational studies. In *Observational studies* (pp. 1-17). Springer, New York, NY.

Rose, D., 2007. Food stamps, the Thrifty Food Plan, and meal preparation: the importance of the time dimension for US nutrition policy. *Journal of Nutrition Education and Behavior*, *39*(4), pp.226-232.

Shapiro, J.M., 2005. Is there a daily discount rate? Evidence from the food stamp nutrition cycle. *Journal of Public Economics*, *89*(2-3), pp.303-325.

Smith, T.A., Berning, J.P., Yang, X., Colson, G. and Dorfman, J.H., 2016. The effects of benefit timing and income fungibility on food purchasing decisions among Supplemental Nutrition

Assistance Program households. *American Journal of Agricultural Economics*, *98*(2), pp.564-580.

Seligman, H.K., Bolger, A.F., Guzman, D., López, A. and Bibbins-Domingo, K., 2014. Exhaustion of food budgets at month's end and hospital admissions for hypoglycemia. *Health Affairs*, *33*(1), pp.116-123.

Schmeiser, M.D., 2012. The impact of long-term participation in the supplemental nutrition assistance program on child obesity. *Health Economics*, *21*(4), pp.386-404.

Smith, J.A. and Todd, P.E., 2005. Does matching overcome LaLonde's critique of nonexperimental estimators?. *Journal of Econometrics*, *125*(1-2), pp.305-353.

Spinney, J. and Millward, H., 2010. Time and money: a new look at poverty and the barriers to physical activity in Canada. *Social Indicators Research*, *99*(2), pp.341-356.

Thompson, F.E., Taren, D.L., Andersen, E., Casella, G., Lambert, J.K., Campbell, C.C., Frongillo Jr, E.A. and Spicer, D., 1988. Within month variability in use of soup kitchens in New York State. *American Journal of Public Health*, *78*(10), pp.1298-1301.

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

Todd, J.E. and Gregory, C., 2018. Changes in Supplemental Nutrition Assistance Program real benefits and daily caloric intake among adults. *Food Policy*, *79*, pp.111-120.

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

Zagorsky, J.L. and Smith, P.K., 2009. Does the US Food Stamp Program contribute to adult weight gain?. *Economics & Human Biology*, *7*(2), pp.246-258.

Appendix

Table A1. Definitions of Time Use Activity in ATUS

Category	ATUS Code
Eating Activity	
- Primary Eating	050202, 1101, 119999
- Food Preparation	0202, 180202
- Grocery Shopping	070101, 180701
Food Away From Home	070103, 1102, 180703, 1811
Medical Service	0103, 0804, 180804
Physical Activity	050203, 1301, 130301, 130399, 130401, 130499, 1399, 181301, 181399
Working Activity	0501, 050201, 050204, 050205, 050299, 0599, 180501, 180502, 180599
Job Search	0503, 180503, 0504, 180504
Child Care	0301, 0302, 0303, 0401, 0402, 0403, 180301, 180302, 180303, 180401, 180402, 180403
House Work	
- Home production	0201, 020302, 020303, 020399, 0207, 0208, 020901, 020902, 020905, 020999, 0299, 180201, 180203, 180207, 180208, 180209, 180299
- Home ownership	020301, 0204, 0205, 180204, 180205
- Buying goods and services	070102, 070104, 070105, 070199, 0702, 0703, 0799, 0801, 0802, 0803, 0805, 0806, 0807, 0808, 0899, 09, 100101, 100103, 100199, 1002, 1003, 1004, 1099, 180702, 180704, 180799, 180801, 180802, 180803, 180805, 180806, 180807, 180899, 1809, 1810, 100102
- Care of others	0304, 0305, 0399, 0404, 0405, 0499, 180304, 180305, 180399, 180404, 180405, 180499
Leisure	
- TV watching	120303, 120304
- Sleeping	0101
- Socializing	1201, 1202, 120307, 120501, 120502, 16, 181201, 181202, 1816
- Personal care	0102, 0104, 0105, 0199, 1801
- Other leisure	0206, 020903, 020904, 120301, 120302, 120305, 120306, 120308, 120309, 120310, 120311, 120312, 120313, 120399, 1204, 120503, 120504, 120599, 1299, 1302, 130302, 130402, 180206, 181203, 181204, 181205, 181299, 181302

