

**Food Spending Among Low-Income Consumers: the Effects of the SNAP Cycle and
Seasonality on Purchases and Produce Incentive Use**

by

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Abstract

The Supplemental Nutrition Assistance Program (SNAP) provides food assistance benefits to low-income households. Participants in SNAP face both a cyclical and seasonal struggle when it comes to maintaining enough food across month (Kuhn, 2015), and often the food purchased is of poor diet quality (Dimitri et al. 2016). Pairing SNAP with a nutrition incentive program may be one way to help improve outcomes for participants. One prominent nutrition incentive program is the Gus Schumacher Nutrition Incentive Program (GusNIP) administered by the USDA. The purpose of this paper is to evaluate findings from a GusNIP initiative in Alabama called “Double Up Food Bucks Alabama.” Our data includes SNAP transaction-level data from one participating retailer in 2021-2022. We use OLS to explore how SNAP spending changes across the month, and how a nutrition incentive program influences this spending. Our results show that household SNAP spending decreases across the month, and that nutrition incentive use increases across the month.

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List of Abbreviations

SNAP	Supplemental Nutrition Assistance Program
USDA	United States Department of Agriculture
GusNIP	Gus Schumacher Nutrition Incentive Program
NSLP	National School Lunch Program
SEBTC	Summer Electronic Benefit Transfer for Children
SFSP	Summer Food Service Program
SSO	Seamless Summer Option
EBT	Electronic Benefit Transfer

Chapter 1

Introduction

Low-income households often are not able to afford to eat enough food, and the food is often of poor dietary quality (Dimitri et al. 2014). The main program addressing the issue of not enough food is the Supplemental Nutrition Assistance Program (SNAP). This program provides food assistance benefits to low-income households. While the program has been in place for many years, there are still improvements to be made for the overall well-being of its participants. One aspect of the program that households struggle with is the lump-sum benefit distribution at the beginning of the month. Households may end up spending their benefits too quickly, resulting in a deficit of resources towards the end of the month (Shapiro, 2004). In addition to the program's cyclical struggle, there is also a seasonal struggle. Households with children may experience an increased reliance on benefits during the summer months (Laurito and Schwartz, 2019).

Other policies seek to address the issue of poor diet quality in low-income households. One possible policy involves placing restrictions on SNAP participants purchases, however, it is unclear if this change really impacted these households purchases since they may just use personal funds to purchase the restricted items (Harnack et al. 2016). Another possible policy involves providing monetary incentives for the purchase of healthy foods. Pairing SNAP with a nutrition incentive program may help increase low-income household spending on fruits and vegetables. Research and evaluation of existing nutrition incentive programs has found that these programs increased sales of fruits and vegetables at both farmers markets and retailers, and helped improve consumer diet, health, and food security (Parks et al. 2020). Less is known about how nutrition incentives are used across the SNAP month and in the summer. We look at this

using data from a nutrition incentive program administered by the USDA called the Gus Schumacher Nutrition Incentive Program (GusNIP). The GusNIP initiative in Alabama is called “Double Up Food Bucks Alabama.” This program gives SNAP customers across Alabama the opportunity to purchase additional fresh fruits and vegetables for free when they make an initial fresh fruit and vegetable purchase.

This paper addresses two separate research questions. The first question we examine is how SNAP spending and nutrition incentive coupon use changes over the month. The second question we examine is how summer influences SNAP spending and nutrition incentive coupon use over the month.

There has been previous research on the SNAP cycle, summer hunger, and nutrition incentive programs individually, however, only one study has been found to date that examines two of these three topics together. The paper that is most similar to ours is Kuhn (2018). Kuhn examines food expenditure, consumption, and diet quality across the SNAP month. He finds that diet quality worsens across the month, and children are affected less than adults due to school meal programs (Kuhn, 2018). Our research differs from Kuhn’s in that we will be using SNAP customer transactional data from a grocery store, and we will be looking at all three of the topics discussed above and how they interact with each other.

With our research, we explore how low-income household spending varies across the SNAP cycle and in the summer months in the context of a unique nutrition incentive program.

Chapter 2

Literature Review

In this paper, we evaluate how the SNAP cycle and summer hunger affects purchase behavior among low-income consumers. In this section, we will discuss previous research on each of these topics.

