Economywide Impacts of the Supplemental Nutrition Assistance Program

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Abstract

Most SNAP research focuses on individuals who receive SNAP without examining the effects on the broader economy. We develop a general equilibrium model of the U.S. economy to quantify SNAP's broader fiscal consequences. We find that SNAP expands the agricultural and food sectors by about 1% while shrinking service sectors favored by higher-income households. Effects on goods and factor prices are modest, with virtually no deadweight losses associated with the taxation needed to fund SNAP. SNAP improves the welfare of low-income recipient households by 4.9%, while having a negligible adverse effect on high-income households.

Introduction

In 2021, there were about 37.9 million people living in poverty in the U.S., translating to a poverty rate of about 11.6% of the U.S. population (Creamer et al., 2022). Poverty remains a persistent problem in the U.S. and the federal government has traditionally funded a number of programs to reduce the rate and mitigate the effects of poverty. The Supplemental Nutrition Assistance Program (SNAP) is the largest food and nutrition assistance welfare program in the U.S. and is intended to help families that are facing food insecurity (King, 2022). Most of the literature on SNAP estimates its effect on individual-level indicators like food security, child malnutrition, child development, school performance, and crime rates (Pender et al., 2014; Mabli and Ohls, 2015; Hoynes, Schanzenbach, and Almond, 2016; Gennetian et al., 2016).

Despite the amount of evidence showing the effectiveness of SNAP, some U.S. policymakers periodically express skepticism about SNAP due to its fiscal burden (Nestle, 2019; Rachidi, 2021). Understanding the economywide impacts of this program is beneficial for informing policymakers (Jones, Toossi, and Hodges, 2022). Studies using input-output multiplier analysis have shed light on this issue. For example, a $1 billion increase in SNAP expenditures has been found to be associated with a $1.50, $1.74, or $1.79 billion increase in national GDP, depending on the time period and circumstances being studied (Hanson, 2010; Blinder and Zandi, 2015; Canning and Stacy, 2019). Subsequent studies suggest that the benefits accrue disproportionately to rural areas compared to urban areas, in part because of the stimulus to relatively rural food and agricultural sectors (Vogel, Miller, and Ralston, 2021). As input-output models, these studies assume fixed behavior among consumers and producers, do not examine welfare of different households, and do not account for potential distortionary effects of taxation (Burfisher, 2021; Reimer, Weerasooriya, and West, 2015). There is a need for updated macro-level analysis that adds heterogeneity by income, and allows for price changes.

This study employs a general equilibrium approach to quantify the economywide effects of the contribution of SNAP on the wellbeing of U.S. households, including households and economic sectors that do not receive direct benefits but which otherwise might be affected. A general equilibrium approach takes into account not only the effects of the program on recipient households, but also on high-income households as well as business sectors since they are affected by goods and factor price changes arising from SNAP's effects on consumption. In addition, high-income households and businesses contribute taxes that are used to fund SNAP. A social accounting matrix (SAM) is first created that details the quantities of goods and services produced in the economy, distinguishing nine household types, 19 sectors, two factors of production, and the U.S. plus a rest-of-the-world region. The model is based on established microeconomic theory and due to its generality, has numerous parameters that are calibrated using data from the SAM. The model is then used to simulate the economy in an equilibrium in which SNAP was not present. A comparison between an equilibrium with SNAP present (represented by the initial SAM) and a hypothetical no-SNAP equilibrium (represented by a SAM created with the model) is drawn to elicit the economywide effects of SNAP.

This general approach has been employed in Reimer and Weerasooriya (2019) to analyze the impact of the U.S. Farm Bill on the U.S. economy, and by Weerasooriya and Reimer (2020) to evaluate SNAP for a single state. Yet those studies left unanswered the questions that drive this contribution: what is the contribution of SNAP to different parts of the U.S. economy, and how does SNAP affect the welfare of different types of households throughout the economy?

The present study is unique in its focus on SNAP while using data for all 50 states (instead of one) and distinguishing nine representative households by income and consumer behavior. We demonstrate below that it is illuminating to distinguish the nine households because they are different in terms of access to in-kind transfers, reliance on labor versus capital earnings, and spending patterns driven by differing marginal propensities to consume. This study also uses disaggregated data on food and agricultural sectors to better match the focus of SNAP.

Our results suggest that SNAP has a large number of small effects throughout the economy. For example, the model predicts that net purchasing power for the poorest households would be 4.9% lower in the absence of SNAP. This translates to an equivalent variation of $2,265 per year per household. This is the amount these households would need to be able to maintain the utility they had under SNAP. Without SNAP, sales of food items would be approximately 1% or $20,970 million lower for businesses in the food and agricultural sector. This is large in absolute terms but small in percentage terms. Without SNAP, demand for capital and labor would be about 1% lower in the food and agricultural sectors, but demand for these factors would be created in other sectors. A number of other results will be described in the results and conclusions sections.

