

# Chapter 1

## INTRODUCTION, PROBLEM STATEMENT AND METHODOLOGY

### 1.1. Introduction

Poverty, inequality and unemployment are realities within the South African economy, and it is therefore no surprise that these are main focus areas in the government's current macroeconomic policy framework (GEAR). Achieving these aims, however, will require high government expenditure, which in turn, must be balanced with increased revenue from either borrowing or from increased taxes or from restructuring taxes. Prudent fiscal management requires staying within the fiscal budget deficit norm of about 2.5 percent of GDP. Borrowing to fund expenditure is not a clear option as government debt is already high, and financing the debt utilizes revenue sources that could have been applied to alleviate poverty. Higher taxes to finance higher expenditure are the other option, but in South Africa the tax burden is already high. Increasing taxes further will only serve to hamper economic growth, which as it is, is not sufficient to generate revenue to pay for the required spending, or to create enough employment opportunities. On the other hand, lowering taxes may also achieve the objectives of GEAR. Another option is restructuring the tax structure, with the aim to broaden the tax base, to reduce the tax burden, to redistribute income and wealth, and to create economic growth. This possibility needs to be investigated. This study will focus on the Value Added Tax (VAT) and specifically the restructuring of VAT, and will aim to answer questions on (a) how the VAT structure could be changed, and (b) how any changes in the VAT structure would impact on the economy.

### 1.2. Poverty, Inequality and Unemployment in South Africa

Poverty in South Africa is severe. In a report on poverty in South Africa, published by Statistics South Africa (2000), it is stated that the proportion of households spending less than R800 per month (the household poverty line) is 28.5 percent. This group of

households is considered very poor. 48.4 percent of South Africans spend less than R250 per month, a per capita poverty line. These statistics are according to the 1996 census. This group of households is classified as poor. Table 1.1 gives an indication of poverty in South Africa based on monthly expenditure:

*Table 1.1: The Percentage of South Africans Living in Poverty from the 1996 Census from (Stats SA,2000:2,60)*

<b>Monthly expenditure (R)</b>	<b>Cumulative Percentage</b>
R600 and below	16,5
R601 – R800	28,4
R801 – R1000	41,3
R1001 - R1800	64,60
R1801 - R3500	82,00
R3501 or more	100,00

As can be seen from table 1.1, 28,4 percent of households spent less than R800 per month, with R800 the household poverty line based on spending.

There is considerable variation between races and by provinces, indicating the degree of inequality that exists. According to the World Bank's Development Report based on 1998 figures, South Africa's level of inequality is among the worst in the world. Inequality is an economic problem - just as the twin evils inflation and unemployment. Inequality cannot be changed rapidly (Stats SA,2000:3). The level of inequality illustrates the accessibility of resources and employment opportunities across different income groups, gender groups, and land areas. In South Africa, the ownership of wealth is also highly inequal: in 1985 the top five percent of the population owned 27 percent of all wealth, while the bottom 65 percent owned only 10 percent (Van Heerden and Schoeman,2000:286). The World Bank reported that the richest 10 percent of South Africa's population contributed 47.3 percent of GDP, while the poorest 10 percent of the population only contributed 1.4 percent of GDP (World Bank: 1998/1999:327). Another indication of inequality is the number of households living with no salary or wage: According to the 1998 household survey 50 percent of Africans, 24 percent of Coloureds,

28 percent of Indians, and 36 percent of Whites live with no wage or salary income (Stats SA,2000:3). Table 1.2 also gives an indication of inequality in South Africa:

*Table 1.2: Monthly Household Expenditures by Population Group from (Stats SA,2000:64)*

<b>Population group</b>	<b>R0-R600</b>	<b>R601-R1000</b>	<b>R1001-R1800</b>	<b>R1801-R3500</b>	<b>R3501-Or more</b>	<b>Total</b>
African	21,5%	32,4%	27,5%	14,2%	4,4%	100%
Coloured	7,8%	13,6%	25,8%	32,7%	20,2%	100%
Indian	0,8%	1,7%	9,3%	37,0%	51,1%	100%
White	1,4%	1,4%	5,8%	20,4%	71,1%	100%
Total	16,5%	24,9%	23,3%	17,4%	28,0%	100%

Inequality in South Africa may be characterized by a situation of dualism: a certain section of the population (mostly Whites) live in first world circumstances, while the majority of the population (mostly Blacks) live under third world conditions. Table 1.2 above shows that the majority of African households (53.9 percent) spend less than R1000 per month, compared to 2.8 percent White households. The majority of White households (71.1 percent), on the other hand, spend more than R3501 per month, compared to the African households where only 4.4 percent spend more than R3501 per month. Inequality, however, does not only exist between population groups, but also between gender groups and between rural and urban households.

