A QUANTITATIVE MEASUREMENT OF POLICY OPTIONS TO INFORM VALUE-ADDED TAX REFORM IN SOUTH AFRICA

By

MARIUS LOUIS VAN OORDT

Submitted in fulfilment of the requirements for the degree

PhD: Tax Policy

in the

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

at the

UNIVERSITY OF PRETORIA

SUPERVISOR: Prof. R.C.D. Franzsen

CO-SUPERVISOR: Prof. N.J. Schoeman

SEPTEMBER 2015

ACKNOWLEDGEMENTS

John 15:5: "'I am the vine, you are the branches; he who abides in Me and I in him, he bears much fruit, for apart from Me you can do nothing."

I would also like to extend my greatest appreciation to a number of exceptional individuals:

- Professor Riël Franzsen, my supervisor. Thank you for your impeccable timing in knocking at my door to determine my interest in pursuing a PhD. Thank you that it was my door that you knocked on. Thank you for allowing me to enjoy personal growth throughout this study. Thank you for your excellent guidance, motivation and belief throughout this study.
- Professor Niek Schoeman, my co-supervisor. Thank you for your continued guidance and encouragement throughout and before this study. Thank you for lending a friendly ear, a sharp mind and a warm handshake. Thank you for showing continued excitement towards this study.
- Professor Madeleine Stiglingh, my previous Head of Department at the Department of Taxation. Thank you for your support and guidance at the start of my career. Thank you for affording me the necessary growth opportunities before embarking upon this journey. Thank you also for your continued friendship.
- Professor Elmar Venter, my friend and colleague. Thank you for your support and motivation throughout this study. Thank you for thinking that I am more intelligent than I really am.
- Professor Daan Gouws, my friend, colleague and a true thought leader. Thank you for continuously planting seeds of wisdom that enabled growth of my consciousness.
- Nikki Groenewald. Thank you for your assistance in proofreading and editing this document. Thank you for showing true support and friendship to my wife and I throughout this study.
- Professor Steve Koch. Thank you for sharing your expertise that assisted in improving the methodology and readability of this study.

- Professor Jan van Heerden. Thank you for your inputs that assisted in improving the methodology of this study.
- Professor Manoel Bittencourt. Thank you for your assistance in relation to the econometrics used in this study.
- My colleagues in the African Tax Institute and the Department of Taxation. Thank you for your continued support throughout and before this study and your interest in this study.
- Claudia Bittencourt. Thank you for supporting Professor Riël Franzsen in obtaining financial assistance and in other matters relating to this degree. Thank you also for your continued friendship.
- The National Research Foundation and the SARChI Chair of Tax Policy and Governance. Thank you for providing me with financial assistance.
- Professor Pierre-Pascal Gendron, Professor Ada Jansen and Professor Sally Wallace, the external examiners of this study. Thank you very much for your willingness, assistance and valuable commentary and recommendations.
- My parents-in-law, family, family-in-law and friends, too numerous to name each one individually. Thank you for your support and for tolerating my absent mind during this study.
- My parents, Gerhard and Jinnie van Oordt. I am not able to thank you nearly enough. Your contribution to my success has been continuous throughout my life. Thank you for being proud of me, loving me and supporting me. Thank you for all your efforts in providing your children with every possible opportunity and for encouraging them to pursue these opportunities. Thank you for making me want to keep you proud.
- Theresa van Oordt, my best friend, love of my life and wife. Thank you for making me want to be the best man that I can be. Thank you for your continuous belief in my ability, your understanding and tremendous support. Thank you for always being and staying by my side, even when my occupied mind did not allow for much conversation. You will always be the best thing in my life.

ABSTRACT

South Africa, as well as many other African countries, require additional domestic tax revenues for sustained development and face a number of political tax revenue and economic tax revenue challenges in obtaining these revenues. Changes to tax policy should take into account the requirement for additional revenue and the challenges faced and also be well-motivated and theory based. To this end, South African policy makers could well consider policy changes to the Value-Added Tax (VAT).

In this interdisciplinary study of law and economics, the structure of a good VAT, based upon theory and studies by experts, was recapitulated. The extent that the South African VAT aligns with this structure was then determined. Based thereon, a number of well-motivated and theory based tax policy changes were identified. To provide empirical evidence of the additional tax revenue and the impact of these policy changes upon households, a structural model of the South African VAT was developed.