Background

Initially called the Food Stamps Program, SNAP was established in 1964 through the Food Stamps Act and is administered by the U.S. Department of Agriculture (USDA). SNAP is a countercyclical program, meaning that its fiscal impact rises and falls with economic downturns and expansions. SNAP benefits are generally provided through Electronic Benefits Transfer (EBT) cards provided at the state level that are credited with funds for qualifying purchases (USDA, 2023).

Eligibility requirements for SNAP vary by state but in general, gross income needs to be below 130% of the federal poverty line while net income has to be less than 100% of the federal poverty line. Liquid assets should have a value of $2,250 or less (Leschewski and Davis, 2022). There are certain exemptions for households with disabled or senior members. Automatic eligibility may be granted to those who are already eligible for other welfare programs (Aussenberg and Falk, 2022).

Due to data availability, we focus on the year 2019 for this study. This year also precedes the COVID-19 pandemic and therefore provides a relatively suitable baseline for the present time. In 2019 the 130% poverty line for a three-person household corresponded to an income of $2,495 per month or $29,940 per year. A total of $55,622 million was spent by the federal government on SNAP in 2019, supporting 35,702,472 persons. The average amount received per month was $130 per person or $258 per household (Tiehen, 2020).

Methodology

A social accounting matrix (SAM) was developed from IMPLAN (2020) data to represent the actual economy. The SAM shows the amount of food that low-income households consume using SNAP benefits to supplement their own resources. It also shows how the economy is oriented more towards food and agriculture than might be the case without SNAP. Furthermore, the SAM shows how much labor and capital are employed in the food and agricultural sectors, as well as other sectors, under the actual policy regime.

To elicit the impact of SNAP throughout the economy, the base scenario under SNAP is contrasted with a hypothetical or counterfactual SAM in which there is no SNAP (Appendix Figure F1). This requires characterizing how households and firms throughout the economy would make different choices if the policy was not available. To represent behavior and choices, an economic model must be specified. Comparison of the two SAMs will answer the research questions: what is the contribution of SNAP to different parts of the economy, and how does it affect the welfare of different types of households throughout the economy?

At a minimum, a multi-market equilibrium model is required so that interactions between sectors as diverse as food (purchasable under SNAP) can be linked to sectors such as health services (not purchasable under SNAP, but nonetheless potentially impacted through consumer substitutions). In addition, households that are not eligible for SNAP are affected in some way by the changes in demand and prices of goods in other sectors. These households and businesses may pay taxes to the federal government to fund SNAP. Finally, changes in the demand for output from different sectors influence the need for labor and capital, which affects factor returns. The factor payments (wages and rents) accrue to households, which sell their labor and capital to firms. Finally, government tax revenue is used to fund SNAP (Appendix Figure F2).

The model must be able to account for the fact that with an in-kind transfer for food, household cash is freed up for use in shelter, transport, and medical care. This has implications for the choice of demand system along with key parameters such as price and expenditure elasticities of demand. These issues are described after the data are introduced.

Data

Data on the 2019 U.S. economy are from IMPLAN (2020) and the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC) database from the U.S. Census Bureau. The study also uses tax data from the Internal Revenue Service (IRS) and household income data from the Congressional Budget Office (CBO). The SAM developed for this study distinguishes 19 sectors, with outputs of individual sectors usable as intermediate inputs in other sectors. The SAM distinguishes nine household categories by their income levels, and their consumption of the various goods and services produced from the sectors. The disaggregation of households by income levels allows for analysis of the distributional effects of the policy across households of various income levels.

Table 1 breaks out household spending by three broad categories. Households in the first category spend 13.1%, 29.2%, and 57.8% of their income on food including food away from home, other goods, and services, respectively (these are aggregates of the 19 goods and services). By contrast, households in the highest-income category spend 8.5%, 21.9%, and 69.6% on food, other goods, and services, respectively.

Table 1 also reports the share of household earnings that come from labor versus capital income. Households in the lowest-income category receive 80.8% of their earnings from labor, as opposed to 65.5% by the highest earning households. The share of income from capital is 19.2% for the lowest income category and 34.5% for the highest income households. Here, we see that higher income households derive a higher proportion of their income from capital while low-income households derive most of their income from labor.

