Food Stamps: The Impact on Consumer Expenditure Behavior

Bryan Schlotterbeck
Drake University

ABSTRACT

The Supplemental Nutrition Assistance Program (SNAP), also known as food stamps, is one of the largest and most important federal assistance programs provided by the United States government. The purpose of the program is to promote proper nutrition for low-income consumers. This paper analyzes the effect of SNAP benefits on consumer spending behavior. Using survey data on food expenditures from 2012-2014, regressions were run on how receiving SNAP benefits impacted average weekly expenditures for different categories of food. The results indicate that SNAP-receiving households spend less on total food per week compared to non-recipients. In addition, SNAP benefits correlated with higher expenditures on unhealthy food, with inconclusive evidence on how the benefits impacted spending on healthy foods. This indicates that the purpose of SNAP is not being fulfilled as intended.

Subjects: Economics, Marketing

INTRODUCTION

The Supplemental Nutrition Assistance Program (SNAP) is a federal program in the United States that provides nutrition benefits for low-income households. The program is managed by the United States Department of Agriculture (USDA) underneath the umbrella of USDA's Food and Nutrition Service (FNS). The benefits provided by SNAP are known as "food stamps." Food stamps are monetary assistance issued monthly onto a physical electronic benefits transfer (EBT) card. These cards resemble debit cards and are used at approved stores and markets to purchase specific food items. SNAP is the largest federal nutrition assistance program in the United States. According to Gray and Kochhar (2015), a monthly average of 46.5 million people utilized SNAP benefits in 2014, with $70 billion of benefits distributed for the entire year.

The purpose of SNAP, as expressed on the USDA website is "to supplement the food budget of needy families so they can purchase healthy food and move towards self-sufficiency." The phrase "healthy food" from this description is the analytical target of this research paper. To prevent misuse of the federal benefits, the USDA specifies the types of products that households can purchase with the allotted funds. The eligible products include fruits and vegetables; meat, poultry, and fish; dairy products; breads and cereals; other foods such as snack foods and non-alcoholic beverages; and seeds and plants that produce food to eat. The USDA further identifies several items that cannot be bought with SNAP funds. These include beer, wine, liquor, cigarettes, tobacco, vitamins, medicines, supplements, live animals, foods that are hot at the point of sale, and any nonfood items (pet foods, household supplies, hygiene items, etc.). It is obvious that these prohibited items are either inedible or have no evident health benefits. However, there are some apparent imperfections within the eligible items. For example, SNAP benefits can be utilized to purchase candy, soda pop, doughnuts, and other items with very limited health qualities. Overall, the USDA clearly defines the boundaries upon which SNAP benefits can be used.

Retailers that have been approved for SNAP use are required to enforce these defined boundaries. However, these approved retailers cannot control the individual purchasing behavior of consumers. Gray and Kochhar (2015) state that the average monthly SNAP benefit in 2014 was $257 per household. This means that participating low-income households had a notably larger amount of funds to appropriate towards food than their non-participating counterparts. Therefore, SNAP benefits could be viewed as extra disposable income in the sense that they could be used to supplant the usual food budget of recipients. This new allocation would free up money to be spent elsewhere.

If the purpose of SNAP was perfectly fulfilled, food stamps would append to the monthly food budget of the receiving household, effectively increasing purchases of nutritional food and drink items. This paper attempts to determine if this idea is expressed in reality. Utilizing consumer expenditure data allows for an analysis on the spending habits of SNAP participants. Does receiving SNAP benefits increase total food expenditures? Does SNAP increase expenditures on healthy or nonhealthy items? The answer to these questions is essential to understanding the behavior of low-income consumers. Results from this analysis could have important implications for updating SNAP and government policy.

By utilizing expenditure data, this paper is focused on analyzing the effects of SNAP receipt on a consumer's weekly purchases. Examining SNAP effects on expenditures for specific food items is a major focus in this study. The inclusion of other seemingly unrelated data, such as household size and composition, is for the purpose of further determining predicting factors for trends in food expenditures. Taking a somewhat naïve approach, it is hypothesized that receiving SNAP benefits will result in higher expenditures on appropriate food items. SNAP-receiving households should have higher consumption of SNAP-eligible food items and less consumption of alcoholic beverages and non-store food. It is predicted that SNAP households with more members correlate to higher overall expenditures on food items. In addition, households with more children are expected to spend more money on sweets (sugar, candy, gum, syrup).

In the next section, previous research and literature is explained and connected. The third section describes the data used in this analysis. The fourth section illustrates the methods taken to find the results of the analysis. The fifth section reports the results from the regressions used in the analysis. The sixth and final section concludes the paper by explaining the significance of the results on the research questions identified.

LITERATURE REVIEW

Significant research has been conducted on the topic of how SNAP benefits are utilized. The question of how SNAP affects consumer behavior has been asked by numerous studies since the inception of the program. In addition, various approaches have been taken to answer this question. Some of the results of these studies are contradictory to each other.

