Effects of the Supplemental Nutrition Assistance Program on Rural and Urban Areas in Oregon

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INTRODUCTION

The Supplemental Nutrition Assistance Program (SNAP), formally known as the food stamp program, provides food purchasing assistance for low and no-income individuals living in the United States. It is a federal aid program administered by the U.S. Department of Agriculture (USDA) under the Food and Nutrition Service (FNS). SNAP is the nation's most important anti-hunger program with an expenditure of $74 billion across 46 million recipients in 2014 (USDA Food and Nutrition Service 2016). In recent years, SNAP expenditures have begun falling due to improving economic conditions. By fiscal year 2024 and adjusting for inflation, it is projected that SNAP expenditures will fall by approximately $24 billion, or 3%, from where they were in 2014 (United States Congressional Budget Office 2015).

Nonetheless, SNAP has been and remains the subject of controversy. For example, the House Budget Committee has introduced a budget plan that would convert SNAP into a block grant beginning in 2021 and cut funding steeply, by as much as $125 billion (34%) over 10 years (Center on Budget and Policy Priorities 2015). In reviewing debates of these policy proposals, it has become clear that there are fundamental questions about SNAP and what its effects are on the economy. A comprehensive analysis would consider not only direct beneficiaries and their well-being, but people and businesses that are indirectly affected by the program, as well as overall economic efficiency.

The academic literature has begun to address some of these issues. Yet much of the research has been focused on beneficiaries, as opposed to people indirectly affected by the

program as well as the broader economy. General themes include the relationship of SNAP with labor markets (e.g., Hanson and Gundersen 2002; Hanson and Hamrick 2004; Huffman and Jensen 2008), with health and nutrition (e.g., Yen 2010; Almond, Hoynes, and Schanzenbach 2011; Kreider et al. 2012; Lentz and Barrett 2013), and with food insufficiency (e.g., Gundersen and Oliveira 2001; Jensen 2002; Kabbani and Kmeid 2005; Wilde and Nord 2005; Nord and Golla 2009; Mykerezi and Mills 2010; Ratcliffe, McKernan, and Zhang 2011, Tiehen, Jolliffe, and Gunderson 2012; Dahl, DeLeire, and Mok 2014).

Only a few studies have addressed the effects of SNAP at a relatively macro scale, and these studies have been at the national level (e.g., Hanson et al. 2002; Reimer, Weerasooriya, and West 2015). In between the extreme of individual-level analysis, on the one hand, and nation-level analysis, on the other, is a need for analysis at the regional level. At least one study of SNAP has argued for place-based research (e.g., DeBono et al. 2012).

Even more than regional analysis, the distinction between urban and rural areas is potentially of great interest but has received little attention in the literature. Poverty and SNAP participation are often associated, at least by the public at large, with distressed urban areas. However, SNAP is clearly important in rural areas as well as urban areas. There are at least two reasons why the urban/rural divide in this manner is of particular interest. First, SNAP eligibility and participation is proportionately higher in many rural areas of the United States, reflecting potential factors such as higher rates of unemployment (USDA Food and Nutrition Service 2016). Rural areas also tend to have more agriculture and food production, however, and these are the very economic sectors that might be positively influenced by the allocation of federal resources towards SNAP. For these reasons, the geographical dimension of SNAP is of interest in its own right. Although SNAP was legislated and is administered

without regards to location, the regional impacts may significantly vary, due not only to the distribution of impoverished households, but also to uneven distribution of economic activity across the landscape.

This study provides a comparison of the economy-wide effects of the SNAP in rural and urban areas, focusing on the state of Oregon in the year 2011. The questions addressed in this study are: How much do SNAP eligible and ineligible households in Oregon gain and lose from this program? How does SNAP affect the size of different sectors of the Oregon economy? What influence does SNAP have on labor markets, trade and the gross regional product (GRP) of Oregon as a whole? In a broad sense, the study seeks to delineate urban/rural distinctions within a specific geographic area, namely the state of Oregon. Limiting the scope of the study in this way makes it more of a case study approach, but has certain advantages in terms of data availability and precision within which certain issues can be discussed. A further objective of this study is to estimate the degree of additionality associated with SNAP, in particular how much an extra dollar of spending on SNAP translates into additional food spending.

To achieve these objectives, a social accounting matrix (SAM) is constructed for Oregon using 2011 IMPLAN data along with supplemental information from the USDA Food and Nutrition Service and other sources. Four representative household types are constructed that differ in terms of rural/urban location, and whether they are eligible for SNAP. Each of the four household types are also distinguished by income level, sources of income, consumption patterns, and transfers to and from each other and government. As constructed, the SAM embodies the effects of SNAP and the Oregon economy as it was in 2011. To isolate the impact of SNAP, the structure of the economy in the absence of this program is

then simulated. This counterfactual scenario is then compared to the actual 2011 Oregon economy to make an inference about SNAP's impact.

The unobservable Oregon economy without SNAP is created with a computable general equilibrium (CGE) model that is parameterized by the SAM described above. The CGE model is a heavily modified version of the CGE model described in Löfgren, Robinson, and Harris (2002). Predicted values from the CGE experiments are compared to baseline data that already embodies the effects of SNAP on rural and urban economy of Oregon. Linkages to regions outside Oregon, including the rest of the United States and rest of world, are incorporated. In making this comparison, differences in the demand for labor and capital, the output of industries directly and indirectly affected by SNAP expenditures, and the welfare and food security of households that do and do not participate in the SNAP are quantified.

A benefit of general equilibrium analysis is that it enables the researcher to keep track of the flow of funds from taxpaying households through to beneficiary households. It recognizes that a dollar spent somewhere must come from somewhere else. Households that effectively fund the program through their taxes have less disposable income as a result of the program. The pattern of spending in the presence of SNAP therefore leads to an economy potentially quite different than would otherwise occur. As outlined above, there are reasons to expect that the effects may vary across rural and urban regions. The case of Oregon, which has urban and rural regions as in many areas of the United States, is used to explore this issue.

The remainder of the paper is as follows. The next section provides a detailed description of the data and SAM for Oregon in 2011. The subsequent section describes the CGE model, focusing on the aspects that are unique to the present study. It also describes how the policy experiment, i.e., the counterfactual scenario, was carried out. Subsequent

sections report and analyze the results, describe limitations of the study, and provide conclusions and implications for other regions and for future studies.

SOCIAL ACCOUNTING MATRIX

IMPLAN data detailing the structure of the regional income and product accounts of Oregon in 2011 were used to create the SAM. IMPLAN data delineate 440 sectors but to make the analysis tractable, sectors of lesser importance were aggregated such that in the end, there are 35 economic sectors examined in the analysis. The 35 were chosen to emphasize issues of key importance to the analysis, including certain agricultural and food categories that are likely to be most influenced by SNAP purchases. Although Oregon does not rank among the largest states in terms of the value of agricultural and food production, these sectors are nonetheless key to the state's economy and constitute a substantial share of overall employment. Many of these jobs are in rural parts of Oregon and therefore could be sensitive to purchasing patterns that are influenced by SNAP.