In addition to labor and capital earnings, household spending power is enhanced by various types of transfers. Some transfers are household-to-household but most are from government. The government's role in the model involves collecting taxes and distributing tax revenues to households as subsidies and lump-sum transfers. Appendix table A1 reports consumption of selected goods and services in 2019 with SNAP as it existed. For example, households in category 1 spent an average $698 per household on meat and seafood and $1,353 on all other processed food. Households in category 9 spent $1,884 per household on meat and seafood and $4,076 on all other processed food in 2019. The biggest difference is in the service categories; households in categories 1 and 9 spent an average $8,443 and $76,268, respectively, per household on education and health. Readers can note the pattern of differences across rows and columns in Appendix table A1.

Model specifics

The general equilibrium model is adapted from the setup in Lofgren, Harris, and Robinson (2002). Our model differs by distinguishing nine different household types that have a range of incomes and spending patterns, including different behavioral responses. Households have different needs for welfare programs, with households 3-9 not qualifying for nutrition assistance. The general equilibrium model links the consumption of different households back to labor and capital usage by sector, along with fixed usage of intermediate inputs by sector. Because the number of equations is extensive, only highlights of the model critical for understanding the following analysis are presented below.

Households are assumed to maximize utility according to a Stone-Geary utility function, which allows for a minimum subsistence consumption level. Household demand functions resulting from the utility maximization are linear expenditure system (LES) functions:

$$D_{ih} = \lambda_{ih} + \frac{\beta_{ih}\left[I_h - \sum_j \lambda_{jh}(1+tc_i)p_j\right]}{(1+tc_i)p_i}, \qquad (1)$$

where D_{ih} is the final demand of good i by household h, λ_{ih} and λ_{jh} are subsistence-level parameters, β_{ih} is the marginal budget share parameter, I_h is the net household income, tc_i is the consumption tax rate paid by households, and p_j and p_i are the prices for goods i and j respectively.

Firms' production is modeled as a Leontief-CES production function that combines labor, capital and intermediate inputs:

$$Y_i = \frac{\theta_i}{1-tva_i-\sum_j ica_{ij}}\left(\sum_f \delta_{fi}\, F_{fi}^{-\rho_i}\right)^{-\frac{1}{\rho_i}}, \qquad (2)$$

where Y_i is the output of good i, θ_i is a shift parameter for the production function, tva_i is the value added tax rate for good i, ica_{ij} is the quantity of i used as an intermediate input per unit of good j, F_{fi} is the quantity of factor f demanded for good i, ρ_i is the exponent for the production function, and δ_{fi} is a share parameter for the production function.

The factor demand equation which equates the marginal cost of the factor in each activity to the marginal revenue product of the factor is given by:

$$\tau_{fi}w_f = \frac{pva_i\theta_i}{1-tva_i-\sum_j ica_{ij}}\left(\sum_f f\,\delta_{ffi}\, F_{ffi}^{-\rho_i}\right)^{-\frac{1}{\rho_i}-1} \delta_{fi}F_{fi}^{-\rho_i-1}, \qquad (3)$$

where τ_{fi} is the wage distortion factor for factor f in activity i, w_f is the rental rate for factor f, and pva_i is the value-added price (factor income per unit of activity) for good i. There are other equations in the model that are necessary for establishing equilibrium but (1)-(3) are key for understanding how household behavioral changes translate into general equilibrium adjustments.

The expenditure elasticities for food are exogenously determined from previous literature (Canning and Stacy, 2019; Reimer and Weerasooriya, 2019). The tax rates are also exogenous and were derived from the IMPLAN (2020) data. We assume that in the absence of SNAP, the taxes are given back to the households in the proportion that they pay taxes to the federal government, and households spend all the money they get back.

Key data and assumptions for the counterfactual scenario are presented in table 2. The first two household categories qualify for SNAP, with the first household category receiving $2,282 per household (56%) of SNAP benefits and the second household category receiving $1,406 per household (44%) based on CBO (2022). The table also has an estimate of average taxes paid to the federal government that are associated with SNAP (including the costs of program administration, at $4.8 billion). This ranged from $8 per household per year for the lowest-income group, and $3,257 per household per year for the highest-income group.

Table 2 shows that the first household category receives a net transfer (or subsidy) of $6,004 million with SNAP in place, but would have to pay an additional $25,031 million in taxes in the hypothetical no-SNAP equilibrium. The negative value of effective tax rate for households 1-2 implies that under SNAP, these households effectively receive more in government support than they pay out. Note that the effective income tax rate for households 3-9 changes under SNAP because it is assumed that they are no longer taxed to pay for SNAP. The analysis can also be run when the elimination of SNAP has no associated reduction in income tax rates for higher-income households. In this case, the tax revenues might still occur but could be used to offset national debt, to name one example. To foreshadow our results, this was tested and there was found to be very little or no difference in overall outcomes. The main results presented below correspond to the case where without SNAP, higher income households have their taxes reduced in proportion to the amount that a household category paid for SNAP. The effective income tax rate presented in Table 2 is used within the model in order to replicate how the economy would function without SNAP.

