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# Economic effects of the reduction of the food sales tax

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June 28, 2016

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# 1 Background

Due to concerns over the incidence of the inclusion of food for at-home preparation (groceries) in the retail sales tax base in Kansas, recent proposals in the state legislature have called for a reduction in the food sales tax or an outright exemption of groceries from the sales tax, with several of them calling for increases in income tax rates or closing loopholes to offset lost revenues (see, for example HB 2444 proposed in the 2016 legislative session). In this paper we examine the likely economic effects for the state of Kansas that come from a full exemption of grocery purchases from the sales tax, paid for by an increase in the state income tax rate. While this is not the only potential "pay for" option, it represents a realistic alternative that could be considered. We use a commonly utilized regional economic model to estimate the economic effects. We find that the exemption of groceries will create moderately large increases in employment and economic activity. When accounting for the need to offset lost revenue, the economic activity effects are nullified and the net effect on economic activity will be slightly negative. However, there is projected to be a small increase in employment generated by the combination of policies. This employment will come from greater employment in service sectors; jobs are projected to be lost in higher paying sectors such as manufacturing. Therefore, labor income will be reduced slightly along with economic activity.

# 2 Literature Review

In order to better frame our analysis, we consulted both the academic and professional literature on the economic effects of taxing groceries. In neither literature is there a mention of a specific analysis of the effects of taxing groceries on the retail grocery industry. Therefore, we rely on the textbook literature on analyzing the effects of sales tax cuts and income tax increases. The literature on sales tax cuts emphasizes two likely effects. When individuals receive an increase in their effective income (which is what a cut in the sales tax rate will cause) there are two ways that they can employ their new income. The first is to purchase more of the good for which there is a sales tax cut. The effect of this is somewhat larger than it otherwise would be due to what economists term the "substitution effect", namely that individuals will purchase more of the item on which the sales tax was reduced due to the fact that its relative price has fallen. So for example, if a family typically spends 20% of their budget on food, they might spend 25% after the price of the groceries falls relative to other goods that are still taxed. The other effect is caused by the fact that household income available for the purchase of all goods goes up after the tax cut. This "income" effect will cause a rise in spending for all goods, as well as increased savings (Anderson, 2012).

The key to sorting out the relative size of the income and substitution effects is figured on the responsiveness to changes in food sales relative to changes in price. This so-called "price elasticity of demand" has been calculated in several studies. A previous KC Healthy Kids/Kansas Public Finance Center (KCHK/KPFC) white paper dealing with

the effect of the grocery sales tax on rural grocery stores calculated the average price elasticity of demand for food items as -0.45, indicating that a one percent increase in the price of groceries will produce a 0.45 percent decrease in the quantity demanded (Kriz, 2015a).

# 3 Methodology and Data

We generate our estimates of the economic effects of the changes in tax policy from a regional economic modeling software, specifically the IMPLAN software (IMPLAN Group, LLC, 2014). This software produces estimates of changes in economic activity in various sectors of the economy given a change in one of those sectors. As an example of the use of IMPLAN, the Economic Research Service (ERS) of the US Department of Agriculture selected IMPLAN to model the effects of the American Recovery and Reinvestment Act (ARRA) of 2009 (Kort, 2009). The model traces out the linkages among various sectors of the economy to project the effects of an increase in public spending on infrastructure projects. The basis of the IMPLAN model is a "social accounting matrix" that describes how a change in one sector of the economy will affect other sectors of the economy. So in the ARRA example, researchers at the ERS would enter an increase in spending in the construction sector of the economy. The model shows estimates of what the construction sector purchases in terms of inputs such as concrete, iron, and other materials as well as labor inputs. These purchases create sales for those input sectors, which in turn are used to purchase inputs (for non-labor sectors) from other sectors. For the labor input, households use labor income to make retail purchases, which in turn creates its own set of follow-on effects. The sum of all of these effects is called a "multiplier" and describes the size of an effect in various sectors caused by a $1 change in a given sector. So if the multiplier for construction is 1.75, each $1 change in the construction sector will cause a net increase of $1.75 across all sectors. Multipliers are available in IMPLAN for aggregate changes as well as by sector, allowing tracing of effects across sectors.

Consistent with the textbook public economics literature, we model two direct effects from the reduction of sales taxes. The first is an increase in spending in the retail grocery store sector. To calculate the expected increase in spending, we need to make several assumptions as well as calculate intermediate results. The second effect is caused by the change in disposable income due to the tax rate cut. We also model the effects of an offsetting income tax increase. The state of Kansas would have to raise other taxes or make cuts in spending in order to maintain a balanced budget as sales taxes from groceries fall. Table 1 summarizes the key assumptions and intermediate results used to calculate these effects. The text after the table discusses these assumptions more fully.