The study conducted by Hoynes et al. (2014) most resembles the approach taken by this paper. Hoynes et al. (2014) use the CES to analyze consumption patterns by SNAP-receiving households. The authors use the neoclassical model as a basis to compare their results with. The neoclassical theory states that the presence of SNAP benefits serves as an increase in disposable income, shifting the budget constraint outward. This leads recipient households to spend more on normal goods, including both food and non-food items. Hoynes et al. (2014) find that the spending habits of a substantial number of SNAP-eligible households can be defined as infra-marginal. This means that SNAP benefits will increase food spending by the same amount as an increase in cash would. These results indicate that consumers act according to the neoclassical model by treating cash and SNAP benefits similarly. These conclusions have serious

policy implications. However, the results from Hoynes et al. (2014) are disputed by several other researchers.

Hastings and Shapiro (2018) utilize panel data of transaction records for a large grocery retailer to study the effect of SNAP benefits on behavior. Three approaches were taken by Hastings and Shapiro (2018): an event-study approach, an instrumental variable approach, and a difference-in-differences approach. Hastings and Shapiro (2018) were especially interested in determining the fungibility of SNAP benefits. If SNAP is treated as fungible, then households would treat program funds the same as cash. This idea is the same as the neoclassical model described by Hoynes et al. (2014). Hastings and Shapiro (2018) acknowledge the neoclassical theory, but instead hypothesize that households treat SNAP benefits as non-fungible and belonging to a separate mental account. The theory of mental accounting suggests that income is treated differently based on its source. Using their event-study analysis Hastings and Shapiro (2018) find that the marginal propensity to consume SNAP-eligible food (MPCF) is between 0.5 and 0.6 – greater than the MPCF for cash. These results are supported by the instrumental-variables and difference-in-differences results. This indicates that households do view SNAP benefits as non-fungible, confirming the authors' hypothesis.

An event-study is also utilized by Harris (2019). Similar to Hastings and Shapiro (2018), Harris (2019) uses retail panel data to look at consumption before and after SNAP adoption. However, Harris (2019) specifically analyzes the trends in purchases for specific products. Her results indicate that overall expenditures increased after SNAP adoption. Specifically, SNAP-eligible products such as meat, oil, and prepared foods experienced higher expenditures. One aspect of the research that Harris (2019) conducted that directly relates to this paper is the effect of SNAP benefits on alcohol expenditures. If SNAP leads to more overall consumption, then there's a possibility that program benefits could free up more money to spend on unhealthy items. However, Harris (2019) finds no significant evidence that SNAP benefits are utilized to subsidize alcohol (or tobacco) purchases, since there were scarce changes in consumption after SNAP adoption.

Some studies have considered the behavior of SNAP recipients using more holistic approaches. Garasky et al. (2016) compare food items purchased by SNAP households with food items purchased by non-SNAP households. Using point-of-sale data from a leading grocery store, the authors find no serious deviation in purchases between SNAP and non-SNAP households. In fact, the top item categories by expenditures are the same for both groups of consumers, just in a different order. SNAP households and non-SNAP households both spend the most money on the meat/poultry/seafood category. Interestingly, when narrowing expenditures down to specific commodities, Garasky et al. (2016) find that SNAP households spend the most on soft drinks. This indicates that SNAP benefits, while being used on eligible items, are not exactly useful in promoting the health and nutrition of consumers.

The effect of SNAP benefits on different facets of consumer behavior is a topic of consistent research. As observed, studies have come to various conclusions regarding how SNAP impacts expenditures of both food and non-food items. This paper utilizes many of the ideas from previous literature. However, the purpose of this research is to add knowledge regarding how SNAP eligibility and adoption impact specific food purchases, both healthy and unhealthy. In addition, by analyzing to a greater extent how household composition impacts expenditures, the hope is to contribute some new findings to the already thorough and expanding research on SNAP and spending.

DATA

The main research question is what the effect of receiving food stamps has on the average weekly food expenditures of consumers. The data being used to address this question comes from the Consumer Expenditure Survey (CES). This is a cross-sectional data set that was collected via household surveys conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics. To best apply this data to the research equation, the CES from the years 2012 through 2014 are used. Before 2014, personal tax information was collected based on self-report. After 2014, income taxes were calculated using the National Bureau of Economic Research's TaxSim program. Therefore, the data after 2014 is not compatible with prior data since the CES calculates income after taxes based off reported tax information. This means that the income after taxes variable is not included in surveys after 2014.

Two separate surveys make up the CES, the Interview Survey and the Diary Survey. For this research, only the Diary Survey is utilized because this data is focused on micro-purchases at high frequencies, including food. Within the Diary Survey there are five different files, but the FMLD is the one chosen for this study. It includes summary expenditures and income and is separated into four "quarterly" files. The Diary Survey fits the research question very well because the data set includes variables on income, food stamp recipients, and weekly food purchases.

The unit of observation is known as a consumer unit (CU). A CU consists of either the related members of a household, a person living alone (regardless of nature of residence) who is financially independent, or two or more people living together who share expenditures. After combining the twelve files (3 years separated into 4 quarters) there were a total of 39,401 observations.

