Household and Intersectoral Effects of Reduced SNAP Expenditures: A Computable General Equilibrium Analysis

Preliminary and Incomplete – Not for Citation

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Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6, 2013

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Introduction

U.S. food assistance programs represent the largest portion of farm bill spending – approximately 75% in recent years. Most food assistance spending comes through the food stamp program, renamed the Supplemental Nutrition Assistance Program (SNAP) in the 2008 farm bill. As the house price bubble began to burst that same year, the number of SNAP recipients started rising rapidly, ultimately reaching 47 million in 2012, with expenditures of approximately $78 billion (USDA FNS, 2013). Disagreement over this program within Congress is a major reason why Congress failed to pass a new farm bill to replace the 2008 bill that expired on October 1, 2012. During farm bill discussions the Senate passed a bill that would cut a total of $4.5 billion from SNAP over a number of years, while a House version would have cut $16 billion out of SNAP (Chite, 2012; House Committee, 2012). As of the writing of this paper a decision about SNAP has not been reached, but it appears that some reduction will be made in the next farm bill.

In very simple terms SNAP is a transfer from middle- and upper-income households to low-income households via tax receipts and expenditures. Although SNAP is designed to enable purchase of food and related items, it frees up income for SNAP-eligible households to spend on other categories of consumption, such as housing, medical care, and transportation. In this sense the SNAP program potentially affects many sectors of the economy, and even international trade. Reductions in SNAP imply poor households will spend less while richer households will spend more, at least if taxes would fall by rates corresponding to the amount that SNAP costs. Even if overall

spending on the economy is roughly the same, the overall pattern of goods consumption is likely to be quite different. This is because income elasticities of demand vary across major expenditure categories, and across income levels. Food consumption, for example, tends to be income-inelastic compared to other goods. As after-tax income is increased for richer households, they are likely to spend this money differently than SNAP-dependent households were spending it.

The purpose of this paper is to quantitatively examine the effects that SNAP spending cuts would have on different types of households and different sectors of the economy. In a sense we seek to understand the role and contribution of SNAP to the United States economy by imposing a purely hypothetical counterfactual: total elimination of SNAP as a program.

To achieve this objective we develop a national-level computable general equilibrium (CGE) model that highlights key sectors of the economy, and which distinguishes SNAP-eligible households from other households in the economy. Consumer preferences for four different types of households are characterized in the model using a demand system that allows for variation in the way that spending on different goods changes as household income changes. The particular demand system used is the Linear Expenditure System (LES), which has its origins in work by Stone (1954). We use variation in spending patterns across income levels to estimate income elasticities of demand.

Other parameters of the CGE model are calibrated using 2010 data from IMPLAN (IMpacts for PLANning). IMPLAN data are constructed from industry input-output tables, consumer expenditure data, and government expenditure data from the National

Income and Product Accounts, Census of Population, BEA REIS datasets, BLS Consumer Expenditure Survey, and the Annual Survey of State and Local Government Expenditures. While IMPLAN data can be broken into as many 509 sectors and down to the zip code level, our focus is on six aggregate consumption categories, and the U.S. as a single geographical unit.

Few studies have employed a multi-sector multi-household model to study food assistance policies. One such study is Hanson et al. (2002), who develop a CGE model to analyze what would happen if food assistance spending was decreased by $5 billion. As in the present study, they model this decrease in the transfer from households which do not receive benefits, to households that do receive food assistance benefits. In effect, transfers to benefit-receiving households fall by $5 billion while non-benefit receiving households have savings of $5 billion. They find this leads to a $1.3 billion decrease in farm and food processing production and a loss of 7,500 jobs. In another study, Hanson (2010) estimates a national input-output multiplier for SNAP spending stimulus. The study primarily focuses on the stimulus effect of increasing SNAP benefits under the American Recovery and Reinvestment Act of 2009. The results indicate that $1 billion of SNAP spending results in $1.79 billion of economic activity, that is a $9 increase in economic activity for every $5 of SNAP benefits an individual receives.

These studies hint that the changes to SNAP would likely go well beyond the benefit recipient households and potentially stretch to agricultural producers, food processors, food retailers, and non-eligible households. The present study explores this possibility in more detail by econometrically estimating the parameters of the CGE

model's demand system to better show how consumption bundles react to income changes.

In this sense the study is similar to Castner and Mabli (2010), who analyze the spending patterns of SNAP participants, non-participants, and ineligible non-participants. They find that income level plays a role in household budget shares, in particular, that SNAP-benefiting households consume food in a different pattern than SNAP eligible non-participants. Reimer and Hertel (2004) analyze consumption behavior by estimating income elasticities for ten different commodity categories at the international level. Their results indicate that staple foods have a lower income elasticity and higher subsistence level than foods such as meats and dairy products, and goods such as recreation, transportation, and education. The findings reinforce the notion that the budget share for food decreases as income increases. Unlike the present study, however, these two studies do not go beyond demand system estimation to consider the impacts on other sectors of the economy.

The remainder of the paper is as follows. In the next section we provide more background on the Supplemental Nutrition Assistance Program. In the following section we briefly describe the CGE model. In the following section we discuss estimation of key parameters of the model. Subsequent sections analyze results and present conclusions in turn.

Background on SNAP

To be eligible for SNAP benefits a household must meet three requirements. First, it must have a gross income at or below 130% of the poverty line. That corresponds to an

annual income of about $24,100 for a household of three. Second, it must have a net income after relevant deductions at or below the poverty line – about $18,500 per year. Third it must have assets of $2,000 or less. These criteria do not strictly apply for households with elderly or disabled members (CBPP, 2012). Most people who receive SNAP benefits live in households with very low income. In 2010 the average income of a benefit recipient household was $8,800 per year. The average benefit was $287 per household per month or $4.30 per person per day (FitzGerald et al. 2012).