Appendix table A2 reports what are perhaps the most important parameters, namely, the household expenditure elasticities for food items, along with upper and lower bounds that are 50% different than the base case (Canning and Stacy, 2019; Reimer and Weerasooriya, 2019). In general, lower-income households have higher food expenditure elasticities compared to higher income households. The combination of factors above mean that the consumption patterns predicted in the event that SNAP is not in place represent the institutional implementation of the program.

Results

Household effects: Table 3 reports the welfare effects of changing from a SNAP to a no-SNAP equilibrium, by household category. These results are reported as the percent changes in net household income, utility and the equivalent variation ($/household per year). These provide general measures of the effect of SNAP on society. The first two households would experience reductions in their net incomes in the absence of SNAP because they initially receive SNAP transfers and then do not in the simulated equilibrium. For example, households in the first category would see a reduction in net household income by about 4.9% and would have an equivalent variation of -$2,265 per household per year. Equivalent variation is the adjustment in income that would alter household utility to equal the level occurring when SNAP is in place, at the new income levels. This means that if SNAP did not exist, these households would need an additional $2,265 per year in order to return them to the utility levels they had under SNAP. Households in the second category would have 2% lower net income and an equivalent variation of -$1,366 per household per year. The utility for households 1 and 2 falls by 0.6% and 0.2% respectively.

Table 3 shows that households which do not receive SNAP experience a rise in their incomes of between 0.12% and 1.08%, and have equivalent variations of between $100 and $3,288 per year. These indicate the mounts by which the households would be better off. Though household 10 is impacted more in absolute terms ($3,288), the percentage change in utility is negligible.

Table 3 also presents the equivalent variation weighted by the number of households in the rightmost column. Finally, an aggregate, overall net welfare effect is calculated to be approximately $4.8 billion. This is a slight loss for the economy, but ultimately an inconsequential 0.02% of GDP. This is best explained by distortionary effects of the U.S. tax system (Burfisher, 2021). For example, SNAP expenditures are possible due to income taxes paid by households which are not lump sum amounts. Rather, the taxes drive a wedge between households' marginal rate of substitution and their marginal product of labor. Taxation wedges can lead to an overall welfare fall for the economy as a whole. Again, the overall distortionary effect for all households is exceedingly small.

Average wage and capital rental rates: Without SNAP, the average wage rate would be 0.014% lower and the rental rate of capital would be 0.019% higher (Appendix table A3). Looking below the aggregate changes, recall that low-income households derive more income from labor (Table 1). Meanwhile some sectors rely relatively more on labor than capital. Appendix table A3 reports the share of labor versus capital in different sectors of the economy. For instance, labor's share of value added is 34.8% in the service sector but just 21.2% in the food and agricultural sector. In the manufacturing sector the share of value added from labor and capital is the about the same (18.8% and 18.7% respectively). The implication is that if SNAP affects a sector such as services relatively more, this can have a greater effect on lower income households, since they have a higher share of earnings from labor (Table 1).

Value of output: Table 4 reports individual sectors in terms of output, price, labor, and capital changes. The sectors are sorted by percentage change in output. In a no-SNAP equilibrium, households 1-2 have less in-kind assistance for food purchases. Households do not reduce food consumption by this full amount, but now must use cash previously applied for other goods and services for food. As a result, the following sectors shrink: all other processed food (-1.05%), meat and seafood (-0.99%), milk-based foods (-0.94%), livestock farming (-0.92%), and crop farming (-

0.87%). By contrast, the following service sectors are higher in a no-SNAP equilibrium: education and health (0.21%), finance and insurance (0.14%), apparel and textiles (0.08%), real estate and housing (0.06%), and all other services (0.06%). This is because households 3-9 have more disposable income since they no longer have to pay taxes that are used to fund SNAP; based on their expenditure elasticities (Appendix table A2) they spend their higher disposable income on non-food sectors in the rows towards the bottom of Table 4. For example, education and health sectors would experience the greatest increase in output, $6,744 million or 0.21%, which is indicative of the significance of these sectors in the economy.

Commodity price and factor usage: As indicated above, each of the food and agricultural sectors experience a decline in sales of about 1% due to reduced demand by the low-income households that no longer receive SNAP. These sectors are forced to reduce their production and this is reflected in the percentage price changes in column 2 of Table 4. Here, we see that all the food production sectors have lower prices in the hypothetical no-SNAP equilibrium. The changes in prices are small. Meanwhile there are higher prices for sectors like transportation, finance and insurance, wholesale and retail trade due to increased demand for these services by high income households which have higher disposable income.