IMPLAN data also distinguish nine households, but as with sectors, these are aggregated to make the analysis tractable. To be eligible for SNAP benefits a household 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 (Center on Budget and Policy Priorities 2015). On this basis, it is assumed that IMPLAN household categories 1-3, with incomes between $0 and $25,000 consist of households that are "SNAP eligible." IMPLAN household categories 4-9 are considered as "SNAP ineligible" households within this study.

A highly aggregated version of the SAM, inclusive of all of Oregon's 36 counties, is presented in Table 1. The 35 sectors of the actual SAM have been aggregated to six, while

households have been aggregated into a single household. This is for presentation purposes only. The columns and rows correspond to a unique account, with a cell corresponding to a payment made from the account of its column to the account of its row. Adhering to the double-entry accounting principle, for each account in the SAM, the total revenue/row total equals total expenditure/column total. The SAM consists of activities, commodities, factors of production, households, institutions and rest of the world trade. Activities are numbered in the SAM as 1-6 and commodities are numbered as 7-12. Separation of activities and commodities permits activities to produce multiple commodities (e.g., poultry as an activity will result in chicken as well as eggs) and also allows any commodity to be produced by multiple activities. As an example, consider the first row. It implies that agricultural and natural resources activities created $8,522 million of agricultural and natural resources, $50 million in manufactured goods, and $16 million of services. At the end of the row the total income for this activity is reported as $8,527 million. The first column of Table 1, by contrast, corresponds to the expenditure made for the activity under agricultural and natural resources. This activity used as intermediate inputs $2,247 million of agricultural and natural resources, $19 million of food and beverages, $1,309 million of manufactured goods, and lesser amounts of the remaining commodities. This activity also required $1,940 million worth of labor and $1,532 million of capital. Finally, this activity paid $1 million worth of business taxes. The total of the first column is $8,527 million, which matches the corresponding row and means the account is balanced. Other activities can be read similarly.

For the commodities in Table 1, consider the eighth row corresponding to food and beverages. Looking across this row, it was used as an intermediate input ranging from $19 million for agricultural and natural resources to $3,424 million for food and beverages. Sales

of food and beverages to all Oregon households were $12,794 million, while government consumed $472 million, $58 million was invested, and $8,486 million was exported. On the other hand, the eighth column shows that food and beverages was produced by the activities food and beverages as well as services, while $36 million was paid to the investment account and $6,396 million was imported. This column total matches the corresponding row total. The rest of the commodities can be explained similarly.

The thirteenth row of Table 1 depicts payments to labor. Services were the single largest employer of labor, at $52,695 million. Total payments to labor were $90,550 million. The thirteenth column depicts labor revenue by households, which sold $79,161 million worth of labor while government derived revenues of $11,389 million associated with government or factor taxes. This brings the total labor revenue side to $90,550 million.

Within Table 1, the gross regional product (GRP) of the Oregon economy can be calculated two ways. First, is the final demand GRP, which can be obtained by adding household consumption, government consumption, investment and net exports and subtracting institutional sales ($135,498 + $33,100 + $25,315 - $18,255 – $9,536 million), resulting in $166,122 million. Second is value added GRP, which is obtained by adding household income/employer compensation, proprietor income plus other property type income and tax on production and imports ($90,550 + $64,039 + $11,533 million), also resulting in $166,122 million.

OVERVIEW OF SNAP AND THE OREGON ECONOMY

While the macro SAM of Table 1 reveals much about the Oregon economy, there are other aspects to be considered that will inform our counterfactual scenarios below. In 2011, median

household income was $46,816, which was slightly below the national median of $50,502. The per capita income was $25,228 which again was lower than the national value of $26,708 (Bureau of Economic Analysis 2015). Table 2 reports a number of related statistics. The 2011 population of Oregon was 3.9 million, with 3.2 million living in urban counties and 0.7 million living in rural counties. Oregon consists of 36 counties out of which 23 are categorized as rural and the rest as urban (Bureau of Economic Analysis 2015). In 2011, approximately 758,608 Oregon residents received $1,189 million of federal SNAP expenditures, which corresponds to 1.63% of total federal SNAP expenditures (USDA Food and Nutrition Service 2016). Approximately one out of five Oregonians received SNAP benefits in 2011. Oregon contributed approximately $670 million towards SNAP, calculated on the basis that Oregon's overall contribution to federal revenue is 0.93%. This implies that Oregon is a net recipient of SNAP funds on the order of $519 million.

Oregon has witnessed a growing divergence in economic outcomes across rural and urban areas. While urban Oregon has been recovering steadily from the last recession, rural Oregon communities are struggling due to a combination of reduced demand for timber products (a mainstay of many rural economies), and a reduction in federal payments that compensate rural counties for federal policies that limit logging on federal lands.

Table 3 reports the number employed, output, income and tax on production and imports for rural and urban Oregon across a set of industries. It can be seen that in most cases, the shares are larger in the urban areas. Yet despite having less than 17% of the state's population, 44% of agricultural and natural resource activity is in rural areas, while 18% of food and beverage employment is in rural areas (Table 3). Further, Weber and Lewin (2013) stipulate that food assistance programs in Oregon play a vital role in rural and urban areas.

According to the Oregon Food Bank (2014), the proposed cut of $24 billion in 10 years would eliminate 90,921 low-income participants from SNAP or nearly one eighth of those who currently rely on the program. Out of these, 33,290 or 37% would be children. As only 22% of all Oregonians are children, SNAP cuts would disproportionately impact children by a significant margin. The participation rate among eligible populations is amongst the highest in the U.S. where it is around 94 – 100% as opposed to California, where it is around 53-59% (USDA Food and Nutrition Service 2014). Hence, Oregon provides an interesting scenario in which the impact of SNAP benefit can be studied across rural and urban areas.

REGIONAL CGE MODEL FOR OREGON

In order to gauge the impact of SNAP, we need to compare the Oregon economy where SNAP is already in place to an economy when there is no SNAP. This unobserved scenario needs to be simulated, and to achieve this, we employ a regional CGE model. The regional CGE model follows a relatively standard, neo-classical economics approach incorporating optimizing households and firms, intermediate input use, inter-household and government transfers, savings and investment, government, and trade with the rest of the world. The model is based on a set of simultaneous linear and nonlinear equations that define the behavior of economic agents as well as the market equilibrium conditions. The SAM (the macro version of which was reported in Table 1) is used to calibrate most model parameters, e.g., the production function shift and share parameters for each sector. During calibration, all prices are set to unity and the base year factor levels and SAM flows are substituted into the model as equilibrium values of model variables. The model also contains a number of exogenous parameters that are set by the user. These are set at values commonly employed in

CGE analyses (Waters, Holland, and Weber 1997; Löfgren, Robinson, and Harris 2002; Holland, Stodick, and Painter 2007; Mccullough et al. 2011). One example is the expenditure elasticities which significantly impacts the analysis. They are set to the values seen in Table 4, which also lists the 35 sectors of the model. The regional CGE model is as described in Löfgren, Robinson, and Harris (2002), except with the following modifications below.