Other	
- Education	14, 15, 1814, 1815
- Civic	06, 1806

Source: American Time Use Survey Activity Lexicon

Table A2. Descriptive Statistics of Samples

	2006-2008 ATUS-EHM		2014-2016 ATUS-EHM	
	SNAP	Lower income	SNAP	Lower income
Gender(1=Male)	0.28 (0.45)	0.38 (0.48)	0.29 (0.45)	0.42 (0.49)
Age	44.11 (16.73)	49.86 (18.60)	47.32 (17.02)	51.86 (18.41)
Education	2.12 (1.03)	2.35 (1.11)	2.33 (1.09)	2.60 (1.15)
Household income	5.10 (3.49)	7.46 (3.51)	6.10 (3.69)	8.48 (3.65)
Child(=1)	0.62 (0.48)	0.45 (0.49)	0.53 (0.49)	0.37 (0.48)
Household size	3.01 (1.81)	2.67 (1.64)	2.85 (1.79)	2.51 (1.58)
Primary family(=1)	0.64 (0.48)	0.61 (0.48)	0.59 (0.49)	0.57 (0.49)
Home owned(=1)	0.33 (0.47)	0.61 (0.49)	0.34 (0.47)	0.59 (0.49)
Employed(=1)	0.36 (0.48)	0.53 (0.49)	0.34 (0.47)	0.51 (0.49)
White(=1)	0.65 (0.47)	0.76 (0.42)	0.64 (0.47)	0.75 (0.43)
Hispanic(=1)	0.23 (0.42)	0.24 (0.42)	0.24 (0.43)	0.24 (0.42)
Metropolitan(=1)	0.76 (0.42)	0.78 (0.42)	0.79 (0.40)	0.80 (0.39)
Northeast	0.15 (0.36)	0.14 (0.35)	0.17 (0.38)	0.14 (0.35)
Midwest	0.24 (0.42)	0.23 (0.42)	0.21 (0.41)	0.22 (0.41)
South	0.42 (0.49)	0.39 (0.48)	0.43 (0.49)	0.41 (0.49)
West	0.18 (0.39)	0.23 (0.42)	0.18 (0.38)	0.22 (0.41)
Year2006 or 2014	0.33 (0.47)	0.33 (0.47)	0.34 (0.47)	0.35 (0.48)
Year2007 or 2015	0.30 (0.46)	0.32 (0.47)	0.33 (0.47)	0.32 (0.46)
Year2008 or 2016	0.36 (0.48)	0.34 (0.47)	0.32 (0.47)	0.32 (0.46)

Note: Standard deviations are in brackets. Education 2 represents High school graduate, and education 3 represents Some college but no degree. Household income 5 represents household income between $12,500 and $14,999, and household income 6 denotes household income between $15,000 and $19,999.