It follows that food and agricultural sectors have lower demand for factors of production. Table 4 shows that the usage of labor, capital and intermediate inputs is about 1% lower in the absence of SNAP, for each of these sectors. Some of the non-food sectors such as finance, insurance, education and health have higher demand for inputs due to higher demand for these services among higher-income households. Labor and capital are reallocated from the food sectors to service and other sectors.

Alternative assumptions and robustness checks

This section presents results under alternative assumptions regarding the aggregation of households and production sectors, factor market assumptions, and household expenditure elasticities. (Readers less interested in these robustness checks can skip this section.)

Aggregation: In order to determine if the results are sensitive to disaggregation of households and production sectors, we ran the simulation again with aggregated household and production sectors. Instead of nine households there were two household categories: those that receive SNAP and those that do not. Sectors were aggregated up to three: agriculture, manufacturing and services. Appendix table A4 shows the results of this analysis. The aggregated reduction in output for the food and agricultural sectors is about 1%, similar to the results obtained under the main (disaggregated) analysis. The reader can inspect the detailed results for differences. Appendix table A3 presents a comparison between the changes in factor payments under these two cases. The results indicate that under the aggregated analysis, the changes in factor payments tend to be biased upwards. Breaking the sectors into more detail allows for more substitution possibilities.

Consumer behavior: Study results may be sensitive to different expenditure elasticities of demand for food among the nine household categories. Plausible lower and upper bounds of elasticities are given in columns 3 and 4 of Appendix table A2. Running the simulation using these alternatives is given in Appendix table A5. The impact of SNAP is transmitted more intensively under the larger elasticities, as might be expected. Nonetheless the differences with prior results are modest. Using lower and upper bound elasticities of demand for food, prices for food and agricultural sectors fall by 0.01% and 0.02% on average, respectively. The demands for labor and capital fall by about 0.5% and 1%, respectively. These results are reasonably similar to those in the main simulation.

To further account for uncertainty involving assumptions, we used bootstrapping techniques to obtain confidence intervals for key variables using different combinations of the range of elasticities presented in Appendix table A2. In this way we have confidence intervals around the main simulation's point estimates. We illustrate the results graphically in Figure 1 for changes in price, output, labor, and capital for key sectors associated with SNAP. The confidence intervals range roughly 0.01% around the point estimates. This exercise provides an additional measure of the uncertainty surrounding our point estimates.

Factor market assumptions: One of the unique benefits of general equilibrium analysis is that it translates changes in goods markets back into underlying factor markets. Four possibilities are examined:

> *Scenario 1:* Labor is mobile across sectors with overall supply fixed, while capital is fixed by sector (Table 4),
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> *Scenario 2:* Labor is mobile across sectors and overall supply is variable, while capital is fixed by sector (Appendix table A6),
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> *Scenario 3:* Labor is mobile across sectors and unemployment is possible, while capital is fixed by sector (Appendix table A6),
>
> *Scenario 4:* Labor is mobile across sectors and unemployment is possible, while capital is mobile across sectors and supply is variable (Appendix table A6).

Scenario 1 was presented above and scenarios 2, 3, and 4 are presented in Appendix table A6. The fixity of capital in scenarios 1-3 implies a short- to medium-run situation, while scenario 4 provides for more flexibility, such as if the supply of capital is declining when SNAP is expanding. The results are not particularly sensitive to the alternative factor market scenarios. We see, for example, that in alternative scenarios, output falls by 0.7 to 1%, and labor and capital use fall by similar proportions. In the fourth case, we assume that both capital and labor are mobile and flexible in supply; this allows that the supply of capital is inversely related to expenditures on SNAP (the latter of which tends to coincide with economic recessions and lower investment spending). Yet again, the differences tend to be minor. A reason is that compared to the economy overall, SNAP expenditures are small; this has held even in historical periods (outside this analysis) when SNAP expenditures were relatively high. Furthermore, even with factor market restrictions, firms and households have other avenues of flexibility by which to adapt to changing circumstances.

Conclusions and limitations

The purpose of this study was to conduct a general equilibrium analysis of the economywide effects of SNAP in the U.S. A counterfactual scenario where SNAP is assumed not to exist and the money is returned to the taxpayers is modeled. This hypothetical case is compared to the actual case where SNAP is in place. The point is not to suggest that SNAP is going to be discontinued; rather it is part of a methodology that we propose for imputing the unique effects of SNAP throughout the economy.