Regional model with external connections

Instead of modeling a country as a whole (as in Löfgren, Robinson, and Harris 2002), a distinct region within a country is modeled, specifically, Oregon as one state within the United States. Oregon's relations with the rest of the United States, as well as the rest of the world, are separately distinguished. There are four representative households that receive income from labor, capital, and transfers. They spend money on commodities, transfers, taxes, and investment. Regional firms use labor, capital, and intermediate goods to maximize profits using constant returns to scale production technology. Regional state governments collect taxes and receive transfers from other institutions, with spending constrained to equal revenue.

Households in the region receive income from labor, capital, inter-household transfers, federal and state government transfers, and investment income. Households spend money on commodities, inter-household transfers, federal and state government taxes, and investment. Household consumption demand is governed by a linear expenditure system (LES), derived from a Stone-Geary utility function. In the model, households are assumed to maximize their utility subject to their budget constraint. LES demand functions indicate how a household's

optimal bundle of goods will change in response to changes in prices and their spending constraint.

On the production side, intermediate inputs, labor, and capital are combined by a constant elasticity of substitution (CES) production function. Intermediate inputs are governed by Leontief's technology. Furthermore, domestically sold and exported commodities are substituted through a constant elasticity of transformation (CET) function with an assumption of imperfect transformability between the two. Domestically produced commodities and imported commodities are substituted by the CES aggregation function, reflecting imperfect substitutability between imports and domestic output sold domestically. Changes in the demand of any household can be transmitted broadly to every other part of the economy, directly through consumer accounts and indirectly through input-output accounts. Market equilibrium is reached by agents optimizing objective functions subject to macro-economic constraints, including the balance of payments, savings-investment balance, government budget balance, and an aggregate supply of primary factors constraint.

Equilibrium in factor markets and macroeconomic balances is established through a number of closure rules, that is, classification of variables into fixed and endogenous. Closures were chosen in part to assure that equivalent variation and related welfare measures are theoretically consistent with the general equilibrium framework used in the study. It is assumed that capital and labor are fully employed, fixed in supply, and mobile across sectors. The consumer price index (CPI) is held constant, and serves as the numéraire, implying that all simulated price and income changes should be interpreted as changes vis-à-vis the consumer price index. In addition, investment is savings driven.

The model makes use of IMPLAN employment data by sector, which allows the model to directly calculate actual numbers of jobs (QF). In addition, these data are used to calibrate a factor productivity factor index by sector (WFDIST) that represents sectoral differences in factor productivities. For example, it allows that labor in farming and certain services is less productive than labor in petroleum refining and certain types of computer services. The state of Oregon is treated as a small open economy, meaning that it cannot affect the prices it pays for imports from outside the state, or the prices it receives for exports from the state.

Rural versus urban distinction

There are four types of households in the analysis: urban households that are eligible for SNAP, urban households that are ineligible for SNAP, rural households that are eligible for SNAP, and rural households that are ineligible for SNAP.

Rural and urban shares are derived from IMPLAN data as they are collected at county level. Counties are divided into rural and urban based on the Bureau of Economic Analysis (BEA) classification. Rural and urban shares are calculated based on population in each category i.e. eligible and ineligible. Finally, the results obtained from the CGE model will be decomposed based on these shares. This approach is sometimes described as a top-down shared approach (Bernat and Hanson 1995). It is a reasonable approximation when the regions are well integrated, which is the case for Oregon.

Table 5 presents aggregate expenditures for each household type in Oregon. Looking at this table, rural and urban SNAP-ineligible households constitute the majority of expenditures at $20,174 million and $96,185 million, respectively. Rural and urban SNAP-

eligible households comprise $3,184 million and $15,181 million of spending, respectively. The rural-urban splits are made using IMPLAN data on county economic activity.

BASELINE SCENARIO AND THE MODEL EXPERIMENT

The model described above is a simultaneous system of non-linear equations written for General Algebraic Modeling System (GAMS) software. The joint equilibrium values of the endogenous variables are calculated using the PATH non-linear programming solver. Once its parameters and flows are calibrated, the model replicates a baseline scenario in which SNAP taxation and expenditures are in place. In 2011, federal and state government spent a total of $1,189 million dollars on SNAP (USDA Food and Nutrition Service 2016) for Oregon. As shown in Table 2, 81% of the eligible population are in urban areas while the remaining 19% of the eligible population is in rural areas (USDA Economic Research Service 2016). However, participation as a percentage of total population is higher in rural areas (23%) than urban areas (19%) as higher poverty rates drive higher propensity to participate in SNAP.

To investigate the contribution of SNAP towards rural versus urban households within a region, a prediction is needed regarding the economy would be like without this program in place. Predicting how the economy would be different if SNAP was not in place would then enable us to determine the impact of SNAP on the Oregon economy. The counterfactual is carried out by manipulating a federal income tax parameter within the model, denoted by *ty*. This parameter represents the percentage of income that households pay to (or receive from) the federal government. These tax rates are for the federal government non-defense spending account, and therefore do not represent taxes to other government accounts such as the federal

government defense account, or the state government accounts. The federal government non-defense account was chosen because it is where SNAP expenditures embedded within the IMPLAN data. It is assumed that SNAP budget is financed through tax money. When there is no SNAP, the eligible households incur an income tax to the federal government non-defense account; $884 million with a corresponding tax rate of 4.80% and ineligible households; $9,657 million with a corresponding tax rate of 6.49%. The overall contribution of Oregon to federal revenue is at 0.93%. Using this, Oregon's share of overall SNAP budget was estimated to be $670 million. When SNAP is implemented nationally, Oregon receives $1,189 million and their taxes would be increased by $670 million (as Oregon has to contribute towards the SNAP budget). This implies that Oregon is a net receiver of SNAP benefits. Hence, $1,189 million worth SNAP benefits are awarded to eligible households and the income tax to the federal government non-defense account becomes -$305 million with a corresponding tax rate of -1.66% (i.e. negative tax rate implies a transfer from the government). The $670 million cost is achieved by imposing taxes on SNAP-ineligible households. Income tax to the federal government non-defense account increases to $10,328 million with a corresponding tax rate of 6.94%. Solving for the model's endogenous variables under these two assumptions provides a counterfactual scenario in which SNAP was not in place in 2011, the baseline year of the analysis. A comparison will be made going from not having SNAP (the counterfactual) to having SNAP (the reality).