Table A3. Balancing Test

	2006-2008 ATUS-EHM		2014-2016 ATUS-EHM	
	Unmatched	Matched	Unmatched	Matched
Gender	8.91 (0.00)	-0.07 (0.94)	11.11 (0.00)	-1.47 (0.14)
Age	11.86 (0.00)	0.44 (0.66)	9.80 (0.00)	0.97 (0.33)
Education	9.18 (0.00)	-0.12 (0.91)	11.18 (0.00)	-0.03 (0.97)
Household income	19.68 (0.00)	0.36 (0.72)	35.32 (0.00)	1.58 (0.11)
Child(=1)	-15.33 (0.00)	1.62 (0.11)	-15.29 (0.00)	1.52 (0.13)
Household size	-7.07 (0.00)	1.98 (0.05)	-8.60 (0.00)	1.14 (0.25)
Primary family(=1)	-2.45 (0.01)	1.26 (0.21)	-0.95 (0.34)	1.67 (0.09)
Home owned(=1)	26.38 (0.00)	0.39 (0.69)	25.32 (0.00)	-1.04 (0.30)
Employed(=1)	15.76 (0.00)	0.49 (0.62)	16.31 (0.00)	0.06 (0.95)
White(=1)	10.12 (0.00)	0.60 (0.55)	10.33 (0.00)	0.58 (0.56)
Hispanic(=1)	1.05 (0.29)	-0.40 (0.69)	-0.62 (0.53)	-0.40 (0.68)
Metropolitan(=1)	2.41 (0.01)	0.55 (0.58)	1.98 (0.04)	-0.36 (0.72)
Midwest	-0.84 (0.40)	2.21 (0.03)	0.92 (0.35)	-0.04 (0.97)
South	-2.24 (0.02)	-2.79 (0.01)	-2.21 (0.02)	-1.09 (0.27)
West	4.42 (0.00)	1.18 (0.24)	4.30 (0.00)	0.92 (0.35)
Year2006 or 2015	-0.55 (0.58)	-1.02 (0.31)	-0.22 (0.82)	-0.74 (0.45)
Year2007 or 2016	1.86 (0.06)	-0.11 (0.91)	-1.03 (0.30)	0.19 (0.85)

Note: Values represent t-statistics with the p-values in brackets.

Table A4. Time Spent on Activities across Benefit Weeks in 2006-2008 with 25%

	2006-2008 ATUS-EHM			2014-2016 ATUS-EHM		
	SNAP	Week 34	SNAP* Week 34	SNAP	Week 34	SNAP* Week 34
Eating Activity	5.18	9.74	-15.34	0.35	10.63	-10.64
	(5.24)	(3.29)***	(5.79)**	(4.24)	(6.04)*	(7.42)
- Primary Eating	-3.17	1.12	-1.24	-2.92	2.61	-1.34
	(2.19)	(2.01)	(2.59)	(2.18)	(3.24)	(4.29)