The data had to be transformed in multiple ways to reach the point when the analysis could begin. First, observations from the states of Hawaii and Alaska were deleted since their poverty thresholds for SNAP eligibility are unique compared to the other forty-eight states and the District of Columbia. New variables were created indicating whether the CU was eligible for SNAP benefits based on whether the CU's income after taxes was at or below a certain federal threshold. The procedure and criteria for determining SNAP eligibility can be found in the Appendix. There were 1,956 observations that were predicted to not be eligible for food stamps, but still received them. This is most likely due to misreporting and inaccuracies within the survey responses. These observations were ultimately not included in the models, for fear they may skew the results.[1]

The purpose of this research is to study the spending behaviors of low-income people, specifically those with access to food stamps. So, the control group are those with low enough income that they are eligible for SNAP but did not apply for it. This allows the control group and treatment group to be similar. Next, all observations that had missing responses for whether their CU had received food stamps in the past year were dropped. Finally, observations that had negative values for income before and after taxes were deleted. The CES records each CU's purchases for two weeks. These were averaged for the analysis. After all these adjustments, the dataset consisted of 5,182 observations, with 974 eligible CUs who received food stamps and 4,208 eligible CUs that did not receive food stamps. The averages of processed and fresh fruit were combined, and the averages of processed and fresh vegetables were combined. This provided a better view of total fruit and vegetable purchases.

As evidenced by Table 1, several important variables are utilized in this study. The SNAP dummy variable is controlled for eligibility, so there is no need to include a separate variable indicating whether the CU could receive food stamps. In addition, the last eight variables in the table are the ones to be analyzed. They each represent a weekly average expenditure on a certain type of product. The summary

---

[1] Similar analyses were completed on a sample including this group. The tables with results from these models and the summary statistics of that sample are in the Appendix.

	Definition	Formula
SNAP	If a CU member has received food stamps in the past year	1=recipients, 0=nonrecipients
Net Income	Annual income after taxes	
Family	Number of CU members	
Children	Number of CU members less than 18 years old	
Seniors	Number of CU members greater than 64 years old	
Fruit	Average weekly expenditures on fresh and processed fruit	Weekly fresh fruit expenditures + Weekly processed fruit expenditures
Vegetables	Average weekly expenditure on fresh and processed vegetables	Weekly fresh vegetable expenditures + Weekly processed vegetable expenditures
Non-Store Food	Average weekly expenditures on food bought away from home/meals	
Store Food	Average weekly expenditures on food bought at a grocery store or prepared by CU	
Total Food	Average total weekly expenditures on food	Non-Store Food + Store Food
Baked Goods	Average weekly expenditures on baked goods	
Alcohol	Average weekly expenditures on alcoholic beverages	
Sweets	Average weekly expenditures on sweet foods (candy, syrups, icing)	

Source: Consumer Expenditure Survey; Diary; 2012, 2013, 2014

CU = Consumer Unit

Table 1: Variable definitions.

statistics of these variables are in Table 2. Most standard deviations are greater than the respective variable's mean. Several of the mean values are lower than expected. For example, an average net income of $4,494.44 seems small, even for a sample of only low-income consumers. The mean weekly expenditures on fruit and vegetables are $5.04 and $4.96, respectively. These are lower than expected and does not show much variation from the mean weekly expenditures on baked goods and alcohol. So, the average CU is not spending much differently on healthy and non-healthy items per week. The mean family size is 2.336, which is reasonable. The mean values for the number of children and seniors within the CU are also realistic. Based on the ranges, there are outliers for certain variables. For example, the maximum average spending on alcohol per week is $245.50, which is very high. A similar inconsistency is found for the average weekly expenditures on non-store food, store food, and total food. The maximum amounts for these variables are all very high for weekly purchases, considering the income levels. There could be some extenuating factors that are causing this, such as events that included food during that week of the survey. The high maximums could also be the result of misreporting.

	Number of observations	Mean	Standard deviation	Minimum	Maximum
SNAP	5,182	0.188	0.391	0	1
Net Income	5,182	$4,494.44	$6,803.77	$0	$45,865
Family	5,182	2.336	1.550	1	14
Children	5,182	0.595	1.130	0	10
Seniors	5,182	0.368	0.633	0	3
Fruit	5,182	$5.04	$7.62	$0	$82.15
Vegetables	5,182	$4.96	$7.36	$0	$62.88
Non-Store Food	5,182	$23.50	$44.38	$0	$844.50
Store Food	5,182	$51.94	$63.57	$0	$689.00
Total Food	5,182	$75.43	$89.03	$0	$1,394.50
Baked Goods	5,182	$4.61	$6.89	$0	$86.53
Alcohol	5,182	$3.14	$12.51	$0	$254.50
Sweets	5,182	$1.80	$3.58	$0	$62.18

Source: Consumer Expenditure Survey; Diary; 2012, 2013, 2014

Table 2: Descriptive statistics.

METHODOLOGY

To get a better picture of the expenditures of the low-income population, several different equations are estimated. The outcome to be measured is food and drink expenditures. The dependent variables, measured weekly, are average fruit expenditures, average vegetable expenditures, average expenditures on alcohol, average expenditures on baked goods, average expenditures away from home, average expenditures at grocery stores, average total expenditures, and average expenditures on sweets. By having multiple different models with different outcome variables, it should provide a more holistic view on the kinds of purchases being made. The treatment variable in this study is whether someone in the CU has received food stamps in the past year, after controlling for eligibility. The control variables are income after taxes, family size, the number of CU members below the age of 18, and the number of CU members aged 64 or older.

