

# Chapter 5

## RESTRUCTURING VALUE-ADDED TAX

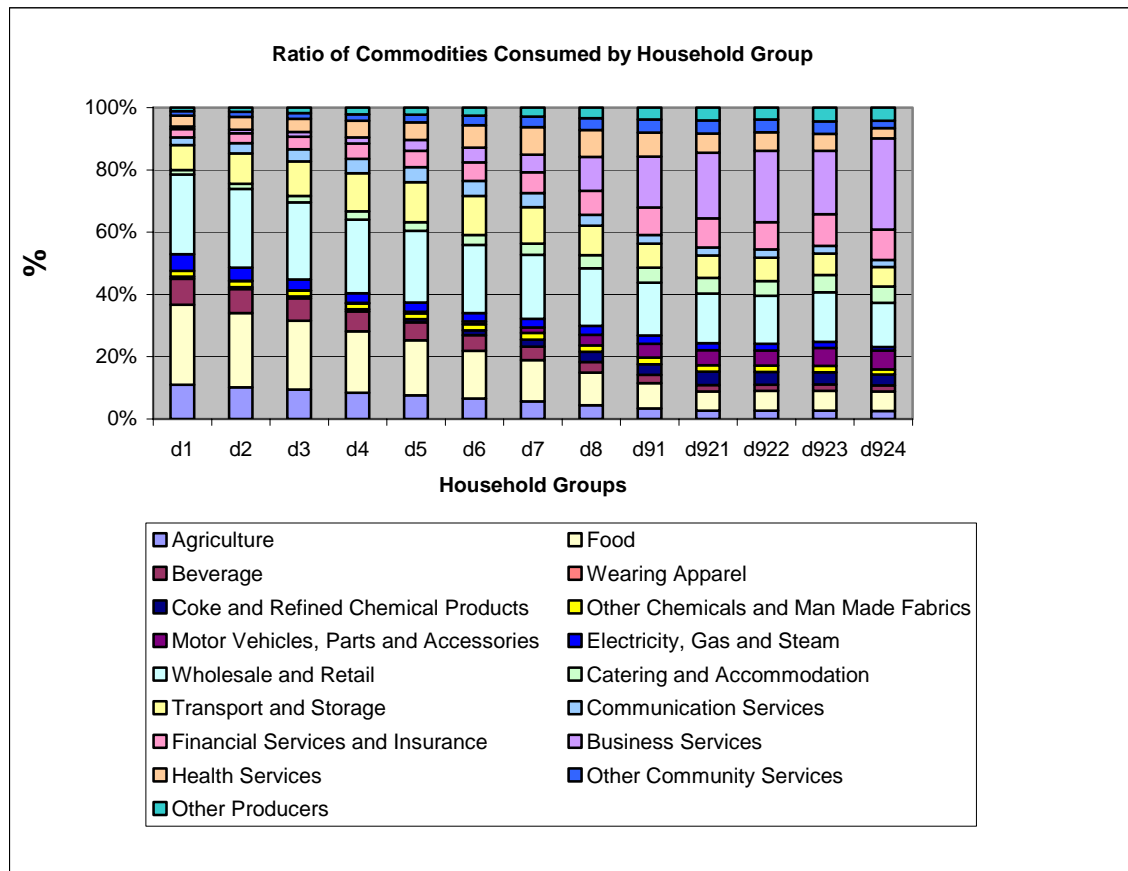
### 5.1. Introduction

There are various possible arguments for restructuring VAT. Firstly, the South African government's strategy GEAR, aims at creating growth, employment and redistribution. Lowering taxes may be used as a tool to achieve the set goals. For example, during the 2002 and 2003 budgets the government has lowered direct income taxes with the aim to generate growth, and also to redistribute. Redistribution was achieved by giving the largest portion of the tax relief to low- and middle-income groups. (RSA,2002a:16 and RSA,2003:16). Redistribution may also be achieved by restructuring VAT to lower the tax burden of the poor.

Secondly, in a report on poverty published by Statistics South Africa in 2000, it is stated that 48.8 percent of South Africans spend less than R250 per month - the per capita poverty line (Statistics South Africa,2000:2). Low-income households consume the largest portion of their income, food being the largest consumption expenditure item. As indicated by Figure 5.1 poor households spend approximately 20 percent of their income on food. As income increases the percentage spent on food decreases, with the highest income group only spending approximately three percent of their income on food.

Zero-rating food may possibly reduce poverty and also inequality in South Africa by reducing the regressiveness of Value Added Tax (VAT): because poor households spend a larger proportion of their income, they also spend a larger proportion of their income on VAT.

Figure 5.1: *The Portion of Income Spent on Food per Household Deciles 1998 from (SA SAM,2003)*



Thirdly, zero-rating food should also be considered against the high increase in food prices during 2002. An increase in food prices affects the poor especially, as they spend a larger portion of their income on food. It is therefore expected that low-income households would be more adversely affected by increases in food prices, as experienced during 2002, relative to high-income households. However, it is recognized that zero-rating food will only lead to a drop in prices and not necessarily to a change in the inflation rate. At the same time zero-rating food may provide immediate poverty relief.

Fourthly, the Commission of the European Communities is investigating the possibility of reducing the VAT rate of certain labour-intensive service industries with the objective to increase employment. Zero-rating labour-intensive industries in South-Africa are also a possibility necessary to be investigated as the official unemployment rate in South Africa in 1997 is 22.9 percent (Stats SA,2000:3).

This chapter aims to answer the question whether or not lowering VAT may achieve the set goals of GEAR, whether or not zero-rating food may reduce poverty and equality, whether zero-rating labor-intensive industries may create jobs and lastly whether or not it is the appropriate time to include the previously zero-rated food items in the VAT basket. VAT is also generally described as a “vanilla tax” meaning that the economic effect of such a tax is not significant (Metcalf as in Baker and Elliott,1997:420). The analysis that will follow will also serve to prove the extent to which the statement is true; how and to which extent changes in VAT would affect the economy.

The simulations conducted include decreasing the VAT rate, zero-rating food with alternative revenue replacement strategies, and zero-rating labor-intensive industries with alternative revenue replacement strategies. Each of these simulations will be done under alternative macroeconomic adjustment rules.

## **5.2. The CGE Model**

A CGE model is used to analyze the effect of changes in VAT on the economy. CGE models are highly suited to show the impact of VAT changes on distribution and welfare. CGE models incorporate consumer and producer behavior as well as the interaction between other economic agents, and therefore incorporate all effects on the distribution of income and economic welfare. The standardized CGE model discussed in chapter four is used to analyze the VAT issues discussed above.

### **The Data**

The SA SAM commissioned by the World Bank in 2002/2003 is used as the main data source. The SA SAM is based on 2001 data and was compiled from a large number of data sources, as may be seen in chapter five. A combination of elasticities obtained from Gibson (2003), the IDC (1997), the South African CGE model of Lewis (2001), as well as the South African CGE model of Thurlow and Van Seventer (2002) is used in the CGE

model. The elasticities are discussed in chapter six. The other parameters will be calibrated within the CGE model to balance and configure the model.

### 5.3. Instruments

The impact of restructuring VAT on economic variables such as GDP, employment, consumption expenditure and investment is observed from the results obtained from the CGE model. The impact on industry and households is also observed. In fact, the CGE model includes a large number of economic variables that allow one to observe the effect of changes in VAT on the economy. Changes in these variables will be observed during each simulation. Apart from these variables other issues such as the regressiveness of VAT, the progressiveness of the complete tax system, changes in income distribution, and overall welfare changes would also be observed. The results of the simulations (experiments) are merely used to determine the value of the instruments below; the instruments do not form part of the model. The additional instruments specified are discussed below.

#### 5.3.1 Regressiveness

Regressiveness is measured by taking the household's expenditure on VAT as a percentage of total income. The total expenditure on VAT for each household category is calculated within the CGE model as follows:

$$Regress(h) = \frac{\sum_c QH(c, h) * PQ(c) * statvat(c) * leakage(c)}{YI(h)}$$

where

$Regress(h)$	measures the regressiveness of VAT for each household
$QH(c, h)$	is the quantity of commodity $c$ consumed by household $h$
$PQ(c)$	is the composite supply price of commodity $c$

$statvat(c) * leakage(c)$  is the actual VAT rate, paid on commodity  $c$   
 $YI(h)$  is the total income of households.

Therefore the actual payment on VAT by a household category is calculated by taking the sum of the quantity consumed by that household of a specific commodity multiplying it with the composite supply price as well as the actual VAT rate on that commodity. The actual payment on VAT by a household category is then divided by the total income of that household to get the measure of regressiveness.

### 5.3.2 Progressiveness

The progressiveness of the complete tax system is measured by taking the total tax payment by each household as a percentage of total income.

$Progress(h)$

$$= \frac{(\sum_c QH(c, h) * PQ(c) * (statvat(c) * leakage(c) + tfuel(c) + texcise(c) + tproducts(c))) + tins(h) * YI(h)}{YI(h)}$$

where

$Progress(h)$  measures the progressiveness of VAT for each household  
 $QH(c, h)$  is the quantity of commodity  $c$  consumed by household  $h$   
 $PQ(c)$  is the composite supply price of commodity  $c$   
 $statvat(c) * leakage(c)$  is the actual VAT rate paid on commodity  $c$   
 $YI(h)$  is the total income of households  
 $tins(h)$  is the marginal tax rate of households

### 5.3.3 Distribution

A Gini Coefficient will be used to measure the impact of policy changes on distribution. The Gini Coefficient is then calculated using the following formula:

$$Gini_y = 1 + \frac{1}{N} - \frac{2}{N^2} \sum_{i=1}^N (N+1-i) \left( \frac{y_i}{y} \right)$$

where

$N$  is the number of observations

$y$  is the income arranged in ascending order

$\bar{y}$  is the arithmetic mean income (Creedy,2001:25)

The Gini coefficient lies between zero and one, where zero indicates perfect equality and one perfect inequality. (Shoven and Whalley,1992:130-131)

The ability of a tax structure to redistribute may be summarized using an L-measure. The L-measure is also called the Reynolds-Smolensky measure and is calculated as follows:

$$L = Gini_y - Gini_{yd}$$

where

$Gini_y$  is the pre-tax Gini Coefficient

$Gini_{yd}$  is the post-tax Gini Coefficient

The L-measure gives the extent of the change in inequality arising from the tax-system. (Creedy,2001:25-26).

### 5.3.4 Equivalent Variation

With CGE models an exact welfare comparison between two equilibrium situations may be achieved. The equivalent variation (EV) (as initially defined by Hicks (1939)) is often used to determine the welfare effect. The equivalent variation asks the question: “How much money is a particular change equivalent to?” The equivalent variation (as specified originally) measures the amount after the price change that the household would be prepared to pay to return to old prices (Creedy,1999:12). The South African CGE model includes an indirect compensation (IC) and EV measurement. The IC measures the income needed at initial prices to generate same welfare as before the simulation, the EV, in turn, measures the income change that, at initial prices, would be equivalent to the change simulated for the simulation (Löfgren *et al*,2001). The standard model also gives the EV value as a percentage of the initial consumption value (EVTAB). An increase in the EVTAB value would indicate an overall improvement in welfare. This measure will be used to evaluate the impact of the simulations of the welfare of the household deciles.

## 5.4. The Simulations

### 5.4.1 Decreasing the Statutory VAT Rate from 14 Percent to 12.6 Percent

VAT was introduced in 1991 at a statutory rate of 10 percent. In 1993 the rate was increased to 14 percent. Since 1993 the statutory rate remained at 14 percent. At the same time the government decreased the tax rates on household income for the last two budget years (RSA,2002a:16 and RSA,2003:16). The question is whether a decrease in the statutory rate from 14 to 12.6 percent may be implemented as an alternative for a decrease in direct taxes.

The expected effect is that a decrease in VAT would serve to decrease prices and therefore increase real income. At the same time it would lead to a drop in government revenue and therefore a drop in government savings. This would in turn have an effect on GDP, trade, savings and investment. A reduction in VAT would have a welfare

implication. The CGE model will aid to determine the size of the impact of decreasing VAT, and will indicate the effect on the different households in terms of welfare. The CGE model will also highlight effects not expected.