SNAP Cycle

Participants in SNAP receive a monthly lump-sum benefit distribution to be used towards food purchases. Previous research indicates that these participants will tend to use up all their benefits soon after receipt, resulting in a deficit towards the end of the monthly benefit cycle. One reason for spending benefits so fast may be that households have a lack of income fungibility and do not treat their benefit dollars the same as other sources of income. As a result, it has been found that SNAP participants have a higher marginal propensity to spend on food when using their benefits (Smith et al. 2016). These participants may also experience short-run impatience. Households with short-run impatience are more likely to run out of food during the month because their timing of consumption is sensitive to their timing of payments (Shapiro, 2014).

The consumer behavior discussed above can result in SNAP participants exhausting their benefits soon after receipt. This can lead to SNAP participants having higher spending and clustering purchases in the first week following benefit receipt (Dorfman et al. 2017; Harris-Lagoudakis et al. 2021; Hastings and Washington, 2010; Smith et al. 2016; Wilde and Ranney 2000; Damon et al. 2013; Castellari et al. 2016). In addition to higher spending in the early

weeks, SNAP participants may also have a decline in spending towards the end of the benefit month (Tiehen et al. 2017; Hastings and Washington, 2010; Valluri et al. 2020).

The spending patterns discussed above can result in SNAP participants having lumpy food consumption. In addition to spending declining over the benefit month, caloric intake also declines due to short-run impatience (Shapiro, 2005; Todd, 2014). Going along with a decline in caloric intake, food energy intake also declines over the benefit month (Todd, 2014; Wilde and Ranney, 2000). This exhaustion of benefits can lead to low-income families relying more on school lunch and breakfast programs towards the end of the month (Laurito and Schwartz, 2019). One study found that adults in some families are more likely to skip meals on the weekends to provide for their children in the absence of school meal programs (Harnack, et al. 2016).

When SNAP participants are faced with running out of benefits at the end of the monthly benefit cycle, they are forced to use other methods and strategies for food acquisition (Darko et al. 2013). One strategy is to purchase cheaper and less healthy food (Beatty and Cheng, 2016) such as processed foods that do not expire quickly (Moran et al. 2019). On top of strategic purchases, SNAP participants may resort to other community resources to help make ends meet. One study found that food pantry visits increase when SNAP benefits run out (Byrne and Just, 2021).

The SNAP cycle can also impact children directly through academic and cognitive performance. Previous research has found that test scores drop significantly at or near the end of the benefit cycle (Cotti, et al. 2018; Gassman-Pines and Bellows, 2015). The SNAP cycle has also been found to impact non-cognitive performance and mental health. Students are more likely to have disciplinary infractions at the end of the benefit cycle, and as soon as two weeks

after benefit distribution, male students worsen in all three non-cognitive outcomes including locus of control, self-concept, and internalizing behavior scores (Gennetian et al., 2016; March.

Summer Hunger

Low-income families with school-aged children are eligible to participate in school breakfast and lunch programs to assist with maintaining adequate dietary intake for their children. However, in most cases, these programs do not carry over into the summer months. This absence of assistance during the summer requires low-income families to rely more heavily on their monthly SNAP benefits even though the benefit amount remains the same throughout the entire year (Laurito and Schwartz, 2019). As a result, these households are unable to absorb this increased need during the summer (Almada and McCarthy, 2017).

The increased demand for food in the summer can lead to seasonal food insecurity, or the inability to access adequate and healthy food during summer months. Low-income households with school-age children may experience greater increases in food insecurity during the summer (Nord and Romig, 2006; Huang et al. 2015). One reason for this may be that children from these households are receiving NSLP during the school year, and the benefits do not extend into summer months (Huang et al. 2016). It has been found that food insecurity is experienced less when SNAP and summer nutrition programs are more widely available (Bartfeld and Dunifon, 2006).

The increased need for food during the summer months can also lead to lumpy food consumption. The lack of the NSLP results in inadequate food consumption during the summer months (Almada and McCarthy, 2017), and previous research has found that during summer months, households with children receiving NSLP more often report they do not have enough

food to eat (Huang et al. 2016). An additional study found 38 percent of participants reported that they were “unable to give their child or children a balanced meal during the summer months” (Sharkey et al. 2013).

Summer hunger can directly impact children. Children gain significantly more weight during the summer (Lane et al. 2021), and child hunger affects both mental and physical health, leading to health conditions, behavioral problems, and anxiety/depression among school-aged children (Weinreb et al. 2002).