Below is the regression model to be tested, with *Expenditures* serving as a representation for each individual expenditure variable.

Expenditures = β_0 + β_1 SNAP + β_2 Net Income + β_3 Family + β_4 Children + β_5 Seniors

There is no certainty that the estimates from these equations will have a causal interpretation. The purpose of this study is to find the effect that access to SNAP benefits has on the purchases of food and drink items. There are several opportunities for error. The CES is a survey - the data is self-reported by participants. So, there will always be risks associated with this. Certain variables could be misreported by survey participants from either dishonesty or lack of recollection. The control group is limited to those that were eligible for SNAP but did not receive benefits. However, there is uncertainty as to why this group did not receive SNAP funds. Since the data does not originate from a randomized trial, there could be other unobserved factors that differentiate the treatment group and control group. In addition, there could be omitted variable bias from the omission of certain control variables from the models. One such variable is vehicle access. It is possible that a CU with regular vehicle access would have more mobility to find stores that sell healthy food, such as fresh fruits and vegetables. Alternatively, it is possible that a

lack of vehicle access could have the opposite effect, while also preventing easy access to food away from home (i.e., eating out).

RESULTS

The regressions from the previous section yielded results that have been expressed in two separate tables. Table 3 contains the estimates of the effect of SNAP benefits on general categories of food expenditures. The results are separated by whether they refer to total food expenditures, away from home food expenditures, and in-store food expenditures. Each column represents a different equation. As expressed in Table 3, net income, family size, number of children, and number of seniors have all been controlled for in each equation. The number of observations indicates that these regressions were calculated with a sample that was also controlled for SNAP eligibility.

Most estimates in Table 3 are statistically significant, and there is a relatively even split between positive and negative coefficients. Column (1) shows a statistically significant negative effect of SNAP benefits on the average of total weekly food expenditures. In fact, those who received SNAP benefits spent about $5.58 less on average per week than those who did not receive benefits. This result contrasts with the original prediction of this paper, which was that SNAP benefits would be treated as fungible with cash and increase overall expenditures. There is also a statistically significant negative effect of SNAP benefits on non-store food expenditures as shown in Column (2). Those who received SNAP benefits spent, on average, $12.29 less on food away from home (non-store) per week than those who did not receive benefits. However, this result was expected since SNAP benefits are not permitted to be used on most cooked, ready-to-eat foods that are purchased at restaurants or other similar locations. In Column (3), SNAP benefits have a statistically significant effect on average weekly store food purchases. A CU that received SNAP benefits spent about $6.71 more on average weekly store food purchases than a CU without SNAP funds. This result was also expected since SNAP benefits can only be utilized in grocery stores and certain farmers markets.

	(1)	**(2)**	**(3)**
	Total	**Non-Store**	**Store**
SNAP	-5.582*	-12.291*	6.709*
	(2.721)	(1.374)	(2.131)
Net Income	0.0013*	0.0003*	0.001*
	(0.00022)	(0.00011)	(0.00016)
Family	24.648*	7.420*	17.228*
	(1.950)	(0.986)	(1.346)
Children	-13.328*	-5.843*	-7.486*
	(2.616)	(1.257)	(1.900)
Seniors	-3.406	-3.018*	-0.388
	(2.025)	(1.086)	(1.387)
Adjusted R-square	0.119	0.036	0.147
Number of observations	5,182	5,182	5,182

Notes: Dependent variable is average weekly food expenditures. Standard errors robust to heteroskedasticity are shown in parentheses. Asterisks (*) are used to indicate estimates that are statistically significant at $\alpha = 0.05$.

Table 3: Estimates of the effect of SNAP benefits on average weekly food expenditures.

When viewing the estimates for the control variables in Table 3, there is not much variation from expectations. The results show that net income and family size have statistically significant positive effects on average total food, non-store food, and store food expenditures per week. The addition of one member to the CU increases average total food expenditures by $24.65 per week. The coefficients for children and seniors are all negative, indicating that expenditures decrease, which makes sense because children and elderly persons usually require less food for subsistence.

The results from the rest of the regression equations are presented in Table 4. Each column in the table represents a different regression on a different dependent variable, separated by specific food categories. In Column (1), the results from the regression measuring the effects of SNAP benefits on average weekly fruit expenditures are given. Interestingly, this estimate is negative, indicating lower fruit expenditures for SNAP recipients compared to those without SNAP benefits. In fact, SNAP recipients are spending an average of $0.23 less on fruit than non-recipients. However, the effect is not statistically significant. A 95% confidence interval indicates that SNAP benefits translate to somewhere between a $0.78 decrease or $0.31 increase in fruit expenditures. Similarly, the effect of SNAP adoption on vegetable purchases shown in Column (2) is not statistically significant at the 95% level either. This estimate is positive, though, with SNAP benefits resulting in approximately $0.26 more spent per week on vegetables on average. The confidence interval places vegetable expenditures between decreasing by $0.26 or increasing by $0.78 if the CU received SNAP.

