The economic implications of a tax on sugar-sweetened beverages in South Africa

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Introduction

Why a tax sugar-sweetened beverages (SSBs) in South Africa?

• Increasing global concern regarding obesity stemming from the excessive consumption of sugar.
• Obesity is a global epidemic and a major risk factor linked to the growing burden of non-communicable diseases (NCDs) including heart diseases, type 2 diabetes and some forms of cancers.
• Obesity has become a concern in SA as well – it is ranked as the most obese country in sub-Saharan Africa.
Proposed tax instrument in SA

Tax Base: Sugar Content of SSBs

• Main contributing factor to weight gain is excess sugar consumption from SSBs.
• Use absolute levels of free sugar as base for taxing SSBs.

Tax Rate:

• Tax every gram of sugar in SSBs.
• Using the current available price and sugar content of soft drinks as a reference point, the estimated tax would be in the region of R2.29 per litre of SSB, or R0.0229 (i.e. 2.29 cents) per gram of sugar contained in a litre of SSB.
Theoretical arguments for sugar tax

- A sugar tax is a standard Pigouvian tax aimed at internalising external costs of obesity-related diseases.

- Internalities as market failure: three sources: lack of self-control, lack of information about the harmful consequences of certain consumption decisions, and behavioural and cognitive errors.

- The “new public health approach”, which focuses on specific behavioural risk factors linked to disease as well as relevant environmental, social and political factors.
Empirical evidence on effects of sugar taxes

A) Sugar taxes and sugar intake

Mexico (Colchero, et al. 2015):

- Average household’s purchases of taxed beverages (carbonated sodas and non-carbonated sugar sweetened beverages) 6% lower than those predicted by pre-tax trends.
- Tax induced households to switch to healthier alternatives: on average, purchases of untaxed beverages were 4% higher than the counterfactual.
- Estimate price elasticities of the demand for sugar-sweetened beverages and to use them to predict likely effects of the introduction of sugar taxes.

B) Impact on the poor

- Several US studies (e.g. Finkelstein, Zhen, Nonnemaker & Todd, 2010) report that lower-income households spend more on SSBs than higher-income groups (in relative and absolute terms).
- Studies in Brazil (Claro, et al. 2012: 179), Ecuador (Paraje, 2016: 9) and Mexico (Barquera, et al. 2008: 2458), find that income elasticity of the demand for such beverages to be positive.
- Low-income households’ demand for SSBs are more price-sensitive than that of high-income households in all three countries (cf. Claro et al., 2012: 180; Colchero, et al. 2015: 133; Paraje, 2016: 8).
Empirical evidence on effects of sugar taxes - SA

Manyema, et al. (2014):

Predict the effects on the prevalence of obesity in South Africa of the introduction of a 20% tax on sugar-sweetened beverages.

The authors assume own-price elasticity of the demand for SSBs is -1.299; cross-price elasticities of milk, fruit juice and diet drinks are 0.129, 0.388 and -0.423, respectively.

These assumptions are combined with consumption data from the 2012 SA National Health and Nutrition Examination Survey (SANHANES-1) to predict the effects of the hypothetical tax on the consumption of SSBs and the prevalence of obesity.

Main finding: introduction of the tax would, via its effects on the prices of SSBs and consumers’ responses to this price shock (including switching to milk, fruit juice and diet drinks), reduce obesity by 3.8% among men and 2.4% among women.
Economic effects of sugar taxes

• Scant evidence is available on the direct (as opposed to the health-related) effects of taxes on SSBs, on aggregates such as economic growth, employment and government revenue.

• As recently as 2013, Cabrera Escobar et al. (2013: 8) stated that “Future research should address the consequences of a tax on SSBs, including the health gains, population affected and the impact on the macroeconomic environment including jobs, monetary savings to the health sector, implementation costs and revenue generated for the governments” [own emphasis].
Our exploratory analysis....

The incidence of a sugar tax

We use data from the Income and Expenditure Survey 2010/11 to show the consumption of sugar and sugar-sweetened beverages by income group. It also combines this information with simple assumptions about tax shifting and the own-price elasticity of the demand for sugar-sweetened beverages to generate rough estimates of the incidence of a 20% sugar tax.
Results

Figure 1: Annual consumption of sugar and sugar-sweetened beverages as percentages of total consumption by consumption deciles, 2010/11
Results

Figure 2: Expenditure on sugar products as proportions of total food consumption by consumption deciles
Tax incidence

Simulation:
We ignore potential behavioural effects of the introduction of a sugar tax, and assume full forward shifting of the tax occurs (put differently, the introduction of the tax raises the price of sugar-sweetened beverages by 20%).