*Table 1. Key Assumptions and Intermediate Results.*

| Assumption | Value | Source(s) or Calculation |
|---|---|---|
| Grocery Sales Tax Base | $6,002,564,102 | Calculated from Fiscal Note to HB 2444 |
| Effective Local Sales Tax Rate | 0.6689% | Calculated from KDOR 2015 Annual Report and U.S. Bureau of Economic Analysis |
| Effective Sales Tax Rate Reduction | 7.1689% | 6.5% State and 0.6689% Local |
| Sales Tax Reduction | $430,317,817.91 | Effective Sales Tax Rate Reduction * Grocery Sales Tax Base |
| Price Elasticity of Demand | -0.45 | Kriz, 2015a |
| Increase in Demand for Food Sales | $193,643,018.06 | Sales Tax Reduction * Price Elasticity of Demand |
| "Income Effect" of Sales Tax Cut | $236,674,799.85 | Sales Tax Reduction – Increase in Demand for Food Sales |
| Income Categories for Allocation of Income Effect and Required Income Tax Increase | Details Available Upon Request | KDOR 2015 Annual Report and Kriz, 2015b, Mapped to IMPLAN Household Income Categories |
| Labor Supply Elasticity for Calculating Required Income Tax Increase | -0.1 | Kriz, 2015a |
| Sectoral Food Sales Allocation | 35% Retail Stores – Food & Beverage, 55% Retail Stores – General Merchandise, 10% Retail Stores – Miscellaneous | KDOR 2015 Annual Report |

One of the most basic assumptions is the existing level of retail grocery sales subject to the tax. For this purpose, we use estimates of the tax loss from HB 2444. That bill proposed a 3.9% cut in the sales tax rate on groceries, from the existing rate of 6.5% to 2.6%. The fiscal note accompanying that bill indicates a projected state revenue loss of $234.1 million (Sullivan, 2016). Dividing this loss by the implied tax cut, we arrive at an estimate of the effective base of grocery sales as $6,002,546,102. Another important piece of information necessary for our calculations is the local sales tax rate. When exempting groceries from the sales tax, both local sales taxes as well as that state sales tax will be impacted. The tax burden on food sales will fall by more than the 6.5% collected by the state. Modeling the local sales tax rate is challenging because of the relatively wide variation in rates. However, a statewide average may be thought of as a first approximation of a statewide rate.[1] To calculate this we use information from the Kansas Department of Revenue Annual Report of 2015 (KDOR, 2015, Section 2). In 2015, local governments in Kansas collected just over $893.6 million in sales taxes. The U.S. Bureau of Economic Analysis estimates Kansas personal income for 2015 at just over $133.5 billion (Bureau of Economic Analysis, 2016). The calculated average local sales

[1] If this were a study on a smaller area such as a county, one could use a weighted average of local rates in the county, for the state as a whole our approach replicates this.

tax rate is therefore 0.6689%. This makes sense as several local jurisdictions have rates in the 0.5 – 1.0% range.

Therefore, the calculated effective tax cut from exempting groceries is 7.1689%, consisting of the 6.5% state rate and the 0.6689% local rate. The last piece of information necessary to calculate the increase in grocery sales due to the sales tax exemption is the price elasticity of demand for groceries. We used a price elasticity of demand of -0.45 as cited in the literature review. Combining these two figures, we estimate that grocery sales would increase 3.226% due to the tax exemption. Using the base estimates of $6 billion from HB 2444, the resulting increase in grocery sales statewide is estimated to be $193.6 million.

The next step in estimating the effects of the sales tax cut involves inputting this increase in grocery sales into IMPLAN. If the study were simply a study of the effect on grocery stores, this could be done by estimating a certain percentage of the sales made in grocery stores (sector 324 in IMPLAN). However, to capture the full economic effect, we need to estimate increased sales not only in grocery stores but also in general merchandise stores (Walmart, Target, etc. – sector 329) and miscellaneous merchandise stores (Dollar General, etc. – sector 330). In this study, we allocate the sales to the stores according to the relative percentages of sales taxes generated. The annual report of the Kansas Department of Revenue indicates that approximately 35% of sales taxes generated in these sectors comes from grocery stores, 55% from general merchandise stores, and 10% from miscellaneous retail stores (KDOR, 2015). This is the allocation that we use for IMPLAN.