USDA FNS (2013) reports that in 2012, federal government spending on SNAP reached a high point of about $78 billion. Of that, 95% went directly to benefits and 5% went to administrative costs. The house price bubble-induced recession of 2007-2008 and the 2009 Recovery Act have greatly increased the number of households that qualify for SNAP, thus explaining the increase in the number of participants and spending levels in the last five years. SNAP spending as a percentage of GDP is expected to decease to pre-recession levels when the economy improves (CBPP, 2012).

The Congressional Budget Office predicts that participation will continue to increase from 2012 to 2014, and then decline in the following years reflecting improving economic conditions and declining unemployment rates. By fiscal year 2022, it is projected that 34 million people will participate in SNAP each month and spending will be $73 billion annually (FitzGerald et al. 2012). The 2009 Recovery Act provided a funding boost to food assistance programs, most notably SNAP. However, this funding trend appears to be short-lived based on the current budgetary climate (Paggi, 2012).

Model

The model used in this study is a derivative of a class of CGE models developed at the International Food Policy Research Institute (IFPRI) CGE model and described in Lofgren et al. (2002). The model incorporates optimizing households and firms, intermediate input use, inter-household and government transfers, savings and investment, government, and trade with the rest of the world. Households maximize utility subject to their income constraint and consume their optimal bundle of goods. Commodity markets establish goods prices endogenously while incorporating imperfect substitution between goods. Goods are consumed domestically and traded on the free market. Aggregate output is generated from the output of different activities and characterized by a constant elasticity of substitution (CES) production function. Output is allocated between domestic and foreign sales and determined based on endogenous domestic prices and exogenous rest of world prices. Demand is constructed by minimizing costs to supply a given amount of aggregate output subject to the CES function. Domestic demand is for a composite commodity composed of imports and domestic output and is made up of demand for household consumption, government consumption, investment, intermediate inputs (activity consumption), and transaction inputs. Therefore changes in the demand of any entity – households, government, activities – affect prices and outputs in the commodity market. Prices, output, and income then determine how much commodity is consumed by production activities as intermediate inputs and by government and households as final goods.

Market equilibrium is reached by agents balancing their own, endogenous, accounts and the model user specifying the closure of the model. The model operates on macroeconomic constraints: the balance of payments, savings-investment balance,

government budget balance, and the aggregate supply of primary factors constraint. The first three constraints are relatively straightforward from a macroeconomic perspective, but the fourth leaves room for variation.

Households receive income from labor, capital, inter-household transfers, federal and state government transfers, and investment. They spend money on commodities, inter-household transfers, federal and state government taxes, and investment. Table 1 presents data from a Social Accounting Matrix (SAM) that we generated from the IMPLAN data files. The households reported are the standard nine categories reported by IMPLAN. They are distinguished by income bracket, measured in hundreds of thousands of dollars.

Table 1 also reports how we aggregate the nine IMPLAN households for use in the SNAP analysis. Households are aggregated to four from the nine original IMPLAN categories to better reflect SNAP benefit recipient households and ineligible households. Our reasoning is as follows. To qualify for SNAP benefits the basic condition is to have gross income at or below 130% of the poverty line. This works out to roughly households that earn $24,100 or less annually for a three person household (CBPP, 2012). Furthermore, the 2010 Consumer Expenditure Survey (BLS, 2010) indicates that income form public assistance programs, including SNAP, rises for households with income up to $15,000 and then declines and drops sharply for households with income above $30,000. This is shown in Table 2, which provides a decomposition of income sources by household income category. On this basis, it is assumed that household categories 1-3, representing households with income between $0-$25,000 represent households that receive or are eligible for SNAP benefits. The remaining six household categories are

assumed to be ineligible households. These households are categorized into three groups termed low, mid, and high income ineligible households. Table 1 reports the final household aggregation.

The sectoral aggregation of the model is reported in Table 3. The model employs national data from 509 different industries. For the purposes of this study, these industries are aggregated into six sectors that are very similar to the six consumption categories over which the demand system is estimated. The SNAP food and food away from home categories represent the food and agricultural sector of the economy.

Household preferences are given by a non-homothetic Linear Expenditure System (LES). Every household category consumes a unique bundle of goods from the six sectors of the economy. Figure 1 depicts the actual budget shares for six consumption categories used in the analysis. These are from the Consumer Expenditure Survey conducted by the BLS for the year 2010.

The model contains a number of exogenous parameters that are set by the user. These parameters are used to characterize different agents' behavior in the model. Parameters that involve trade include the elasticity of demand for world exports, elasticity of substitutions for production, the Armington trade function, and the transformation between domestic and foreign demand are chosen to represent common values from the literature (specific values are available from the authors upon request). The model also includes parameters that affect demand for commodities and factors: income elasticity of demand, consumption flexibility – the minimum subsistence level parameter known as the Frisch parameter – and demand elasticity for labor and capital. The parameters that affect consumption of goods – which are relevant to analyzing the

Supplemental Nutrition Assistance Program – are the income elasticity of demand and consumption flexibility – subsistence level. Income elasticities and the Frisch parameter are established by estimating the LES demand system discussed in the following section.

Demand System Estimation

The demand system is based in large part on (Stone, 1954) and given by the following equation:

$$w_{it} = \frac{p_i \gamma_i}{y_t} + \beta_i \left(1 - \frac{\mathbf{p}\boldsymbol{\gamma}}{y_t} \right) \quad \forall i, t$$

where $i = 1, ..., 6$ indexes goods, $t = 1, ..., 13$ indexes household expenditure levels, β_i is the marginal budget share for category *i*, $\mathbf{p}$ is a vector of prices, and $\boldsymbol{\gamma}$ is a vector of the subsistence parameters. Thus, β_i and $\boldsymbol{\gamma}$ can be econometrically estimated for good *i*, and the demand system can be evaluated for every *t*.