RESULTS

There are a variety of effects to consider in moving from an equilibrium without SNAP to one with SNAP. The most fundamental change is on disposable income by household type. From

this comes a succession of effects: consumption by household, production by economic sector, exports and imports, and firm demand for labor, capital, and other inputs, which in turn further affects household income. These effects may differ across rural and urban areas. Once these are reported, changes to household welfare and GRP are reported, along with aggregate changes in consumption categories associated with SNAP allocations (additionality).

Disposable income

Results are displayed in Table 6. SNAP raises disposable income of all eligible rural households by an average $244 million, and disposable income of all eligible urban households by $979 million. Of course, this increased disposable income must be spent on food and other items allowable under SNAP. However, this frees up disposable income for spending on other products, according to the parameterized demand system (these results are described below). Among ineligible households, rural households have an aggregate $29 million less disposable income than otherwise would be the case, and urban households have an aggregate $150 million less disposable income. From these results, it is clear that urban households in both eligible and ineligible categories have the largest change in disposable income. This reflects the greater population in urban areas, but also reflects actual differences in the households themselves.

To see this more clearly, changes in disposable income are also reported in Table 6 on a per household level, based on the information about households in Table 2. SNAP eligible urban households benefit greatest with SNAP, with a gain of $2,925 in disposable household income. Rural SNAP-eligible households, meanwhile, have an increase in disposable

household income of $900. Ineligible households, by contrast, have less disposable income with SNAP, as their tax dollars are going to pay for it. The declines are $142 and $156 for rural and urban ineligible households, respectively. The conclusion, therefore, is that urban eligible households gain more and urban ineligible lose more than their rural counterparts. This is intuitive as more poor eligible households as well as richer ineligible households both live in urban areas.

Consumption

The changes in disposable income by household induce changes in the consumption bundles of the households. These changes include direct effects of disposable income changes, plus the indirect influence of prices resulting from the choices of other households and firms.

It is important to emphasize that these changes are driven by the LES demand functions that allocate expenditures. Price and cross-price elasticities are calibrated from the SAM, but expenditure elasticities are set exogenously based on evidence in the literature. Looking at examples within Table 4, expenditure elasticities for crops are seen to be very inelastic, at 0.044 for SNAP-eligible households and 0.032 for SNAP-ineligible households. By contrast, expenditure elasticities for personal services are elastic, at 1.323 for SNAP-eligible households and 1.286 for SNAP-ineligible households. These differences play a large role in the subsequent results.

Changes in consumption patterns are reported in Table 7. Due to SNAP, overall spending by eligible households is $204.67 and $819.77 million higher in rural and urban respectively. This indicates that the eligible households have increased their consumption expenditure, and urban eligible households benefit most in the aggregate. This increase in

expenditure spans over all food and non-food categories. Beyond these aggregate effects, eligible households have increased their consumption expenditure notably on food at home ($6.09 million for rural and $24.38 million for urban), utilities ($11.77 million for rural and $47.15 million for urban), services ($46.25 million for rural and $185.25 million for urban), housing ($30.72 million for rural and $123.06 million for urban) and health ($52.89 million for rural and $211.85 million for urban). On the other hand with SNAP, spending by ineligible households is $61 and $320 million lower across all rural and urban households, respectively. This is plausible, as they have less disposable income under SNAP. There are notable decreases in expenditure on housing ($11.24 million for rural and $58.5 million for urban), health ($14.32 million for rural and $74.52 million for urban) and services ($15.19 million for rural and $79.06 million for urban). Interestingly, their food consumption expenditure has not decreased by a large margin. This is due in large part to the expenditure elasticities for food, which tend to be closer to zero (more inelastic) than for other goods and services (Table 4). Overall, the net impact of implementing SNAP has increased consumption expenditure for both rural and urban households by $143.12 million and $499.41 million, respectively.

It is also useful to view these changes in household-level terms which are possible by incorporating information on household numbers from Table 2. Table 8 presents the changes in consumption expenditure on a per household level. These results are similar in pattern to the results presented in Tables 7. SNAP increases consumption expenditure in eligible households ($753.4 for rural and $2,448.8 for urban) and decreases spending in ineligible households ($305.6 for rural and $333.8 for urban). On the average, at the household level,

consumption expenditures rise under SNAP in the amount of $309.4 for rural households and $438.5 for urban households.

Additionality and its implication on measuring SNAP impacts

Additionality is defined as the amount by which a dollar of program spending results in additional food spending (Levedahl 1995, Barrett 2002, Hanson 2003, Hanson and Oliveira 2009). Additionality is an index ranging from 0 to 1. An additionality of zero for SNAP would imply that all food purchased under SNAP would have been purchased anyway with the participants' own money. In this case, SNAP has no effect on food expenditure; the precise amount of money previously spent on food is now spent on other goods and services, or is saved. SNAP is essentially a cash transfer. At the other extreme, an additionality value of one implies that food expenditures rose by precisely the amount of the SNAP benefits. In this case, SNAP is very influential on food expenditure.

One might expect additionality for food to lie between these extremes, so it is helpful to consider the following example. Suppose that before the SNAP came into being, there were two low-income households, A and B. Household A spent $55 of its income on food per month, and B spent $130. Once SNAP comes into effect, each household qualified for 100 dollars' worth of SNAP benefits. Both households took advantage of these benefits, and spending on food by A and B rose to $100 and $165, respectively. This would imply that the household A and B increased spending on food by $45 and $35, respectively. Household A uses all of its $100 SNAP benefits while B uses $65 of its own and $100 of its SNAP benefits. Overall food spending increases by $80. Given total SNAP benefits of $200, additionality in this case is 0.4 (40%).

The regional CGE model treats SNAP benefits like cash, but these dollars are spent by households according to price and income elasticities that are unique by product and household. As with the household spending changes, expenditure elasticities (Table 4) influence the additionality results.

Additionality calculations are reported in Table 9 for SNAP eligible households in the top half of Table 9, and for all households in the bottom half of Table 9. The latter estimates accounting for the fact that higher-income households are generally worse off under SNAP. Since they reduce their spending by roughly the same amount as SNAP eligible households increase their spending, the effect is not as strong as might otherwise be the case. The effects are not necessarily easy to anticipate, however, since low- and high-income households spend their money across the 35 sectors in different ways, due for example to Engel effects.