#### **5.4.2 Zero-rating Food**

When VAT was introduced in 1991 various basic food items were already exempted to improve the regressiveness of VAT. Food items like brown bread, maize meal, samp, mealie rice, dried mealies, dried beans, lentils, pilchards, milk powder, milk, rice, unprocessed vegetables and fruit, vegetable oil, and eggs are exempt (SA Tax,2001:Schedule 2 Part B). In 2001 paraffin a fuel used by most poor households was also exempt.

As may be seen from figure 5.1 poor households spend the largest proportion of their income on food. It seems as if zero-rating all food items may further contribute to improving the regressiveness of VAT, and simultaneously aid redistribution. However, the loss in revenue due to the zero-rating of food will have to be absorbed by other taxes. The loss in revenue may be replaced by either increasing direct taxes, or by allowing another commodity or service, more extensively used by high income groups, to absorb the loss by applying higher VAT rates to that commodity or service. This will also serve the purpose of redistribution. High-income groups, in turn, spend the largest proportion of their income on business services. Business services include bookkeeping, legal, accounting, programming and data processing, consultant engineers, architects, land surveyors, security, marketing, and other professional services. It seems that applying higher VAT rates to the business service industry will absorb the loss in revenue, but also simultaneously result in redistribution.

#### **Zero-rating Food While Increasing Direct Taxes**

Food will be zero-rated, while direct taxes will increase to absorb the loss in revenue. Direct taxes are increased with the same percentage point for all households, which is



more equitable: as lower income households' tax rates are already lower, the same percentage point average direct tax rate increase for all households will affect lower income households the least.

### **Zero-rating Food While Increasing VAT on Business Services**

Food will be zero-rated, while VAT on business services will be increased to absorb the loss in revenue. Both direct taxes and government savings will be fixed.

#### **5.4.3 Zero-rating Labor-intensive Industries**

The Commission of the European Communities is investigating the possibilities of zero-rating labor-intensive service industries not exposed to trade. The objectives of this strategy are to increase employment and reduce the black economy. Employment will be increased via an indirect mechanism. Reducing the VAT rate would lead to a fall in consumer prices which in turn would generate increased demand. Increased demand would increase production activity and employment. The black economy referred to here is the formal economy which entails properly registered businesses, but which tend to under disclose VAT receipts. Lowering VAT rates will possibly increase compliance.

The following requirements are set for the targeted services:

- (1) they must be labor-intensive;
- (2) they must, in the main, provide directly to final consumers;
- (3) they must be based locally, and not be exposed to international trade;
- (4) there must be a close link between lower prices resulting from the rate reductions and the foreseeable increase in demand and employment.

The industries targeted in the European Communities are small repair services, renovations of private dwellings, window cleaning, domestic care services, and hair dressing. (The Commission of the European Communities,2003:1-10).

The next step is to identify service industries in South Africa to meet the same requirements as above. Table 5.1 lists the service industries contained within the SA SAM (2003) and show how the industries are exposed to trade, what share they sell to households, and their use of semi- and unskilled labor as a percentage of total factor use:

*Table 5.1: Targeting Labor-Intensive Industries from (SA SAM,2003)*

	Export Share (%)	Export – Output Ratio (%)	Import Share (%)	Import – Demand Ratio (%)	Household Sales Share (%)	Semi-skilled Labor Use Share (%)	Unskilled Labor Use Share (%)
C_HOTEL	2.3	41.7	1.8	34.3	0.73	13.3	4.5
C_TRANS	4.6	14.3	8.2	20.5	0.36	24.2	14.5
C_COMM	1.5	6.7	2.1	8.5	0.29	21	10.1
C_FINAN	2.6	6.2	1.6	3.5	0.33	22.3	3.3
C_BUS	1.1	2	1.6	2.8	0.33	15.1	6.9
C_MOTHS	0.3	2.1	0.3	2.1	0.65	19.9	3.3

For the purpose of this paper, financial service will be zero-rated. The change in employment of semi- and unskilled labor will be observed. Zero-rating financial services may possibly reduce the cost thereof and make it more accessible to poor households.

The fourth requirement (as stated by the Commission for the European Communities) specified above, requires that there should exist a close link between lower prices resulting from the rate reductions and the foreseeable increase in demand and employment. This criterion will be tested using a CGE model.

### **Zero-rating Financial Services**

The financial service industry will be zero-rated. Changes in employment and other variables are observed.

## **Zero-rating Financial Services While Increasing Direct Taxes**

Zero-rating the financial service industry will result in a loss in revenue for government. The revenue replacement strategy used here increases direct taxes with an equal percentage for all households.

### **5.5. The Macroeconomic Adjustment Rules**

Factor market closures assume capital and high skilled labor are fully employed and activity specific, while semi-skilled and low-skilled labor are unemployed and mobile. The impact of these closures is that for capital and high-skilled labor total employment will not change. The only change here would be the activity specific rental price of capital and the wage of high skilled labor. Capital and high-skilled labor may therefore not move between activities. For semi- and unskilled labor, wages will remain constant as these factors experience high levels of unemployment. The only factor that would change for semi- and unskilled labor is employment. The wage rate of semi- and unskilled labor is fixed at real wage level. The real wage is included in the model as the initial wage level multiplied by the consumer price index relative to the initial CPI level.

The closure for the rest of the world assumes a flexible exchange rate with fixed foreign savings. The adjustment rule follows from observations made by Davies and Van Seventer (2003) who noted that foreign savings as defined by the national accounts behaved relatively constant over the last 10 years.

The savings-driven investment closure is used for the simulations appended with SAV. The marginal propensity to save for all non-government institutions will be fixed, while capital formation is flexible. The level of savings determines investment. In a paper read by Nell (2002), he mentioned that, on the long-run, private savings were strongly exogenous to private investment in the period 1977 to 2001. This implies that the savings level will determine investment. (Nell,2002:26).

The numeraire in the model is the domestic price index.

## 5.6. The Results

### 5.6.1 Decreasing the Statutory VAT Rate from 14 Percent to 12.6 Percent

It is not expected that lowering the statutory VAT rate to 12.6 percent would have any significant macro economic effects. Table 5.2 gives a summary of the GDP effects of lowering VAT from both the income and expenditure side:

Table 5.2: *Changes in Real GDP when Lowering the VAT Rate to 12.6 Percent*

	BASE	SHARE in GDP	LOWERING VAT RATE	CONTRIBUTION IN CHANGE IN GDP
	R billion		Percentage change	Percentage
Consumption	608.633	59.15	0.54	0.32
Fixed Capital Formation	144.127	14.01	-1.39	-0.20
Change in Stock	7.436	0.72	Exogenous	
Government Consumption	231.34	22.48	Exogenous	
Exports	301.841	29.34	0.031	0.01
Imports	-264.464	-25.70	0.04	-0.01
<b>GDP at Market Prices</b>	<b>1028.914</b>	100	<b>0.12</b>	<b>0.12</b>
GDP at Factor Cost	916.45	89.07	0.12	0.103
VAT	58.613	5.69	-9.85	-0.561
Other Net Indirect Taxes	53.90	5.23	11.11	0.580

Source: BASE SA SAM 2003  
CGE Simulations

The change in GDP at market prices is relatively small and is due to changes in the composition of aggregate demand. Lowering the statutory VAT rate results in an increase in GDP at market prices of 0.12 percent. Consumption expenditure increases with 0.54 percent as a result of the decline in prices. Investment declines with 1.39 percent, mainly as a result of the adjustment rules assumed. If VAT is lowered, the composite price of most commodities will decrease and consumption will therefore increase. As government expenditure and the trade balance are assumed fixed, investment will decrease to counterbalance the increase in household consumption. The

mechanism behind this is: If the budget deficit goes up, government savings and therefore domestic savings decline. Given fixed foreign savings, and fixed private savings rates assumed, the only variable that is then allowed to adjust is investment. Hence investment will decline and counterbalance the increase in household consumption so that GDP increases to a lesser extent.

On the income side GDP at factor cost increases due to the expansion of domestic production activities. GDP at factor cost is derived from value-added, value-added in turn depends on changes in the employment of unskilled and semi-skilled labor. Employment of unskilled labor increased with 0.26 percent and semi-skilled labor with 0.4 percent. Changes in VAT and other net indirect taxes also contributed to the overall change in GDP at market prices. The initial decline in VAT contributed 0.56 percent of the overall decline in GDP. The other net indirect taxes increased to offset the initial reduction in VAT; this is mainly due to the expansion in the volume of production, as well as in imports.

Other macro economic results are summarized below in table 5.3.

*Table 5.3: Some Macro Economic Results when Lowering the VAT to 12.6 Percent*

<b>Item</b>	<b>BASE</b>	<b>LOWERING VAT RATE</b>
	<b>Percentage</b>	<b>Percentage Change</b>
Consumer Price Index (CPI)	100	-0.4
Real Exchange Rate (REXR)	90.6	-0.1
Investment share in GDP	14	-0.3
Private savings share in GDP	14.7	0.1
Government savings share in GDP	-0.2	-0.4
Direct taxes share in GDP	15	0.1

Source: BASE SA SAM 2003

*CGE Simulations*

Lowering the statutory VAT rate with 10 percent from 14 to 12.6 percent will result in a decline in the CPI of 0.4 percent. This in turn will result in an increase in consumption of both imported goods and domestically produced goods. Given fixed foreign savings,

exports also have to increase - the increase in exports value relative to import value leads to an appreciation of the real exchange rate of 0.1 percent.

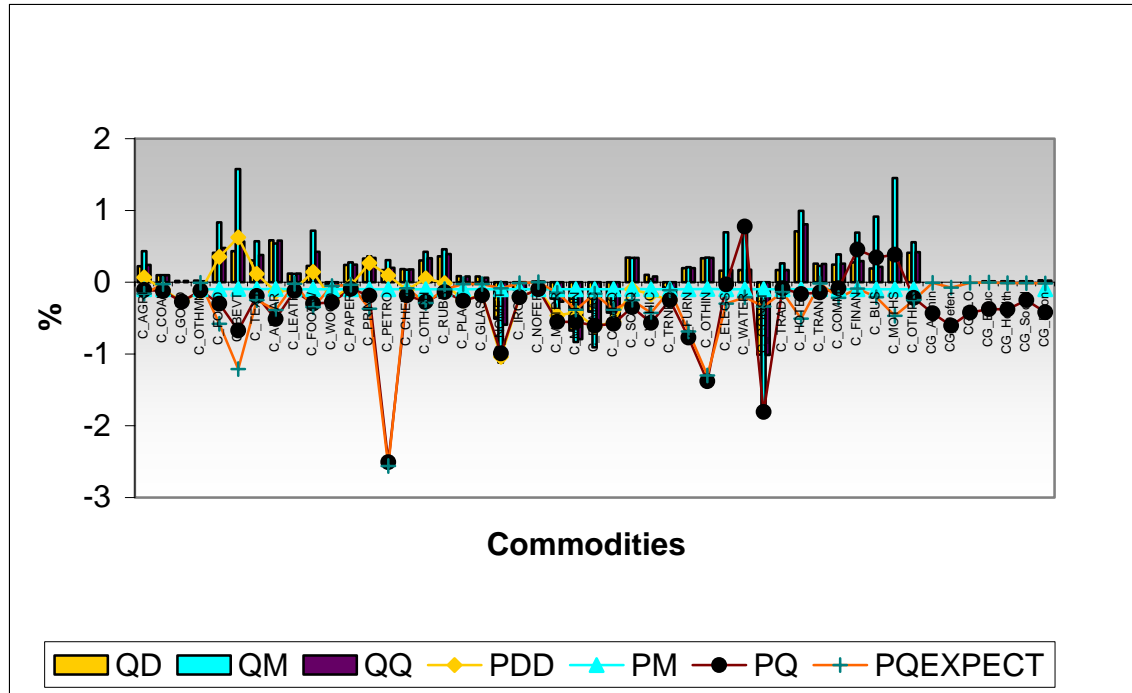
Lowering the statutory VAT rate is expected to lead to a loss in government revenue of 2.26 percent, however government revenue only declined with 2.18 percent. The smaller decline is due to the increase in revenue from import duties and activity taxes – even though the rates of these taxes remained the same the expansion in volume of imports and domestic activity resulted in the increase in income. The smaller decline in revenue is also associated with an increase in direct tax revenue – both personal tax revenue and corporate tax revenue increased due to an increase in factor income of capital and high-skilled labor (this may be seen in figure 5.3).