To estimate the LES demand system an econometric model was solved in GAMS using the PATH solver. Data were from the Consumer Expenditure Survey conducted by the BLS for the year 2010. The consumer expenditure survey is conducted on an ongoing basis, and it collects data on expenditure, income, and demographic characteristics of consumers in the United States. The model captures data for 13 different income categories ranging from less than $5,000 to more than $150,000 with observations totaling 121,107 consumer units, i.e., households (BLS, 2010). The expenditure data were aggregated into 6 groups to reflect food that can be purchased with SNAP benefits, other food, and other consumer goods and services (the same categories as in the CGE model). The model output included the β_i and γ_i parameters for the LES demand system

equation, actual budget shares, fitted budget shares, marginal budget shares, and a Frisch, or subsistence level parameter. Expenditure elasticities are calculated by taking the marginal divided by the fitted budget shares at mean prices (Reimer and Hertel, 2004).

Table 4 reports parameter estimates and calculated expenditure elasticities for the four different households (Table 1) and six consumption categories. The elasticities are similar but differ slightly across income levels and consumption categories. For SNAP-eligible households, we see that the expenditure elasticity for food at home is 0.95. This means that a 1% increase in expenditure is associated with a rise in food at home purchases of 0.95%. For the highest-income households, however, this elasticity is only 0.75%. As their income rises, their purchases of housing, utilities, and consumer goods (category 4) is predicted to rise by 1.34%. This is the most elastic response that is estimated.

These results for nonfood items are similar to those of Huang (1993), who estimates expenditure elasticities of 1.1661 for nonfood items. His estimates of expenditure elasticities for food are relatively more inelastic than those found in this study, at 0.2745. Similarly Reimer and Hertel (2004) find relatively inelastic expenditure elasticities for food items, with estimates for different food categories generally below 0.6 when International Comparisons Program data are used. This likely occurs, however, since their international data include numerous observations for which expenditure per person is much broader than that found within the United States. The variation in spending per household within the United States is dwarfed by the size of differences encountered at the international level. In addition, Reimer and Hertel (2004) employ a

relatively flexible demand system that relaxes the constancy of marginal budget shares across spending levels that is implicitly assumed as part of LES.

Counterfactual Scenario

Once the remaining model parameters have been calibrated to replicate a 2010 baseline, we turn to the design of an experiment designed to mimic the economy-wide reverberations of the Supplemental Nutrition Assistance Program. We do not attempt to replicate a particular policy being proposed, in part because these are in flux, but mainly because we seek to provide an upper bound on the types of effects that SNAP has on the rest of the economy. In a sense we are analyzing the effect that SNAP as a whole has on the U.S. economy and particular types of households and industry sectors within it.

The counterfactual scenario considers elimination of SNAP benefits in the year 2010, along with elimination of the associated administrative costs, which are approximately five percent of SNAP spending. The premise for this policy analysis relies on the fact that the federal government taxes households and uses a portion of its revenue to spend on SNAP benefits – transfers back to many eligible households in the form of food vouchers – and on costs to administer the program – primarily consumption of services.

The counterfactual scenario assesses the impact of a redistribution of income from low-income households (by a cut in food stamps) to higher income households (by a cut in income tax). SNAP eligible and ineligible households are defined as indicated in Table 1. The SNAP-eligible household group will lose income via a change in effective federal income tax that offsets all SNAP benefits paid to that group. SNAP-ineligible

households will consequently receive a decrease in federal income tax to offset all benefits paid to SNAP eligible households and administrative costs spent by the federal government. This represents a revenue-neutral change where SNAP spending is completely eliminated from the model.

To calculate these changes the 2010 SNAP spending data from the USDA and the constructed SAM using 2010 national level IMPLAN data are used. The USDA Food and Nutrition Service (2013) reports that in 2010 the federal government spent a total of $68.3 billion dollars on SNAP. Of this total, $64.7 billion went directly to benefits, and the remainder went to administrative costs. Thus, an increase in federal income tax of SNAP eligible households of $64.7 billion – representing benefits only – and a decrease in federal income tax of non-eligible households of $68.3 billion – total SNAP spending – is used to model the elimination of SNAP.

The specification of the income tax parameter in the model is as follows:

```
ty(G,H) = SAM(G,H)/SAM('TOTAL',H)
```

Where `ty(G,H)` is the income tax parameter on government account, G and household account, H. For our purposes, G represents the federal government non-defense account and H represents the four household accounts – SNAP, LOW, MID, and HIGH. `SAM(G,H)` represents a vector of absolute income tax accounts by government unit G on household H. and `SAM('TOTAL',H)` represents a vector of total household income for households H. Thus, in the model, the income tax parameter represents the percentage of income that household accounts pay to the federal government non-defense account.

In the counterfactual scenario the income tax paid to the federal government non-defense account (which can be negative or positive) is scaled to represent this change in SNAP spending and benefits and to calculate new values of endogenous variables. These

results are compared to the baseline. SNAP households actual have a negative income tax to the federal government non-defense account of -$13.2 billion for a tax rate of -0.9%. Adding back the $64.7 billion in SNAP benefits increases the income tax rate to 3.7% for a 492.4% change. Collectively, the remaining ineligible households pay an income tax of $912.2 billion for a tax rate of 8.1%. After subtracting out $68.3 billion in SNAP expenditures their tax rate decreases to 7.5% leading to a change of -7.5% in the tax rate. The changes in the tax rates are used to scale the tax rate parameter for the four household groups to effectively remove SNAP spending and benefits from the model. It is important to note that these tax rates are for the federal government non-defense spending account and therefore do not represent taxes to other government accounts such as federal government defense, or state government accounts. The federal government non-defense account was chosen because it is where SNAP expenditures are located in the model data.