Programs Addressing Summer Hunger

Given the various impacts of summer hunger on low-income families, there have been programs put into place to attempt to address the issue.

The Summer Electronic Benefit Transfer for Children (SEBTC) program provided additional benefits during summer months to families whose children receive school breakfast and lunch (Food and Nutrition Service USDA). Two additional programs addressing summer hunger include the Summer Food Service Program (SFSP) and the Seamless Summer Option (SSO). Both programs provide funding to serve meals and snacks to children over the summer where at least 50% of children in that geographic area are eligible to participate in free or reduced school meals. The SSO differs from the SFSP in that it is only eligible for schools, however, the SFSP is open to non-school sites including summer camps (Hayes and Fitzsimons, 2020).

Nutrition Incentive Programs

Our research will involve looking at how a fruit and vegetable incentive program affects the purchase behavior of low-income consumers. These incentive programs have been

implemented most commonly at farmers markets, despite this, there is some research on programs in supermarkets and grocery stores.

The USDA Healthy Incentives Pilot operated from 2011-2012 and gave random SNAP participants across Massachusetts who shopped at eligible grocery stores \$0.30 for every SNAP dollar they spent on targeted fruits and vegetables. The incentive was immediately credited to their SNAP card for future use and was capped at \$60 per household per month. (Food and Nutrition Service USDA). This program resulted in increased fruit and vegetable intake as well as a slight increase in fruit and vegetable expenditures (Olsho, 2016; Wilde et al. 2015).

A similar USDA pilot program called “Double Up Food Bucks” was implemented in Michigan grocery stores from 2014-2016 with varied incentive mechanisms including providing SNAP participants with a 100 percent matching subsidy on their EBT or loyalty card up to \$20 per day on eligible produce purchased or issuing gift cards to be used at a future transaction. This program also resulted in increased fruit and vegetable intake as well as an increase in fruit and vegetable spending (Parks et al. 2021; Steele-Adjogonon and Weatherspoon, 2017; Rummo et al., 2019; Noriega-Goodwin, 2019).

Smaller nutrition incentive programs have been implemented and evaluated as well. The “Health Double Study” was conducted at one supermarket in Maine and included primarily low-income participants with at least one child under 18. These participants purchased were tracked during a baseline period of no intervention and an intervention period including a same-day 50 percent off incentive on fresh, frozen, or canned fruits and vegetables up to \$10 per day. These participants were also requested but not required to participate in a “Cooking Matters” event. The incentivized shoppers had an increase in weekly spending on fresh fruits and vegetables but no change in frozen or canned produce (Moran et al. 2019; Polacsek et al. 2018).

Another smaller nutrition incentive study was implemented at a supermarket in Pennsylvania. Participants included low-income adults with at least one child and were sent gift cards that were loaded with the automatic rebate of 50 percent of the dollar amount they spent on fresh or frozen fruits and vegetables. This was a four-phase study consisting of a baseline period, an intervention period, a tapering period, and a follow-up period. During the intervention period, participants purchased more servings of fruits and vegetables per week (Phipps et al., 2015).

“SuperSNAP” was implemented at supermarkets across North Carolina. This program provided an additional \$40 per month in funds for SNAP participants to spend on fresh, frozen, or canned fruits and vegetables with no added sugar, fat, or salt. This program resulted in increased monthly purchases of fruits, vegetables, nuts, and legumes (Berkowitz et al. 2021).

Incentive programs have also been paired with restrictions on less nutritious foods. A study conducted in Minnesota recruited participants near eligible or eligible for SNAP benefits that were placed in one of four groups: a group that received a 30% financial incentive on fruits and vegetables, a group that was not allowed to purchase sugar-sweetened beverages, sweet baked goods, or candy, a group that had both incentive plus restriction, and a control group. Out of the four groups, the incentive plus restriction group had the most positive results including an increased fruit intake (Harnack et al. 2016).

One additional study compares SNAP participants in four different groups: participants who lived near an incentive-eligible sampled farmers market, participants who lived near an incentive-eligible sampled farmers market and shopped there as well, participants who lived near an incentive-eligible sampled grocery store, and participants who lived near an incentive eligible sampled grocery and shopped there as well. This study found that for those who participated in

the incentive program, there was an increase in monthly fruit and vegetable expenditures (Vericker et al. 2021).