- Food Preparation	5.16	5.56	-9.13	3.68	6.16	-7.52
	(3.22)	(2.91)*	(4.27)**	(3.12)	(3.55)*	(4.84)
- Grocery Shopping	3.19	3.06	-4.97	-0.40	1.87	-2.09
	(1.63)*	(1.62)*	(2.46)**	(1.35)	(1.81)	(2.34)
FAFH	-0.24	-0.26	-0.24	-1.08	1.53	-1.72
	(1.06)	(1.18)	(1.48)	(0.93)	(1.29)	(1.43)
Medical Service	7.20	7.50	-3.56	13.27	2.36	-7.77
	(4.28)*	(5.54)	(5.98)	(3.23)***	(4.31)	(6.26)
Physical Activity	-4.26	-0.44	1.80	-2.83	-3.01	3.01
	(1.93)**	(2.67)	(4.03)	(2.52)	(3.04)	(3.31)
Working	-32.22	-5.59	6.80	-11.27	-8.66	0.58
	(9.22)***	(13.74)	(16.60)	(7.72)	(10.31)	(12.13)
House Work	-3.02	4.48	-1.08	-3.10	-2.06	6.67
	(8.76)	(10.35)	(11.92)	(6.27)	(6.29)	(8.19)
- Home production	0.22	-3.75	2.79	-1.94	-5.74	9.99
	(4.65)	(6.57)	(6.60)	(4.22)	(4.51)	(4.96)**
- Home ownership	-2.15	1.35	-0.39	-2.26	1.28	-2.43
	(2.20)	(2.45)	(3.25)	(2.28)	(3.19)	(3.28)
- Buying goods and services	-1.40	3.29	-0.62	-3.58	3.08	-1.68
	(3.79)	(4.05)	(5.02)	(2.81)	(3.58)	(4.79)
- Care of others	0.31	3.59	-2.86	4.68	-0.69	0.78
	(2.48)	(3.11)	(5.67)	(2.03)**	(1.94)	(3.41)
Leisure	25.00	-7.03	4.19	7.71	5.84	-1.11
	(13.05)*	(12.23)	(14.98)	(10.85)	(12.44)	(17.44)
- TV watching	5.08	-13.36	22.66	29.77	17.79	-13.79
	(10.63)	(15.34)	(17.35)	(9.47)***	(13.62)	(17.58)
- Sleeping	17.87	10.63	-12.97	-8.89	-8.41	12.73
	(7.52)**	(11.25)	(11.67)	(8.41)	(9.19)	(10.60)
- Socializing	6.30	-2.68	-3.68	-1.17	7.25	-12.46
	(6.11)	(8.12)	(10.10)	(6.83)	(9.84)	(10.46)
- Personal care	-0.09	-1.41	-1.26	2.06	-0.58	-1.86
	(2.38)	(2.37)	(2.79)	(2.15)	(2.46)	(3.06)
- Other leisure	-4.16	-0.22	-0.55	-14.06	-10.22	14.27
	(6.16)	(7.14)	(10.71)	(5.65)**	(7.69)	(8.53)*