A Gini Coefficient is usually used as a measure of inequality, the closer the Gini Coefficient to one the more unequal the distribution of income and wealth. South Africa's Gini Coefficient according to Statistics South Africa, based on the 1995 household survey, and taking income and expenditure into account, is equal to 0.59 percent (Stats SA,2000:83). Table 1.3 gives a summary of Gini Coefficients calculated by Statistics South Africa. The figures are based on income only:

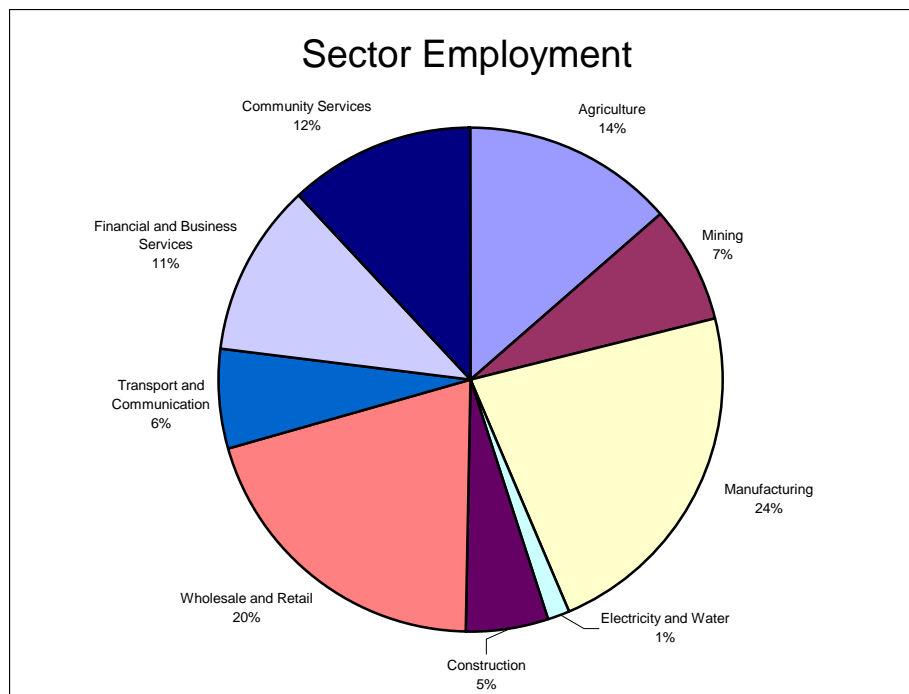
The Gini Coefficient for the African population group is much higher than for the White group. There is, however, a general increase in inequality for all population groups from 1995 to 1998.

Table 1.3: *Gini Coefficients on Pay for African, Coloured and White People, 1995-1998 from (Stats SA,2000:88)*

Population group	1995	1996	1997	1998
African	0,70	0,78	0,77	0,81
Coloured	0,57	0,61	0,59	0,65
White	0,55	0,61	0,62	0,67

Unemployment in South Africa is also severe. In 1995, 28 percent of households in South Africa contained no earners, and 43 percent contained only one (Stats SA,1998:56). The official unemployment rate has risen from 16.9 percent in 1995 to 22.9 percent in 1997 (Stats SA,2000:3). The highest level of unemployment is for elementary occupations filled mostly by unskilled persons. Unemployment is also higher for the African population group, as well as for women in general. Employment in the formal sector also decreased from 1994 to 1997 - in 1994 5.3 million jobs existed in the formal sector compared to 5.1 million in 1997. Figure 1.1 illustrates the distribution of the employed in the different economic sectors in 1997:

Figure 1.1: *Distribution of the Employed in Economic Sectors in 2001 from (SA SAM 2003)*



Manufacturing contributes the most to employment (24 percent) in value terms followed by wholesale and retail (20 percent). Community services contribute 12 percent; this illustrates the government's role as an employment provider.

Poverty, growing inequality, declining employment opportunities combined with the inaccessibility of jobs make policy towards alleviating poverty a real challenge.

### **1.3. Government Policy**

Since the Apartheid-era a number of government strategies have been developed to address inequality, employment, and poverty. The Growth, Employment and Redistribution (GEAR) strategy, the Reconstruction and Development Program (RDP), Affirmative Action, and the Land Reform strategy are the most important.

#### **GEAR**

South Africa's current macro-economic policy strategy GEAR is a program aimed at generating economic growth, creating sufficient employment opportunities, delivering social services, redistributing income, and protecting its citizens (RSA, 1997:2). The Government introduced the GEAR strategy in 1996. The long-run vision of GEAR is to create a competitive fast-growing economy; sufficient jobs for all job seekers; to redistribute income; to provide health, education and other services, to all; to secure the home environment; and to create a productive place to work. The following, core elements of the strategy, are aimed specifically towards redistribution and alleviating poverty:

- Budget reform to increase redistributive expenditure;
- Stimulating investment to create more jobs;
- Expansionary infrastructure programs aimed at addressing service deficiencies;
- Training, funded through a levy system (the skills development levy).

(RSA,1996:3)

South Africa's huge unemployment problem requires acceleration in economic growth. Economic growth and job creation need to take place simultaneously. Job creation needs to be sustainable. An increase in investment is needed to drive economic growth. GEAR also makes provision for various employment-intensive public expenditure programs such as land reform, low-cost housing, community water, and municipal infrastructure, which will be used to create jobs and will also work towards redistribution.