The "income" effect of the tax exemption is estimated by taking the difference between the total estimated revenue effect and the substitution effect modeled above. The total revenue loss can be estimated by applying the total effective tax cut (7.1689%) to the estimated food sales tax base ($6 billion). The difference between this figure – just over $430 million – and the increase in food sales - $236.7 million – is our estimate of the income effect of the sales tax exemption. This amount also has to be allocated across income groups according to the benefit that they are likely to realize from the cut. We use figures from the Kansas Department of Revenue annual reports on income realized by different groups (KDOR, 2015) and data on the incidence of the sales tax taken from a previous KC Healthy Kids/KPFC white paper (Kriz, 2015b) to allocate the $196.5 million income effect to different income groups. So for example, the income group "$0 - $25,000" within the KDOR annual report is estimated to realize a 2.74% income effect given their incidence of the sales tax. Given their relative level of income, this equates to an income effect of approximately $80 million for this income group.

Another issue in making the data conformable with IMPLAN concerns the allocation of income effects to different income categories. The categories in the KDOR report are somewhat different than those used by IMPLAN, so KDOR categories were mapped to IMPLAN categories based on the relative size of each category. For example, the KDOR report has categories for "No Kansas Adjusted Gross Income (AGI)" and "$0 – $25,000",

while IMPLAN has categories for "Less Than $10,000", "$10,000 - $15,000", and "$15,000 - $25,000". We chose to include all of the estimated effects for KDOR's "No Kansas AGI" category and 40 percent of the "$0 – $25,000" KDOR category in IMPLAN's "Less Than $10,000" category. With these results in hand we could then enter all of the data for the effects of the sales tax exemption into IMPLAN.

The estimates obtained from IMPLAN in this first stage of the analysis do not take into account the need for the state to achieve fiscal balance. Like most states, the state of Kansas is required to submit a balanced budget. Therefore, any decreases in sales taxes must be balanced by either spending cuts or increases in other taxes. Either of these changes is likely to produce a change in the amount of grocery store sales in an area. So in order to produce a final estimate of the effect of the sales tax on grocery stores, we must account for "balanced budget" effects. Without knowing the specific tax or spending change, we employ the modeling convention of assuming an equal change in the tax rate, changing household income in IMPLAN by an amount equal to the percentage of the across the board tax increase. For the state of Kansas, an increase in the income tax rate equivalent to a 0.61% of personal income was calculated to produce revenue equivalent to the sales tax (using an estimated labor supply elasticity of -0.1 and taking into account the slight revenue gain from increased economic activity generated by the grocery sales exemption).[2] The loss in disposable income associated by the tax was then allocated across income categories using the same data from the Kansas Department of Revenue used in calculating the income effect of the grocery exemption. These estimated reductions in disposable income were then entered into IMPLAN as reductions in household income for purposes of estimating the economic effects of the tax.

# 4 Results

We break the results out into effects from each portion of the analysis, the positive effects of the food sales tax increase due to both the increased food sales effect and the income effect, and the negative effect of the compensating income tax increase. Table 2 shows the results of the model estimating the economic effects of increased food sales throughout the state generated by the grocery sales tax cut. Employment throughout the state is expected to rise by nearly 1,200 jobs due to this portion of the policy change. Out of this figure, 950 jobs are expected to be generated directly in retail outlets selling groceries, as shown in the "Direct Effect" row. An additional 77 jobs are expected to be created in suppliers of retail grocery sales establishments (called the "Indirect Effect" of the change). Finally, purchases of other items (food, cars,

[2] Further calculations available from the author. Please note that there is an implicit assumption embedded in our formulation of the offsetting tax increase. As pointed out when discussing the effects of the sales tax exemption a portion of the revenue loss will come from local governments that collect sales taxes. By modeling an increase in the income tax we are assuming that the state will collect the tax and remit a portion to local governments to compensate for the lost sales tax revenue tied to the exemption. If local governments use their own taxes to offset the revenue loss, the combination of economic effects will be different.

clothes, etc.) made by workers both in retail outlets and suppliers are expected to generate another 161 jobs (this is the "Induced Effect"). Labor Income is expected to rise by over $38 million statewide due to the policy. Output of businesses is expected to rise over $89 million. The figure that most regional economists cite as the ultimate measure of economic impact is termed "Value Added". This measure captures economic returns to all factors of production (labor, land, and capital) due to increased economic activity. After the policy of exempting grocery sales goes into effect, these returns are expected to rise by just over $65 million due to economic activity at retail grocery outlets (Direct Effect of $45 million), their suppliers (Indirect Effect $6.9 million), and businesses affected by purchases made by workers of these businesses (Induced Effect $13 million).