Chapter 3

Data

The data for this study comes from a program funded through Gus Schumacher Nutrition Incentive Program (GusNIP). GusNIP is a USDA-funded project aimed at increasing the purchase of fresh fruits and vegetables (National Institute of Food and Agriculture USDA). In the state of Alabama, the program is referred to as “Double Up Food Bucks Alabama.” Alabama SNAP participants can visit one of seven eligible farmers markets or four eligible grocery stores across the state, and if they purchase any fresh fruits or vegetables, they will automatically receive a dollar-for-dollar match of up to \$20 per day to be used for the purchase of additional fresh fruits and vegetables. The incentive dollars are distributed as coupons or tokens.

For this paper, we utilize transaction-level data from one GusNIP participating grocery store. The data includes any Alabama SNAP customers that made purchases at that grocery store within the year we use for analysis. We have one year of transaction data from September 2021 to August 2022 that includes date, time, last four digits of EBT card number, total spent on SNAP, total spent on fruits and vegetables, total spent on other items, dollar value of incentive coupons issued and redeemed, and count of incentive coupons issued and redeemed.

Alabama SNAP participants are issued benefits on a day of the month that is determined by the last two digits of the EBT card number. The state of Alabama issues benefits from the 4th day of each month to the 23rd day of each month, and benefits are available for use the following day including weekends and holidays. We use information on the SNAP payment date for different EBT card numbers to match the EBT card numbers in our data with the day of benefit receipt. We quantified a SNAP cycle month as the number of days between the current month

issuance date and the next month issuance date. Therefore, one month of transactions includes any transactions that occurred after the current month's issuance date and before the next month's issuance date. Because not all households visited the grocery store often enough on a daily level, we created a weekly variable. Within each SNAP cycle month, there are four weeks. The first week includes transactions on days 0-6 after benefit receipt. The second week includes transactions on days 7-13 after benefit receipt. The third week includes transactions on days 14-20 after benefit receipt. The fourth week includes transactions on days 20-31 after benefit receipt. For example, say a household receives its benefits on the 4th day of the current month, and they make a purchase on the 3rd day of the next month. This transaction would be considered to occur in the fourth week of the current SNAP cycle month. With previous, current, and next month variables, we were able to calculate the days since their last benefit receipt.

To look at seasonal changes in purchase behavior, we defined summer transactions as any transaction that occurred between the months of June and August, and non-summer transactions as any transaction that occurred between the months of September and May. From the transaction level dataset, for each household and each month, we summed the following variables by week: total spent on SNAP, total spent on fruits and vegetables, total spent on other items, dollar value of incentive coupons issued, dollar value of incentive coupons redeemed, count of incentive coupons issued, and count of incentive coupons redeemed. Our dataset is a household-month-week level data set for analysis purposes. The final dataset includes 118,584 observations from 6,575 households.

We found that 22 percent of our household months only visited this grocery store in week four after receiving their SNAP benefits. While we recognize these observations require further investigation, we chose to restrict our sample to the remaining 78 percent of household months

who did not display this shopping pattern. After we chose to restrict our sample, the final number of observations for this sample is 91,564 household month week observations from 6,575 households.

Chapter 4

Summary Statistics

Table 1 displays summary statistics on household weekly SNAP cycle spending. As expected, based on the previous literature on the SNAP cycle, total SNAP dollars spent decreases across the weeks in a SNAP cycle month. On average, these households spend \$9.34 less in week four compared to week one after benefit receipt. In addition to total SNAP spending, fruit and vegetable spending and spending on other items also decrease across the weeks in a SNAP cycle benefit month.

Table 1
Summary Statistics Overall Weekly Spending

	Week 1	Week 2	Week 3	Week 4
Average SNAP \$ spent	36.46 (69.37)	35.05 (64.79)	33.98 (62.31)	27.12 (63.56)
Average \$ spent on fruits and vegetables	2.24 (5.68)	2.16 (5.38)	2.08 (5.21)	1.74 (5.19)
Average \$ spent of other items	35.58 (67.55)	34.32 (63.34)	33.31 (60.98)	26.56 (62.30)
Average \$ value of incentive coupons redeemed	0.20 (1.34)	0.18 (1.24)	0.19 (1.27)	0.18 (1.29)
Observations	22891	22891	22891	22891

Table 2 displays summary statistics on household weekly spending in summer vs non-summer months. Things to note include the small increase in average SNAP spent per transaction in summer months vs non-summer months. In addition to the increase in average

weekly SNAP spending, total spent on fruits and vegetables, and total spent on other items in the summer months vs the non-summer months.