## **RDP**

The Reconstruction and Development Program (RDP) focuses on the provision of safe water, sanitation systems, housing, and infrastructure. The RDP program was constructed even before GEAR was introduced. The success of RDP is dependent on the country's ability to develop. Development in turn is a function of economic growth and redistribution. GEAR, therefore may be seen as a platform for RDP. The social policies in GEAR are in line with RDP objectives and work towards:

- Improvement in education - higher quality, better access, improved pass rates, more involvement from the private sector.
- Health and welfare services - free access, comprehensive primary care, improved health conditions, more rural clinics, redistribution of resources from expensive institutionally-based services to under-served areas, assistance of disabled and needy children.
- Housing, land reform and infrastructure - accelerated housing delivery, job-creation through different projects, improved water and sanitation in rural communities, land reform through asset redistribution, emerging farmer support through financing, marketing support, technological interventions and extension services.

(RSA,1996:15-16).

The strategies mentioned above, need expanded expenditure. This must be achieved without increasing the deficit, and thus debt.

## **The Budget**

Redistribution was also addressed in past budgets. Government expenditure on social services, with specific focus on services for the poor, increased. These include housing schemes and subsidies, water, and sanitation. Education received more. Resources were reallocated to benefit the previously disadvantaged communities. Health services for the poor improved, with free primary health care. The tax structure was also improved to lower the burden on the lower and middle-income groups. State assets will be restructured; some will be sold, as to pay back debt. This will reduce expenditure on interest, leaving more revenue for redistribution. Extensive measures were undertaken from 1997 to further the objectives of GEAR. A discussion of certain past budgets (from 1997 to 2003) follows below.

In the 1997 budget R300 million was set aside for poverty relief. Social security for the elderly was increased. More money was allocated to adult education. Expenditure on housing doubled. There was increased spending on land restitution, redistribution and tenure. Various RDP projects were undertaken; free health care, primary school nutrition programs, community water supply and sanitations, just to mention a few. The tax structure was reviewed to make it more equitable. (RSA,1997).

In the 1998 budget RDP expenditure increased again. Welfare and social grants, health services, education, housing programs, water schemes, land redistribution and reform, and poverty relief programs received more than in the previous budget. Again the tax structure was changed to improve equity. Bracket creep was reduced (bracket creep mainly affects the lower and middle-income groups, and by eliminating it more money is put back in the pockets of the poor). (RSA,1998).

The 1999 budget followed the same trend set by the previous two budgets. Poverty relief expenditure increased. More money was allocated to spend directly to job creation. Education expenditure increased. Expenditure on health increased. Welfare services and grants also increased. RDP expenditure on housing projects and water schemes increased

by over 25 percent between 1995 and 1998, and will continue to grow. More was spent on policing and security. RDP projects, including the delivery of water, sanitation and jobs to previously disadvantaged, undertaken in previous years, were deemed successful. Under the land redistribution program 179 thousand hectares of land had been transferred to 33 thousand households. The tax structure was changed again to benefit lower income groups. (RSA,1999).

In the 2000 budget the Government announced the restructuring of state assets to repay debt, leaving more money to spend on development. It was estimated that 57 percent of spending now went to the poorest 40 percent of South Africans; and 9 percent of spending to the wealthiest 20 per cent. Redistribution had been achieved through increased spending on poverty relief, housing subsidies, child support, free primary health care, the redistribution of resources between provinces and/or, districts, schools, and hospitals within provinces. The Government proposed the imposing of capital gains tax. Capital gains tax aims to make the income tax more equitable. Various tax loopholes were closed - this would broaden the tax base. Non-profit organizations are exempted from tax. Now donations to non-profit organizations, pre-primary schools, and primary schools, children's homes, organizations caring for the aged, and those focused on HIV/AIDS, will be tax deductible. Tax relief was again extended to the lower income groups, even though, in this budget, the higher income groups also received some relief. The biggest beneficiaries however were the people in the lower and middle-income groups. (RSA,2000).

The 2001 budget allocated more funds to provinces to strengthen their social service delivery. Expenditure on infrastructure, housing, water and sanitation, health, education, policing, and all other welfare and social areas increased. The tax structure was improved again to make it even more equitable. Capital gains tax would be implemented on 1 October 2001. VAT rates on illuminating paraffin were zero-rated. This would definitely benefit the lower income groups, since paraffin is an important energy source for low-income households. (RSA,2001).



In the 2002 budget support for local governments increased, to strengthen their capacity towards the provision of basic municipal services to poor households. The criminal justice sector received more to strengthen the fight against crime. Spending on education increased, as did spending on social grants and old age pensions. More money was allocated towards HIV/Aids programs. More money was allocated to improve employment in the Health Sector. Spending on infrastructure increased: so that roads, rail services, the Post-Office, and other infrastructure could be expanded. RDP spending increased: the electrification of houses, access to water and sanitation were some of the issues that would be addressed. More money was set aside for sustainable land reform. Tax relief was extended to all income groups, with the lower income groups benefiting most. An accelerating depreciation allowance scheme was introduced to stimulate investment. Small businesses received tax relief with the aim to stimulate small business development. Proposals to simplify the VAT administration system were also announced. (RSA,2002a).