The results show that SNAP improves overall welfare by 0.56% for the lowest-income households, and that they would need an additional $2,265 per year (an average) to maintain their utility levels if they could not access SNAP. Without SNAP the disposable income of these households would be 4.9% lower. This highlights the significance of SNAP on the welfare of low-income households. Without SNAP, sales of food items would be about 1% or between $1.4 and $7.3 billion lower, depending on the sector, due to lower demand by low-income households. The demand for capital and labor is also about 1% lower in the hypothetical no-SNAP equilibrium. Labor would be reallocated to other nonfood sectors of the economy, mainly the service sectors which comprise about two-thirds of the U.S. economy.

Overall, this study finds that SNAP makes an economically significant positive impact on the households that receive it. It also has small, positive impacts on the agricultural and food-processing sectors, and results in very small reductions in spending on service sectors for which there is a high marginal propensity to consume. There are small welfare losses among higher-income households, but these are arguably a negligible proportion to those households.

The above results rely on various assumptions about model structure and consumer behavior. Therefore, we test the sensitivity of the results to alternative assumptions such as the aggregation of the sectors and household categories, expenditure elasticities of demand, and the flexibility of labor markets. Conducting the analysis under using aggregated sectors and households gives similar results for the changes in output, but biases the predicted changes in factor payments upwards. Using bootstrapping techniques, we constructed confidence intervals for key variables with respect to uncertainty we had about household expenditure elasticities. Alternative assumptions about the expenditure elasticities for food yielded a change in output, capital, and labor by about 0.5% for the food and agriculture sectors if SNAP was not in place. These differences are viewed as insubstantial.

There are a number of limitations of this study as is the case with any study. The first one is with regards to the functional forms assumed for the consumer demand as well as the production technologies. The cost of utilizing a large number of consumer demand systems and production functions is that fully flexible functional forms cannot be used due to lack of full information about appropriate parameterization. Therefore, relatively simple production functions (constant elasticity of substitution) and preferences (represented by linear expenditure systems) are employed. In these choices we allow for a large number of dis-similar firms and households, but use fairly conventional, somewhat restrictive functional forms with calibrated parameters, except in those cases where we allow for free parameters and then introduce bootstrapping techniques to generate confidence intervals.

Another limitation is that the parameters for the model were calibrated using historical data. These parameters could be different for different levels of SNAP expenditures, something which could distort this study's estimates of impacts. This type of drawback is a common feature of work that involves behavioral responses under different policy regimes (Lucas, 1976). In future work, we can explore other methods of estimating these parameters.

We also acknowledge that we have abstracted from other issues that are worthy of investigation. For example, an important question not addressed here is on how shifts in the macroeconomy impact the percentage of the population that lives in poverty and needs a program such as SNAP. By contrast, our research is on how SNAP – the major poverty program of the United States – affects the macroeconomy as a whole. We conclude that the greatest impact of SNAP is on the purchasing power of households with extremely low incomes. SNAP's effects on higher income households and the economy as a whole are quantifiable but are relatively insignificant.

Finally, this study complements the input-output multiplier literature on SNAP. A benefit of our general equilibrium approach is that the model characterizes the small behavioral actions made in the wake of a large federal program such as SNAP. This includes the effects on households and businesses that experience changes in goods and factor prices, and which may contribute financially to the program through taxes. In addition, we are able to provide a welfare analysis, and can allow for distortionary effects of taxation. These factors show that SNAP does not have as large as positive economic effects as multiplier studies do. This may be partly because of the different time period, in which there was not a recession, when SNAP might have an outsized impact. In addition, a general equilibrium model allows for adjustments by households and firms that dampen the adverse effects of a change; they have avenues to reallocate resources under a new policy regime. Despite the lack of large economywide impacts, it’s important to emphasize that our results show substantial distributive effects, with clear utility-enhancing benefits for households that qualify for SNAP.

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Table 1. Profile of U.S. households in 2019 with SNAP as it existed

Household	Income category ($/year)	Number of households	Spending on food including food away from home (%)	Spending on other goods (%)	Spending on services (%)	Labor's share of earnings (%)	Capital's share of earnings (%)
1	< 15,000	13,646,344	13.1	29.2	57.8	80.8	19.2
2	15–30,000	17,413,546	11.3	29.4	59.4	82.3	17.7
3	30,001–40,000	11,207,441	10.9	28.5	60.6	83.0	17.0
4	40,001–50,000	10,353,287	11.3	27.0	61.7	81.9	18.1
5	50,001–70,000	18,041,344	11.6	27.9	60.5	83.8	16.2
6	70,001–100,000	19,325,908	10.6	26.3	63.1	83.8	16.2
7	100,001–150,000	18,276,414	10.9	27.2	61.9	82.1	17.9
8	150,001–200,000	7,831,829	9.6	27.7	62.7	79.7	20.3
9	>200,000	8,709,787	8.5	21.9	69.6	65.5	34.5

Note: Authors calculations based upon SAM developed using IMPLAN (2020) data. Spending percentage represents share of all spending by the households.