Results

The results of the counterfactual scenario represent the new equilibrium values of the variables that change when the counterfactual above is implemented. The first result that we consider is changes in net (disposable) income. These are reported in Table 5 for each of the four households, along with their percentage changes. We see that SNAP eligible households lose about 5.5% of their disposable income. This is a $72.1 billion decrease in disposable income. Low- and middle-income households gain 0.3% and 0.7% respectively, while the greatest percentage increase goes to high-income households, at 1.2%. These increases equal the $72.1 billion lost by SNAP-eligible

households. These changes are represented as a chart in Figure 2. It is clear that SNAP-eligible households have a pronounced change in disposable income; the improvement among SNAP-ineligible households is small. It is the highest-income group that has the largest benefit.

The counterfactual shock also induces changes in consumption, with large differences across sectors and across SNAP-eligible and higher-income households. Aggregate consumption remains relatively constant – changing by approximately $9 million – but consumption patterns change due to the redistribution of income. Absolute changes in consumption of particular goods are reported in Table 6, and percentage changes in Figures 3 and 4. The four household groups experience an overall change in consumption equal to their change in income. Due to variation in expenditure elasticities, however, different sectors expand and contract. For SNAP eligible households, the biggest drop in relative terms is transportation, food away from home, and education, health, entertainment and other services (Figure 3). High-income households have relatively large increases in their consumption of non-food categories (Figure 4). These variations are in large part driven by the estimated income elasticities of demand.

SNAP-eligible households have greater absolute and percentage changes in consumption than ineligible households (Table 6). Due to the decrease in income, SNAP recipients decrease their consumption of transportation, food away from home, and education, healthcare, entertainment and other series more than they do SNAP food and housing, utilities, and consumer items. For ineligible households, the high-income group experiences the largest absolute and percentage increase in consumption due to the policy change. Consumption patterns change relatively consistently across goods, except for

housing, utilities, and consumer items, transportation, and education, healthcare, entertainment, and other services for the high income category.

Table 7 reports the change in commodity sector value and output. The SNAP food sector experiences a decrease of $2.1 billion in value of output. Prices themselves change very little; the changes in the value of outputs are therefore essentially changes in physical quantities. Despite the revenue-neutral hypothetical change in policy, the total value of output decreases by $700 million. All sectors contract slightly except for housing, utilities, and consumer items, which expands by $5.7 billion. SNAP food, or more generally the food sector of the economy contracts by $2.142 billion. The sector changes are small overall, as is indicate by the percentages. These are also depicted graphically in Figure 5.

Despite the small size, there is a pattern to the change, and it is driven by the expenditure elasticities estimated in the LES demand system. As after-tax income shifts from SNAP-eligible to high-income households, less food is purchased and more spending is allocated towards income elastic commodities.

Factor Markets

Changes in the commodity markets cause shifts in the employment of primary factors which lead to slight changes in primary factor markets. The model closure specifies that capital is mobile and its supply is fixed, and labor is mobile and supply is fixed. Therefore, capital and labor are redistributed across industries but remain fully employed. Like the redistribution in the commodity market, these redistributions keep aggregate demand relatively constant and therefore lead to negligible effects on the wage rate and

the rental rate of capital. Since households supply primary factors, these changes slightly affect household income. Thus, the changes result in a full loop describing how income flows throughout the economy when the model is shocked to represent an elimination of the SNAP program. Overall, there is a 0.01% increase in the rental rate of capital and a 0.01% decrease in the wage rate. Supply of labor and capital do not change. These results in the primary factor markets are not surprising due to the fact that results indicate that changes only take place on the demand side of the economy.

Household Welfare

Percentage change in household utility is depicted in Figure 6. We see that SNAP-eligible households have a fall in utility of approximately 0.4%, while the ineligible households all have increases in utility of less than 0.1%. These values are clearly not as dramatic as the changes in after-tax income or in the changing consumption of products of different sectors. This is due in part to the fact that households can re-optimize their consumption in the face of a shock in such a way that utility does not change as much as expenditure does. The results nonetheless confirm the results of the existing studies that welfare changes more drastically for the SNAP-eligible households than for ineligible households. This has the effect of creating larger welfare inequality between wealthy and poor households.

Conclusions

This study assesses the economy-wide impacts of the Supplemental Nutrition Assistance Program (SNAP) by way of a computable general equilibrium (CGE) model,

paying special attention to households' income elasticities of demand, which are estimated using cross-sectional data on U.S. consumer spending patterns. The role and contribution of SNAP to the United States economy is delineated by way of a counterfactual in which SNAP is eliminated entirely as a program; this scenario is compared to the United States economy in the year 2010 as represented in the baseline.

The counterfactual induces a revenue-neutral change in which SNAP benefits are cut from eligible households, while ineligible (higher income) households experience a corresponding reduction in taxes, increasing their disposable income. Despite the revenue-neutral nature of this shock, a number of important changes occur on the demand side of the economy which then reverberate through to the rest of the economy.

The counterfactual scenario shows that eliminating SNAP ultimately leads to a decrease in net income of $72.1 billion aggregately for SNAP eligible households and an increase in effective net income by the same amount, in aggregate, for ineligible households. SNAP household welfare declines fairly strongly, while SNAP-ineligible households gain little. SNAP-recipient households experience a drop in spending power by 5.5%. Higher income SNAP-ineligible households, however, gain roughly 1% in spending power.