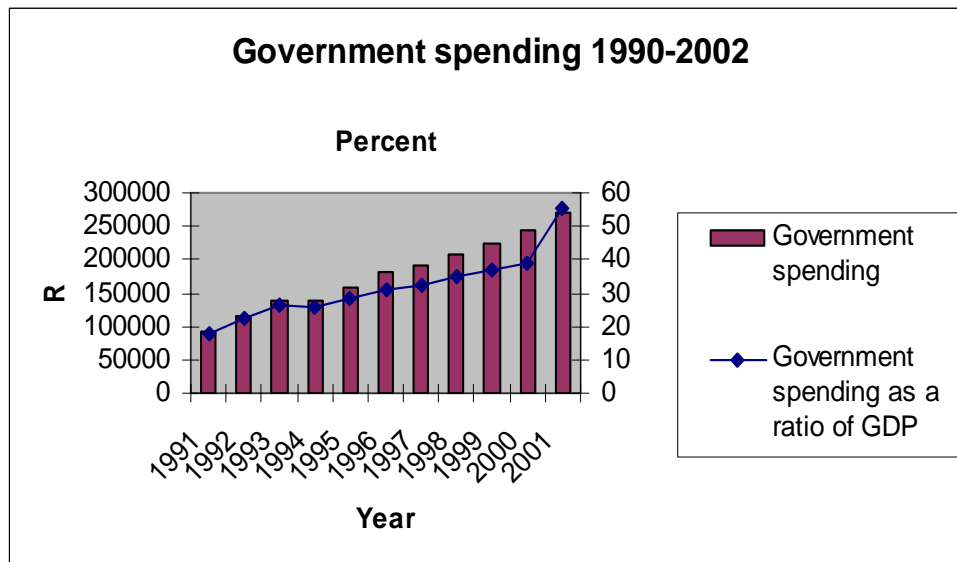
The 2003 budget focused on reducing poverty by increasing the child support grant and by increasing spending on the primary school nutrition program: the total increase in spending intending to meet the needs of children was R11,9 billion. Expenditure on social grants also increased. Other focus areas were HIV/Aids, basic services, land restitution, restructuring of universities and technikons, skills development and the fight against crime. In the 2003 budget generous tax relief was extended to low and middle income groups. Of the total tax relief 56 percent accrued to tax payers earning less than R150 000 per year, and 23 percent to those earning between R150 000 and R250 000 per year. (RSA,2003:4,11).

To summarize: from 1997 to 2003 significant budgetary measures were imposed towards the objectives of GEAR. There was increased government expenditure especially on social services, education, health, and poverty relief. Focus was placed on RDP projects combined with land reform. The tax structure was adjusted to make it more equitable, and also to promote small business and investment. The overall tax burden was reduced. The deficit was kept within the current deficit norm of 2.5 percent of GDP.

## Government Expenditure, Tax Revenue and the Deficit

From 1997 to 2002 government expenditure, and more specifically spending towards social services, increased. However, the scope for increasing spending on social services is limited. Firstly, the aim of the government is to reduce the deficit, which in turn will require a cut in government spending, and therefore does not leave not enough scope for social spending. Secondly the high population growth rate reduces the impact of increased spending on social services, making social spending ineffective. Social spending should increase faster to keep track of population growth (RSA,1996:3-4).

Figure 1.2: Government Expenditure from 1990 to 2002 from SARB Time Series Data



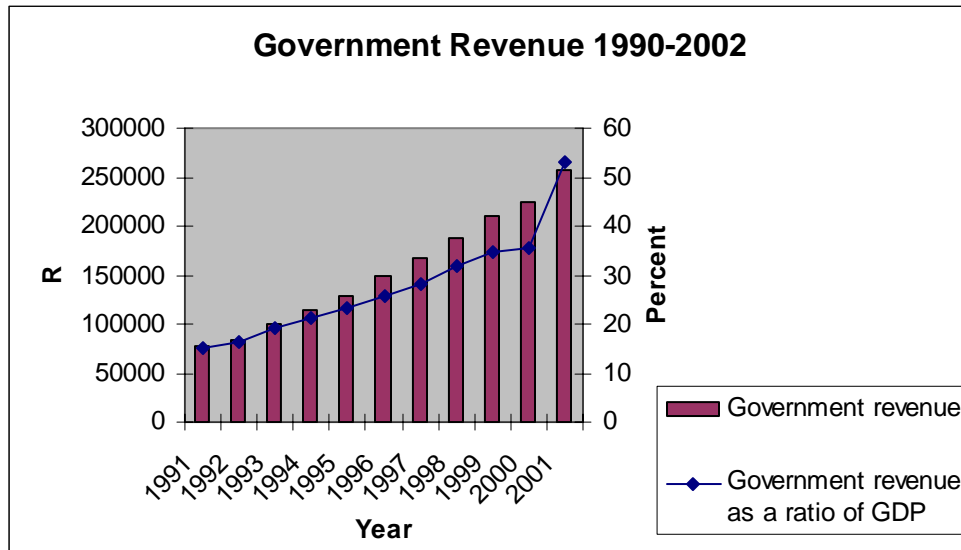
KBP4186 and KBP6006

The years 1999/2000, 2000/2001. 2001/2002 are estimates only - (RSA 2002b)

As may be seen from figure 1.2 above, government expenditure increased steadily from 1991 onwards. Government expenditure as a percentage of gross domestic production (GDP) also increased, showing a faster increase in 2002.