	(1)	(2)	(3)	(4)	(5)
	Fruit	Vegetables	Sweets	Baked Goods	Alcohol
SNAP	-0.233	0.262	0.307*	0.475	-1.296*
	(0.278)	(0.264)	(0.135)	(0.256)	(0.370)
Net Income	0.00008*	0.00009*	0.00003*	0.00007*	0.00003
	(0.00002)	(0.00002)	(0.00001)	(0.00002)	(0.00003)
Family	1.591*	1.711*	0.547*	1.320*	1.105*
	(0.151)	(0.149)	(0.067)	(0.141)	(0.317)
Children	-0.596*	-0.834*	-0.237*	-0.402	-1.568*
	(0.221)	(0.209)	(0.103)	(0.208)	(0.401)
Seniors	0.208	0.210	0.094	0.150	-0.793*
	(0.167)	(0.175)	(0.087)	(0.157)	(0.334)
Adjusted R-square	0.081	0.093	0.049	0.083	0.008
Number of observations	5,182	5,182	5,182	5,182	5,182

Notes: Dependent variable is average weekly food expenditures. Standard errors robust to heteroskedasticity are shown in parentheses. Asterisks (*) are used to indicate estimates that are statistically significant at $\alpha = 0.05$.

Table 4: Estimates of the effect of SNAP benefits on specific food expenditures.

For fruit and vegetable purchases, there was an expectation that SNAP would increase average weekly expenditures by at least one dollar. Most families may only go grocery shopping once or twice every week. However, fruits and vegetables are key aspects of a healthy and fulfilling diet. Having extra funds from SNAP to spend on expensive healthy items was assumed to have a significant impact on weekly fruit and vegetable expenditures. The results from the regressions on fruit and vegetable expenditures seem to contradict this expectation. The coefficients indicate that SNAP-recipients are spending less on

fruit and only a small amount more on vegetables. However, both estimates were statistically insignificant. In addition, the confidence intervals for both variables are quite wide when compared to the estimates. This means that the coefficients are imprecise. However, there is still 95% confidence that fruit expenditures do not increase by more than $0.31 per week for SNAP-recipients. There is also 95% confidence SNAP-receipt will only increase vegetable expenditures by $0.78. Therefore, the confidence intervals both provide some evidence that expenditures on neither fruit nor vegetables will increase by one dollar for households with SNAP benefits.

Also included in Table 4 are results from regressions determining the impact of SNAP benefits on goods usually considered to be unhealthy. Column (3) shows that households that reported receiving SNAP benefits spent an average of approximately $0.31 more on sweets per week. This result was statistically significant at the 95% level. In Column (4), a similar regression with baked goods as the dependent variable produced an estimate of 0.475, meaning an average increase of $0.48 spent per week on baked goods for SNAP recipients. However, this result is not statistically significant, with a large standard error relative to the coefficient. In Column (5), the results indicate that there is a decrease in average weekly alcohol expenditures of approximately $1.30 for SNAP recipients, compared to non-recipients. This estimate is statistically significant. The results from Column (3) and Column (4) indicate that a CU that has received SNAP benefits is more likely to spend more money on sweets and baked goods, two categories of food that are usually considered unhealthy. Since these items are eligible food items for SNAP usage, these results are not completely unexpected. Alcohol expenditures, on the other hand, decreased for SNAP-households, which should be expected, since alcohol is ineligible for purchase by program benefits.

Like Table 3, most of the estimates for the control variables in Table 4 follow expected patterns. There are statistically significant positive effects of net income on expenditures for all categories. Contrary to the neoclassical model, which suggests that any increase in disposable income leads to higher expenditures, the effect of income on alcohol has a positive coefficient, while the effect of SNAP on alcohol is negative. The effects for household size also resemble Table 3, albeit much smaller. Coefficients for the children variable are all negative and statistically significant, with the highest effect occurring on alcohol expenditures. These results were expected because, as previously stated, children eat less, and they cannot legally drink alcohol. However, a surprising result is a negative, statistically significant estimate for children in the regression on sweets. It was assumed that more children in a household would lead to a positive correlation on sweet food item expenditures. However, the results indicate this is not the case. Finally, based on Table 4, having elderly members of a CU leads to higher average weekly expenditures on fruit, vegetables, sweets, and baked goods. However, these results are not statistically significant. The only statistically significant estimate for seniors is for average alcohol expenditures, which decrease by approximately $0.79 per week. This indicates that a high prevalence of elderly people within a CU lead to less alcohol consumption.

CONCLUSIONS

SNAP is a program that impacts the everyday decisions of millions of Americans. The addition of SNAP funds can significantly increase the spending power of low-income consumers. The purpose of this study was to analyze the impacts of SNAP benefits on both total food expenditures and expenditures on specific food and drink categories. Utilizing an approach that combines that of Hoynes et al. (2014) and Garaksy et al. (2016), this paper attempts to find how consumers decide to spend their money on certain products

and in specific locations. The approach taken in this paper is compatible with both the neoclassical model and the idea of mental accounting, as expressed in Hastings and Shapiro (2018). While there is inspiration taken from previous literature, this paper does take a different approach. The control group in this study was constructed to only include CUs that should have been eligible for SNAP benefits. This is a significant contribution to existing research. It must be noted, however, the results may not have a causal interpretation because there is no information as to why the control group did not receive SNAP benefits.