When lowering the VAT rate, investment as a share in GDP declined with 0.3 percent again due to the drop in government savings – government savings as a share in GDP declined with 0.4 percent in comparison to an increase in private savings to GDP of 0.1 percent. Private savings increased due to the income effect generated by lowering VAT.

Lowering the statutory VAT rate from 14 to 12.6 percent is expected to lower the composite price of all commodities. Lower prices will generate an income effect, real income increase and both domestic supply and imports, in most industries, will expand. The presence of a substitution effect depends on whether or not the decline in import prices (due to the appreciation of the exchange rate) is larger than the change in the domestic supply price. Figure 5.2 shows the expected change in the composite price of all commodities as well as the actual changes in price, indicating the factors that offset the expected change in commodity prices, and indicating the presence of a substitution effect.

Industries that produce commodities sold mostly to households will benefit from lowering the statutory VAT rate as consumption expenditure increases with 0.54 percent.

Figure 5.2: The Expected and Actual Change in Commodity Prices When Lowering VAT to 12.6 Percent



Source: CGE Simulations

Examples of industries that produce commodities sold mostly to households are food (94.8 percent), textiles (35.3 percent), beverages and tobacco (79.6 percent), apparel (32.8 percent), footwear (77.3 percent), hotel and accommodation (72.7 percent), transport (35.59 percent), and medical services (64.6 percent)<sup>1</sup>. Figure 5.2 shows that these industries benefit from lowering the statutory VAT rate and experience an increase in activity. The mechanism is as follows: lowering the statutory VAT rate will lead to an increase in domestic supply and imports – income effect. However, domestic supply is constrained with respect to capital and high-skilled labor. The activity-specific rental price of capital and the wage rate of high-skilled labor will increase. This will lead to an increase in the domestic supply price. There is also a change in the relative price of imports to domestic goods; import prices decline due to the appreciation of the exchange rate. In the industries selling mostly to households the domestic supply price increases. Due to this substitution effect imports increase with more. For commodities such as

<sup>1</sup> The number in the bracket indicates the percentage of total sales sold to households for each commodity.

agriculture, food, beverages, textiles, footwear, and petroleum, the relative large increase in imports results in a lower than expected decline in the composite price of these commodities. Thus, the net effect is still a reduction in the composite price of goods. For water, financial, business, and medical services, the increase in imports outweighs the initial decline in prices due to the lowering of the statutory VAT rate and the net effect is an increase in their respective composite prices.

Industries that do not benefit from lowering the statutory VAT rate are industries that produce commodities sold mostly to investment, as investment demand decreased with 1.4 percent. Examples of industries that produce commodities sold mostly to investment are machinery and equipment (51.5 percent), equipment and electronic machinery (23.3 percent), communication equipment (52.8 percent), and construction (58.41 percent)<sup>2</sup>. Construction experienced the largest decline in activity because construction sells exclusively to investment, and furthermore construction is also relatively capital intensive (41.5 percent), and experienced a decline in the activity-specific rental price of capital of 0.73 percent. Construction also does not import and therefore does not benefit from lower import prices.

To summarize: Industries that benefit from lowering the statutory VAT rate are industries that sell mostly to households, as private consumption expenditure increase. Industries that do not do well are industries that sell mostly to investment, or industries that are either capital or labor intensive as the rental price of capital as well as the wage rate of high-skilled labor increases.

The average level of domestic activities increased. This required the use of additional factors. The change in employment of semi- and unskilled labor will influence GDP at factor cost. Employment of high-skilled labor and the factor supply of capital will not change. This is a result of the macroeconomic adjustment rules assumed. The simulations assumed that the supply of high-skilled labor and capital is fixed – fully

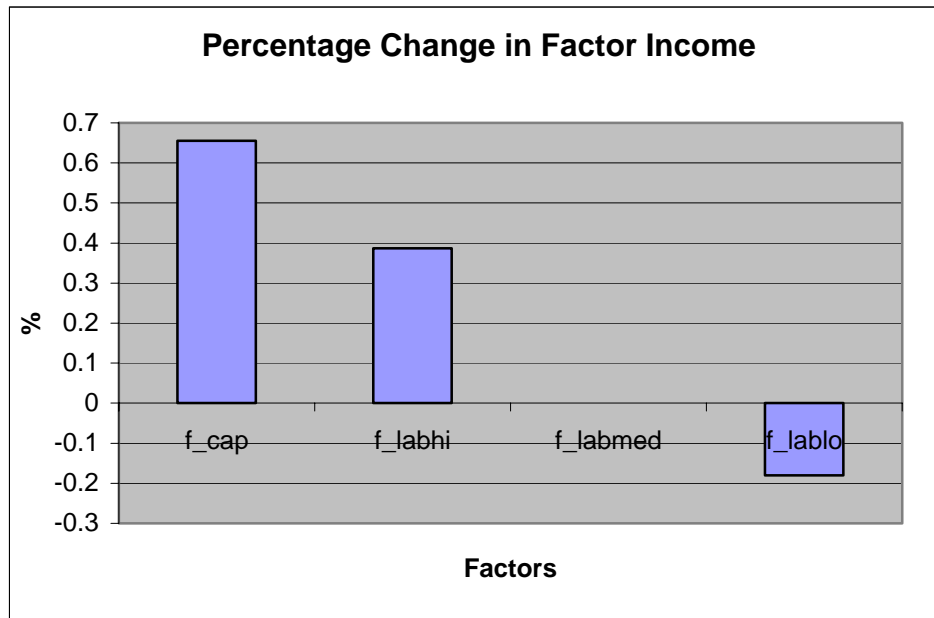
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<sup>2</sup> The number in the bracket indicates the percentage of total shares sold to investment for each commodity.



employed. Therefore for capital and high-skilled labor the adjusting factor is the activity-specific rental price of capital and wage rate of high-skilled labor. Figure 5.3 summarizes the impact of lowering VAT on factor income:

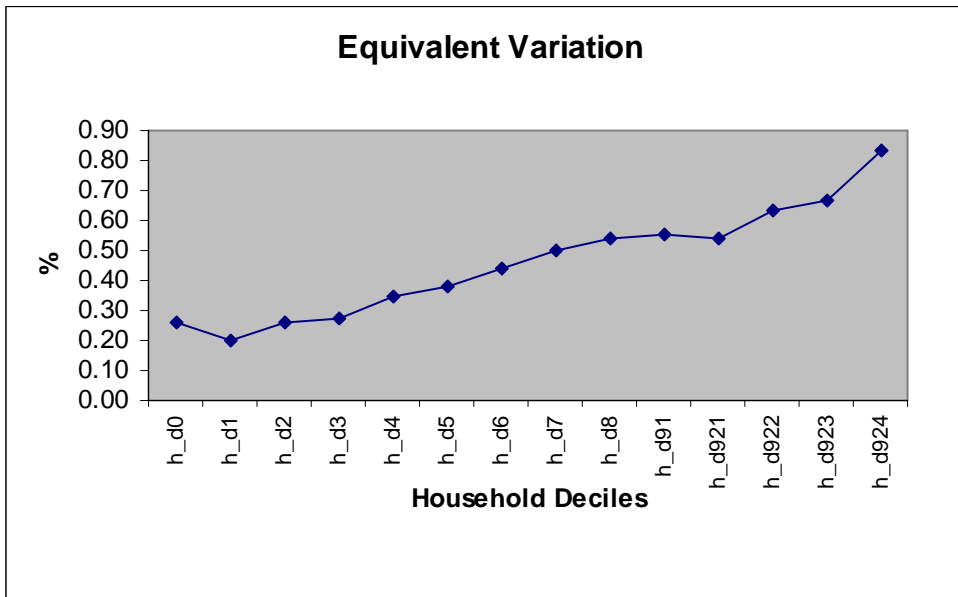
*Figure 5.3: The Percentage Change in Factor Income when Lowering the VAT rate to 12.6 Percent*



Source: CGE Simulations

As already seen above, the employment of unskilled labor increased with 0.26 percent and semi-skilled labor with 0.4 percent. However, the real wage of both semi-skilled labor and unskilled labor would decline as it is fixed at real wage levels - the reduction in the CPI of 0.4 percent resulted in an overall decline in wages. The average rental price of capital increased for most industries, except industries that show a decline in activity due to the decline in investment. The same applies to the wage of high-skilled labor. The changes in factor income will translate to changes in household income. Poor households are expected to do worse as factor income of unskilled labor declines. At the same time a lower VAT rate generates an increase in real income, which will increase consumption-expenditure. Both these effects are captured with an equivalent variation. Figure 5.4 shows the change in the EV value for all household deciles:

Figure 5.4: *The Equivalent Variation when Lowering the VAT Rate to 12.6 Percent*



Source: CGE Simulations

Reducing the VAT rate to 12.6 percent results in an overall improvement in welfare. High-income households benefit more due to the increase in their income from capital and high-skilled labor. High-income households spend, in absolute terms, more on commodities than poor households and therefore also benefit to a greater extent from the reduction in VAT. Low-income households factor income from unskilled labor declines. This decline is still outweighed by the reduction in commodity prices, resulting in the overall increase in welfare.

The same simulation was performed, but now investment driven savings is assumed. The simulation showed that the marginal propensity to save, of firms and households, needs to increase with 1.8 percent to maintain the initial level of investment given the reduction in the VAT rate.

### 5.6.2 Zero-rating Food

Again it is not expected that zero-rating food would have any significant macroeconomic effect, as VAT on food is 0.6 percent of GDP. Table 5.4 summarizes the changes in GDP when food was zero-rated:

Table 5.4: *Changes in Real GDP when Zero-rating Food*

	BASE	SHARE	ZERO RATE FOOD	CONTRIBUTION IN CHANGE IN GDP	ZERO RATE FOOD INCREASE DIRECT TAXES	CONTRIBUTION IN CHANGE IN GDP	ZERO RATE FOOD INCREASE VAT BUSINESS SERVICES	CONTRIBUTION IN CHANGE IN GDP
	R billion		% Change	%	% Change	%	% Change	%
Consumption	608.633	59.15	0.64	0.38	0.35	0.21	0.33	0.19
Fixed Capital Formation	144.127	14.01	-1.92	-0.27	-0.34	-0.05	-0.86	-0.12
Change in Stock	7.436	0.72	Exogenous		Exogenous		Exogenous	
Government Consumption	231.34	22.48	Exogenous		Exogenous		Exogenous	
Exports	301.841	29.34	-0.03	-0.01	0.14	0.04	0.02	0.01
Imports	-264.464	-25.70	-0.03	0.01	0.15	-0.04	0.02	-0.01
GDP at Market Prices	1028.914	100	0.11	0.11	0.16	0.16	0.07	0.07
GDP at Factor Cost	916.45	89.07	0.11	0.10	0.16	0.14	0.07	0.06
VAT	58.613	5.70	-9.32	-0.53	-9.23	-0.53	-2.23	-0.13
Net Indirect Taxes	53.90	5.23	10.04	0.55	10.40	0.55	2.61	0.14

Source: BASE SA SAM 2003

CGE Simulations

Again the change in GDP at market prices is relatively small and is due to changes in the composition of aggregate demand. Zero-rating food, without a revenue replacement strategy, results in an increase of GDP of 0.11 percent. The increase in GDP is due to a relatively large increase in consumption expenditure of 0.64 percent. The large increase in consumption expenditure is offset by a decrease in investment (1.92 percent), due to a reduction in government savings. These results follow directly from the adjustment rules assumed. If the composite price of food decreases (due to the zero-rating of food) consumption will increase. Investment will decrease to counter-balance the increase in household consumption. The reason for this is: If the budget deficit goes up, domestic savings decline. Given fixed foreign savings, and fixed private savings rates assumed, the only variable that is then allowed to adjust is investment. Hence investment will decline and counterbalance the increase in household consumption to such a degree that GDP as

a whole decreases. Under this simulation government revenue declined due to the zero-rating of food with 1.88 percent, the expected decline was 2.10 percent. The smaller decline in government revenue is associated with the increase in net other indirect taxes, combined with an increase in government revenue from income taxes. Although the direct tax rates are fixed, the increase in income will earn government higher revenue.