Table 2. Counterfactual design for SNAP

Household	Net transfers to federal government (all in this category, $ millions)		Total income including from L, K, and transfers ($ millions)	Effective income tax rate		Average SNAP benefits received per year ($/hhld)	Average taxes paid for SNAP ($/hhld)
	With SNAP	Without SNAP		With SNAP	Without SNAP		
1	-6,004	25,031	631,906	-0.010	0.040	2,282	8
2	-21,539	2,548	1,091,307	-0.020	0.002	1,406	22
3	-5,985	-6,986	921,859	-0.006	-0.008	0	89
4	14,918	13,416	970,505	0.015	0.014	0	145
5	92,787	90,006	1,975,430	0.047	0.046	0	154
6	188,043	184,372	2,708,529	0.069	0.068	0	190
7	343,785	338,779	3,662,727	0.094	0.092	0	274
8	273,519	260,726	2,295,878	0.119	0.114	0	1,633
9	860,878	832,510	5,293,921	0.163	0.157	0	3,257

Note: Authors calculations. The effective income tax rate accounts for the fact that most households have some amount of transfer from and to the federal government, whether these take the form of subsidies or taxes. The negative value of tax rate for households 1-3 implies that under SNAP, these households effectively receive more in government support than they pay out. Note that the effective income tax rate for households 4-9 changes under SNAP because it is assumed that they are no longer taxed to pay for SNAP (in this particular scenario). Effective tax rates for household 1 are calculated as -0.010 = -6004 / 631,906 and 0.040 = 25,142 / 631,906.

Table 3. Household effects of changing from SNAP to no-SNAP equilibrium

Household	Income category ($/year)	Net household income (%)	Stone-Geary utility (%)	Equivalent variation ($/hhld per year)	Number of households	Weighted equivalent variation
1	< 15,000	-4.86	-0.56	-2,265	13,646,344	-30,908,969,160
2	15–30,000	-2.17	-0.23	-1,366	17,413,546	-23,786,903,836
3	30,001–40,000	0.12	0.01	100	11,207,441	1,120,744,100
4	40,001–50,000	0.18	0.02	160	10,353,287	1,656,525,920
5	50,001–70,000	0.17	0.02	174	18,041,344	3,139,193,856
6	70,001–100,000	0.19	0.02	228	19,325,908	4,406,307,024
7	100,001–150,000	0.26	0.03	408	18,276,414	7,456,776,912
8	150,001–200,000	0.86	0.09	1,670	7,831,829	13,079,154,430
9	>200,000	1.08	0.10	3,288	8,709,787	28,637,779,656
1-9	All combined				124,805,900	4,800,608,902

Note: Results from general equilibrium model. Equivalent variation (EV) is the adjustment in income required to keep utility equal to the level occurring when SNAP is in place. For context, the $4.8 billion aggregate EV was 0.0002 of the U.S. GDP of $21.4 trillion in 2019.

Table 4. Decomposition by sector: Changing from SNAP to no-SNAP equilibrium

Sector	Price (%)	Output ($ million)	Output (%)	Labor use ($ million)	Labor use (%)	Capital use ($ million)	Capital use (%)
Food away from home	-0.002	-7,392	-0.711	-100,997	-0.701	-1,150	-0.733
All other processed food	-0.019	-5,083	-1.053	-13,064	-1.049	-591	-1.081
Meat and seafood	-0.019	-3,199	-0.995	-6,388	-0.978	-135	-1.010
Crop farming	-0.026	-2,261	-0.856	-23,571	-0.929	-739	-0.961
Milk based foods	-0.010	-1,560	-0.942	-2,380	-0.922	-139	-0.955
Livestock farming	-0.010	-1,474	-0.916	-9,169	-0.908	-389	-0.940
Petrochemicals	-0.005	-723	-0.052	-462	-0.029	-160	-0.061
Energy	0.002	-422	-0.023	-99	-0.006	-176	-0.038
Alcohol and tobacco	-0.006	-263	-0.136	-313	-0.102	-49	-0.134
Mining	0.004	-11	-0.009	27	0.009	-9	-0.023
Apparel and textiles	-0.024	60	0.070	393	0.090	3	0.058
Construction	-0.001	91	0.05	2,142	0.018	-65	-0.015
All other manufacturing	-0.009	156	0.004	1,810	0.021	-58	-0.012
Wholesale retail trade	0.002	404	0.011	5,387	0.023	-63	-0.010
Transportation	0.002	738	0.051	7,282	0.062	73	0.030
Real estate and housing	0.012	2,852	0.075	8,156	0.094	1,274	0.061
Finance and insurance	0.004	4,488	0.140	15,822	0.152	912	0.120
All other services	-0.001	5,993	0.052	50,819	0.066	813	0.034
Education and health	-0.005	6,744	0.206	64,605	0.243	648	0.211

Note: Results from general equilibrium model. Sectors are sorted by change in output.