Engel's Law predicts that low- and high-income households would spend their money differently. We confirm this by estimating the Linear Expenditure Demand system used within the CGE model. Income elasticties of demand vary across categories of expenditure and across the four types of households portrayed in the sample. As poorer households cut back their spending, the food and agricultural sector shrinks $2.1 billion. Meanwhile, the gain by higher-income households results in an expansion of the

Housing, Utilities, and Consumer Goods sector by $5.6 billion. Among higher income households, the latter sector has an income elasticity of 1.34, while the food at home sector has an income elasticity of 0.75. They therefore spend their money differently than SNAP-eligible households.

In summary, alterations to the SNAP program will have differential impacts by sector as well as by household group. This study sheds light the likely direction of those changes as well as their potential magnitude.

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Table 1. Household categories

Original IMPLAN households	Income bracket ($1000)	Total national income ($ million 2010)	Aggregated household in this study	Description of aggregation in this study	Abbreviation
1	0-10	378,392	1	SNAP eligible households	SNAP
2	10-15	275,372	1	SNAP eligible households	SNAP
3	15-25	745,831	1	SNAP eligible households	SNAP
4	25-35	916,646	2	Low income ineligible households	LOW
5	35-50	1,484,986	2	Low income ineligible households	LOW
6	50-75	2,460,850	3	Middle income ineligible households	MID
7	75-100	1,690,885	3	Middle income ineligible households	MID
8	100-150	1,844,040	4	High income ineligible households	HIGH
9	150+	2,850,625	4	High income ineligible households	HIGH

Table 2. Decomposition of Income Before Taxes

Income Source	Less than $5,000	$5,000 to $9,999	$10,000 to $14,999	$15,000 to 19,999	$20,000 to $29,999	$30,000 to $39,999	$40,000 to $49,999	$50,000 to $69,999	$70,000 and more
Public assistance, supplemental security income (including food stamps)	525	1,403	1,236	1,041	851	481	393	274	122
Self-employment income	-5,001	-96	104	222	617	960	1,112	2,212	7,634
Social Security, private and government retirement	721	2,907	6,025	7,587	8,672	8,487	8,327	8,263	6,869
Interest, dividends, rental income, other property income	141	97	99	210	359	632	772	1,105	2,568
Unemployment and workers' compensation, veterans' benefits	59	214	539	596	715	794	799	749	605
Regular contributions for support	212	394	509	393	372	437	267	454	439
Other income	424	478	332	259	208	142	101	160	133
Total Income Before Taxes	-1,105	8,082	12,607	17,483	25,001	34,761	44,733	59,253	129,151

Table 3. Commodity aggregation

No.	Name	Description
1	SNAPFD	Food that can be purchased under SNAP
2	AWAYFD	Restaurants and food services
3	SINPROD	Alcohol and Tobacco
4	HOUSE	Housing, household goods, utilities, and consumer items
5	TRANS	Transporation and related service
6	SER	Education, healthcare, entertainment, apparel, and other services

Table 4. Demand System Estimation and Expenditure Elasticities

	Estimates		Expenditure elasticities for different household types			
Consumption Category	β_i	γ_i	SNAP	Low Income	Mid Income	High Income
Food at home (SNAP purchases)	0.102	5.145	0.95	0.97	0.98	0.75
Food away from home	0.064	2.223	1.03	1.02	1.01	0.71
Alcohol and Tobacco	0.022	1.105	0.95	0.96	0.97	0.70
Housing, Utilities, and Consumer Goods	0.322	17.113	0.93	0.96	0.97	1.34
Transportation	0.255	5.785	1.11	1.07	1.05	1.11
Education, Healthcare, Apparel, and Other Services	0.235	9.068	1.01	1.01	1.00	1.04

Table 5. Change in Household Net Income ($ million 2010)

Household	Base	Counterfactual experiment	Difference	Percent Change
SNAP	1,312,237	1,240,109	-72,128	-5.5%
LOW	2,143,436	2,150,079	6,643	0.3%
MID	3,578,492	3,603,033	24,541	0.7%
HIGH	3,426,770	3,467,704	40,934	1.2%

Table 6. Change in Household Consumption ($ million 2010)

Commodity	SNAP	LOW	MID	HIGH
SNAP Food	-4,511	426	1,351	1,162
Food Away from Home	0	0	0	0
Alcohol & Tobacco	-494	51	194	230
Housing, Utilities, & Consumer Items	-22,765	2,341	8,515	17,154
Transporation	-29,037	2,475	9,649	15,960
Edu, Health, Entertainment & Other Services	-15,319	1,350	4,832	6,427

Table 7. Change in Sector Value and Output ($ million 2010)

Household	Base	Counterfactual experiment	Difference	Percent Change
SNAP Food	1,091,330	1,089,188	-2,142	-0.2%
Food Away from Home	24,541	24,539	-2	0.0%
Alcohol & Tobacco	31,080	31,074	-6	0.0%
Housing, Utilities, & Consumer Items	12,938,212	12,943,980	5,768	0.0%
Transporation	5,683,207	5,682,067	-1,140	0.0%
Edu, Health, Entertainment & Other Services	6,047,578	6,044,400	-3,178	-0.1%