Zero-rating food with an increase in direct taxes to absorb the loss in revenue results in an increase in GDP of 0.16 percent. When zero-rating food while increasing direct taxes, the decrease in GDP may be attributed to the increase in direct taxes, which lowers the marginal propensity to save. In this simulation a balanced budget is assumed, with direct taxes being the adjusting variable. In other words, direct taxes increase to offset the decline in government revenue due to lower indirect taxes. Consequently, total household expenditure does not increase as much as in the previous simulation, and therefore private sector investment does not have to adjust downwards as much, since most of the adjustment is already achieved by household expenditure itself. Nevertheless, the net effect is not negative for GDP, in fact it is slightly positive. The tax rates of firms and households were proportionately increased with 2.09 percent to absorb the loss in revenue. This reduces the disposable income of households, which in turn lowers consumption expenditure.

Zero-rating food, while increasing VAT on business services, generates the lowest GDP growth. GDP grows with 0.07 percent due to an increase in consumption expenditure. Private consumption expenditure does not change significantly. The reason is the same as in the second simulation. However, investment decreases more than in the previous simulation, presumably because investment demand is now also negatively impacted by the increase in VAT on business services. VAT on business services had to increase with 121.946 percent. This implies a statutory VAT rate on business services of 31.1 percent, which is unrealistically high. Zero-rating food, while increasing VAT on business services, does not seem to be a realistic policy strategy to follow. However, for the purpose of this chapter the results of this simulation are discussed, as there are advantages to this policy strategy worth investigating.

On the income side, zero-rating food without a revenue replacement strategy will result in an increase in GDP at factor cost due to the increase in domestic activity. VAT declined with 9.32 percent, which contributed to an overall decline in GDP at market prices of 0.53 percent. Again other net indirect taxes increased to offset the initial decline in VAT. The increase in net indirect taxes is due to an increase in revenue from import tariffs and taxes on production. When zero-rating food while increasing direct taxes, GDP at factor cost increases and again the initial effect of VAT is offset by increases in other net indirect taxes. When food is zero-rated while VAT is increased GDP at factor cost now only increases with 0.07 percent. The net change in VAT is also much smaller when zero-rating food, while increasing the VAT rate on business services. Again the initial effect of VAT is offset by increases in other net indirect taxes.

Other macro economic results are highlighted in table 5.5:

*Table 5.5: Some Macroeconomic Results when Zero-rating Food*

	<b>BASE</b>	<b>ZERO RATE FOOD</b>	<b>ZERO RATE FOOD INCREASE DIRECT TAXES</b>	<b>ZERO RATE FOOD INCREASE VAT BUSINESS SERVICES</b>
		<b>Percentage Change</b>	<b>Percentage Change</b>	<b>Percentage Change</b>
Consumer Price Index (CPI)	100	-0.7	-0.7	-0.5
Real Exchange Rate (REXR)	90.6	-0.1	0.1	0.1
Investment share in GDP	14	-0.3		-0.1
Private savings share in GDP	14.7	0.1	0.1	
Government savings share in GDP	-0.2	-0.3		
Direct taxes share in GDP	15	0.1	0.4	

SOURCE: BASE SA SAM 2003  
CGE Simulations

Zero-rating food results in a reduction in the CPI of 0.7 percent, when zero-rating food without a revenue replacement strategy, or when increasing direct taxes to absorb the loss in revenue. Zero-rating food, while increasing VAT on business services, only reduces the CPI with 0.5 percent.

Zero-rating food without a revenue replacement strategy results in an appreciation of the real exchange rate of 0.1 percent. Imports decline due to the higher import content of

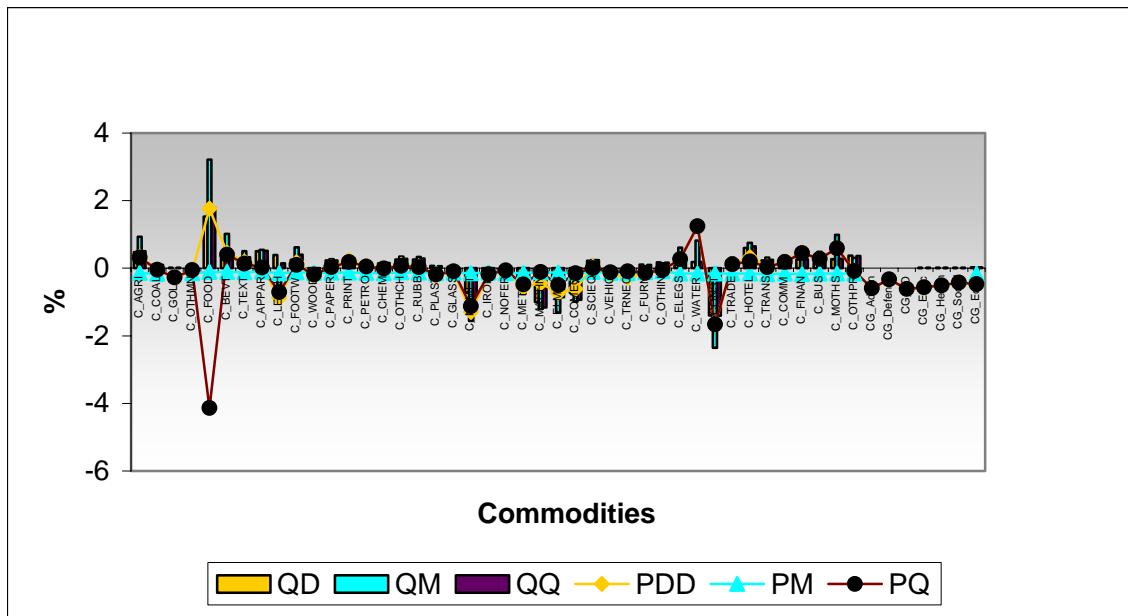
investment demand, compared to household expenditure. Given fixed foreign savings, exports also have to decline, which presumably is achieved with an appreciation of the exchange rate. The real exchange rate appreciated with 0.1 percent, as total imports declined more than total exports.

Zero-rating food with a revenue replacement strategy (either increasing direct taxes or VAT on business services) results in a depreciation of the real exchange rate. Imports, and therefore also exports, go down for the same reason as before but not as much, and the exchange rate stays virtually constant. Zero-rating food while increasing direct taxes, results in a depreciation of the exchange rate of 0.1 percent. Zero-rated food, while increasing VAT on business services, results in a slightly higher depreciation of the exchange rate, as investment is more affected and therefore the impact on imports and exports is slightly higher than in the previous simulation.

Zero-rating food is expected to lower the composite price of commodities. The expected decline is equal to 5.535 percent. The actual change in the composite price of commodities is 4.13, 4.25 and 4.15 for zero-rating food without a revenue replacement strategy, or increasing direct taxes, or increasing VAT on business services, respectively. Figures 5.5, 5.6 and 5.7 show the factors that offset the larger decline in the composite commodity price when zero-rating food:

Food prices are expected to decrease with 5.5 percent due to the zero-rating of food. However, the price of food only decreased with 4.1 percent. The offsetting factor is the relatively large increase in the imports of food (3.2 percent). The relatively large increase in imports is due to both an income and substitution effect. The income effect, in turn, is due to lower import prices: import prices declined with 0.01 percent. The substitution effect is due to a change in the relative price of imported foods to domestically produced foods – import prices decline with 0.01 percent compared to an increase in the price of domestic demand of 1.8 percent.

Figure 5.5: *The Expected and Actual Change in Commodity Prices When Zero-rating Food*



Source: CGE Simulations

The relatively larger than expected increase in imports resulted in a smaller than expected decrease in the composite price of food. The zero-rating of food and the resultant decline in the composite price of food will also generate an income effect that will cause both imports and domestic production to increase. Domestic production increased with 0.71 percent. There was a substitution away from exports as food exports declined with 3.36 percent. Food is also used intensively in the production of food itself, a factor that in turn will result in a larger decrease in the price of food. The net effect is a decline in food prices of 4.1 percent.

The agricultural industry benefits from zero-rating food, as agricultural products are used intensively in the production of food - agricultural products contribute 56.3 percent of total intermediate use in the food industry. The agricultural industry, in turn, also uses food as an intermediate good – 19.7 percent of total intermediate use. The resultant effect is a relatively large increase in activity in the agricultural industry. Imports of agricultural goods increase with 0.94 percent due to lower import prices, and domestic sales increase with 0.47 percent. Other industries that also benefit (because they are using

food as an intermediate) are beverages and tobacco, hotel and accommodation, and the leather industry. The leather industry benefits to a very large extent as food (mainly meat) contributes to 65.6 percent of total intermediate use. Domestic sales of leather increase with 0.4 percent, while imports decline with 0.86 percent. Exports of leather increase with 2.14 percent. Most of the domestic sales of leather are for intermediate use by the footwear industry. This is then the reason why the footwear industry also benefits from zero-rating food. The service industries in general benefit from zero-rating food as most of the services use food as an intermediate. Service industries also benefit from lower import prices.

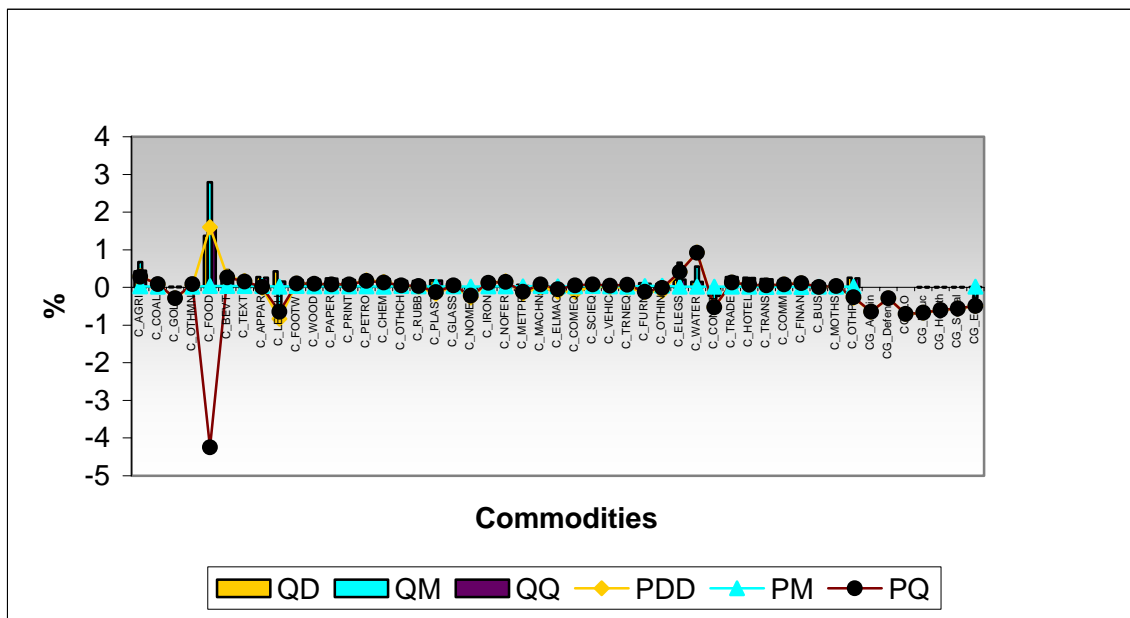
The water industry also experiences an increase in activity as the agricultural industry uses a large share of the total water use (2.9 percent). As domestic production of agricultural goods increase, water use will also increase. Furthermore, most services also use water to a large extent, and as the activities in services increase, the uses of water also increase.

Industries that do not benefit are the industries that sell mostly to investment. The construction industry is an example of an industry that performs very poorly. The construction industry sells 58.2 percent of total sales to investment. As investment demand decreases with 3.32 percent, demand for construction will also decrease. The domestic supply of construction decreases with 2.3 percent. The construction industry imports a very small share of total domestic demand (0.8 percent) and therefore does not benefit to a great extent from lower import prices.

The price effects when zero-rating food, while increasing direct taxes, are not significant. The food industry and industries producing commodities in the production of food benefit slightly from lower food prices. The price of leather again is reduced due to the lower price of food, a main intermediate in the production of leather. Most industries expanded slightly due to the increase in consumption expenditure. Again industries that sell mostly to investment experience a slight contraction of activities.