Table 2
Summary Statistics Summer and Non-Summer Weekly Spending

	Non- Summer Months	Summer Months
Average SNAP \$ spent	33.11 (64.57)	33.30 (66.76)
Average \$ spent on fruits and vegetables	2.05 (5.31)	2.06 (5.53)
Average \$ spent of other items	32.37 (63.08)	32.64 (65.34)
Average \$ value of incentive coupons redeemed	0.19 (1.28)	0.19 (1.30)
Observations	67268	24296

Table 3 displays summary statistics of the same variables in Table 2 but as an average weekly proportion of total monthly spending in those categories. The weekly percentage of SNAP spending decreases by 15 percentage points from week one to week four. Across all other categories except coupon usage, there is also a decrease in the average weekly proportion of spending from week one to week four. Average weekly coupon usage increases slightly in week four suggesting that households who purchase fruits and vegetables may use the coupons as an additional means to fruit and vegetable purchases when SNAP benefits run out towards the end of the month.

Table 3
Statistics Weekly Proportions

	Week 1	Week 2	Week 3	Week 4
Weekly Proportion SNAP	0.29 (0.40)	0.29 (0.40)	0.28 (0.40)	0.14 (0.25)
Weekly Proportion Coupons Usage	0.07 (0.22)	0.06 (0.21)	0.07 (0.22)	0.08 (0.22)
Weekly Proportion F&V	0.02 (0.15)	0.02 (0.09)	0.02 (0.13)	0.01 (0.04)
Weekly Proportion Other Items	0.29 (0.55)	0.29 (0.47)	0.29 (0.58)	0.13 (0.25)
Weekly Proportion Transactions	0.29 (0.39)	0.29 (0.39)	0.29 (0.38)	0.13 (0.22)
Observations	22891	22891	22891	22891

Chapter 5

Methods

We examine the relationship between time since SNAP issuance and variables describing household spending. We focus on the five following outcomes: SNAP spending in a week, incentive coupon spending, fruit and vegetable spending, spending on other items, and the total number of SNAP transactions in a week. To account for different total SNAP spending in a month, we divide our outcomes for weekly SNAP spending, fruit and vegetable spending, and other items spending by the total SNAP spent in a month. Likewise, we divide the total number of SNAP transactions in a week by the total number of SNAP transactions in a month, and to account for different total amounts spent on fruits and vegetables over time, we divide weekly incentive coupon spending by the total amount of fruits and vegetables spent in a week.

We use the following specifications to estimate the relationship between household h 's spending in month m and week w and the time since the household's latest SNAP payment:

$$1) y_{hmw} = \alpha + \beta_1 \text{week}2_w + \beta_2 \text{week}3_w + \beta_3 \text{week}4_w + \text{summer}_m + \varepsilon_{hmw}$$
$$2) y_{hmw} = \alpha + \beta_1 \text{week}2_w + \beta_2 \text{week}3_w + \beta_3 \text{week}4_w + \text{summer}_m + \beta_4 \text{week}2_w \times \text{summer}_m + \beta_5 \text{week}3_w \times \text{summer}_m + \beta_6 \text{week}4_w \times \text{summer}_m + \varepsilon_{hmw}$$

We created two models for each of the five dependent variables for a total of ten different models. The first model for each dependent variable includes independent indicator variables

week2, *week3*, and *week4* for week two, week three, and week four of the monthly SNAP cycle, and *summer_m* as an indicator for whether the month *m* is in the summer. The second model for each dependent variable includes the independent indicator variables *week2*, *week3*, and *week4* for week two, week three, and week four of the monthly SNAP cycle, *summer_m* as a control variable for summer months, interactions between the indicator variables for each week and the summer indicator variable: *week2* × *summer*, *week3* × *summer*, *week4* × *summer*.