In developing the structural model, a complete demand system and a food demand system were estimated for 24 752 South African households. From these estimations, unique demand equations for each household were determined, allowing for households' consumption behaviour to change in response to a change in VAT policy and direct cash expenditure policy. The identified policy changes were applied to the structural model, the results were described and policy recommendations were made.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

Abbreviation / Acronym	Meaning
AD	Anno Domino
AIDS	Almost Ideal Demand System
BC	Before Christ
BDO	Binder Dijker Otte
BLUE	Best Linear Unbiased Estimator
CBS	Central Bureau of Statistics
CEMAC	Communauté Économique et Monétaire de l'Afrique Centrale
CGE	Computable General Equilibrium
CIT	Corporate Income Tax
COICOP	Classification of Individual Consumption According to Purpose
CPI	Consumer price index
EASI	Exact Affine Stone Index
ENS	Edward Nathan Sonnenbergs
EU	European Union
EY	Ernst and Young
FAD	Fiscal Affairs Department
GDP	Gross Domestic Product
GST	Goods and Services Tax
IES	Income and Expenditure Survey
IMF	International Monetary Fund
LA/AIDS	Linear Approximated Almost Ideal Demand System
NDP	National Development Plan
NHI	National Health Insurance
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PIT	Personal Income Tax
PNC	Public sector bodies, non-profit organisations and charitable organisations
PwC	PricewaterhouseCoopers
QUAIDS	Quadratic Almost Ideal Demand System
SACU	Southern African Customs Union
SARS	South African Revenue Services
UEMOA	Union Économique et Monétaire de l'Ouest Africain
UK	United Kingdom
US	United States
VAT	Value-Added Tax

VIF	Variance inflation factor
WGI	Worldwide Governance Indicators

CHAPTER 1:
INTRODUCTION

1.1 Background

Amidst a mixed recent global economic picture, African countries have registered relatively strong growth. The average annual growth rate for this continent increased from 1.8 percent for the period 1980-1989 to 5.3 percent for the period 2000-2010 (United Nations, 2014). Furthermore, it is expected by the Growth Commission that more than half of "growth miracle" countries[1] in the coming 25 years will be from Africa (Sy, 2014).

Despite this economic performance, many African countries are faced with several challenges, including high unemployment, poverty and income inequality, food insecurity and a lack of economic transformation (United Nations, 2014). Moreover, sustained development for African countries will require additional publicly financed investments and unfortunately most government budgets do not allow for these investments (Cnossen, 2015). There is therefore an urgent need for more revenues to enable African states to provide and maintain public services (Fjeldstad and Rakner, 2003).

Due to the decrease in aid from developed countries, decreases of taxes upon imports and exports, uncertain future foreign investment and generally high levels of debt, African countries will have to look towards increasing domestic tax revenues for sustained development (African Economic Outlook, 2010; Cnossen, 2015). These countries however face certain challenges in increasing domestic tax revenues. These include economic tax revenue challenges and political tax revenue challenges.

The main economic tax revenue challenges may be grouped into two categories, namely structural challenges and tax base challenges (African Economic Outlook, 2015). Considering structural challenges, many African countries have large informal sectors – individuals and companies operating outside of the reach of the law or public administration (European Parliament, 2014; African Economic Outlook, 2015). For Sub-Saharan Africa countries, the OECD (2009) estimates that the highest share

[1] These are countries with a GDP growth consistently greater than 7 percent per annum.

of informal employment in total non-agricultural employment is, on average, found in these countries (76 percent).[2]

Taxes, and in particular taxes upon income as an economic base, are generally more difficult to collect from large informal sectors (European Parliament, 2014; African Economic Outlook, 2015). Administrative costs in collecting taxes from informal sectors are also generally larger compared to formal sectors (European Parliament, 2014). Formalising informal firms may provide for smaller than expected tax revenue gains (African Economic Outlook, 2010). Coupled with relatively high compliance costs found in African countries,[3] small firms may be incentivised to stay informal and it may not be sensible for governments to directly tax informal sectors.

Another structural challenge for African countries is administrative capacity constraints. Many African countries' public administrations are characterised by limited capacity, inefficiency and poorly-trained personnel (Schuppan, 2009). Additionally, the skilled tax officials are often employed by large international organisations that are able to provide remuneration with which public administrations cannot compete (European Parliament, 2014). These administrative capacity constraints limit tax policy options (African Economic Outlook, 2010), and weak administrations may provide for increased tax evasion and avoidance, particularly in the context of complex tax laws. Corruption within these tax administrations may also be a concern.

One important tax base challenge relates to profit shifting and transfer pricing techniques by multinational corporations. With approximately 30 percent of world trade taking place between individual corporations, some of these corporations are taking advantage of different jurisdictional tax regimes through transfer pricing techniques (African Economic Outlook, 2010). This allows multinational corporations to greatly minimise their tax burdens, decreasing the base of corporate taxes (OECD, 2013).