Figure 1. Actual Budget Shares

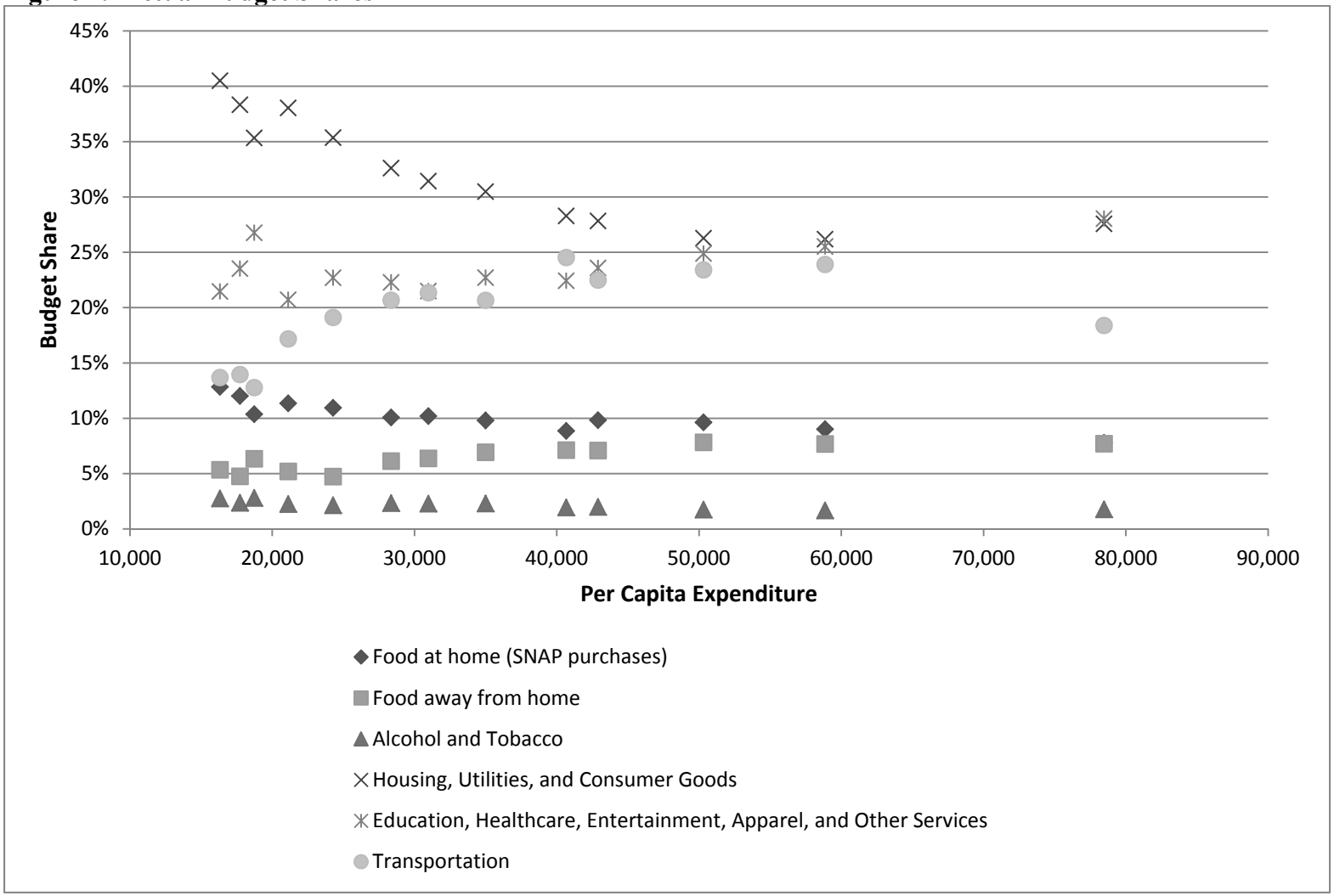

Figure 2. Percentage Change in Household Net Income

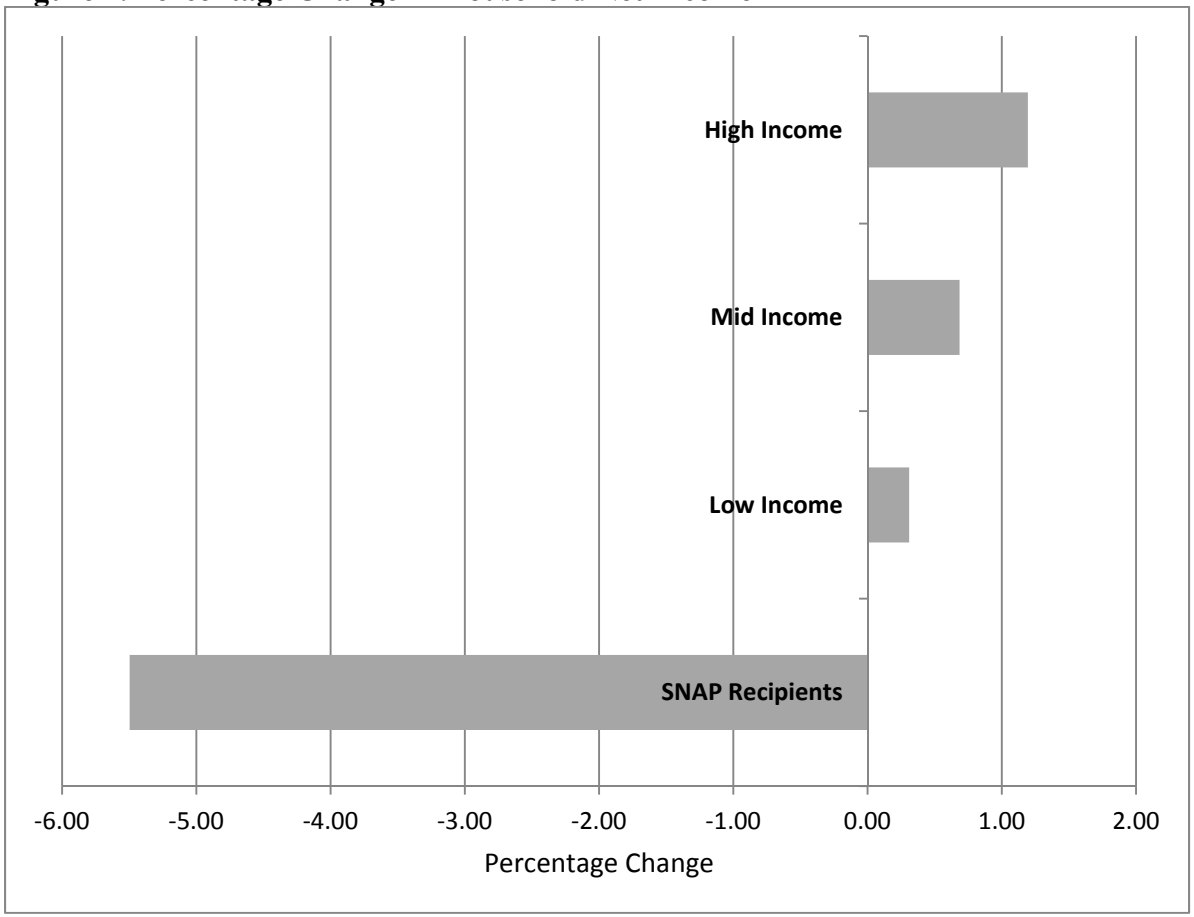