Chapter 6

Results

Table 4 provides regression results for the weekly proportion of total SNAP spending across the SNAP cycle month, and weekly proportion of total SNAP spending across the SNAP cycle month including summer month interaction variables. Over all months (summer and non-summer), in relation to total SNAP spending (as a proportion of monthly SNAP spending) in week one, weeks two and three have no significant change. However, in week four, there is a significant decrease in weekly SNAP spending compared to week one. The weekly proportion of total SNAP spending in week four dropped by 15.4 percentage points. Referring to Table 3, this is 53.1 percent change relative to week one. Results are similar in both summer and non-summer months. In non-summer months, there are no significant changes in spending in weeks two and three, and in week four, there is a decrease in weekly SNAP spending compared to week one. Our results follow the pattern of the SNAP cycle effect and indicate that the percentage of weekly spending across the SNAP month does not significantly differ between summer and non-summer months.

Table 4
Model 1 - Weekly SNAP Spending Summer and Non-Summer

	Weekly Proportion SNAP	Weekly Proportion SNAP
week2	0.00225 (0.60)	-0.00193 (-0.45)
week3	-0.00385 (-1.03)	-0.00484 (-1.12)
week4	-0.154*** (-49.47)	-0.150*** (-41.60)

summer	-7.42e-11 (-0.00)	-0.00164 (-0.27)
week2 × summer		0.0157 (1.84)
week3 × summer		0.00372 (0.44)
week4 × summer		-0.0129 (-1.82)
constant	0.289*** (105.49)	0.289*** (94.33)
<i>N</i>	91564	91564

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5 provides regression results for incentive coupon redemption as a proportion of weekly fruit and vegetable spending compared to week one across the SNAP cycle month, and incentive coupon redemption as a proportion of fruit and vegetable spending compared to week one across the SNAP cycle month including summer month interaction variables. These results will only include households that purchased fruits and vegetables in a particular month. Over all months (summer and non-summer), in relation to incentive coupon usage in week one, weeks two and three do not have a significant change. However, in week four, there is a small statistically-significant increase in incentive coupon usage for the purchase of fruits and vegetables. Weekly incentive coupon usage as a proportion of fruit and vegetable spending in week four increased by .009 percentage points. Referring to Table 3, this is a 13.8 percent change relative to week one. Our findings suggest that for households who purchase fruits and vegetables, they may use these incentive coupons as an additional means to purchase fruits and vegetables when SNAP benefits run out towards the end of the month.

Table 5

Model 2 - Weekly Incentive Coupon Usage Summer and Non-Summer

	Weekly Proportion Coupon Usage	Weekly Proportion Coupon Usage
week2	-0.00535 (-1.38)	-0.00634 (-1.43)
week3	-0.000330 (-0.08)	0.00133 (0.29)
week4	0.00967* (2.21)	0.0121* (2.41)
summer	0.00595 (1.77)	0.00860 (1.32)
week2 × summer		0.00360 (0.40)
week3 × summer		-0.00647 (-0.70)
week4 × summer		-0.0101 (-0.99)
constant	0.0672*** (23.01)	0.0666*** (20.63)
<i>N</i>	22509	22509

t statistics in parentheses* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6 provides regression results for weekly fruit and vegetable spending as a proportion of total monthly SNAP spending across the SNAP cycle month, and weekly fruit and vegetable spending as a proportion of total monthly SNAP spending across the SNAP cycle month including summer month interaction variables. Over all months (summer and non-summer), in relation to week one, there is no significant change in fruit and vegetable spending in weeks two and three. However, in week four, there is a significant decrease in fruit and

vegetable spending. Fruit and vegetable spending as weekly percentage total SNAP spending in week four dropped by 1.3 percentage points. Referring to Table 3, this is a 68 percent change relative to week one. The second column of Table 6 shows that, in non-summer months, the change in spending is marginally significant and decreases in week two and continues to decrease into week four. These results align similarly with our previous results and indicate that fruit and vegetable spending also follows the pattern of the SNAP cycle.

Table 6

Model 3 - Weekly Fruit and Vegetable Spending Summer and Non-Summer

	Weekly Proportion F&V	Weekly Proportion F&V
week2	-0.00196 (-1.68)	-0.00268* (-2.10)
week3	-0.00153 (-1.14)	-0.000919 (-0.57)
week4	-0.0136*** (-12.99)	-0.0132*** (-11.04)
summer	0.000327 (0.39)	0.000644 (0.27)
week2 × summer		0.00269 (0.92)
week3 × summer		-0.00230 (-0.81)
week4 × summer		-0.00166 (-0.67)
constant	0.0238*** (23.14)	0.0237*** (20.53)
<i>N</i>	91564	91564