Figure 5.6: *The Expected and Actual Change in Commodity Prices When Zero-rating Food While Increasing Direct Taxes*



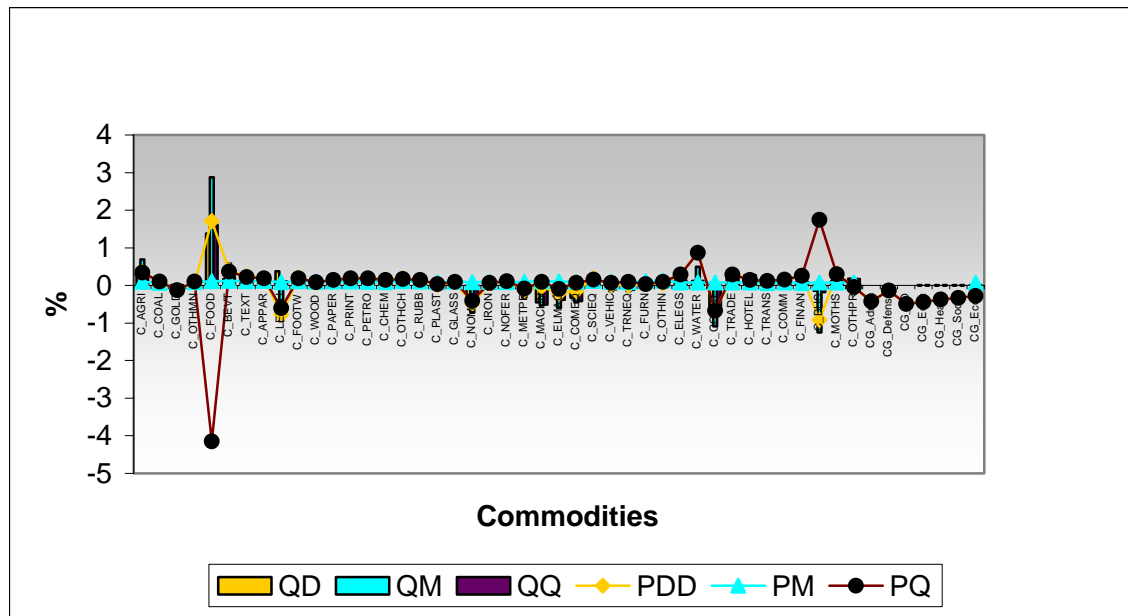
Source: CGE Simulations

The expected increase in the price of business services is 2.66 percent. The actual increase was lower at 1.75 percent. Domestic supply of business services decreased with 1.44 percent, while imports decreased with 1.25 percent. Composite supply declined with 0.18 percent, generating the largest offset to composite prices. Business services share of imports is relatively small (1.6 percent), and the share of imports to domestic supply is 2.8 percent. It is therefore not expected that the change in imports contribute to a large extent to the smaller increase in composite price. There is a substitution effect away from business services.

The rest of the industry results are similar when zero-rating food, while increasing VAT on business services.

The change in employment of semi- and unskilled labor will influence GDP at factor cost. Employment of high-skilled labor and the factor supply of capital will not change. This is a result of the macroeconomic adjustment rules assumed.

Figure 5.7: *The Expected and Actual Change in Commodity Prices When Zero-rating Food and Increasing VAT on Business Services*



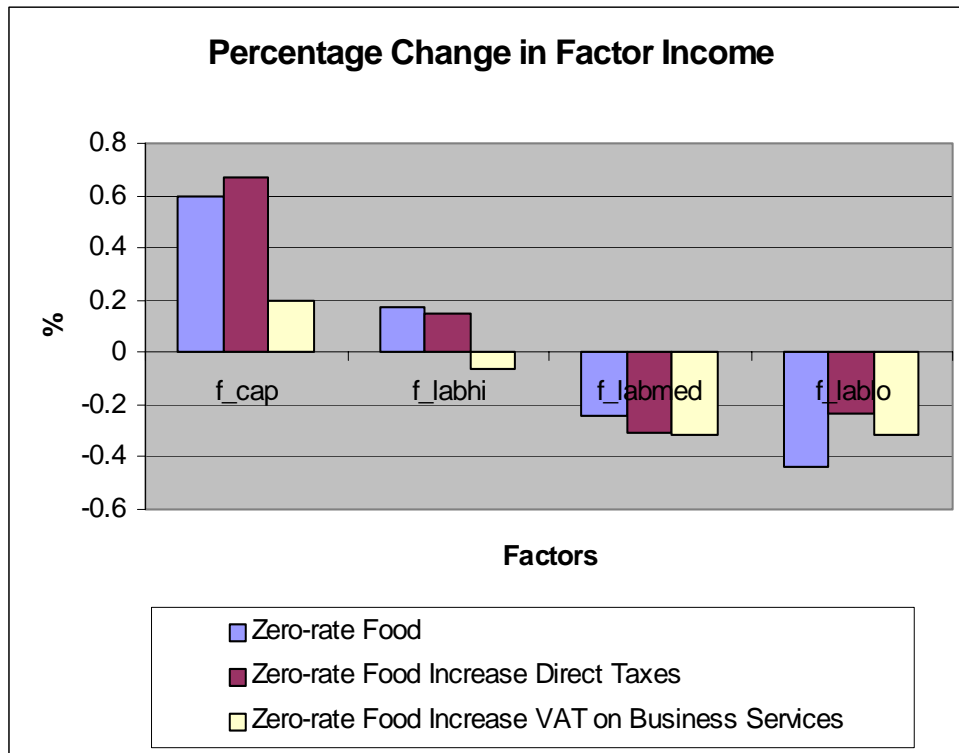
Source: CGE Simulations

The simulations assumed that the supply of high-skilled labor and capital is fixed – fully employed. Therefore for capital and high skilled labor the adjusting factor is the activity-specific rental price of capital and wage rate of high-skilled labor.

Changes in production activities will effect employment of unskilled and semi-skilled labor, as well as the return on capital and high-skilled labor. Figure 5.8 summarizes the impact of changes in employment and returns on factor income:

Zero-rating food without a revenue replacement strategy (FOODZEROSAV) will lead to a decline in the employment of semi- and unskilled labor, which in turn translates to a decline in factor income. Unskilled labor is more affected, as industries that experience a contraction in production, such as industries producing non-metal products, iron products, non-ferrous products, metal products, machinery, electronic machinery, equipment, and construction, use unskilled labor intensively.

Figure 5.8: The Percentage Change in Factor Income When Zero-rating Food

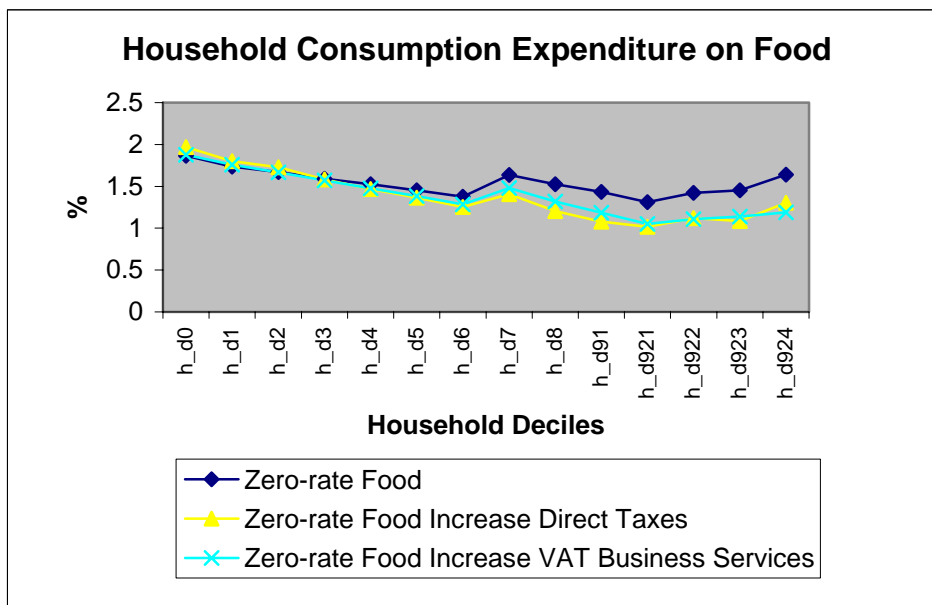


Source: CGE Simulations

Construction uses 41.1 percent unskilled labor of total factor use. Construction was an industry that experienced a particular large decline in activity. Factor income of capital and high-skilled labor increased. The increase in factor income is directly associated with an increase in the average rental price of capital and the average wage of high-skilled labor, as the quantity of both are assumed fixed. Return on capital increased with almost 0.6 percent as industries such as agriculture, food, leather, electricity, and water, are capital intensive. The capital share of total factor use is 69.4 percent in agriculture, 49.0 percent in food, 75.0 in leather, 63.7 in electricity and 77.9 percent in water production. The results when zero-rating food, while increasing direct taxes are similar. When zero-rating food, while increasing VAT on business services, high-skilled labor also experiences a decline in factor income. The construction industry showed a decline in the wage of high-skilled labor of -3.20 percent, business services showed a decline of -1.69 percent. Other contributing industries are industries selling mostly investment goods as well as government. The impact on factor income is more severe when

increasing VAT on business services. Changes in factor income in turn will impact on the income of households. This will in turn impact on consumption expenditure. The expenditure of households on food is an important issue, as one of the aims of restructuring VAT was poverty alleviation. A large number of South Africans suffer from malnutrition; increasing consumption expenditure of food by poor households may contribute to the alleviation of this problem. Figure 5.9 shows the changes in household consumption expenditure on food.

*Figure 5.9: The Percentage Change in Household Consumption Expenditure on Food When Zero-rating Food*



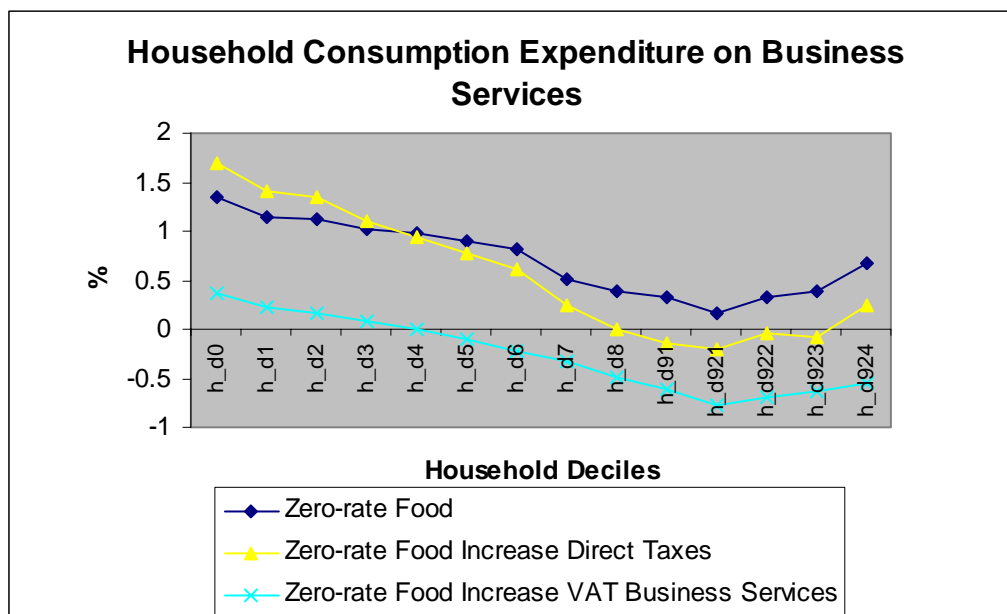
Source: CGE Simulations

Zero-rating food under all simulations resulted in an increase in consumption of food by poor households. Zero-rating food without a revenue replacement strategy results in higher consumption expenditure for middle and high-income households, as their consumption expenditure is not constrained by higher taxes.

Consumption expenditure on business services increases for poor households under all simulations. This is due to the increase in real income experienced by poor households due to the zero-rating of food. The increase in consumption of business services is the largest for poor households when zero-rating food while increasing direct taxes, as the

decline in factor income is not as severe. High-income households will increase consumption of business services when food is zero-rated, also because their real income increases. As soon as zero-rating food is combined with a revenue replacement strategy, consumption of business services decline. This is especially the case when increasing VAT on business services. The higher price of business services leads to a decline in consumption of both middle- and high-income households.