Figure 3. Percentage Change in SNAP Recipient Household Consumption

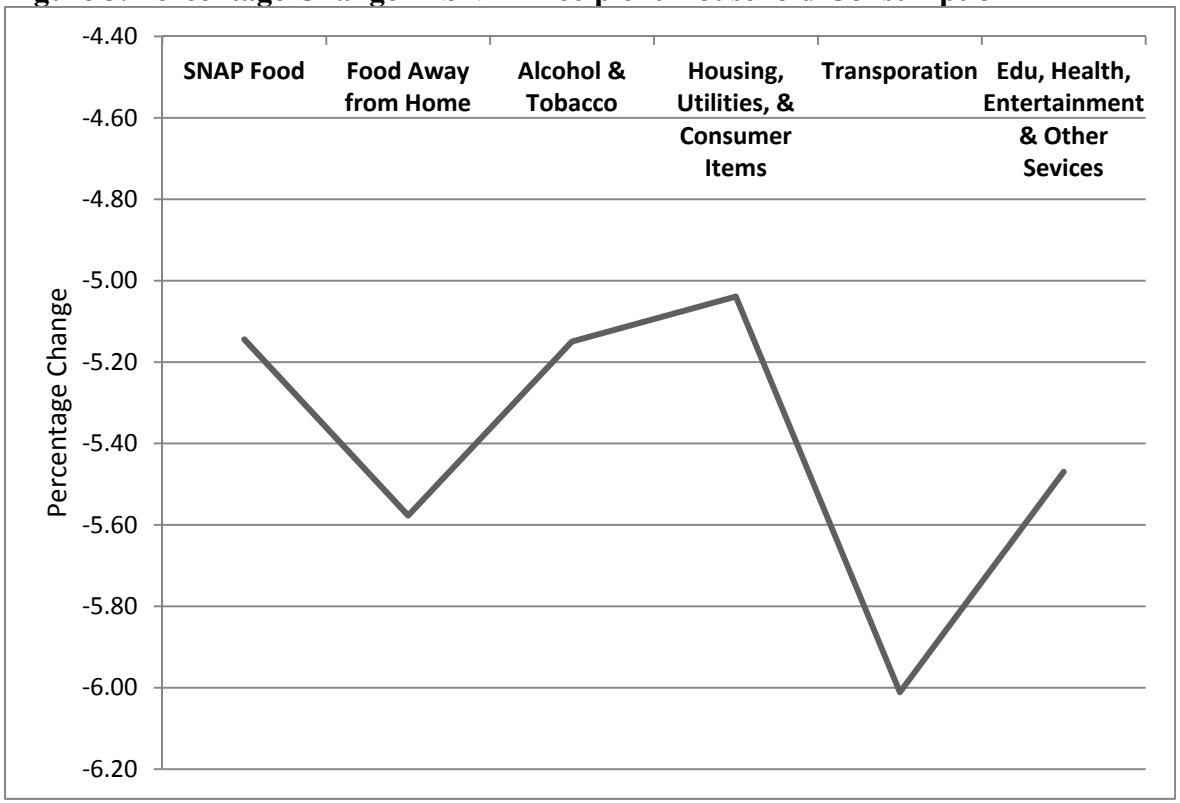

Figure 4. Percentage Change in Ineligible Household Consumption