High government expenditure must be accompanied by increased revenue, as not to increase the deficit. The change in government revenue is shown in figure 1.3:

Figure 1.3: Government Revenue from 1990 to 2002 from SARB Time Series Data



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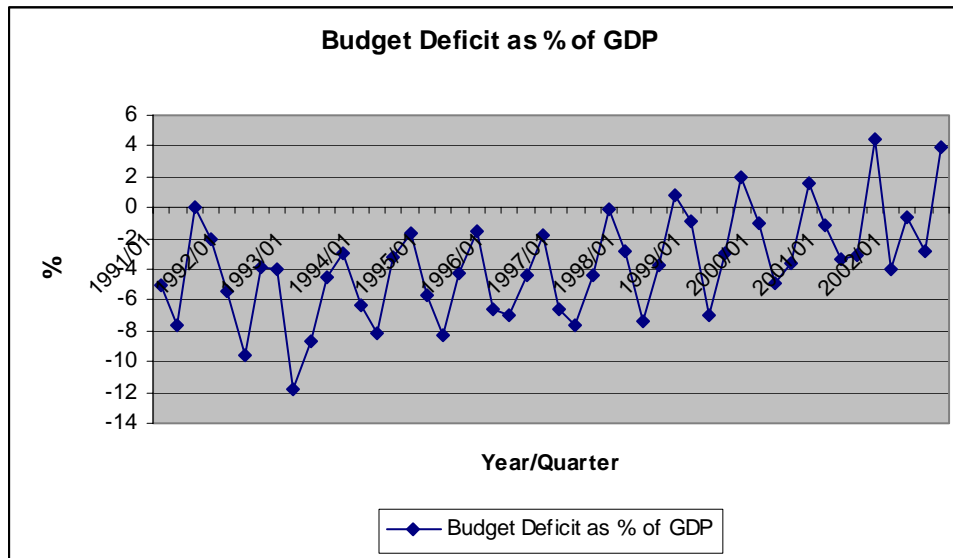
The years 1999/2000, 2000/2001, 2001/2002 are estimates only - (RSA 2002b)

Revenue also increased from 1991 onwards. Revenue as a percentage of GDP also increased more during 2002. The main reason for this is the increase in tax collected during the budget year 2001/2002. The increase in revenue is attributed mainly to more efficient tax collection methods. Redistribution and poverty alleviation will also require that the tax system remains progressive, while the revenue base should be as broad as possible. Taxation on retirement funds, higher excise duties on tobacco, and improved tax collection will lead to an increase in revenue. However, the personal income tax structure will have to be adjusted to correct fiscal drag, and excessive tax rates will be reduced. This in turn will lower the revenue base. If the economic growth rate increases, it will mean an increase in tax revenue relative to GDP. (RSA,1996:10-11).

Figure 1.4 shows the budget deficit / surplus of government for the period 1990 to 2002.

The budget deficit was efficiently reduced from an average of seven percent in 1993 to about an average of 0.86 percent in 2002. This is mainly due to prudent fiscal management, more efficient tax collection, and the broadening of the tax base.