Child Care	8.86	-4.06	2.92	8.35	-0.19	3.39
	(5.36)*	(4.82)	(5.85)	(3.12)***	(3.75)	(4.90)
Other	-6.54	-4.29	4.56	-11.22	-6.42	7.78
	(5.28)	(6.19)	(7.05)	(6.52)*	(6.81)	(7.85)
- Education	-7.18	-7.79	7.74	-12.08	-6.21	9.17
	(4.29)*	(4.95)	(5.24)	(5.17)**	(5.65)	(6.69)
- Civic	0.65	3.50	-3.18	0.86	-0.22	-1.39
	(3.26)	(4.71)	(5.22)	(4.88)	(4.44)	(6.25)

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A5. Time Spent on Activities across Benefit Weeks in 2006-2008 with 75%

	2006-2008 ATUS-EHM			2014-2016 ATUS-EHM		
	SNAP	Week 34	SNAP* Week 34	SNAP	Week 34	SNAP* Week 34
Eating Activity	3.11	8.84	-10.12	-3.41	0.83	-3.44
	(5.25)	(5.34)	(7.45)	(4.73)	(4.52)	(5.00)
- Primary Eating	-3.97	0.13	0.45	-2.19	1.59	-2.75
	(2.30)*	(3.21)	(3.97)	(1.81)	(2.66)	(2.92)
- Food Preparation	4.42	6.31	-7.02	-2.01	-3.32	3.63
	(3.63)	(3.22)*	(4.94)	(3.29)	(4.09)	(4.22)
- Grocery Shopping	2.67	2.39	-3.56	0.79	2.56	-4.32
	(1.45)*	(1.48)	(2.42)	(1.62)	(1.53)*	(1.87)**
FAFH	-0.14	0.16	-0.42	-2.52	-1.87	1.07
	(1.05)	(1.07)	(1.50)	(1.20)**	(1.58)	(1.78)
Medical Service	5.33	1.88	0.59	15.49	4.91	-11.53
	(4.75)	(6.07)	(6.04)	(3.71)***	(4.44)	(5.22)**
Physical Activity	-3.18	1.42	-0.46	-0.36	2.02	-1.80
	(1.79)*	(2.75)	(3.45)	(2.16)	(2.72)	(3.11)
Working	-40.57	-30.06	23.08	-11.04	-0.95	0.57
	(12.06)***	(13.58)**	(15.62)	(9.92)	(10.25)	(14.47)
House Work	-3.37	2.45	-0.19	-4.23	-3.28	8.41
	(8.82)	(10.58)	(12.63)	(8.17)	(10.90)	(12.21)
- Home production	0.97	2.28	0.91	-3.15	-8.34	11.80
	(5.59)	(6.05)	(8.88)	(5.26)	(6.89)	(8.14)
- Home ownership	-1.02	3.23	-2.57	-2.69	2.12	-1.44
	(2.16)	(3.67)	(4.51)	(2.25)	(3.87)	(4.52)
- Buying goods and services	-3.41	-4.41	3.58	-7.25	-1.40	5.32
	(5.48)	(6.01)	(7.25)	(4.03)*	(3.78)	(5.36)
- Care of others	0.08	1.34	-2.11	8.87	4.34	-7.27
	(2.21)	(2.85)	(3.82)	(2.00)***	(1.70)**	(2.89)**
Leisure	40.81	18.41	-27.50	-1.24	-11.21	15.78
	(11.84)***	(12.08)	(15.79)*	(12.90)	(14.37)	(16.63)
- TV watching	13.36	0.89	4.54	24.89	-4.32	-4.35
	(12.46)	(10.75)	(13.85)	(11.03)**	(14.03)	(17.09)
- Sleeping	22.41	22.25	-21.02	-10.08	-2.59	14.47
	(5.82)***	(8.71)**	(12.24)*	(9.19)	(7.45)	(10.83)
- Socializing	6.35	-0.64	-3.66	-5.11	2.39	-4.29
	(7.47)	(10.71)	(14.60)	(9.39)	(9.42)	(14.16)
- Personal care	1.12	-0.47	-3.57	3.47	2.55	-4.39
	(2.58)	(2.06)	(2.94)	(1.99)*	(2.14)	(2.70)
- Other leisure	-2.42	-3.65	-3.79	-14.42	-9.24	14.34
	(5.26)	(6.24)	(8.33)	(6.38)**	(7.34)	(10.39)

Child Care	3.16	-3.95	13.68	13.24	8.64	-6.19
	(6.02)	(5.32)	(6.74)**	(3.55)***	(3.71)**	(5.08)
Other	-5.04	0.90	1.13	-5.50	1.39	-3.45
	(5.62)	(6.96)	(9.50)	(5.57)	(5.34)	(7.29)
- Education	-6.27	-3.12	5.19	-9.19	-2.48	3.20
	(4.83)	(5.25)	(7.31)	(4.58)**	(4.55)	(5.44)
- Civic	1.23	4.02	-4.07	3.68	3.87	-6.66
	(3.76)	(4.69)	(5.93)	(3.16)	(2.95)	(4.73)

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.

Table A6. Time Spent on Activities across Benefit Weeks (No Employment)