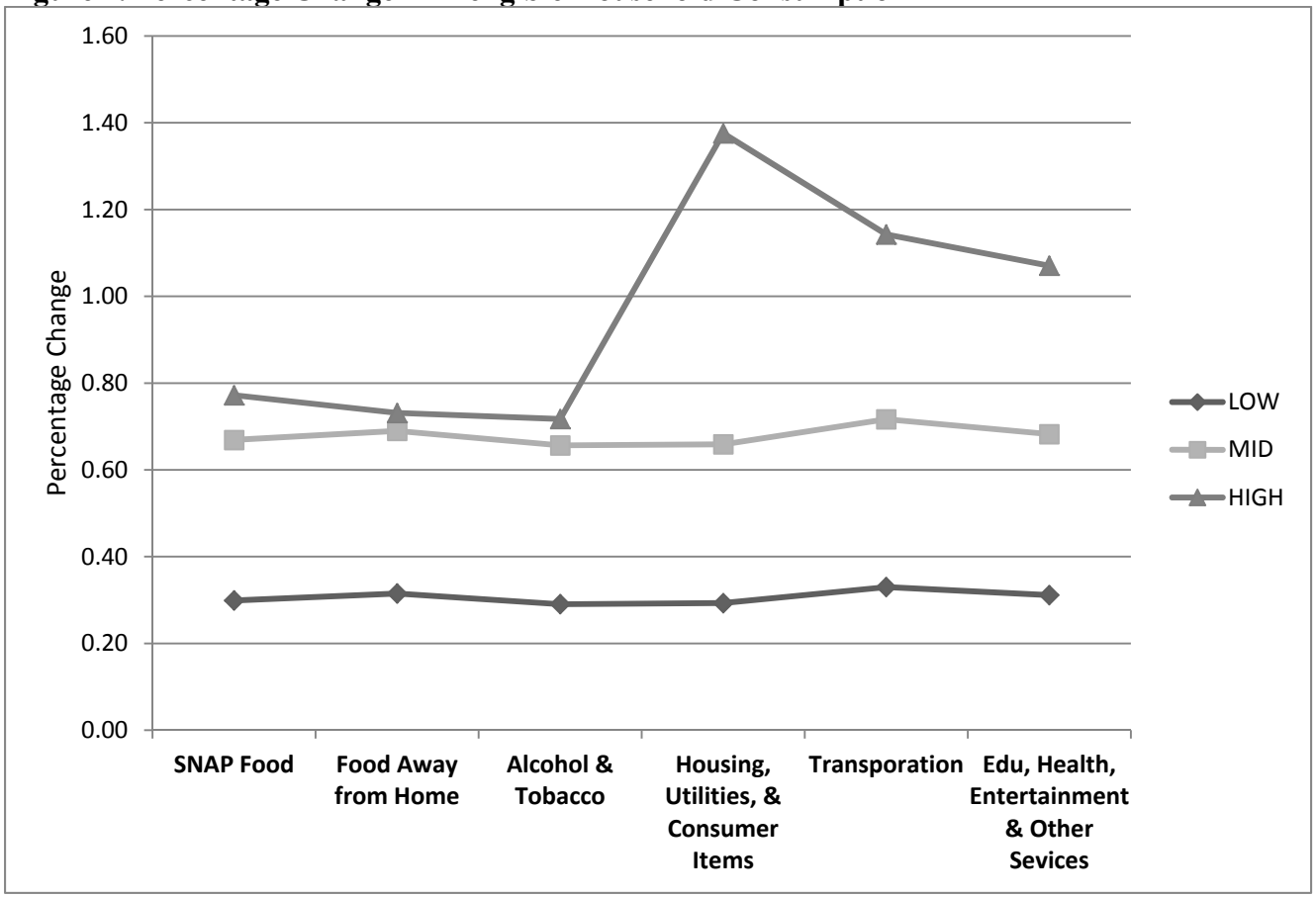

Figure 5. Percentage Change in Commodity Sector Output Value

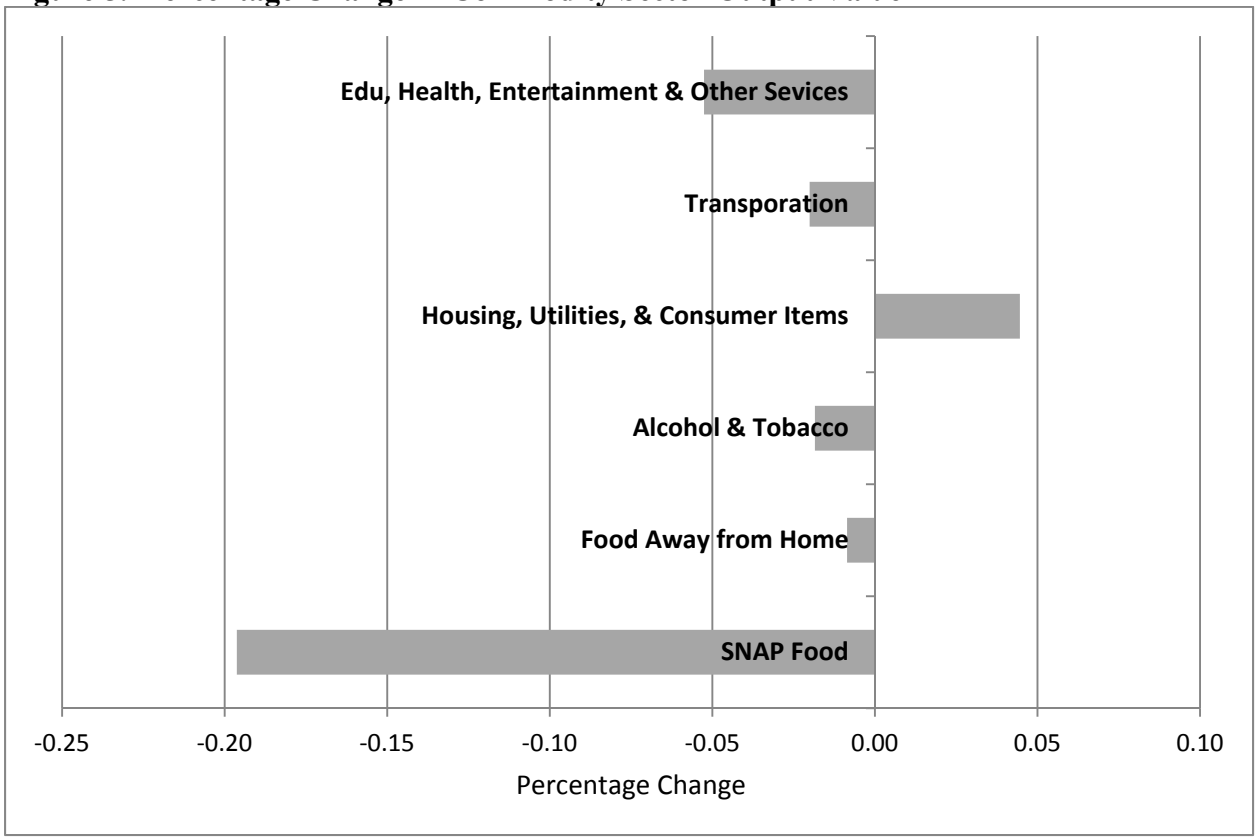

Figure 6. Percentage Change in Household Utility