*Table 2. Economic Effects from Increased Food Sales Generated by Sales Tax Exemption for Groceries.*

| Impact Type | Employment | Labor Income ($) | Total Value Added ($) | Output ($) |
|---|---|---|---|---|
| **Direct Effect** | 958.58 | 27,388,592.85 | 45,281,948.19 | 57,318,246.47 |
| **Indirect Effect** | 77.71 | 3,753,193.17 | 6,894,742.60 | 10,993,559.08 |
| **Induced Effect** | 161.40 | 7,000,820.59 | 13,075,258.68 | 21,050,307.84 |
| **Total Effect** | 1,197.70 | 38,142,606.61 | 65,251,949.47 | 89,362,113.39 |

Table 3 shows the economic effects generated by the income effect. Note that there are no direct effects of this policy, in other words no single sector is affected directly by increased purchasing power. Instead the benefits are induced through increased purchases of all goods. These induced effects amount to over 1,600 jobs and $129.1 million in economic activity as measured by Value Added.

*Table 3. Economic Effects from the Income Effect Generated by Sales Tax Exemption for Groceries.*

| Impact Type | Employment | Labor Income ($) | Total Value Added ($) | Output ($) |
|---|---|---|---|---|
| **Direct Effect** | 0.00 | 0.00 | 0.00 | 0.00 |
| **Indirect Effect** | 0.00 | 0.00 | 0.00 | 0.00 |
| **Induced Effect** | 1,632.08 | 68,785,683.05 | 129,158,127.52 | 207,144,518.70 |
| **Total Effect** | 1,632.08 | 68,785,683.05 | 129,158,127.52 | 207,144,518.70 |

These induced effects are seen in the impact of the income tax increase that must be generated to offset the budgetary effects of the sales tax exemption. However, the induced effects in this case are negative, the tax increase reducing disposable income of consumers throughout the state. If this policy of raising taxes was done in isolation, the increase would be projected to reduce employment by almost 2,600 jobs and result in a loss of $204.8 million in economic activity (Table 4).

*Table 4. Economic Effects of Income Tax Increase.*

| Impact Type | Employment | Labor Income ($) | Total Value Added ($) | Output ($) |
|---|---|---|---|---|
| **Direct Effect** | 0.00 | 0.00 | 0.00 | 0.00 |
| **Indirect Effect** | 0.00 | 0.00 | 0.00 | 0.00 |
| **Induced Effect** | -2,588.98 | -109,687,387.35 | -204,834,981.40 | -329,153,749.65 |
| **Total Effect** | -2,588.98 | -109,687,387.35 | -204,834,981.40 | -329,153,749.65 |

However, as we know, this policy would not be enacted in isolation, but rather in conjunction with the sales tax exemption. Therefore, in Table 5 we net out the effects of the income tax increase from those of the sales tax exemption on groceries to obtain our final estimates of the economic impact of undertaking such a policy. On net, the policy is expected to generate 240.8 new FTE jobs throughout the state. Economic activity as measured by Value Added is expected to fall slightly, by $10.4 million.

*Table 5. Net Economic Effects of the Policy Change.*

| Impact Type | Employment | Labor Income ($) | Total Value Added ($) | Output ($) |
|---|---|---|---|---|
| **Direct Effect** | 958.58 | 27,388,592.85 | 45,281,948.19 | 57,318,246.47 |
| **Indirect Effect** | 77.71 | 3,753,193.17 | 6,894,742.60 | 10,993,559.08 |
| **Induced Effect** | -795.50 | -33,900,883.71 | -62,601,595.19 | -100,958,923.10 |
| **Total Effect** | 240.80 | -2,759,097.69 | -10,424,904.40 | -32,647,117.55 |

At first, the results may seem incongruous, with employment rising slightly as economic activity falls slightly. The key to understanding this lies in the combination of Direct, Indirect, and Induced effects on both the Employment and Labor Income measures. What the model is suggesting is that the policy of cutting the effective sales tax rates is boosting employment and labor income in the grocery sector and in sectors that supply the grocery sector, while the remaining sectors of the economy will see slight decreases in Employment and Labor Income. These decreases in Labor Income translate into less sales in firms across the economy, reducing economic activity on the whole.

One other point about these results is that the effects are very small. The increase in employment is 0.017% of current Kansas nonfarm payroll employment and the Value Added decrease is smaller than that in percentage terms, only 0.007% of Total Value Added in the state economy as of 2015.

# 5 Conclusions

Using a commonly employed regional economic model, we find that the policy of exempting groceries from the retail sales tax base in the state of Kansas and replacing

the revenue lost from the exemption by increasing income taxes will produce small gains in employment throughout the state, accompanied by a slight decrease in economic activity. The gains in employment will largely be found in grocery retailers and their suppliers, while job losses and reduced economic activity will be realized more broadly across sectors. Overall, labor income will fall slightly. From a policy analysis perspective, it would seem that this policy change is nearly neutral in terms of gross economic effects. Impacts in other areas, such as relative incidence of the two taxes, administrative burden, and compliance issues become more important as the economic effects become smaller. The key to crafting a sound policy may be found in the tradeoffs among each of these concerns.

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