Figure 1.4: The Budget Deficit / Surplus from 1990 to 2002 from Time Series Data

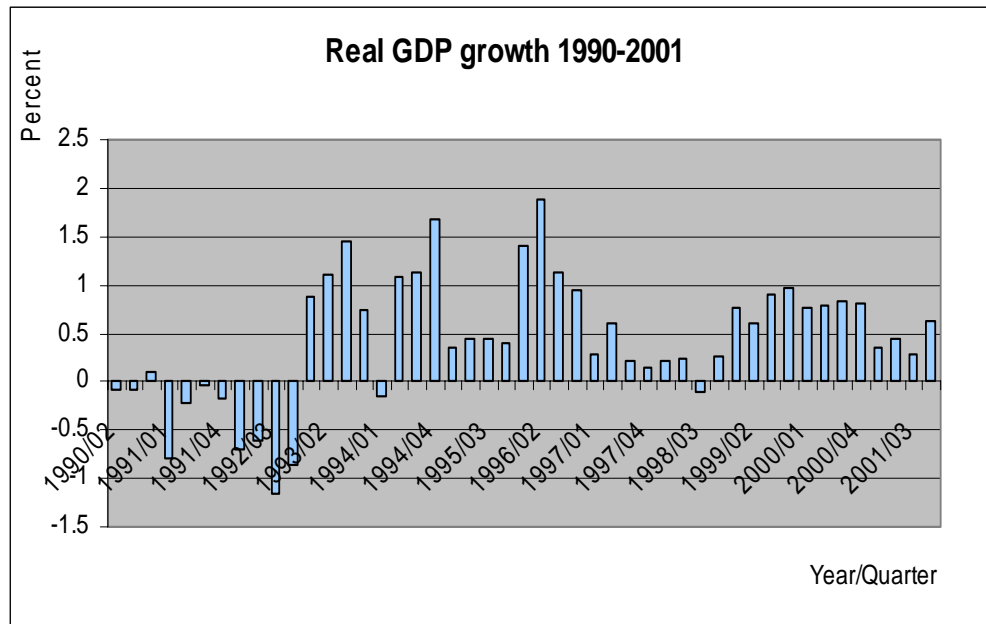


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An increase in real GDP growth also facilitates higher revenue collection, and therefore higher government expenditure while maintaining the deficit norm; the deficit as a percentage of GDP remained the same. At the same time economic growth might also assist in job creation and thus poverty alleviation. Economic development is not possible without economic growth and a proper revenue base. Figure 1.5 shows the growth in real GDP from 1990 to 2001. For the past two years real growth did not exceed 1 percent in any quarter.

The revenue base is made up mostly of taxes. The most important taxes are income tax, company tax, value added tax, import taxes, and estate duties. During 2000 a new tax, namely capital gains tax was introduced. With this large demand on revenue, and debt getting more extensive, steps should be taken to broaden the revenue base. This study will mainly focus on VAT as revenue source of government, and will investigate how, and if, VAT may be restructured to increase revenue, to lower the tax burden and to redistribute income.

Figure 1.5: Growth in Real GDP from 1990 to 2001 from Time Series DATA



SARB Timeseries KBP6006

#### 1.4. Restructuring Value Added Tax

The plan to change from the then existing general sales tax (GST) to value added tax was announced in the early 90's. VAT was implemented on 30 September 1991 at a rate of 10 percent. The implementation process was experienced by most as painful. Questions were raised about the administrative burden VAT would impose, whether or not VAT would fully replace GST as a revenue source, and whether or not VAT would be inflationary: would VAT lead to a once-off increase in general prices or would it lead to inflationary expectations? Issues were also raised about the burden of VAT on poor households. VAT is in nature regressive, unless specific steps like zero-rating essential foodstuff, are taken. This is the reason why initially, when VAT was imposed, certain food items were zero-rated. 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 some of the food items exempted (SA Tax, 2001:Schedule 2 Part B).

In 1993 the statutory VAT rate increased to 14 percent. One of the latest changes in the VAT structure is the zero-rating of paraffin in 2001 (RSA,2001:16), to further assist poor households, and in 2002 Minister Trevor Manuel announced the attempts that are going to be made to improve the VAT administration system, to simplify tax compliance for small businesses, and to simplify the process of calculating VAT obligations (RSA,2002a:17). Since 1993 no changes were made to the statutory VAT rate.

The economic debate on VAT mainly focused on the redistributive nature of VAT. Fourie and Owen (1993) stressed that the regressiveness of VAT should be considered taking the complete tax structure into account; specifically against the progressive nature of income tax. Fourie and Owen (1993) came to the conclusion that VAT is mildly regressive, and that zero-rating, or even differential VAT rates for different goods would reduce some of the regressiveness. On the other hand, the advantages of such a tax system must not be eroded by administrative complications, or practical applicability that differential rates or zero-rating would impose. Zero-rating or differential rates might also create non-compliance and tax evasion. Lastly Fourie and Owen (1993), stressed that the social goals of zero-rating may be achieved by direct social transfers instead. Other authors such as Sartorius von Bach and Van Zyl (1994) also indicated that higher equality may be achieved by zero rating foodstuffs. In South Africa certain necessities (as may be seen from the list above), consumed mostly by poor households, are already exempted from VAT. In the 2001 budget, Minister Trevor Manuel also excluded paraffin, a commodity used as fuel and energy source by most poor households in South Africa. Minister Manuel, however, stated in an interview on 21 February 2002, that there is no real evidence that the advantages of zero-rating paraffin actually reach poor households as it is intended to. He also indicated that (at that moment) no other social grant scheme or direct transfers to poor households would take place, as he is not certain such an act would be financially sustainable (Finansies & Tegniek,2002).

Another factor that needs to be considered is the importance of VAT as a revenue source for government. Table 1.4 shows the importance of the different revenue sources for government:

*Table 1.4: The Major Revenue Sources of National Government as a Percentage of Total Tax Receipts from (SARB,2001:S-54)*

<b>Item</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
Taxes on income and profits	<b>55,96</b>	<b>58,13</b>	<b>59,38</b>	<b>60,46</b>	<b>60,14</b>	<b>59,30</b>
Income tax	54,28	54,94	56,09	56,12	55,35	54,43
Secondary company tax	1,03	0,94	0,90	1,08	1,36	2,16
Other	0,65	2,25	2,39	3,24	3,43	2,71
Payroll taxes (Skills development levy)	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,00</b>	<b>0,59</b>
Taxes on property	<b>1,81</b>	<b>1,65</b>	<b>1,64</b>	<b>1,58</b>	<b>1,97</b>	<b>1,87</b>
Domestic taxes on goods and services	<b>39,55</b>	<b>37,53</b>	<b>37,82</b>	<b>36,87</b>	<b>37,28</b>	<b>37,18</b>
VAT	26,62	25,18	25,06	24,37	24,95	25,67
Excise duties	12,51	11,99	12,56	12,39	12,27	11,22
Other	0,42	0,36	0,20	0,13	0,06	0,29
Taxes on international trade and transactions	<b>5,01</b>	<b>4,90</b>	<b>3,51</b>	<b>3,37</b>	<b>3,50</b>	<b>3,89</b>
Custom duties	4,33	4,56	3,77	3,34	3,36	3,69
Other	0,68	0,34	-0,26	0,03	0,13	0,20
Other taxes	<b>0,83</b>	<b>0,84</b>	<b>0,93</b>	<b>0,83</b>	<b>0,84</b>	<b>1,13</b>

The total percentages will not sum to 100 percent, because the tax refunds to SACU countries are yet to be subtracted.