Following Johannes, et al. (2006: 11), the tax paid is calculated as follows:

\[
\text{Tax paid} = \left( \frac{t}{1 + t} \right) \times E
\]

where \( t \) = ad valorem tax rate and \( E \) = post-tax expenditure on an item.
Tax incidence

In absolute terms, the rich contribute a greater amount, but in relative terms (as a proportion of income) the average tax rate is higher for poorer income groups.

Tax revenue raised in this simulation: R0.9 billion.
Tax incidence

In absolute terms, the rich contribute a greater amount, but in relative terms (as a proportion of income) the average tax rate is higher for poorer income groups.
Substitution effects

The availability and popularity of substitutes should influence health effects of a sugar tax on different income groups. Income and cross-price elasticities of the demand for various beverages are needed to estimate these effects - such elasticities are not available for South Africa.

To get a sense of possible switching effects after tax, we analyse the composition of the consumption of beverages by low-income, middle-income and high-income households (low income group = deciles 1 to 3, middle income group = deciles 4 to 7, high income group = deciles 8 to 10). We compare six types of beverages: cold drinks (which include carbonated sodas), fresh full-cream milk, fresh low fat milk, mineral water, fruit juices and other drinks (which include energy drinks).
## Substitution effects

Table: The composition of consumption of beverages by income groups, 2010-2011

<table>
<thead>
<tr>
<th>Beverages</th>
<th>Shares of beverage consumption (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Decile 1-3</td>
</tr>
<tr>
<td>Cold drinks</td>
<td>51.0</td>
</tr>
<tr>
<td>Fresh full-cream milk</td>
<td>35.9</td>
</tr>
<tr>
<td>Fruit juices</td>
<td>9.2</td>
</tr>
<tr>
<td>Fresh low fat milk</td>
<td>2.0</td>
</tr>
<tr>
<td>Mineral water</td>
<td>1.3</td>
</tr>
<tr>
<td>Other drinks</td>
<td>0.6</td>
</tr>
<tr>
<td>All beverages</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Source: Own calculations based on data from Statistics South Africa (2012).*
The economic significance of sugar in the South African economy

- We analyse the economic effects of a 20% tax on SSBs with a simulation that estimates the economic implications of the tax for industries, households and the rate of growth of the South African economy.
- We use a computable general equilibrium (CGE) model based on the 2010 Social Accounting Matrix (SAM) data for South Africa The Excel-based CGE model incorporates 64 activities, 100 commodities, 4 categories of labour plus capital, 15 household groups and 4 taxes, namely activity taxes, direct taxes, import duties, and sales taxes.

- The model consists of equations that describe the model variables and a SAM database that is consistent with these equations.
- Neoclassical general equilibrium theory forms the basis of the model equations. Hence, key assumptions are that producers minimise costs, that average-cost pricing is applied and that optimising behaviour underpin household demand.
- The model conforms to the theoretical general equilibrium paradigm but allows for macro-economic and production factor closures.
Simulation results

A 20% sugar tax on non-alcoholic beverages would result in a 0.48% drop in GDP at factor cost, ceteris paribus. GDP at market prices decrease by slightly less (0.38%) because indirect taxes increase by 0.5%. Private consumption expenditure shows a drop of 0.42%.

The simulation exercise suggests that a drop in output will be accompanied by a decrease in labour income.
Impact on output
Employment effects

Would the tax necessarily lead to a reduction in employment?

Beverage Association of South Africa: tax will cost SA between 62 000 and 72 000 jobs.

Consideration should be given to:
- Whether consumption of near-substitutes is taken into account in the analysis
- Companies themselves could switch production to healthier, untaxed drinks.
- Impact of government revenue on economic activity
Concluding remarks

Our preliminary analysis points to the following:

- Cold drinks are disproportionately more consumed by the poor.
- Richer households contribute a greater tax amount, but in relative terms (as a proportion of income) the average tax rate is higher for poorer income groups.
- Further research is needed to estimate price, income and cross-price elasticities of the demand for various beverages - such elasticities are not available for South Africa.

- Macro effects:
  - Assuming no behavioural responses, we observe a 0.4% reduction in GDP and decreases in income.
  - Whether employment will decrease depends on substitution effects in consumption and production, amongst other factors.