The limited administrative capacity of many African countries may provide that these profit shifts are not identified when audited, or not audited at all (African Economic Outlook, 2010). Furthermore, increasing corporate income tax rates will increase the

[2] North African countries have a lower share estimated at 47 percent on average (OECD, 2009).
[3] It takes fewer hours on average for firms in Africa to pay taxes than in Latin America, but more than in the Pacific, Asia and OECD countries (African Economic Outlook, 2010).

incentive for firms to profit shift and be a disincentive for foreign investment, and therefore may consequently not be a preferable policy option to increase domestic tax revenues.

A further tax base challenge is the high levels of income inequality[4] often found in African countries. Besides being associated with an increase in conflict, a reduction in economic growth, weakened social cohesion and security and a crippling effect upon sustainable development (World Economic Forum, 2015), income inequality often limits the base of a tax. This is predominantly due to equity considerations within the tax and transfer system (European Parliament, 2014). Tax and transfer policy could be the best solutions to income inequality (as identified by the Survey on the Global Agenda (2014)), but African countries may face difficulty in balancing revenue and equity objectives.

Political tax revenue challenges relate to the "power relations around taxation" (European Parliament, 2014:17). Taxes can be used as a political tool by politicians and officials involved in setting tax policy by favouring specific people or companies. These tax incentives or preferences are difficult to target and may provide undesirable results, such as significant tax revenue losses (African Economic Outlook, 2010). Socio-economic interest groups could also attempt to influence government (European Parliament, 2014). Other factors such as corruption, the quality of governance and tax morale could affect the willingness of citizens to contribute additional tax revenue (Bird and Gendron, 2007). These political challenges may result in taxes that are not collecting the full amount of revenue due and tax structures that allow for increased evasion.

Africa's economic growth has also benefited South Africa (Lipton, 2013). Similar to the African continent, the average growth rate of South Africa increased from 1.4 percent for the period 1980 – 1989 to 3.9 percent for the period 2000 – 2010 (United Nations, 2014). Since 2011 growth momentum in South Africa have faded from 3.6 percent for the period 2010 – 2011 to 1.9 percent in 2013 (World Bank, 2014). In fact, since 2011 the South African economy has failed to achieve rising growth rates

[4] The World Economic Forum (2015) identified worsening income inequality as the top trend (that needs to be addressed) for 2015.

in two consecutive quarters (World Bank, 2014). South Africa also currently faces a number of other challenges.[5]

With a Gini coefficient[6] of 0.65, South Africa has the highest level of income inequality in the world (World Bank, 2015)[7] and 53.8 percent of income is held by the highest 10 percent of income earners, also the highest in the world. Only 1.1 percent of income is held by the lowest 10 percent of income earners, the third lowest in the world (World Bank, 2015). What is perhaps more worrying is that the level of income inequality appears to be on an upward trend. The South African Gini coefficient was measured at 0.56 in 1995, 0.57 in 2000, 0.63 in 2009 and 0.65 in 2012 (World Bank, 2015). Income inequality may see a rise in wealth inequality, meaning inequality of capital ownership, in future decades and generations (Pikkety, 2015) and this is should be of particular concern for South Africa.

South Africa also has an unemployment rate estimated at 24.9 percent of the total labour force. This is the sixth highest unemployment rate in the world (World Bank, 2015). According to the South African National Health and Nutrition Examination Survey (2012) only 45.6 percent of the population is food secure, with 28.3 percent of the population at risk of hunger and 26 percent experiencing hunger.

Despite spending more per capita upon education than the average for Southern and Eastern Africa countries (EFA Global Monitoring Report, 2010), South Africa's educational system is not performing as well as other countries in this region. According to the World Economic Forum's Global Information Technology Report (2014), the educational system is ranked 146 (out of 148 countries considered) and its quality of mathematics and science education is ranked last.

Although these challenges could potentially be addressed by increases in public expenditure and public investment (as mentioned in the government's National Development Plan for 2030) South Africa has a current budget deficit of 3.8 percent of GDP, limiting the government's ability to expend and invest (Trading Economics,

[5] Only some challenges are mentioned here. The National Planning Commission's Diagnostics Report (2011) also mentions other challenges, namely inadequate and under-maintained infrastructure, the public health system not meeting demand or sustaining quality and poor quality of public services.
[6] The Gini coefficient is a measure of a country's distribution of income, with a coefficient of 0 indicating that all income is equally shared and a coefficient nearing 1 indicating that all income is earned by a single citizen.
[7] It should be noted that the data of the World Bank (2015) does not contain inequality measures for all countries and for some countries the data may not be accurately recorded.