Figure 5.10: *The Percentage Change in Household Consumption Expenditure on Business Services When Zero-rating Food*



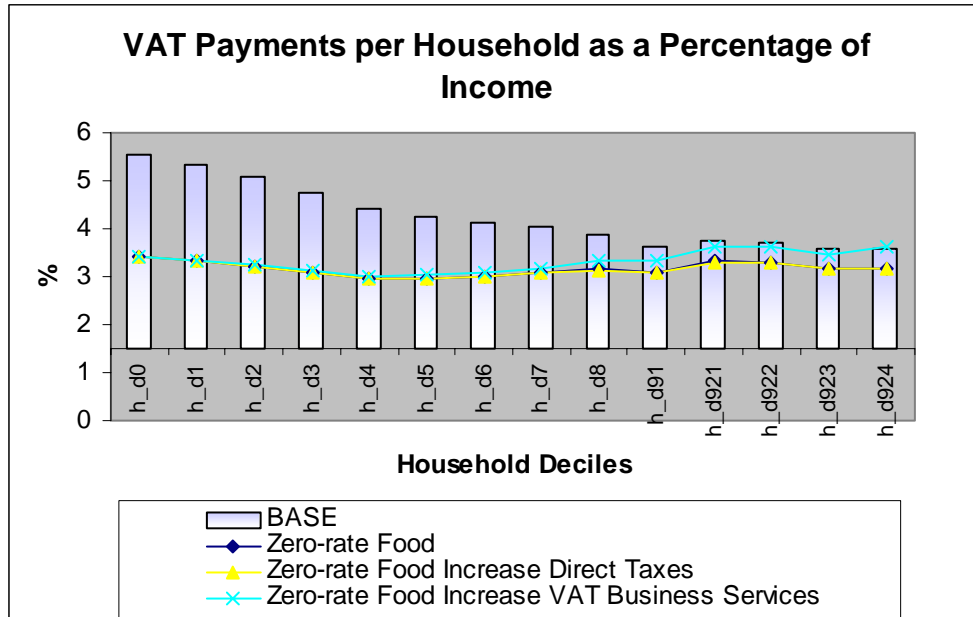
Source: CGE Simulations

The combined effect of changes in income and the price of consumption goods are captured with an equivalent variation measure. The equivalent variation gives an idea of the impact of zero-rating food with or without a revenue replacement strategy on welfare. The equivalent variation is discussed at the end of this section.

The regressiveness of VAT is measured by taking the actual VAT payments by households as a percentage of their income. The regressiveness of VAT is reduced if the VAT payment as a percentage of income decreases, and is increased if the opposite

applies. Figure 5.11 illustrates the effect of each simulation on the regressiveness of VAT.

Figure 5.11: Changes in the Regressiveness of VAT When Zero-rating Food

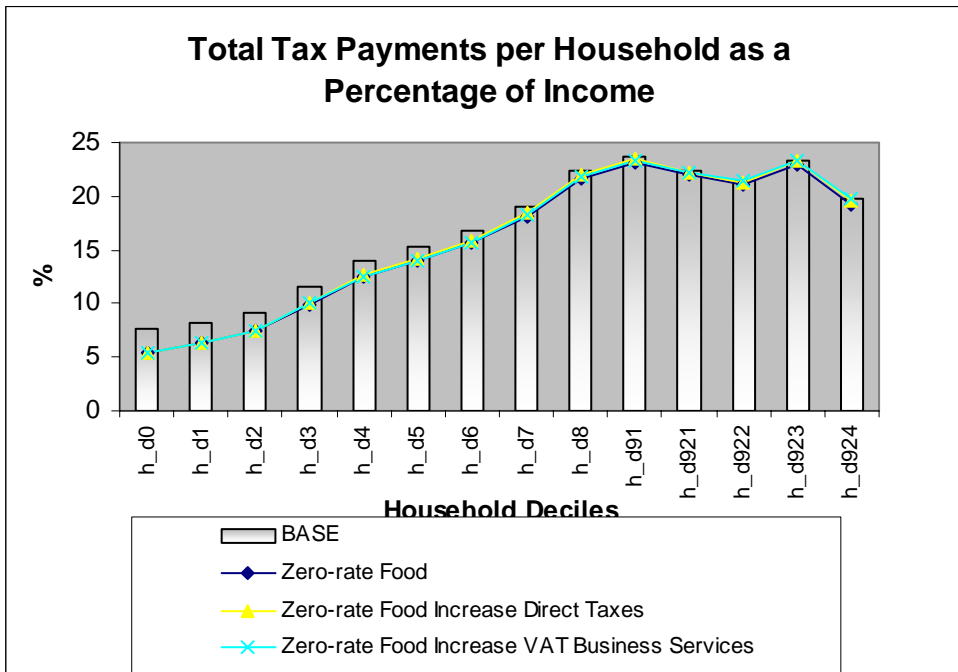


Source: BASE SA SAM 2003  
CGE Simulations

The base case indicates that VAT in 2001 was regressive, as lower income groups pay a larger percentage of their income to VAT than higher-income groups. Lower-income households pay above five percent of their income on VAT compared to higher-income households paying less than four percent. Zero-rating food, while increasing VAT on business services, is most effective in turning a regressive VAT into a progressive VAT. When zero-rating food without a revenue replacement strategy, or when increasing direct taxes, the impact on the regressiveness of VAT is similar. Zero-rating food reduces the regressiveness of VAT.

It is also important to look at the progressiveness of the complete tax system. Progressiveness is measured by taking total tax payments by households as a percentage of income.

Figure 5.12: *Changes in the Progressiveness of the Overall Tax Structure When Zero-rating Food*



Source: BASE SA SAM 2003  
CGE Simulations

Figure 5.12 shows that under all simulations the tax burden of lower-income groups is reduced, while the tax burden of higher-income groups is at least maintained. A question that arises at this point is whether the tax effect is generated by changes in income or changes in the tax rates. The Reynolds-Smolensky measure (also known as the L measure) is used to show the pre-tax and post-tax effect of income on distribution. The L measure consists of two Gini Coefficients that are calculated on pre-tax income and post-tax income respectively. Table 5.6 gives the L measure, as well as the two Gini Coefficients for the simulations.

The Gini Coefficient at base is comparable to Gini Coefficients calculated in other studies such as the World Bank (1998) and McDonald et al (2000) based on expenditure. The World Bank (1998) calculated the Gini Coefficient for 1993 at 0.58, and McDonald et al (2000) estimated the Gini Coefficient for all households by Province and Residential location in a range of 0.54 to 0.66.

Table 5.6: *Gini Coefficients when Zero-rating Food*

Gini Coefficients		BASE	ZERO RATE FOOD	ZERO RATE FOOD INCREASE DIRECT TAXES	ZERO RATE FOOD INCREASE BUSINESS SERVICES
Pre-tax		0.57	0.57	0.57	0.57
	Percentage Change		0.12	0.10	0.06
Post-tax		0.54	0.54	0.54	0.54
	Percentage Change		0.14	0.01	0.07
L measure		0.02	0.02	0.02	0.02
	Percentage Change		-0.22	2.27	-0.11

SOURCE: Own Calculations

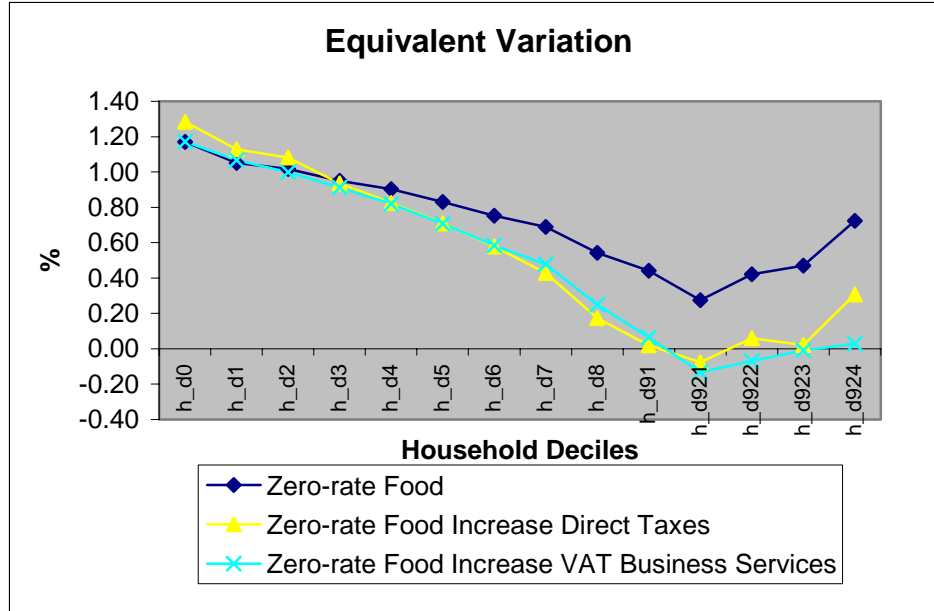
The Gini Coefficient in this study is calculated for the ten income deciles, and the data is therefore highly aggregated in terms of household information, and therefore does not say anything of the income distribution within each of the ten deciles. However, for the purpose of this study it is important to see how the Gini Coefficient changes from one simulation to the next.

Zero-rating food without a revenue replacement strategy results in an increase in pre-tax inequality that is aggravated for the post-tax case. The same applies when zero-rating food while increasing VAT on business services. Zero-rating food without a revenue replacement strategy, resulted in an increase in factor income favoring higher-income households, given that the average direct tax rate does not change, post-tax inequality will be higher. The same principle applies to the case where food is zero-rated and VAT on business services is increased. Zero-rating food while increasing direct taxes improves overall equity; direct taxes contribute 2.268 percent to the improvement in equity.

The equivalent variation (EV) is a measure of the monetary value of the price change. The higher the EV value, the higher the monetary value of the change, and the households are better off. Figure 5.13 gives an indication of the change in EV for each of the simulations from the base EV value.



Figure 5.13: Equivalent Variation When Zero-rating Food



Source: CGE Simulations

Even though poor households experience a decline in income, overall welfare still shows an improvement. The decline in food prices and the accompanying increase in consumption expenditure outweigh the decline in income. This is also explained by food being such an important expenditure item for poor households. High-income households did not experience the same levels of welfare improvement. High-income households' welfare improved when food was zero-rated without an increase in taxes, but when increasing either direct taxes or VAT on business services the welfare of high-income households showed a decline.

The three simulations were also performed assuming investment driven savings. This gives an indication of the required increase in the marginal propensity to save of firms and households to at least achieve the initial value of investment. When zero-rating food without a revenue replacement strategy, the marginal propensity of firms and households need to increase by 2.48 percent. When direct taxes were increased the required increase was 0.42, and when VAT on business services was increased the required rate was 1.09 percent.

### 5.6.3 Zero-rating Financial Services

The impact of zero-rating VAT on financial services on GDP is very small as VAT (as a percentage of GDP) is only 0.11 percent. Table 5.7 summarizes the impact of zero-rating financial services on GDP:

Table 5.7: *Changes in Real GDP when Zero-rating Financial Services*

	BASE	SHARE	ZERO RATE FINANCIAL SERVICES	CONTRIBUTION IN CHANGE IN GDP	ZERO RATE FINANCIAL SERVICES INCREASE DIRECT TAXES	CONTRIBUTION IN CHANGE IN GDP
	R billion		% Change	%	% Change	%
Consumption	608.633	59.15	0.10	0.06	0.03	0.02
Fixed Capital Formation	144.127	14.01	-0.33	-0.05	0.07	0.01
Change in Stock	7.436	0.72	Exogenous		Exogenous	
Government Consumption	231.34	22.48	Exogenous		Exogenous	
Exports	301.841	29.34	-0.02	-0.01	0.02	0.01
Imports	-264.464	-25.70	-0.02	0.01	0.03	-0.01
GDP at Market Prices	1028.914	100	0.01	0.01	0.03	0.03
GDP at Factor Cost	916.45	89.07	0.01	0.01	0.03	0.02
VAT	58.613	5.70	-1.87	-0.11	-1.85	-0.11
Net Indirect Taxes	53.90	5.23		0		0

Source: BASE SA SAM 2003

CGE Simulations

Consumption will increase with 0.1 percent when zero-rating financial services without a revenue replacement strategy. Due to the assumptions that government consumption and the foreign balance do not change, the only adjusting variable is investment. Investment declines with 0.33 percent to counterbalance the increase in consumption. This results in an overall increase in GDP at market price of 0.01 percent. However, when direct taxes are increased to replace the revenue loss, consumption only increases with 0.03 percent. Now investment actually increases with 0.07 percent, generating an overall increase in GDP of 0.03 percent. The increase in investment is due to an increase in private savings. The increase in private savings is a result of an increase in income of all households and firms, given that the marginal propensity to save for all households and firms remain the same.