It was hypothesized that SNAP-recipients would treat program benefits as cash, and total spending would increase. In addition, it was assumed that when given the choice of what to use SNAP benefits to purchase, consumers would primarily choose substantially healthy foods such as fruit and vegetables. This would serve as an indication that the purpose of SNAP to provide nutritional benefits to low-income consumers was being fulfilled.

Using consumer expenditure survey data from several years, regressions were run on average weekly expenditure totals for food and drink categories. The results shown in Table 3 and Table 4 met most of the assumptions of basic demand theory. For example, children eat less, so their estimates are negative, and as family size increases, so does food expenditures. However, several of the results most pertinent to this paper did not calculate as expected. Total average weekly expenditures decreased for those households that received SNAP benefits, compared to those that did not. There was no statistically significant effect of SNAP benefits on average weekly expenditures for fruits or vegetables. On the other hand, SNAP-receiving households had higher average weekly expenditures on sweets and baked goods, with the sweets estimate being statistically significant. One crucial assumption that was confirmed by the results was a decrease in average weekly alcohol expenditures for SNAP-households.

While this study was not tied to the neoclassical model, it did provide some evidence to contradict it. The neoclassical theory would predict the coefficients for SNAP recipients and net income would have the same sign. This study finds that in the regressions for total food spending, non-store food spending, fruit spending, and alcohol spending the coefficients for SNAP were negative, while the coefficients for net income were positive. In addition, the fact that total food expenditures decreased provides some contradictory evidence to the neoclassical model. The estimates indicate that consumers treat SNAP benefits as non-fungible, mimicking the conclusion from Hastings and Shapiro (2018). Instead of viewing SNAP funds as another form of disposable income, consumers seem to utilize the funds differently than they would with cash. This suggests that consumers are engaging in mental accounting. However, a more comprehensive study should be conducted to determine if this effect is true. The sample used in this study was relatively small compared to samples used in previous research. Plus, as expressed in Table 3, in-store spending did increase for SNAP households, which was expected. However, the decrease in non-store food expenditures implies that consumers decide to save money from other income sources after receiving SNAP benefits. More research should be conducted to find if SNAP-adoption result in expenditures on non-food items increasing.

Interpreting the results from Table 4 on specific food category expenditures gives an idea of the efficacy of SNAP. Based on the estimates, SNAP-adoption had minimal, if any, positive impact on the food consumption choices of low-income consumers. A small statistically insignificant decrease in average weekly fruit expenditures and a small statistically insignificant increase in average weekly vegetable expenditures proved inconclusive to determining if SNAP promotes health benefits. When viewing the confidence intervals for the estimates, though, the evidence points to neither increasing by more than $0.80. On the contrary, there is evidence to suggest that SNAP-recipients, on average, spend more on sweets and baked goods per week, compared to non-recipients. One positive result from the Table 4

estimates was that there was a statistically significant negative effect of SNAP benefits on average alcohol expenditures per week. This indicates that consumers are not using SNAP funds to subsidize alcohol consumption. Overall, there is concerning evidence that SNAP-receiving households are not utilizing the program funds on food items typically considered nutritional. In fact, more evidence supports the opposite. This conclusion is important for policy makers considering updates to the program. If consumers are not actually receiving any health benefits resulting from SNAP funds, then stricter food-eligibility guidelines should possibly be implemented. However, more comprehensive research should be conducted on this specific facet of spending behavior and the actual health outcomes of SNAP-receiving consumers.

Interpreting the results of this study and understanding their behavioral foundation is crucial to gaining insights into consumer expenditure trends. In addition, it is important for determining the effectiveness of the SNAP program. This paper is contributing to a growing pool of research on the topic of SNAP benefits. The conclusions of this study have reinforced ideas that have been presented by previous literature, and hopefully provided some new insights about consumer expenditure behavior.

REFERENCES

Aussenberg, R. A. (2014). Supplemental Nutrition Assistance Program (SNAP): a primer on eligibility and benefits. *Congressional Research Service*, 1-24.

Garasky, S., Mbwana, K., Romualdo, A., Tenaglio, A., & Roy, M. (2016). Foods typically purchased by Supplemental Nutrition Assistance Program (SNAP) households. *Prepared by IMPAQ International, LLC for USDA, Food and Nutrition Service*, 1-42.

Gray, K. F., & Kochhar, S. (2015). Characteristics of Supplemental Nutrition Assistance Program households: fiscal year 2014. *U.S. Department of Agriculture, Food and Nutrition Service, Office of Policy Support*, 1-119.

Harris, K. (2019). What are SNAP benefits use to purchase? Evidence from a supermarket retail panel. *Michigan State University*, 1-46.

Hastings, J., & Shapiro, J. M. (2018). How are SNAP benefits spent? Evidence from a retail panel. *American Economic Review*, 108(12), 3493-3540.