As may be seen from Table 1.4, VAT is the second most significant revenue source for the Treasury next to direct income tax, and contributes around 25 percent to total tax revenue. If one compares VAT to personal tax or corporate tax separately the importance of VAT is even bigger. Also, the government sees VAT as a dependable and broad-base tax revenue source (RSA,2002a:17). The pressure on government income sources to finance high government expenditure towards GEAR necessitates one to look into the expansion of VAT as a revenue source. At the same time government has lowered the tax burden of low- and middle-income households in the past two budgets (2002 and 2003). The question asked is whether or not lowering VAT is an option for redistribution. Changes in the VAT structure should be investigated especially the possibility of a lowering of the statutory VAT rate.

It is now almost a decade since the inception of VAT. At this time it might be valuable to investigate some of the issues around VAT. Some of the questions that need to be addressed are:

- (a) How regressive is VAT, taking current zero-ratings into consideration?
- (b) What are the implications of VAT on the standard of living of the different income groups (especially the lower income group)?

- (c) How may the importance of VAT as a revenue source for the government be improved?
- (d) How savings and future capital will be influenced by changes in the VAT structure?
- (e) How restrictive is VAT as a fiscal policy instrument: to what extent would an increase in VAT lower aggregate demand and therefore restrict growth?
- (f) How neutral is VAT? Can zero-rating labour-intensive industries, for example, contribute to lower unemployment?

### **1.5. Using a Computable General Equilibrium Model to Simulate Changes in VAT**

A computable general equilibrium (CGE) model a set of equations that indicate the relationship between the different variables. CGE models work by simulating the interaction between various economic participants and markets, as specified in neo-classical general-equilibrium theory. Behaviour is based on the optimization principle as found in microeconomics. The model requires that all markets should be in equilibrium with full closure, demand must equal supply in all markets. When an economy is at general equilibrium it will mean market efficiency. Supply and demand interaction (the principle on which all market economies are based) gives an efficient allocation of prices and quantities at equilibrium level. In a general equilibrium framework it means all the markets in the economy function at optimal levels. (Starr, 1997:5).

CGE models link prices with taxes, making CGE models very useful for the purpose of evaluating changes in the tax structure. The disaggregation of households in CGE models allows for the evaluation of the impact of policy on distribution. South African statistics and specific features of the South African economy are added to the model, making it an applied CGE model. This model will be used to analyze the effect of changes in the VAT structure on the economy. CGE models are often used to evaluate trade policy, taxation, structural adjustment, economic development and welfare



distribution. For this application a CGE model is used to measure the impact of changes in VAT on the economy, and specifically welfare.

General equilibrium modeling has its roots in general equilibrium theory. General equilibrium theory in turn, has its roots in Adam Smith's (1776) book "The Wealth of Nations". Cournot (1838) and Jenkins (1870) contributed literature to partial equilibrium analysis of a single market. Walras (1874), however, was the first economist to work on the principle of general equilibrium. Walras's model consisted of households and firms. Walras identified a vector of prices that cleared all the markets. He not only discussed the existence of equilibrium but also the stability thereof. He was the first to stipulate that an equal number of equations and variables is a necessary (but not sufficient) condition for general equilibrium. Walras, however, could not prove his theorem sufficiently, the proof only followed later. Edgeworth (1881) developed the notion of the contract curve where each point on the curve shows competitive equilibrium while satisfying a set of conditions, including optimal allocation. Pareto (1909) introduced competitive equilibrium and the optimal allocation of resources. Cassel (1918) simplified Walras's system of general equilibrium. Various authors contributed to the proof of existence of equilibrium started by Walras. They include Neisser (1932), Zeuthen (1932), Von Stackelberg (1933), and Wald (1936). In 1937 Von Neumann published an application of general equilibrium theory and used the saddle-point theorem to prove the existence of general equilibrium. Hicks (1939) and Samuelson (1941-1942) specified the second-order conditions for profit maximization by producers, and utility maximization by consumers. At this time, game theory played an important role to prove and to specify conditions for the existence of equilibrium. The work done by Von Neumann and Morgenster (1944) used game theory to prove the existence of general equilibrium. In the early 1950's three economists, Kenneth Arrow, Gerard Debreu, and Lionel McKenzie entered the field of general equilibrium theory. In 1951 Arrow restated the ideas of welfare economics in the language of general equilibrium theory. In a paper presented by Debreu and McKenzie to the Econometric Society in 1952, they provided the proof that a fixed-point theorem would lead to proofs of existence of general equilibrium (As in Starr,1997:7). Arrow and Debreu (1954) argued the existence of equilibrium for a

competitive economy. McKenzie (1954) summarized the existence theorems and conditions. Debreu (1959) gave a complete systematic account of the existence conditions - work mostly done by Arrow up to date, which includes various articles published by Arrow, and other authors. In 1962 Debreu published the most general version of the existence theorem. Debreu and Scarf contributed by elaborating on Edgeworth's bargaining model. Their findings were published in the 1963 publication called: "A limit theorem on the core of an economy". Arrow and Debreu received the Nobel Prize in economics for their work on general equilibrium theory in 1972 and 1983 respectively. (Starr,1997:7-9).