2015). Further, the gross debt burden of the general government has increased from 35.9 percent of GDP at the end of the period 2010 - 2011 to 45.9 percent at the end of the period 2013 – 2014 (World Bank, 2014).

South Africa therefore has to look towards additional domestic tax revenue (Budget Speech, 2015) or decreases in tax expenditures, meaning tax rules that substitute for direct government spending (Feldstein, 2014) and also how the current tax structures could be amended in an attempt to address the challenges government is facing (Survey on the Global Agenda, 2014). This has to be done whilst keeping in mind economic tax revenue challenges and political tax revenue challenges.

South Africa's share of informal employment in total non-agricultural employment is estimated by the OECD (2009) at 50.6 percent. Although this estimate is the smallest for Sub-Saharan Africa countries, it is likely to remain a structural challenge towards additional domestic revenue, especially from taxes upon income. Since the activities of the informal sector are less able to not be subjected to consumption taxes, it has often been suggested that an appropriate tax burden upon those in the informal sector could be imposed by taxes upon consumption (Bird and Gendron, 2006). It is further shown by Alm *et al*., (2004) that the larger the informal sector, the more heavily a country relies upon consumption taxation.[8]

For the purposes of tax administration, South Africa applies a revenue authority model. This model "aims partly to limit direct political interference into day-to-day operations by the Ministry of Finance, and partly to free the tax administration from the constraints of the civil service system" (Fjeldstad and Rakner, 2003:16). This model allows the South African Revenue Service (hereinafter "SARS") to pay salaries above the civil service regulations and could therefore, in theory, be more capable of employing and retaining skilled personnel. Although this model aims to limit political interference, empirical evidence shows that this model is vulnerable to such interference and this may also be a challenge faced by SARS (Fjeldstad and Rakner, 2003). Corruption is also a common challenge faced under this model (Fjeldstad and Rakner, 2003).

A further administrative challenge likely faced by SARS is in respect of complicated or unclear tax legislation that could result in non-standard collection procedures

[8] These findings are based upon a sample of 76 countries of which 57 are developing and 19 are industrialized.

(Luoga, 2002). This could result in less revenue being collected and increased administration costs in correcting collection procedures. A tax structure that contribute to complicated or unclear tax legislation, also create more opportunities for corruption within tax administrations and evasion and fraud by taxpayers.

Considering tax base challenges, the Davis Tax Committee[9] (2014) in an interim report considers the extent that profit shifting decreases South African revenues. This report shows that corporate tax revenues (as a percentage of GDP) are on the decrease.[10] This decrease in corporate tax revenues is accompanied by increases in cross border non-goods transactions (Davis Tax Committee, 2014). The report concludes that this increase "poses a serious threat to the fiscus insofar as tax revenue, and is an indication that illicit tax base migration through avoidance schemes and practices could be taking place" (Davis Tax Committee, 2014:24). Although methods of addressing profit shifting are being investigated by this committee, profit shifting seems to currently be a tax base challenge that likely limits the use of the corporate income tax towards additional domestic revenue.

The level of income inequality is also a significant tax base challenge. This is most evident from the base of the personal income tax. For the 2013 year of assessment, 3.29 million taxpayers from the population of approximately 55 million contributed 98.4 percent of personal income tax revenue (Tax Statistics, 2014). According to a study by Oberholzer (2005), reasons for not paying income tax are primarily that individuals are unemployed/pensioners (48.4%), do not have enough money to pay (26.3%), are part-time workers (10.5%) or do not know (6.3%). Interestingly, only 1.1 percent of respondents did not pay income tax due to their perception that government are not using revenue appropriately.

With approximately 35 percent of domestic tax revenue being received from the relatively small base of personal income taxpayers, arguments of inequality have been raised by these taxpayers (Tax Statistics, 2014).[11] South Africa may therefore carry a risk of a volatile personal income tax base (African Economic Outlook, 2010).

[9] The Davis Tax Committee is a current tax review committee appointed by the Minister of Finance upon 17 July 2013. This committee operates upon the basis of various sub-committees that are to inquire into the role of the South African tax system, taking into account the objectives of the National Development Plan.
[10] It should be noted that this can be as a result of profit shifting, a decrease in economic activity or other factors.
[11] Following a recent personal income tax increase, the argument of inequality of the personal income tax has received media attention.

This perceived inequality has led to a journalistic view that South Africa is on the verge of a tax revolt and no more additional revenues can be collected from the personal income tax (Financial Mail, 2015; Moneyweb, 2015).[12]

In considering the political tax revenue challenges, reference is made to Worldwide Governance Indicators ("WGI") data. The WGI (2014) is a research data set summarizing the views upon the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. The dimensions[13] of government indicated in this data set, together with the estimate (ranging from -2.5 (weak) to 2.5 (strong) governance) for South Africa for each dimension are provided in Table 1.