t statistics in parentheses
 * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7 provides regression results for weekly spending on other items as a proportion of total SNAP spending across the SNAP cycle month, and weekly spending on other items as a proportion of total SNAP spending across the SNAP cycle month including summer month interaction variables. Over all months (summer and non-summer), in relation to week one, weeks two and three have no significant change. However, in week four there is a significant decrease in weekly spending on other items compared to week one. Spending on other items as a weekly proportion of total SNAP spending in week four dropped by 15.6 percentage points. Referring to Table 3, this is a 53.7 percent change relative to week one. In summer months, relative to week one, there is a slight increase in the proportion of spending on other items in week two, however, it then decreases into week four. Our results align with the patterns of the SNAP cycle and indicate that the proportions of weekly spending on other items across the SNAP cycle month may slightly differ between summer and non-summer months.

Table 7

Model 4 - Weekly Spending on Other Items Summer and Non-Summer

	Weekly Proportion Other Items	Weekly Proportion Other Items
week2	0.00258 (0.54)	-0.00274 (-0.47)
week3	0.00105 (0.20)	-0.00102 (-0.16)
week4	-0.156*** (-39.31)	-0.155*** (-31.56)
summer	-0.00205 (-0.62)	-0.00765 (-1.08)
week2 × summer		0.0200*

		(2.03)
week3 × summer		0.00782 (0.73)
week4 × summer		-0.00546 (-0.68)
constant	0.290*** (75.49)	0.291*** (64.70)
<i>N</i>	91564	91564

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8 provides regression results for the weekly transactions as a proportion of total monthly transactions, and weekly transactions as a proportion of total monthly transactions including summer month interaction variables. Over all months (summer and non-summer), in relation to week one, week two and week three have no significant change in the number of transactions. However, in week four, there is a statistically-significant decrease in the proportion of weekly transactions. The weekly transactions as a proportion of total monthly transactions in week four dropped by 15.6 percentage points. Referring to Table 3, this is a 53.7 percent change relative to week one. In the summer months, relative to week one, there is a slight increase in the proportion of weekly transactions during week two, however, it then decreases into week four. Our results broadly align with the patterns of the SNAP cycle and indicate that the proportions of weekly transactions across the SNAP cycle month may slightly differ between summer and non-summer months.

Table 8

Model 5 - Weekly Transactions Summer and Non-Summer

	Weekly Proportion Transactions	Weekly Proportion Transactions
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week2	0.00434 (1.20)	-0.000993 (-0.24)
week3	-0.00129 (-0.36)	-0.00264 (-0.63)
week4	-0.156*** (-53.26)	-0.153*** (-45.06)
summer	-1.93e-10 (-0.00)	-0.00367 (-0.62)
week2 × summer		0.0201* (2.42)
week3 × summer		0.00508 (0.62)
week4 × summer		-0.0105 (-1.57)
constant	0.288*** (109.00)	0.289*** (97.64)
<i>N</i>	91564	91564

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Chapter 7

Conclusion

The first question our research answers is how SNAP spending and incentive coupon use change over the month. We find that overall, in the three spending outcomes we examined, there is a decrease in low-income household spending across the SNAP cycle month. While the decrease is more gradual in week two and week three of the SNAP cycle month, week four shows a steep decline. Our findings align with previous literature that documents how low-income consumers tend to spend their benefits soon after receiving payments. The fourth outcome we examine is the number of weekly transactions as a total of monthly transactions. Similar to spending across the month, transactions also declined across the SNAP cycle month. There was a gradual decrease in week two and week three, and a steep decline in week four. The fifth outcome we examined was nutrition incentive coupon spending as a percentage of fruit and vegetable purchases. We find that nutrition incentive coupon use increases at the end of the SNAP cycle month. This suggests that low-income consumers who purchase fruits and vegetables may be using the incentive coupons as a supplement to purchase fruits and vegetables when SNAP benefits run out towards the end of the month.

The second question our research answers is how summer influences SNAP spending and nutrition incentive coupon use over the month. Interestingly, across all outcomes examined, our results indicate very little differences between summer and non-summer months.

Our analysis has some limitations. We do not have any demographic data on participants. Our data only includes SNAP transactions and does not account for spending with other tenders such as cash, check, credit card, and debit card. We also do not have the household's total food

expenditures. Our data is from one grocery store in Alabama and does not include the full spending profile of the household. Therefore, we do not observe what a household spends at other stores. In addition, during our period, SNAP Emergency Allotment payments and P-EBT payments were still being disbursed, which could have influenced how the SNAP payment schedule impacted household spending.