Additionality in food and agriculture related goods (which would cover a majority of qualified SNAP purchases) was found to be 5.3% for SNAP eligible households. This implies that a dollar of SNAP spending raises expenditures on food and agriculture related goods by 5 cents. This declines to 4.0% when the spending changes for all households are considered. This implies 4 cents of increased food expenditure per dollar of SNAP benefits. If wholesale and retail trade is included in the calculation, the additionality estimate rises to 17.7% and 9.6% for SNAP-only and all households, respectively. This is lower than some previous estimates, such as the 26 percent for SNAP in Hanson and Oliveira (2009) and Levedahl (1995). The difference has multiple reasons. This analysis employs a general equilibrium model and takes into account 35 sectors in total; previous studies consider the food sector alone. Further, none of the previous studies consider the fact that tax-paying households (i.e. ineligible households) may have less disposable income due to the program. Further, this

analysis was done for a recent time period for a specific geographic area as opposed to a more national setting.

In addition, we estimated additionality for non-food categories as well as for all consumption categories combined. These are also reported in Table 9. It can be seen that for all of the main non-food categories, the additionality has increased. Interestingly, all consumption for SNAP eligible households has increased by $1 for each dollar they received as SNAP benefits. This goes down to 60 cents when we consider all households, since higher-income ones have to cut back on spending to fund the program.

Production and prices

As a result of the shifts in demand created by SNAP, there are changes in prices and hence production, as well as trade with other regions. Table 10 reports the change in total economic activity, labor activity, changes in the value of output, and percentage changes in commodity and producer prices after implementing SNAP. There is an increase in prices for most of the 35 sectors (only some of which are reported in the table). However, this increase is very small for all categories and the rise generally does not exceed 0.3%. Value of output rises for all sectors with notable increases in food processing ($11.38 and $29.55 million), food services ($6.14 and $34.65 million), manufactured goods ($3.21 and $64.13 million), wholesale and retail trade ($15.36 and $119.11 million), housing and construction ($22.51 and $147.23 million), health ($28.09 and $211.36 million) and services ($49.19 and $339.51 million) for rural and urban areas. Clearly, urban areas receive the bulk of the benefit of the changes, at least in terms of value of output.

Total economic activity is also increased in most industries with the exception of agricultural services (0.08% and 0.07%), crop farming ($0.006% and 0.005%) and durable goods manufacturing (0.01% and 0.19%). Notable increases in economic activity can be observed in food processing (0.04% and 0.10%), wholesale and retail (0.02% and 0.16%), housing (0.05% and 0.35%), health (0.10% and 0.76%), utilities (0.06% and 0.32%) and services (0.03% and 0.20%). However, the changes are generally less than 1%.

Despite the fact that SNAP matters importantly for Oregon households, both rural and urban, there are not dramatic changes by industry, at least in terms of prices. Yet the apparent stability belies the fact that there are winners and losers from the policy, and it is different sets of households making the purchases in any given sector. There are key differences in welfare, by household type, and this will be described after first discussing the factor market effects.

Factor market effects

SNAP's effects on labor and employment are presented in Tables 6 and 10. The latter reports percentage changes in the numbers of jobs, which may include part time as well as full time jobs per the IMPLAN data. Labor activity follows total economic activity, with most industries expanding labor activity under SNAP. Table 10 shows that labor activity has increased in industries with the exception of crop farming (0.007% and 0.006%), agricultural services (0.08% and 0.07%) and durables manufacturing (0.01% and 0.20%) for rural and urban areas. As in the case of economic activity, these changes were found to be very small. Food services (0.04% and 0.22%), wholesale and retail (0.02% and 0.16%), health (0.10% and 0.75%), education (0.03% and 0.92%), utilities (0.06% and 0.31%) and services (0.03%

and 0.20%) were some of the notable increases in labor activity. Overall, it was found that SNAP as a whole has increased the number of jobs by 189 in Oregon.

Table 6 provides more detail on these impacts by household, reporting changes in household labor income. There is an increase of labor income for both rural and urban households. However, the increase is lower among eligible households, that is, the very households who are more likely to be in need of greater income. In particular, the increase in labor income for eligible households ($3 million for rural and $13 million for urban) was less than that of ineligible households ($57 million for rural and $299 million for urban).

These differences are not driven simply by the greater number of ineligible households. To understand this, labor income changes are also presented at the household level in Table 6. There is an increase in per household labor income, but this increase is much larger among ineligible households. SNAP makes very little difference for eligible households, with labor incomes rising by $12 and $38 for the average rural and urban household, respectively. SNAP does make a relatively substantial difference for ineligible households, causing their labor income rises by $285 and $311 for rural and urban households, respectively (Table 6).

Trade

Table 11 reports changes in exports and imports owing to SNAP. For most sectors there are small increases in imports that typically outweigh any change in exports. This is consistent with earlier results showing that overall demand for goods and services is higher under SNAP. The increase is more pronounced in urban areas. Looking at total production (bottom row of Table 11), imports by rural areas rose 0.06% while imports by urban areas rose slightly more,

at 0.34%. Looking across industries, the increase in import value is more prominent for food processing and farming related industries than for other industries. This is consistent once again with the nature of SNAP, which boosts consumption of food slightly more than other products in the study areas.

Gross regional product and welfare effects

There are several different measures of GRP that can be considered. One measure of GRP is consumption plus investment, government, and net exports. For rural and urban, this is $92.5 million and $690.4 million higher when SNAP is in effect. Another measure is value added, that is, total activity output less intermediate cost, less indirect business taxes. For rural and urban areas there is an increase of $91.1 million and $680.2 million, respectively. While SNAP appears to have a stimulative effect, this is such a small fraction of overall GRP that little conclusive can be drawn in this regard. Measures of welfare can also be considered, such as equivalent variation. According to this measure, the average beneficiary rural and urban households require $236 and $945 respectively to be as well off as without SNAP as they are with it. Ineligible rural and urban households, meanwhile, require $75 and $391 respectively to be as well off with SNAP as they are without it (Table 6).

These latter differences make clear that there is a stark difference in who benefits from SNAP. While higher-income households do better in terms of labor earnings, they lose out somewhat (an average of $466 per household).

TENTATIVE CONCLUSIONS

In this study a regional CGE model is used to quantify the impact of SNAP on rural and urban households in Oregon. A simulation is developed that mimics what the Oregon economy would have been like in 2011 had SNAP not been in place. Under this counterfactual scenario, which is designed to replicate what is otherwise an unobservable equilibrium, the funds currently provided to the program are returned to higher-income, tax-paying households according to their relevant tax rates. This enables a comparison between the structure of the economy as it existed under SNAP in 2011, with how it would have been had SNAP not been in place. Although this study is currently at a draft stage, a number of tentative conclusions can be summarized below.

- Rural households that are eligible for SNAP effectively have $900 more disposable income under the program, but urban households gain an average $2,925 more. Meanwhile, higher-income households that are ineligible for SNAP have $142 and $156 less disposable income for a rural and urban household, respectively.
- While agriculture and food sectors are larger under SNAP, they do not grow significantly more than sectors producing output that is not able to be purchased with SNAP funds. A measure of the effect of SNAP dollars on food spending, called additionality, is found to be fairly modest. It is found that a dollar of SNAP spending raises expenditures on food and agriculture related goods by 5.3 cents if just the beneficiaries themselves are included or 4.0 cents if all Oregonians are included. So while food expenditures increase under SNAP, this mostly frees up funds among the beneficiaries to spend on other goods and services.