The government deficit due to zero-rating financial services savings increased from R1.750 billion to R2.632 billion. To maintain the deficit at the initial level of R1.750 billion direct taxes were increased proportionately with 0.005 percent.

Other macroeconomic variables of importance are listed in table 5.8:

*Table 5.8: Some Macro Economic Results when Zero-rating Financial Services*

	<b>BASE</b>	<b>ZERO RATE FINANCIAL SERVICES</b>	<b>ZERO RATE FINANCIAL SERVICES INCREASE DIRECT TAXES</b>
		<b>Percentage Change</b>	<b>Percentage Change</b>
Consumer Price Index (CPI)	100		
Real Exchange Rate (REXR)	90.6		
Investment share in GDP	14	-0.1	
Private savings share in GDP	14.7		
Government savings share in GDP	-0.2	-0.1	
Direct taxes share in GDP	15		0.1

SOURCE: BASE SA SAM 2003  
CGE Simulations

Zero-rating financial services has no significant impact on the consumer price index, nor on the real exchange rate. When zero-rating financial services without a revenue replacement strategy, imports decline due to the higher import content of investment demand. The decline in imports will be accompanied by a decline in exports – the overall change in imports and exports are not significant. When zero-rating financial services, while increasing direct taxes, imports increase, due to the increase in both consumption expenditure and investment demand. The increase in imports is now accompanied by an increase in exports – again the change in imports and exports is not significant.

When zero-rating financial services without a revenue replacement strategy, government savings as a percentage of GDP will decline with 0.1 percent. This, in turn, results in a decline in investment to the same extent. When direct taxes are increased proportionately

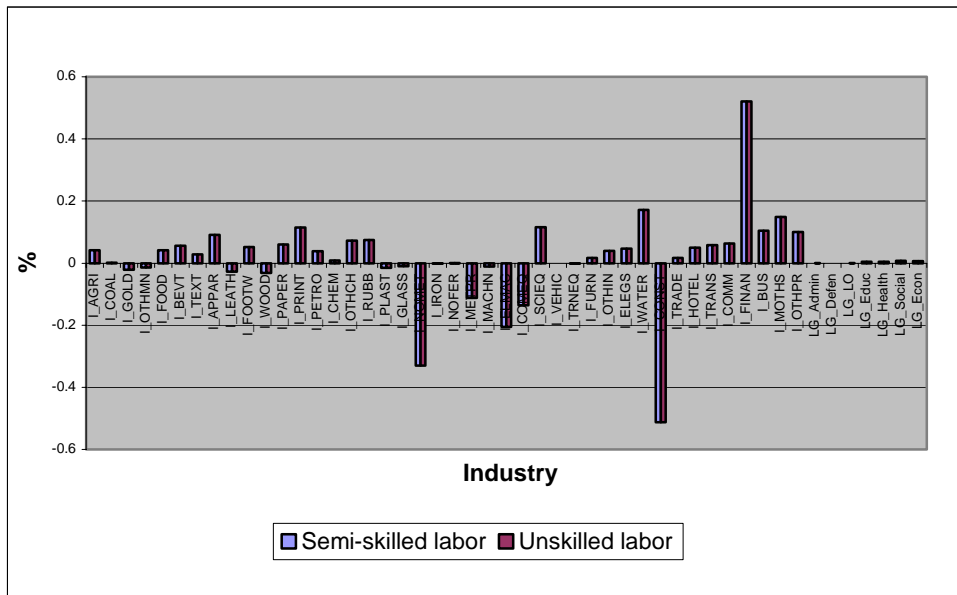
to absorb the loss in revenue there is no change in government savings or in investment. Direct taxes as a percentage of GDP increase with 0.1 percent.

The most important aspect of interest is the impact of zero-rating financial services on employment. Table 5.8 above shows that GDP at factor cost increased with 0.01 percent when zero-rating financial services without a revenue replacement strategy, and 0.03 when increasing direct taxes to absorb the loss. The increase in GDP in factor cost, indicates an increase in employment of semi- and unskilled labor. Employment of high-skilled labor (and capital) will not change, as it is assumed fully employed. When zero-rating financial services without a revenue replacement strategy, employment of semi-skilled labor increased with 0.05 percent, while employment of unskilled labor declined with 0.02 percent. The decline in investment demand impacted heavily on unskilled labor as industries (such as the construction industry) use unskilled labor intensively. When zero-rating financial services, while increasing direct taxes proportionately, employment of semi- and unskilled labor increased with 0.06 percent respectively. Since consumption and investment demand increased, employment of both semi- and unskilled labor has increased. It is important at this stage to look at the compositional changes in employment of semi- and unskilled labor.

The changes in employment of semi- and unskilled labor are associated with changes in the demand for semi- and unskilled labor in the industries. Figures 5.13 and 5.14 summarize the percentage change in the demand for semi- and unskilled labor under the two simulations.

The demand for semi- and unskilled labor increases with 0.5 percent when financial services are zero-rated without a revenue replacement strategy. Industries that benefit from zero-rating financial services are industries that sell mostly to households, as consumption increased. Other industries that benefit are industries, which produce commodities used as an intermediate in the delivery of financial services. Such industries are paper and print (25 percent of intermediate use), financial services itself (41 percent of intermediate use), and medical services (18.5 percent of intermediate use).

Figure 5.14: Percentage Change in the Demand for Semi- and Unskilled Labor When Zero-rating Financial Services



Source: CGE Simulations

Industries that use financial services intensively will also benefit from zero-rating financial services. Examples of such industries are the printing industry (21.5 percent of intermediate), the financial service industry itself (41 percent of intermediate use), the trade industry (13.27 of intermediate use), business services (10.63 percent of intermediate use), as well as other industries such as agriculture, food, petroleum, metal products, machinery, vehicles, electricity, construction, and transport.

The decline in the demand for semi- and unskilled labor is directly associated with industries that sell mostly to investment. The construction industry again experiences the largest decline in domestic activity, as it sells mostly (58.04 percent) to investment demand. The construction industry also employs unskilled labor intensively; 41.1 percent of total factor use is unskilled labor. Thus the decline in the employment of unskilled labor when zero-rating financial services, is due to the drop in investment demand that impact heavily on industries such as the construction industry, which in turn uses unskilled labor intensively.

Figure 5.15: *Percentage Change in the Demand for Semi- and Unskilled Labor When Zero-rating Financial Services While Increasing Direct Taxes*



Source: CGE Simulations

When zero-rating financial services while increasing direct taxes to absorb the loss in revenue, all industries experience an expansion in domestic activity. However, the demand for semi- and unskilled labor in the financial service industry now only increased with 0.47 due to the lower increase in consumption. As there is no decline in investment demand, all industries benefit from zero-rating financial services.

The changes in the demand for semi- and unskilled labor, combined with the changes in the wage of high-skilled labor and the rental price of capital, result in changes in factor income. Table 5.9 shows the change in factor income under both simulations:

Table 5.9: *The Change in Factor Income when Zero-rating Financial Services*

	BASE	ZERO RATE FINANCIAL SERVICES	ZERO RATE FINANCIAL SERVICES INCREASE DIRECT TAXES
Capital	458.493	0.13	0.15
High-skilled Labor	144.475	0.10	0.09
Semi-skilled Labor	179.576	0.05	0.03
Unskilled Labor	133.905	-0.04	0.02

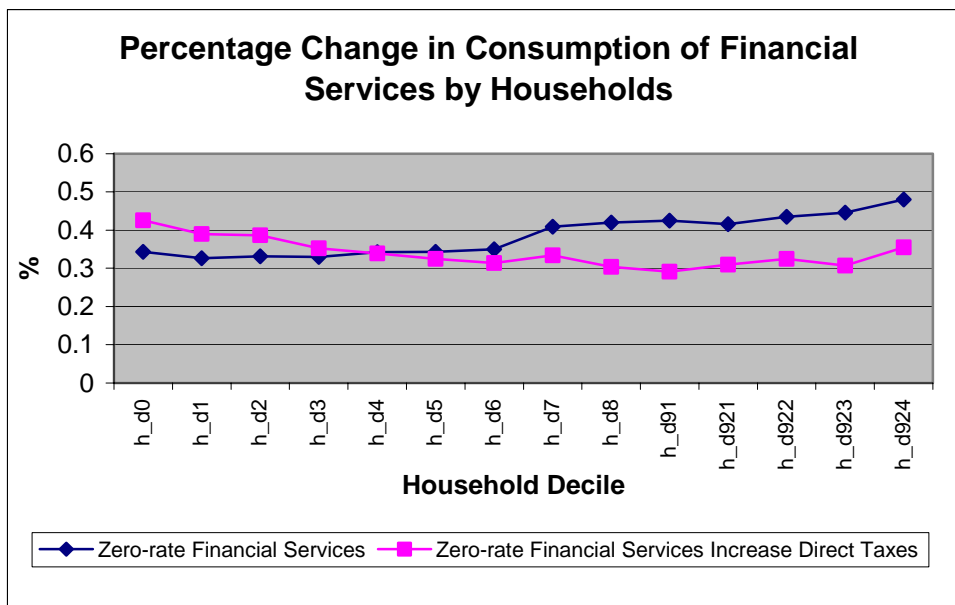
Source: BASE SA SAM 2003

CGE Simulations

When zero-rating financial services without a revenue replacement strategy factor income of capital will increase most, followed by high-skilled labor. Factor income of semi-skilled labor increases with 0.05 percent, while factor income of unskilled labor declines with 0.04 percent due to overall decline in the demand for unskilled labor. When zero-rating financial services while increasing direct taxes to absorb the loss in revenue, factor income of all factors increase. Again capital, followed by high-skilled labor, sees the largest increase in factor income. Factor income of semi- and unskilled labor increases with 0.03 and 0.02 percent respectively.

Zero-rating financial services may also possibly make it more accessible to poor households. Figure 5.16 shows the change in consumption of financial services by the household deciles:

Figure 5.16 Consumption of Financial Services When Zero-rating Financial Services



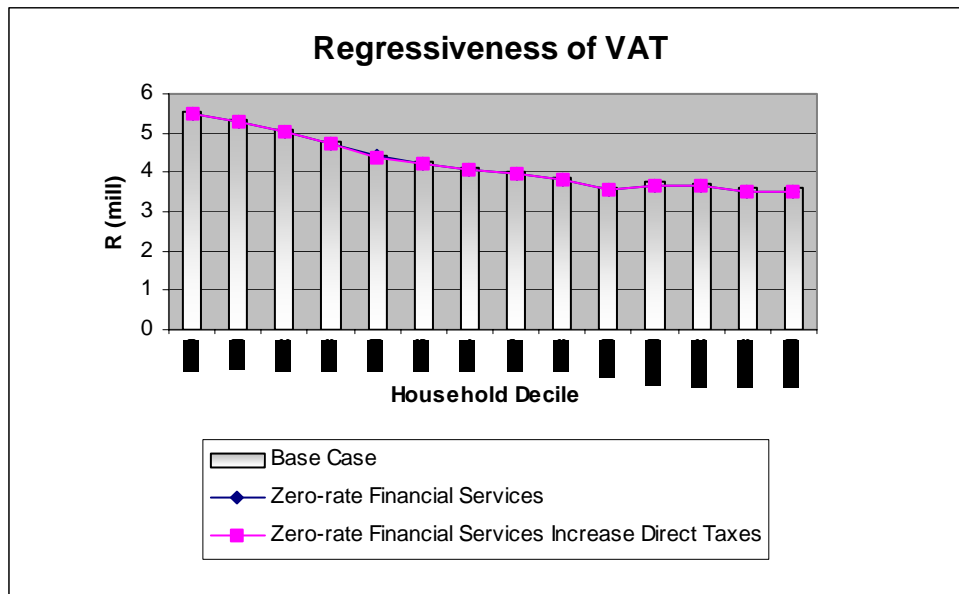
Source: CGE Simulations

Zero-rating financial services leads to an increase in the consumption thereof by all households. However, zero-rating financial services without a revenue replacement strategy benefits higher income groups more, as their consumption of financial services increases with more. When using direct taxes as a revenue replacement strategy the

consumption of financial services of poor households increases with relatively more. The consumption of financial services by high-income households is now constrained by the increase in direct taxes to replace the loss in revenue.