Hoynes, H. W., McGranahan, L., & Schanzenbach, D. W. (2016). SNAP and food consumption. In J.Bartfeld, C. Gundersen, T.M. Smeeding, & J.P. Ziliak (Eds.), *SNAP Matters: How Food Stamps Affect Health and Well-Being* (pp.107-133). Studies in Social Inequality. Stanford: Stanford University Press.

Supplemental Nutrition Assistance Program (SNAP). Food and Nutrition Service U.S. Department of Agriculture. (2021, August 16). Retrieved March 9, 2022, from https://www.fns.usda.gov/snap/supplemental-nutrition-assistance-program.

U.S. Bureau of Labor Statistics. (2022, March 11). *Consumer Expenditure Surveys (CE) public use microdata data files*. U.S. Bureau of Labor Statistics. Retrieved March 9, 2022, from https://www.bls.gov/cex/pumd_data.htm#stata.

APPENDIX A: DATA DESCRIPTION

The only data source used in this study was the Consumer Expenditure Survey (CES). The CES provides data on expenditures, income, and demographics for consumers in the United States. It is the only government survey that completely encompasses these topics. CES data collected nationwide every year by the Census Bureau on behalf of the Bureau of Labor Statistics (BLS). Two separate surveys are used to derive the estimates in the CES. The purpose of the Interview Survey is to collect quarterly data on large and recurring expenditures, such as rent and utilities. The Diary Survey is used to collect weekly data on small, frequent expenditures. The unit of observation is a Consumer Unit (CU).

The Diary Survey was the survey utilized in this study. All data from the surveys are compiled into public use microdata (PUMD), which are available for free use. The PUMD is provided in several different forms, but the data utilized in this study was the Diary data in Stata do-file format from the years 2012, 2013, and 2014. There are several files within the Diary Survey data, but only the FMLD quarterly file was utilized in this study. The data was accessed on March 9, 2022, from https://www.bls.gov/cex/pumd_data.htm#stata. This website also includes the Dictionary for Interview and Diary Surveys, an Excel file that has a comprehensive list of all the variables ever used in either survey. The dictionary was also accessed on March 9, 2022. Using the dictionary, the desired variables were located by filtering out the unnecessary data. For the Survey column, Diary was the only selected option. In the File column, FMLD was the only one selected. Finally, the years had to be filtered out to ensure the data included variables used in the survey years being used.

Stata was the software utilized in this study. After downloading the quarterly data for each year into Stata, significant data cleansing was undertaken. Observations in the data come from across the country, and the state of origin was included. So, observations originating from Alaska and Hawaii were dropped from the dataset. This was done to prevent any skewness in the results. Hawaii and Alaska usually have separately higher prices than the rest of the states and Washington D.C. In addition, the poverty thresholds differ in these two states. The federal government specifies a universal basic poverty threshold for the contiguous forty-eight states, as shown in Appendix B. This threshold is the criteria upon which SNAP eligibility is based on. However, this threshold is updated uniquely to accommodate the higher living costs in Alaska and Hawaii. So, to promote consistency, these two states were dropped from the data set.

Next, the eligibility requirements had to be calculated to separate out the low-income consumers. Aussenberg (2014) described the three eligibility requirements for households in 2014 to be considered eligible for SNAP benefits. The first two requirements relate to a household's net and gross monthly incomes. Eligibility relies on a household having income that does not exceed the poverty threshold explained in the previous paragraph. The monthly income limits are adjusted based on number of people in the household as well. In addition, there is a third requirement of eligibility that relates to a household's assets. Aussenberg (2014) states that households without an elderly member could not have counted liquid assets exceeding $2,250. Unfortunately, the CES did not have any data relating to value of household assets in the years studied. So, this third requirement was left alone, because it was assumed that any household that does not exceed the income guidelines will most likely not have liquid assets of much value to be ineligible for SNAP. After calculating the eligibility in Stata, 15,007 CUs met the first requirement and 12,530 met the second requirement, and 12,479 met both requirements and were therefore eligible for SNAP benefits in this model.

More data transformation had to take place. The next strategy was to drop all observations that were not eligible for SNAP and did not receive food stamps. This allowed for the sample to only include eligible

low-income consumers. All households that had no response for whether they had received SNAP were also dropped. Next, all observations that had income reported income less than zero were removed from the sample. At this point, to get an idea of the structure of the data, the following command was run in Stata: *tabulate eligible foodstamps*. In this command, the *eligible* variable refers to all households that meet the requirements of SNAP eligibility and *foodstamps* is the dummy variable for whether someone in the household received benefits within the past year. Finally, there needed to be a more holistic view of food expenditures. So, the mean weekly amount spent on the desired food categories was calculated. For the fruit and vegetables categories, the average expenditures on fresh and processed goods were combined to create a general variable for both categories.

The command to compute the estimates in Stata was *regress*. An example of a regression command for this analysis is given below:

regress avgfoodtot foodstamps fincaftx fam_size perslt18 persot64 if ok2use & eligible, vce(robust)

This model was run using the data sample that only included those eligible for SNAP benefits. To run a model on the sample that included those observations that were predicted to be not eligible but still received SNAP benefits, the only change needed is to remove the *& eligible* part of the above code. Exactly similar models to those presented in this paper were run on the larger sample that included non-eligible SNAP recipients. The results from those models can be viewed in Appendix C.