- Higher income households have less discretionary income under SNAP, compared to what they would without SNAP, since their taxes are slightly higher than would otherwise be the case (under the assumptions of this analysis). In effect, SNAP acts as a large transfer from higher-income to lower-income households.
- SNAP plays a reasonably large role in the purchasing power of poorer households in the study area, particularly urban ones. Using the concept of equivalent variation, the average beneficiary rural household would require $236 to be as well off as without SNAP as they are with it, while the corresponding amount for urban households is $945.
- At the outset, it was thought that wage earners in rural Oregon might have a proportionately larger benefit from SNAP, since food and agricultural activities often occur in rural areas. While there is increased food consumption in Oregon as a result of SNAP, much of this – including the raw commodities – are imported into Oregon. Furthermore, much of the food processing that does take place in the state occurs in larger urban areas as opposed to the rural areas of the state. Therefore, in terms of enhancing economic activity, rural areas themselves do not appear to experience substantial benefit from SNAP, whether measured in jobs or otherwise. Urban areas appear to experience most of the positive economic benefits of SNAP. This is both in terms of labor employment income and in terms of the final welfare impact by household.
- Engle's law stipulates that SNAP-eligible and -ineligible households will respond differently when faced with a shock to discretionary income. This effect – coupled

with the return of SNAP transfers back to the originating households – moderates the potential for the food and agricultural sectors to be strongly affected by SNAP.

- Due to changes in the demand for goods and services, the labor market also changed under SNAP, with most of the increase in jobs occurring in urban areas as opposed to rural areas. While this is very small in percentage terms, there is a net change of 189 jobs in all of Oregon.
- In terms of the percentage change in value, imports into Oregon from other parts of the U.S. and world rise slightly. This change is slightly more prominent in urban areas compared to rural areas, and for food categories compared to other sectors.

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Table 1: Macro-SAM of Oregon for 2011 ($ millions)

	Activities								Commodities				Factors		Households	Institutions			ROW	
Category	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Total
Activities																				
1. Agricultural & natural resources	0	0	0	0	0	0	8,522	0	50	0	0	16	0	0	0	0	0	0	0	8,587
2. Food & beverages	0	0	0	0	0	0	0	20,683	9	0	0	0	0	0	0	0	0	0	0	20,693
3. Manufactured goods	0	0	0	0	0	0	30	9	77,526	0	0	288	0	0	0	0	0	0	0	77,853
4. Wholesale-retail trade & transportation	0	0	0	0	0	0	0	0	0	37,149	0	0	0	0	0	0	0	0	0	37,149
5. Housing, construction & utilities	0	0	0	0	0	0	0	0	9	0	41,486	794	0	0	0	0	0	0	0	42,290
6. Services	0	0	0	0	0	0	0	63	0	164	1,333	119,091	0	0	0	0	0	0	0	120,652
Commodities																				
7. Agricultural & natural resources	2,247	3,065	2,913	44	1,415	143	0	0	0	0	0	0	0	0	1,346	95	319	0	4,741	16,328
8. Food & beverages	19	3,424	292	150	191	1,302	0	0	0	0	0	0	0	0	12,794	472	58	0	8,486	27,188
9. Manufactured goods	1,309	2,507	28,192	2,903	3,358	5,570	0	0	0	0	0	0	0	0	17,097	6,010	14,912	0	56,976	138,834
10. Wholesale-retail trade & transportation	346	1,433	4,599	1,231	1,119	1,481	0	0	0	0	0	0	0	0	22,347	1,347	2,083	0	5,641	41,626
11. Housing, construction & utilities	550	1,119	2,521	1,715	4,311	6,500	0	0	0	0	0	0	0	0	25,817	1,518	4,641	0	722	49,413
12. Services	643	2,541	11,973	6,341	6,658	26,976	0	0	0	0	0	0	0	0	56,096	23,658	3,303	0	19,000	157,190
Factors																				
13. Labor	1,940	3,858	14,035	13,975	4,048	52,695	0	0	0	0	0	0	0	0	0	0	0	0	0	90,550
14. Capital	1,532	1,879	12,440	6,158	18,056	23,974	0	0	0	0	0	0	0	0	0	0	0	0	0	64,039
Households																				
15. Households	0	0	0	0	0	0	0	0	135	0	0	892	79,161	22,989	2,119	36,230	24,455	0	1,315	167,297
Institutions																				
16. Government	0	0	0	0	0	0	173	0	72	0	257	5,068	11,389	1,180	17,233	24,045	23,130	11,533	0	94,079
17. Investment	0	0	0	0	0	0	3	36	1,920	0	0	980	0	40,908	12,447	704	9,262	0	15,902	82,162
18. Business taxes	1	866	889	4,631	3,134	2,011	0	0	0	0	0	0	0	0	0	0	0	0	0	11,533
Rest of the world (ROW)																				
19. Net exports	0	0	0	0	0	0	7,600	6,396	59,113	4,313	6,337	30,061	0	-1,038	0	0	0	0	220	113,002
Total	8,587	20,693	77,853	37,149	42,290	120,652	16,328	27,188	138,834	41,626	49,413	157,190	90,550	64,039	167,297	94,079	82,162	11,533	113,002	0

Source: Author calculations using data from IMPLAN (2012).

Table 2: Oregon and SNAP

	Urban	Rural	Total
Oregon population	3,218,528	653,331	3,871,859
# SNAP participants	607,047	151,561	758,608
Participation rate (%) in overall population	19.1	23.2	42.3
# SNAP eligible households	334,772	70,260	405,032
# SNAP ineligible households	959,710	201,417	1,161,127
Fraction from total eligible population	0.81	0.19	1.0
Fraction from total ineligible population	0.84	0.16	1.0

Source: USDA Food and Nutrition Service (2016) and IMPLAN (2012).