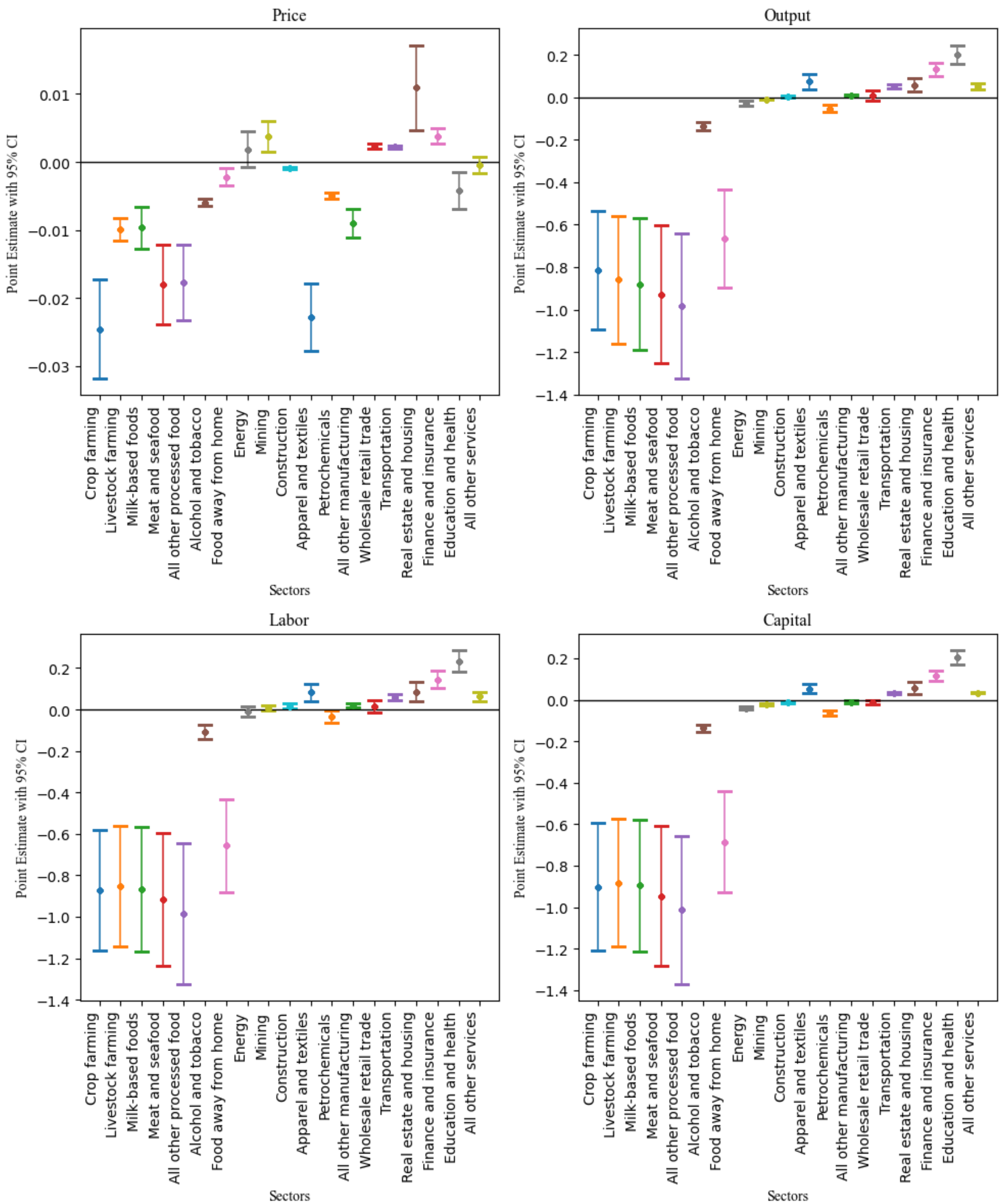

Figure 1. Confidence intervals for key results under variable consumer elasticities

Source: Author illustration.