Zero-rating financial services is likely to increase the regressiveness of VAT, as high-income households spend a larger portion of their income (around six percent) on financial services, compared to poor households which only spend around two percent on financial services. As may be seen from figure 5.17, zero-rating financial services increases the regressiveness of VAT to a small degree. However, when zero-rating VAT, while increasing the direct tax rate, the overall progressiveness of the tax structure should be maintained. Figure 5.18 shows the progressiveness of the complete tax structure.

*Figure 5.17: Changes in the Regressiveness of VAT When Zero-rating Financial Services*

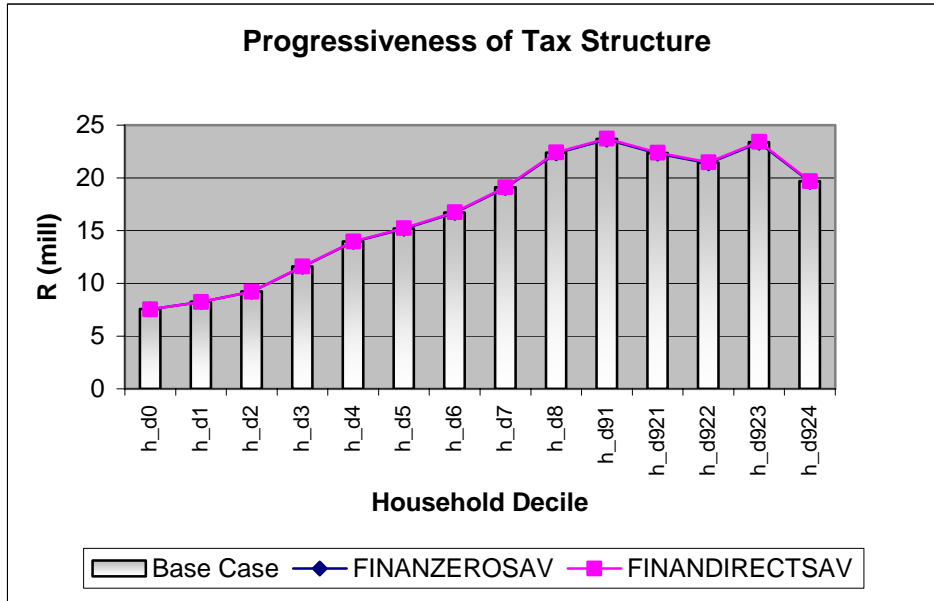


Source: BASE SA SAM 2003  
CGE Simulations

Zero-rating financial services, while increasing direct taxes, implies that one source of tax revenue is merely replaced with another and therefore the progressiveness of the complete tax structure is maintained.



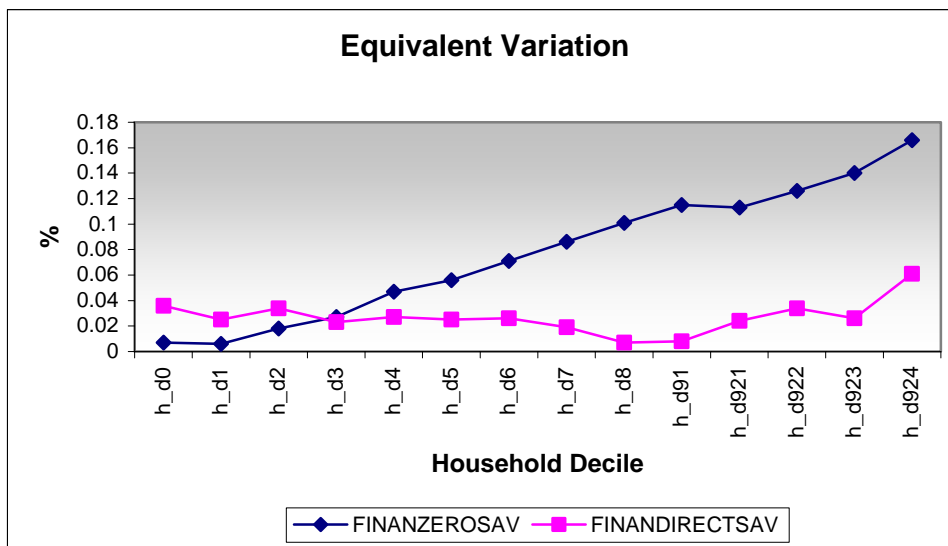
Figure 5.18: Changes in the Progressiveness of the Tax Structure When Zero-rating Financial Services



Source: BASE SA SAM 2003  
CGE Simulations

Lastly figure 5.19 gives an indication of the overall welfare impact of zero-rating financial services.

Figure 5.19: Equivalent Variation When Zero-rating Financial Services



Source: BASE SA SAM 2003  
CGE Simulations

Zero-rating financial services leads to an overall welfare improvement of all households. High-income households benefit more: firstly high income households derive most of their income from high-skilled labor and capital which increased most when zero-rating financial services, and secondly high income households consume a larger share of financial services. Zero-rating financial services, while increasing direct taxes, results in a higher welfare improvement for low-income households, as they experience an increase in factor income. Middle- and high-income earners do not benefit to the same extent as before as they are constrained by the increase in taxes. However, all households still experience an improvement in welfare.

### **5.7. What the Model Does Not Say**

Zero-rating commodities, or increasing the VAT rate of selected commodities means differential VAT rates to certain commodities or industries. Applying differential VAT rates may contribute to the operational cost of VAT (as seen from chapter two). There are two types of operational costs associated to any type of tax, namely the administrative costs incurred by the tax authorities, and the compliance costs incurred by the taxpayers. (Ebrill et al,2001:53). Administrative cost is the cost associated with operating and enforcing such a tax system. (Cnossen,1994:1609). For instance, increasing VAT on the business services industry would mean that inputs in that industry (of other products) are credited at a different rate. This complicates the record keeping process. Administrative cost also increases, as the audit process gets more complicated. The model at this point in time does not capture the administrative and compliance cost associated with a certain tax scheme. The model at this point, however, captures the results of applying differential rates on the economy.

### **5.8 Summary**

This chapter investigated three possible ways in which the VAT structure of South Africa may be restructured, namely (a) the possibility of lowering the VAT rate from 14 to 12.6 percent to achieve the set targets of GEAR, (b) zero-rating food as a poverty reduction

strategy, and (c) zero-rating financial services (a service industry using semi-skilled labor intensively) to create employment. The standard CGE model developed by Löfgren et al (2001) was used, however the model was adapted to include more commodity taxes specific to the South African economy, and to include a statutory VAT rate. The data used for the model is the South African SAM, based on 2001 data. The SAM was commissioned by the World Bank and developed by Claude Van Der Merwe of Quantec. Gibson (2003) estimated the Armington trade elasticities for 43 industries within South Africa. These elasticities form the core of the elasticities used within the model. Other elasticities were obtained from the IDC (1997), the CGE model of Lewis (2001) and the CGE model of Thurlow and Van Seventer (2002). A number of instruments were included within the model to measure the impact of VAT on the welfare of households. The instruments included are the regressiveness of VAT, the progressiveness of the complete tax structure, the distribution of income through a set of Gini coefficients, and the overall impact of welfare, using an equivalent variation calculation. The model also captures the incidence of VAT, the price distortions imposed and the burden of the tax. The CGE model includes a large set of variables, which also show the effect of VAT.

Reducing the statutory VAT rate from 14 percent to 12.6 percent results in a decrease in GDP of 0.12 percent. The decline in GDP is associated with an increase in consumption of 0.5 percent due to lower prices. Investment however declines with 1.39 percent, mainly due to the assumptions of the model. Lowering VAT results in a decline in prices, which in turn will lead to an increase in imports. To maintain the fixed foreign trade balance assumed, exports increase accordingly; this is achieved by an appreciation of the real exchange rate of 0.1 percent. Industries which benefit from lowering VAT are industries selling mainly to households, for example agriculture, food, textiles, beverages and tobacco, apparel, footwear, and most service industries. Industries that do not benefit are industries that sell mostly to investment; the construction industry is most severely affected. Due to the changes in industry activity, employment of semi-and unskilled labor also changes – employment of unskilled and semi-skilled labor increases with 0.26 percent and 0.4 percent respectively. However, because the wages of unskilled and semi-skilled labor are fixed at real wage levels, factor income of semi-skilled labor is

unchanged while the factor income of unskilled labor shows a decline. The factor income of capital and high-skilled labor increases. The welfare effect of the lower prices still outweighs the income effect to generate an overall increase in welfare for all households, with high-income households experiencing the largest welfare gains. It seems that lowering the VAT rate may generate growth and employment, however the redistribution impact is under question as high-income households benefit to the largest extent from lowering the VAT rate.

Zero-rating food is not expected to have any significant effect on a macroeconomic level. Zero-rating food without a revenue replacement strategy resulted in an increase in GDP of 0.11 percent. This increase in GDP is due to a relatively large increase in consumption of 0.64 percent. Investment again decreases to counterbalance the increase in consumption (with 1.92 percent). Zero-rating food without a revenue replacement strategy results in a decline in imports, due to the larger import content of investment; this is followed by a decline in exports, which again is achieved by an appreciation of the exchange rate. Zero-rating food, while increasing direct taxes, resulted in a slightly larger increase in GDP of 0.16 percent. The change in GDP is associated with a relatively smaller increase in consumption combined with a relatively smaller decline in investment. Consumption is constrained due to the increase in direct taxes. Investment did not decline as much as the increase in direct taxes kept government savings unchanged. The impact on imports and exports when zero-rating food, while increasing direct taxes, are not significant. When zero-rating food while increasing VAT on business services GDP only increases with 0.07 percent. Consumption showed the smallest increase for this simulation, while investment declined to a larger extent than when direct taxes were increased. This is because investment demand is also negatively impacted by the increase in the price of business services. Again the effect on import and exports is not significant.

Zero-rating food without a revenue replacement strategy will lead to a decline in the composite price of food. The actual decline in food prices is smaller than expected. The following are possible reasons: lower food prices result in an increase in demand which

would drive prices upward, and lower food prices create a large increase in food imports (which is facilitated by the appreciation of the exchange rate). An offsetting factor is the fact that food is also used as an intermediate in the production of food itself; this would lead to a larger than expected decline in food prices. The net effect is a decline in the composite price of food of 4.13 percent. Other industries that benefit from lower food prices are industries that produce commodities used in the production of food, like the agricultural industries, or industries that use food as an intermediate in their production processes - the leather industry is an example. Industries that sell mostly to households also benefit, as well as industries that import. Industries that sell mostly to investment do not benefit from zero-rating food. When zero-rating food without a revenue replacement strategy, factor income of semi-skilled and unskilled labor, declines. There is still an overall welfare improvement for all households as the decline in the prices of food outweighs the employment effect; poor households experience the largest welfare improvement. When zero-rating food while increasing direct taxes high income households experience a welfare decline. The welfare decline of high-income households is the largest when VAT on business services is increased. Zero-rating food may give immediate poverty relief, especially if combined with an increase in direct taxes. This will also effectively turn a regressive VAT into a progressive VAT, and at the same time improve the overall progressiveness of the tax structure.

The financial services industry use semi-skilled labor intensively (22.3 percent of total factor use). Zero-rating financial services may possibly generate employment of semi-skilled labor. The reasoning is as follows: lowering the VAT on financial services will result in a decline of the composite price thereof, which, in turn, will lead to an increase in the demand for financial services. Domestic supply of financial services will increase, increasing the need for semi-skilled labor. The results of the simulations performed showed that zero-rating financial services indeed resulted in an increase in employment – employment of semi-skilled labor increased with 0.05 percent. Factor income for all factors increased, except for the unskilled category. However, zero-rating financial services increased the regressiveness of VAT, as high-income groups use financial services more intensively. Zero-rating financial services without a revenue replacement

strategy, also generates the largest welfare gains for high-income households. When direct taxes are increased to absorb the loss in revenue due to the zero-rating of financial services, the welfare gains are equally spread among all households as one tax is replaced by another. Therefore zero-rating financial services may create employment for the labor category most intensively used (in this case semi-skilled labor). The negative impact on redistribution may be reduced by an increase in direct taxes. Zero-rating financial services also make them more accessible to poor households.