APPENDIX B: SNAP ELIGIBILITY REQUIREMENTS

	48 States, D.C., and other territories	Alaska	Hawaii
1 person	$973	$1,215	$1,119
2 persons	1,311	1,639	1,508
3 persons	1,650	2,062	1,897
4 persons	1,988	2,485	2,286
5 persons	2,326	2,909	2,675
6 persons	2,665	3,332	3,065
7 persons	3,003	3,755	3,454
8 persons	3,341	4,179	3,843
Each additional person	339	424	390

Source: Aussenberg, R. A. (2014). Supplemental Nutrition Assistance Program (SNAP): A primer on eligibility and benefits. *Congressional Research Service*.

A1: Net monthly income eligibility limits for SNAP by household size.

	48 States, D.C., and other territories	Alaska	Hawaii
1 person	$1,265	$1,580	$1,454
2 persons	1,705	2,130	1,960
3 persons	2,144	2,681	2,466
4 persons	2,584	3,231	2,972
5 persons	3,024	3,781	3,478
6 persons	3,464	4,332	3,984
7 persons	3,904	4,882	4,490
8 persons	4,344	5,432	4,996
Each additional person	440	551	506

Source: Aussenberg, R. A. (2014). Supplemental Nutrition Assistance Program (SNAP): A primer on eligibility and benefits. *Congressional Research Service*.

A2: Gross monthly income eligibility limits for SNAP by household size.

APPENDIX C: SUMMARY AND ESTIMATES TABLES FOR SAMPLE WITH INELIGBLE SNAP-RECIPIENTS

	Number of observations	Mean	Standard deviation	Minimum	Maximum
SNAP	6,141	0.315	0.464	0	1
Net Income	6,141	$9,843.37	$17,245.52	0	$197,407
Family	6,141	2.473	1.618	1	14
Children	6,141	0.691	1.183	0	10
Seniors	6,141	0.350	0.617	0	3
Fruit	6,141	$5.27	$7.93	0	$156.32
Vegetables	6,141	$5.22	$7.56	0	$99.18
Non-Store Food	6,141	$24.46	$44.37	0	$844.50
Store Food	6,141	$56.11	$67.14	0	$935.30
Total Food	6,141	$80.57	$91.82	0	$1,394.50
Baked Goods	6,141	$4.97	$7.13	0	$86.53
Alcohol	6,141	$3.31	$12.79	0	$254.50
Sweets	6,141	$1.96	$3.81	0	$62.18

Source: Consumer Expenditure Survey; Diary; 2012, 2013, 2014

A3: Descriptive Statistics.

	(1) Total	(2) Non-Store	(3) Store
SNAP	-3.363	-12.774*	9.411*
	(2.562)	(1.313)	(2.031)
Net Income	0.00067*	0.00038*	0.00029*
	(0.0001)	(0.00006)	(0.00008)
Family	24.370*	6.706*	17.664*
	(1.77)	(0.882)	(1.251)
Children	-11.513*	-5.298*	-6.215*
	(2.271)	(1.093)	(1.652)
Seniors	-1.609	-3.121*	1.512
	(2.014)	(1.007)	(1.472)
Adjusted R-square	0.142	0.0488	0.159
Number of observations	6,141	6,141	6,141

Notes: Dependent variable is average weekly food expenditures. Standard errors robust to heteroskedasticity are shown in parentheses. Asterisks (*) are used to indicate estimates that are statistically significant at $\alpha = 0.05$.

A4: Estimates of the effect of SNAP benefits on average weekly food expenditures.

	(1)	(2)	(3)	(4)	(5)
	Fruit	**Vegetables**	**Sweets**	**Baked Goods**	**Alcohol**
SNAP	0.035	0.456	0.370*	0.608*	-0.908*
	(0.259)	(0.239)	(0.128)	(0.228)	(0.383)
Net Income	0.00002	0.00002*	0.00001*	0.00003*	0.00004*
	(9.17e-06)	(9.07e-06)	(5.59e-06)	(8.56e-06)	(0.00002)
Family	1.558*	1.804*	0.546*	1.320*	0.983*
	(0.140)	(0.138)	(0.067)	(0.133)	(0.275)
Children	-0.475*	-0.843*	-0.165	-0.222	-1.510*
	(0.194)	(0.186)	(0.097)	(0.184)	(0.345)
Seniors	0.388*	0.356*	0.183	0.317*	-0.780*
	(0.169)	(0.171)	(0.094)	(0.157)	(0.314)
Adjusted R-square	0.077	0.097	0.056	0.1001	0.008
Number of observations	6,141	6,141	6,141	6,141	6,141

Notes: Dependent variable is average weekly food expenditures. Standard errors robust to heteroskedasticity are shown in parentheses. Asterisks (*) are used to indicate estimates that are statistically significant at $\alpha = 0.05$.

A5: Estimates of the effect of SNAP benefits on specific food expenditures.

Data and Stata code used to compute the estimates are available from the author on request.