Continuing to evaluate and make improvements to SNAP is important as low-income households' behavior will always be adapting to the economy and require different needs. Our research highlights the already-established cyclical spending habits of low-income households. However, in addition to this finding, we see there is little difference between these habits during summer and non-summer months. This suggests that among our sample, SNAP cycle is not changed by having children at home over the summer. Further investigation is needed into whether this is a general finding or is specific to our sample. In addition, more work is needed to understand the behavior of the consumers who only shop at this store at the end of the SNAP month. Policy implications of our research include changes to the SNAP disbursement schedule, such as making smaller disbursements of benefits across the month instead of a lump-sum disbursement once a month.

Since nutrition incentive programs are relatively new in policy, evaluating them will be important for future policy decisions. Our research found that for households who purchase fruits and vegetables, they will use nutrition incentive coupons to supplement their purchases towards the end of the SNAP cycle month. This is important as it helps maintain the consistency and quantity of households' fruit and vegetable purchases in the presence of the SNAP cycle. The use of incentives compared to overall spending is still very small. Because these programs are new, policy implications include increasing consumer awareness of nutrition incentive programs and

offering educational opportunities on the purchase of healthy foods. Additionally, these programs can be used to help smooth consumption across the month.

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Appendix 1

Summary Statistics Weekly Proportions Non-Summer

	Week 1	Week 2	Week 3	Week 4
Weekly Proportion SNAP	0.29	0.29	0.28	0.14
	(0.40)	(0.39)	(0.39)	(0.25)
Weekly Proportion Coupons Usage	0.02	0.02	0.02	0.01
	(0.15)	(0.07)	(0.15)	(0.04)
Weekly Proportion F&V	0.07	0.06	0.07	0.08
	(0.22)	(0.20)	(0.21)	(0.23)
Weekly Proportion Other Items	0.29	0.29	0.29	0.14
	(0.58)	(0.47)	(0.61)	(0.25)
Weekly Proportion Transactions	0.29	0.29	0.29	0.14
	(0.38)	(0.38)	(0.38)	(0.22)
Observations	16817	16817	16817	16817

Appendix 2

Summary Statistics Weekly Proportions Summer

	Week 1	Week 2	Week 3	Week 4
Weekly Proportion SNAP	0.29	0.30	0.29	0.12
	(0.41)	(0.41)	(0.40)	(0.24)
Weekly Proportion Coupons Usage	0.02	0.02	0.02	0.01
	(0.16)	(0.12)	(0.08)	(0.03)
Weekly Proportion F&V	0.08	0.07	0.07	0.08
	(0.22)	(0.22)	(0.22)	(0.22)
Weekly Proportion Other Items	0.28	0.30	0.29	0.12
	(0.43)	(0.45)	(0.50)	(0.25)
Weekly Proportion Transactions	0.29	0.30	0.29	0.12
	(0.40)	(0.40)	(0.39)	(0.21)
Observations	6074	6074	6074	6074

Appendix 3

ALABAMA'S EBT ISSUANCE SCHEDULE

FOOD ASSISTANCE (SNAP)

Ongoing monthly Supplemental Nutrition Assistance Program (SNAP) benefits are issued over a span of 20 days each month based on the last two digits of the case number starting with the date of the 4th and ending with the 23rd. *

LAST TWO DIGITS	CALENDAR DATE
00-04	4 th
05-09	5 th
10-14	6 th
15-19	7 th
20-24	8 th
25-29	9 th
30-34	10 th
35-39	11 th
40-44	12 th
45-49	13 th
50-54	14 th
55-59	15 th
60-64	16 th
65-69	17 th
70-74	18 th
75-79	19 th
80-84	20 th
85-89	21 st
90-94	22 nd
95-99	23 rd

- Monthly – SNAP benefits are available the same calendar date each month.
- Daily – SNAP benefits are available the next day after they are entered in the system if the benefit is for the past month or the current month.
- Residents of Drug and Alcohol Treatment Centers – Special issuance provisions are used for these SNAP benefits. One half of the regular monthly allotment is available on the 4th of the month and the remaining one half of the allotment is available on the 16th of the month.

Note: *This change is effective beginning September 2013.