Empirical work on general equilibrium models was started by Johansen (1960) and Harberger (1962). Johansen's work focused on a multi-sector study of economic growth and Harberger studied the incidence of corporate income tax. Scarf in 1967 contributed a fixed-point algorithm to compute equilibrium, and provided the bridge between theory and empirical work. Shoven and Whalley (1972), Whalley (1973), Shoven (1976) and Whalley (1977) contributed a series of papers on the incidence of taxation. Adelman and Robinson (1978) developed a model to investigate income distribution policy in developing countries. Other important contributions followed and some include Lysy and Taylor (1980), a multi-sector model developed for Australia by Dixon, Parmenter, Sutton and Vincent (1982), Ginsburgh and Mercenier (1987), Adelman and Robinson (1988), Bourguignon, Branson and De Melo (1989), Dixon and Meagher (1990), Meagher (1990), Devarajan, Lewis and Robinson (1994), the 1-2-3 model developed by Devarajan, Go, Lewis, Robinson, and Sinko (1997), a simple dynamic model was developed by Devarajan and Go (1998), Löfgren, Harris and Robinson (2000), Devarajan and Go (2002), and Bourguignon, Pereira and Stern (2002) to mention a few. Institutions like the World Bank and the International Food Policy Research Institute (IFPRI) make extensive use of CGE modeling to aid policy analysis. CGE models specifically developed for South Africa include Van Heerden (1996), Gibson and Van Seventer (1997), Arndt and Lewis (2000), Devarajan and Van der Mensbrugge (2000), Lewis (2001), Van Seventer (2001) for TIPS, Thurlow and Van Seventer (2002), and Thurlow (2003). Van Heerden (1996) developed a dynamic overlapping- generations model to

test the welfare impact of redistribution as well as the incidence of various taxes on the young and the old. Gibson and Van Seventer (1997) applied their model to determine the impact of restructuring public expenditure by function in South Africa. The models developed by Arndt and Lewis (2000) and Lewis (2001) evaluated the impact of HIV/Aids on South Africa and the model of Devarajan and Mensbrugge model (2000) focused on trade reform in South Africa. Thurlow and Van Seventer (2002) also developed a standard general equilibrium model for South Africa. In 2003 Thurlow developed a dynamic general equilibrium model for South Africa.

For the purpose of this study, a standard CGE model developed by Löfgren et al (2001) at IFPRI is used to analyze the effect of changes in the VAT structure on the economy. Theoretical general equilibrium models are complex, with the existence of equilibrium one of the focal issues. Empirical models are simplified, but empirical models are sometimes more time consuming due to the large data requirements. The CGE model used in this study will require as data input a social accounting matrix (SAM) of South Africa, as well as certain elasticities of substitution estimated, using South African data. The CGE model is used to simulate changes in the VAT structure. Each simulation is analyzed to determine the effect on the economy. Factors of importance that will be observed are among others, standard of living, regressiveness of VAT, as well as changes in employment, income, and GDP. The different changes in VAT are compared and policy recommendations will be made.

This study will start by giving an overview of VAT: what design principles are incorporated within a VAT system. Chapter 2 also looks at the performance of VAT since its inception in 1991 to 2001. Chapter 3 will give a theoretical explanation of the CGE model used in the analysis of the effect of changes in the VAT structure as well as the adaptations made to the model. Thereafter the data requirements of a CGE model will be discussed, which includes a SAM and a set of substitution elasticities. The SAM and other data sources will be discussed in Chapter 4. The next chapter, Chapter 5, will discuss the changes in VAT and the impact of these changes on the economy, and lastly, Chapter 6 will contain some conclusions and policy recommendations.

## **1.6. Summary**

South Africa is faced with high levels of poverty, and unemployment, as well as a highly inequal distribution of income and wealth. The strategy GEAR is in place to set the direction for fiscal spending towards economic growth, employment creation, and redistribution. Fiscal spending, however, is constrained by insufficient revenue sources and trying to maintain a deficit of around 2.5 percent of GDP. A balance should be struck between increasing revenue through higher taxes and maintaining incentives for growth. Another possibility is restructuring existing taxes to broaden the base, and to lower the burden, also to promote a more equitable distribution of income. This study will specifically investigate the possibility of restructuring VAT with the above-mentioned aims in mind. A CGE model will be used to analyze the effect of changes in VAT on the economy. The results will be used to draw conclusions and to make policy recommendations.