	2006-2008 ATUS-EHM			2014-2016 ATUS-EHM		
	SNAP	Week 34	SNAP* Week 34	SNAP	Week 34	SNAP* Week 34
Eating Activity	8.65	21.60	-27.01	-3.35	-1.08	-3.08
	(6.43)	(6.33)***	(7.94)***	(6.01)	(7.63)	(9.18)
- Primary Eating	-1.24	7.84	-8.09	-1.53	1.54	-3.36
	(2.75)	(2.87)***	(3.51)**	(2.86)	(3.96)	(4.58)
- Food Preparation	5.46	9.44	-12.57	-0.10	-3.33	3.24
	(4.58)	(4.21)**	(5.96)**	(4.57)	(5.66)	(8.03)
- Grocery Shopping	4.44	4.31	-6.36	-1.72	0.71	-2.97
	(1.69)**	(2.41)*	(3.51)*	(1.97)	(2.18)	(2.35)
FAFH	0.18	0.73	-0.68	-1.82	1.11	-1.50
	(1.26)	(1.50)	(1.78)	(1.13)	(2.06)	(1.92)
Medical Service	14.11	9.58	-14.55	16.78	3.39	-5.69
	(5.33)**	(7.81)	(8.79)*	(4.37)***	(4.08)	(5.43)
Physical Activity	-6.29	-2.59	3.24	5.94	3.52	-6.37
	(3.43)*	(3.89)	(5.28)	(1.68)***	(2.39)	(2.68)**
Working	-20.49	2.59	-5.83	-4.28	-1.69	-1.41
	(9.34)**	(11.74)	(12.57)	(6.93)	(9.64)	(10.10)
House Work	-4.68	-0.39	14.84	-5.66	-4.52	11.63
	(10.87)	(12.68)	(13.42)	(8.83)	(9.62)	(9.60)
- Home production	2.72	-3.62	13.70	-5.21	-14.04	12.85
	(4.53)	(7.13)	(8.56)	(6.50)	(7.76)*	(7.44)*
- Home ownership	-3.23	3.14	0.31	0.56	6.33	-4.57
	(2.93)	(3.77)	(5.05)	(2.67)	(3.71)*	(4.09)
- Buying goods and services	-3.22	0.58	0.74	-7.22	1.15	3.26
	(6.41)	(6.12)	(7.20)	(3.62)*	(3.55)	(4.38)
- Care of others	-0.96	-0.50	0.09	6.22	2.04	0.09
	(2.67)	(3.53)	(4.40)	(2.44)**	(2.09)	(3.92)
Leisure	15.82	-28.17	17.03	3.42	3.51	7.19
	(14.15)	(18.82)	(18.05)	(15.70)	(17.48)	(25.53)
- TV watching	17.16	8.22	-0.95	25.55	7.47	-3.41
	(14.54)	(16.03)	(16.95)	(13.45)*	(15.04)	(23.13)
- Sleeping	25.85	-4.15	-8.49	-14.01	-20.36	31.03
	(9.14)***	(11.81)	(14.59)	(12.49)	(12.00)*	(14.79)**
- Socializing	-1.86	-9.91	2.44	6.08	21.66	-26.76
	(7.29)	(10.99)	(12.67)	(6.97)	(11.98)*	(13.78)*
- Personal care	-2.91	-2.38	-0.09	0.90	0.49	-0.51
	(2.87)	(3.09)	(3.44)	(2.34)	(3.17)	(3.79)
- Other leisure	-22.41	-19.95	24.11	-15.10	-5.75	6.84
	(8.31)***	(9.34)**	(12.23)*	(8.26)*	(9.50)	(11.42)

Child Care	9.47	1.80	5.27	9.27	4.54	-8.02
	(8.15)	(6.71)	(9.64)	(4.65)*	(5.36)	(6.52)
Other	-16.68	-4.97	7.57	-19.90	-8.36	6.83
	(7.20)**	(10.46)	(12.74)	(8.69)**	(8.91)	(10.84)
- Education	-17.02	-10.76	14.42	-19.51	-9.82	12.68
	(5.96)***	(8.95)	(10.24)	(6.98)***	(8.01)	(9.63)
- Civic	0.34	5.79	-6.86	-0.39	1.46	-5.85
	(3.69)	(5.52)	(5.95)	(5.15)	(4.52)	(6.32)

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively. Working activity includes time spent on main jobs, other income-generating activities, and activities related to job search. No employment only considers the time spent on main jobs. We reject the hypothesis of similar time use of grocery shopping in the third and fourth weeks of the month (F-statistic=5.87, $p<0.05$).