Table 3: Rural and urban shares for major consumption categories

Industry	No. employed (share)		Output in million $ (share)		Income in $ million (share)		Tax in million $ on production and imports (share)	
	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Total	339,740	1,848,261	39,744	296,549	18,651	168,308	967	6,777
	(0.16)	(0.84)	(0.12)	(0.88)	(0.10)	(0.90)	(0.12)	(0.88)
Agricultural & natural resources	39,496	51,110	3,795	3,347	1,374	1,690	5	49
	(0.44)	(0.56)	(0.53)	(0.47)	(0.45)	(0.55)	(0.08)	(0.92)
Food & beverages	27,742	129,721	3,369	12,138	835	4,019	41	170
	(0.18)	(0.82)	(0.22)	(0.78)	(0.17)	(0.83)	(0.19)	(0.81)
Manufactured goods	16,590	135,192	4,938	95,979	1,256	51,565	77	808
	(0.11)	(0.89)	(0.05)	(0.95)	(0.02)	(0.98)	(0.09)	(0.91)
Wholesale-retail trade & transportation	55,426	308,246	5,365	31,898	2,404	18,107	201	1,836
	(0.15)	(0.85)	(0.14)	(0.86)	(0.12)	(0.88)	(0.10)	(0.90)
Housing, construction & utilities	29,661	187,989	6,863	41,816	3,572	23,302	465	2,468
	(0.14)	(0.86)	(0.14)	(0.86)	(0.13)	(0.87)	(0.16)	(0.84)
Services	131,383	725,288	10,205	70,439	6,929	48,137	113	884
	(0.15)	(0.85)	(0.13)	(0.87)	(0.13)	(0.87)	(0.11)	(0.89)

Note: Income is the sum of employee compensation, proprietor income and other property income. Source: IMPLAN (2012)

Table 4: Elasticities used in the analysis

#	Category	Elasticity of substitution for production	Expenditure elasticity	
			SNAP eligible	SNAP ineligible
1	Crop farming	0.5	0.044	0.032
2	Animal farming	0.5	0.092	0.079
3	Agriculture chemicals and services	0.5	0.093	0.079
4	Forestry and mining except coal and crude oil	1.1	1.323	1.286
5	Processed food of animal origin	1.1	0.092	0.079
6	Processed food of plant origin	1.1	0.044	0.032
7	Processed food other	1.1	0.110	0.093
8	Food purchased away from home	1.1	0.093	0.079
9	Alcohol and tobacco	1.1	0.117	0.099
10	Crude oil and natural gas and coal mining	1.1	1.059	1.064
11	Apparel and textiles	1.1	0.900	0.915
12	Refined petroleum products	1.1	1.199	1.194
13	Chemical rubber and plastic products	1.1	1.106	1.099
14	Iron and other metal related manufacturing	1.1	1.143	1.119
15	Computer and electronic related manufacturing	1.1	1.143	1.119
16	Electric goods manufacturing	1.1	1.106	1.099
17	Machinery and equipment manufacturing	1.1	1.143	1.119
18	Motor vehicles manufacturing	1.1	1.199	1.194
19	Household related manufacturing and services	1.1	1.106	1.099
20	Other non-durable manufacturing	1.1	1.143	1.119
21	Other durable manufacturing	1.1	1.143	1.119
22	Construction	1.1	1.059	1.064
23	Transportation	1.1	1.199	1.194
24	Wholesale trade	1.1	1.143	1.119
25	Retail trade	1.1	1.143	1.119
26	Finance and insurance	1.1	1.143	1.119
27	Housing real estate and owner occupied dwelling	1.1	1.059	1.064
28	Education	1.1	0.956	0.926
29	Health	1.1	1.100	1.116
30	Electric utilities private and public	1.1	1.059	1.064
31	Gas utilities private and public	1.1	1.059	1.064
32	Other utilities water and sanitary radio TV and telephone	1.1	1.199	1.194
33	Business related services	1.1	1.143	1.119
34	Personal services	1.1	1.323	1.286
35	Other services	1.1	1.143	1.119

Note: Production elasticities of substitution are based largely on Hanson et al. (2002) and sources therein, while expenditure elasticities are from Meade et al. (2014).

Table 5: Actual expenditures by household type

Industry		SNAP-eligible household demand ($ million)		SNAP-ineligible household demand ($ million)	
		Rural	Urban	Rural	Urban
Total	3,184	15,181		20,174	96,185
Agricultural & natural resources	40	192		183	870
Food & beverages	204	972		1,441	6,865
Manufactured goods	324	1,541		2,212	10,540
Wholesale-retail trade & transportation	515	2,452		3,795	18,085
Housing, construction & utilities	694	3,305		3,653	17,408
Services	431	2,065		2,713	12,990

Source: IMPLAN (2012). The 35 sectors have been aggregated to the six for this table only.

Table 6: Impact of SNAP on disposable income and equivalent variance

	Household type			
	Rural eligible	Rural ineligible	Urban eligible	Urban ineligible
Disposable income ($ million)				
Without SNAP	3,456	18,882	13,840	98,274
With SNAP	3,700	18,854	14,820	98,124
Difference	244	-28	980	-150
Disposable income ($ per household)				
Without SNAP	12,719	93,747	41,343	102,400
With SNAP	13,619	93,605	44,268	102,244
Difference	900	-142	2,925	-156
Labor income ($ million)				
Without SNAP	679	12,151	2,719	63,240
With SNAP	682	12,208	2,732	63,539
Difference	3	57	13	299
Labor income ($ per household)				
Without SNAP	2,498	60,328	8,122	65,896
With SNAP	2,510	60,613	8,160	66,207
Difference	12	285	38	311
Equivalent Variation ($ per household)	236	-75	945	-391

Table 7: Changes in consumption patterns due to SNAP

Industry	Change in consumption/expenditure ($ millions)					
	All households		SNAP eligible		SNAP ineligible	
	Rural	Urban	Rural	Urban	Rural	Urban
Food at home	5.15	19.51	6.09	24.38	-0.94	-4.87
Dairy, meat, fish	1.96	7.42	2.32	9.29	-0.36	-1.87
Fruit, vegetables	1.39	5.28	1.64	6.55	-0.24	-1.27
Miscellaneous food	1.80	6.81	2.13	8.54	-0.33	-1.73
Food away from home	3.60	13.23	4.59	18.37	-0.99	-5.14
Non-food consumption	134.37	466.67	194.00	777.03	-59.63	-310.35
Alcohol and tobacco	1.27	4.85	1.46	5.85	-0.19	-1.01
Clothing	1.39	4.96	1.90	7.63	-0.51	-2.67
Other non-durables	10.22	37.93	12.73	50.98	-2.51	-13.05
Durables	8.22	28.58	11.83	47.36	-3.61	-18.78
Petroleum	3.61	12.45	5.28	21.15	-1.67	-8.70
Utilities	8.53	30.27	11.77	47.15	-3.24	-16.87
Finance and Insurance	3.03	7.67	6.78	27.14	-3.74	-19.47
Housing	19.48	64.56	30.72	123.06	-11.24	-58.50
Health	38.57	137.32	52.89	211.85	-14.32	-74.52
Education	5.75	20.82	7.61	30.47	-1.85	-9.64
Transportation	3.23	11.07	4.78	19.16	-1.55	-8.08
Services	31.06	106.19	46.25	185.25	-15.19	-79.06
Total consumption	143.12	499.41	204.67	819.77	-61.55	-320.36