Table A7. Time Spent on Activities across Benefit Weeks with the Second Order Terms

	2006-2008 ATUS-EHM			2014-2016 ATUS-EHM		
	SNAP	Week 34	SNAP* Week 34	SNAP	Week 34	SNAP* Week 34
Eating Activity	10.23	13.90	-18.58	-1.17	7.09	-9.19
	(4.86)**	(5.21)**	(7.01)**	(3.63)	(5.51)	(6.44)
- Primary Eating	-1.50	3.30	-4.21	-2.11	3.93	-4.21
	(2.42)	(2.19)	(2.29)*	(1.89)	(2.03)*	(2.38)*
- Food Preparation	10.35	9.30	-12.28	1.34	1.38	-1.41
	(3.43)***	(3.41)***	(5.20)**	(2.76)	(4.30)	(5.50)
- Grocery Shopping	1.38	1.29	-2.09	-0.40	1.77	-3.58
	(1.85)	(1.80)	(2.66)	(1.82)	(2.21)	(2.32)
FAFH	-1.98	-1.48	1.56	-0.17	2.84	-2.86
	(1.33)	(0.99)	(1.47)	(0.90)	(1.17)**	(1.37)**
Medical Service	2.21	-6.64	5.26	6.46	-1.29	-1.56
	(6.85)	(6.79)	(7.37)	(3.32)*	(3.34)	(5.43)
Physical Activity	-4.35	-2.75	4.52	-3.40	1.47	-2.02
	(2.80)	(2.98)	(3.03)	(2.09)	(2.73)	(2.96)
Working	-24.15	-12.92	4.00	-1.24	7.08	-14.22
	(9.67)**	(15.25)	(15.62)	(8.54)	(12.11)	(11.83)
House Work	-9.19	7.02	-2.59	-7.49	-16.74	17.51
	(7.61)	(8.76)	(10.36)	(5.17)	(7.41)**	(8.02)**
- Home production	2.39	4.70	-2.03	-4.94	-14.87	12.36
	(5.75)	(5.98)	(9.19)	(4.41)	(5.10)***	(5.10)**
- Home ownership	-4.83	-1.69	1.91	-3.57	-3.11	3.99
	(3.38)	(3.86)	(4.39)	(2.45)	(2.35)	(3.00)
- Buying goods and services	-1.58	9.93	-8.78	-3.19	2.75	-0.64
	(3.66)	(4.17)**	(5.49)	(3.01)	(3.51)	(4.58)
- Care of others	-5.17	-5.92	6.31	4.22	-1.51	1.79
	(3.44)	(3.53)	(4.15)	(1.93)**	(1.46)	(3.05)
Leisure	29.48	8.26	-3.79	9.51	5.94	8.33
	(17.71)*	(18.48)	(24.69)	(11.64)	(10.89)	(15.55)
- TV watching	11.69	12.58	-4.57	9.78	-21.29	21.61
	(8.94)	(12.02)	(13.79)	(11.31)	(10.16)**	(15.92)
- Sleeping	11.78	-5.02	4.76	-0.50	10.51	-0.72
	(9.06)	(10.16)	(12.81)	(7.62)	(7.65)	(9.56)
- Socializing	3.57	0.46	-1.20	7.91	9.70	-12.90
	(6.95)	(7.53)	(10.74)	(6.67)	(8.40)	(9.76)
- Personal care	0.96	1.60	-4.79	1.84	4.48	-4.21
	(2.42)	(2.30)	(3.09)	(1.84)	(2.21)**	(2.86)
- Other leisure	1.47	-1.36	1.99	-9.50	2.53	4.55
	(6.82)	(8.18)	(10.36)	(5.25)*	(9.17)	(9.84)

Child Care	6.31	0.11	6.08	7.94	-1.51	0.86
	(5.12)	(7.46)	(8.70)	(5.11)	(5.30)	(5.91)
Other	-8.44	-5.32	3.48	-10.24	-4.72	2.87
	(6.83)	(9.88)	(11.59)	(5.48)*	(5.95)	(7.12)
- Education	-6.06	-5.89	4.94	-7.46	-1.89	3.40
	(6.18)	(6.11)	(6.91)	(4.27)*	(4.99)	(6.43)
- Civic	-2.38	0.58	-1.47	-2.78	-2.82	-0.54
	(3.67)	(6.57)	(7.65)	(4.09)	(4.05)	(4.43)

Note: Standard errors, clustered at the state level, are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1%, respectively.