Table 8: Per household changes in consumption patterns due to SNAP

Industry	Change in consumption/expenditure ($ per household)					
	All households		SNAP eligible		SNAP ineligible	
	Rural	Urban	Rural	Urban	Rural	Urban
Food at home	17.8	67.7	22.4	72.8	-4.6	-5.1
Dairy, meat, fish	6.8	25.8	8.5	27.7	-1.8	-1.9
Fruit, vegetables	4.8	18.2	6.0	19.6	-1.2	-1.3
Miscellaneous food	6.2	23.7	7.8	25.5	-1.7	-1.8
Food away from home	7.6	10.2	16.9	54.9	-4.9	-5.4
Non-food consumption	284.0	360.5	714.1	2321.1	-296.1	-323.4
Alcohol and tobacco	2.7	3.7	5.4	17.5	-1.0	-1.0
Clothing	2.9	3.8	7.0	22.8	-2.5	-2.8
Other non-durables	21.6	29.3	46.8	152.3	-12.4	-13.6
Durables	17.4	22.1	43.5	141.5	-17.9	-19.6
Petroleum	7.6	9.6	19.4	63.2	-8.3	-9.1
Utilities	18.0	23.4	43.3	140.8	-16.1	-17.6
Finance and Insurance	6.4	5.9	24.9	81.1	-18.6	-20.3
Housing	41.2	49.9	113.1	367.6	-55.8	-61.0
Health	81.5	106.1	194.7	632.8	-71.1	-77.6
Education	12.2	16.1	28.0	91.0	-9.2	-10.0
Transportation	6.8	8.6	17.6	57.2	-7.7	-8.4
Services	65.7	82.0	170.2	553.4	-75.4	-82.4
Total consumption	309.4	438.5	753.4	2448.8	-305.6	-333.8

Table 9: Additionality estimates

Category	Change in household spending ($ million)	Additionality
All SNAP-eligible households (rural and urban)		
Food and agriculture related goods		
Without wholesale-retail trade	63	5.3%
With wholesale-retail trade	210	17.7%
Wholesale-retail trade and transportation	171	14.4%
Manufactured goods	159	13.4%
Housing, construction and utilities	213	17.9%
Services	568	47.8%
All consumption	1,181	99.4%
All four household types		
Food and agriculture related goods		
Without wholesale-retail trade	48	4.0%
With wholesale-retail trade	114	9.6%
Wholesale-retail trade and transportation	80	6.8%
Manufactured goods	107	9.0%
Housing, construction and utilities	123	10.3%
Services	350	29.5%
All consumption	715	60.1%

Notes: Additionality was estimated using the total SNAP benefit received by Oregon which was $1,189 million. The numerator for the additionality calculation was derived from the authors' estimates that also underlie Table 7.

Table 10: Changes in production and activity level in industries due to SNAP

Industry	Change in							
	Total Economic Activity (% change)		Labor Activity (% change in jobs)		Value of output ($ million)		Commodity prices (% change)	Producer prices (% change)
	Rural	Urban	Rural	Urban	Rural	Urban		
Food processing	0.039	0.101	0.038	0.098	11.38	29.55	0.247	0.239
Animal origin	0.057	0.148	0.056	0.145	3.77	9.80	0.251	0.241
Plant origin	0.024	0.063	0.023	0.060	3.36	8.72	0.235	0.237
Other	0.035	0.0912	0.034	0.089	4.25	11.03	0.255	0.239
Food services (restaurants etc.)	0.040	0.226	0.040	0.223	6.14	34.65	0.253	0.251
Alcohol and tobacco	0.029	0.146	0.028	0.142	1.29	6.44	0.227	0.227
Farming and services	0.005	0.004	0.003	0.003	8.58	7.57	0.216	0.234
Crop farming	-0.006	-0.005	-0.007	-0.006	4.92	4.34	0.211	0.235
Animal farming	0.103	0.091	0.101	0.089	3.08	2.72	0.242	0.236
Agri-services	-0.083	-0.073	-0.083	-0.074	0.58	0.51	0.194	0.229
Manufactured goods	0.002	0.035	0.002	0.031	3.21	64.13	0.169	0.208
Clothing	0.001	0.027	0.001	0.025	0.06	1.28	0.072	0.188
Petroleum	0.012	0.248	0.012	0.239	0.07	1.39	0.218	0.185
Durables	-0.010	-0.193	-0.010	-0.196	1.73	34.71	0.175	0.228
Non-durables	0.003	0.060	0.003	0.055	1.34	26.75	0.212	0.230
Wholesale and retail trade	0.021	0.165	0.021	0.162	15.36	119.11	0.267	0.255
Transportation	0.003	0.011	0.003	0.008	6.37	21.49	0.198	0.219
Financial and Insurance	0.014	0.137	0.019	0.126	4.14	27.10	0.002	0.250
Housing and construction	0.053	0.347	0.052	0.338	22.51	147.23	0.249	0.250
Education	0.030	0.922	0.030	0.921	1.09	33.38	0.259	0.253
Health	0.101	0.760	0.101	0.758	28.09	211.36	0.261	0.252
Utilities	0.063	0.321	0.062	0.316	11.50	59.08	0.223	0.218
Services	0.029	0.203	0.029	0.200	49.19	339.51	0.259	0.255
Total production	0.033	0.260	0.033	0.256	169	1,101	0.218	0.239

Table 11: Changes in exports and imports due to SNAP

Industry	% change in imports		% change in exports	
	Rural	Urban	Rural	Urban
Food processing	0.109	0.284	0.021	0.054
Animal origin	0.111	0.288	0.033	0.086
Plant origin	0.106	0.274	0.011	0.028
Other	0.111	0.290	0.019	0.048
Food services (restaurants etc.)	0.043	0.242	0.026	0.145
Alcohol and tobacco	0.082	0.410	0.019	0.097
Total Farm	0.124	0.109	-0.018	-0.016
Crop farming	0.188	0.165	-0.028	-0.025
Animal farming	0.135	0.119	0.078	0.069
Agri-services	0.048	0.042	-0.104	-0.092
Manufacturing	0.013	0.257	-0.001	-0.025
Clothing	0.014	0.272	0.001	0.027
Petroleum	0.011	0.223	0.005	0.104
Durables	0.009	0.187	-0.011	-0.214
Non-durables	0.017	0.344	-0.001	-0.016
Wholesale and retail	0.039	0.306	0.001	0.006
Transportation	0.065	0.221	-0.030	-0.103
Financial and Insurance	0.031	0.304	0.004	0.042
Housing	0.057	0.373	0.028	0.180
Education	0.021	0.646	0.013	0.391
Health	0.093	0.703	0.061	0.459
Utilities	0.052	0.268	0.043	0.219
Services	0.048	0.332	0.011	0.079
Total production	0.060	0.343	0.014	0.118