Table 1: Governance Indicators and percentile rank for South Africa

Voice and Accountability	Political Stability	Effectiveness	Regulatory Quality	Rule of Law	Control of Corruption
0.58	-0.06	0.43	0.41	0.13	-.012

Source: Worldwide Governance Indicators (2014).

From Table 1 it is evident that overall the South African government is viewed as neither weak nor strong. The view that the South African government is not providing strong governance may provide a challenge towards generating additional tax revenue. The control of corruption dimension is of particular concern, as this view may result in reluctance from citizens to pay additional taxes, especially in the case of taxes upon income that are easier to evade (compared to consumption taxes). The rule of law dimension may also indicate that some citizens may believe that it would not be difficult to evade taxes.

The level of income inequality in South Africa may also provide a political tax revenue challenge, since taxing the poor is a politically sensitive issue (Bird and

[12] There is unfortunately no empirical evidence that could be found supporting this argument.

[13] Voice and Accountability reflect perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media. Political Stability reflects perceptions of the likelihood that the government will be destabilized or overthrown. Effectiveness reflects perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Regulatory Quality reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. Rule of Law reflects perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence. Control of Corruption reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.

Gendron, 2007). This issue is likely to be particularly sensitive in South Africa, since the majority of registered voters are not personal income taxpayers (Electoral Commission of South Africa, 2015). The South African government may therefore disregard additional revenues from consumption taxes, often also paid by poorer citizens, as taxing these citizens is likely to be an unpopular approach.

It therefore seems that with regard to additional domestic tax revenue, South Africa does not have many options. It is projected that for the period 2014 – 2015 tax revenues will be R10 billion (0.3 percent of GDP) less than the budgeted target. This is mainly due to an underperforming corporate income tax and lower than expected revenues from the value-added tax ("VAT"). Although the Medium Term Budget Policy Statement (2015) includes tax policy and administrative reforms to generate approximately R10 billion a year in additional revenue, the correct fiscal tool for this reform is not clear.

The rate of personal income taxes were raised by one percent in the most recent budget, but this is not estimated to provide enough additional revenue to overcome the budget deficit of 3.8 percent of GDP (Budget Speech, 2015). Further taxing the relatively small base of personal income taxpayers may result in a decrease in tax morale and consequently revenue from this base.

The corporate income tax also does not appear to lend itself to additional tax revenues. It is rather the case that as is, corporate tax revenues as a percentage of GDP are on the decrease. Attempting to increase revenues from this base could potentially increase profit shifting and decrease investments.

The potential of additional revenue from the VAT, the only other major tax based upon revenue yield, has therefore received much recent attention (Davis Tax Committee, 2015). As a broad-based consumption tax, the VAT will obtain revenues indirectly from both the formal and informal sectors. It is further shown by the Davis Tax Committee (2015) that additional revenue from VAT[14] will have the smallest impact upon real GDP, agriculture, mining, manufacturing, electricity, water, construction, service and household expenditure (compared to the other two major taxes). However, as a broad based consumption tax additional revenue from the VAT remains sensitive to increased inequality (Davis Tax Committee, 2015).

[14] This is only additional revenue as a result of a rate increase.

Additional revenue from the VAT can be obtained by either increasing the rate of the tax, expanding the base of the tax, improving the administration of the tax or increased compliance to the tax. Additional revenue from the VAT has received very little recent empirical consideration and the scope for expanding the base and whether this is preferred to a rate increase, is not clear.

Additional revenue under the VAT should also not be the only consideration. Changes to the structure of the VAT, possibly coupled with the redistribution of tax revenue, could also potentially assist in addressing some of the other challenges faced by South Africa, especially income inequality (Survey on the Global Agenda, 2014; Davis Tax Committee, 2015).

The scope for increasing the base and changes to the structure of the VAT should however be based upon an understanding of what can be regarded as the structure of a good VAT. Additionally, an understanding of the South African VAT and how it is aligned with the structure of a good VAT is important. Not doing so may result in policy considerations that are not well-motivated.

It is further important that changes to tax policy must be supported by empirical evidence (Ebrill *et al*., 2001). Tax policy is, and ought to be, unique for each country (Bird, 2005). Policy changes without proper empirical evidence could provide undesired results. The method used in obtaining empirical evidence is therefore important.

Since the introduction of the South African VAT in September 1991, other southern African countries, such as Namibia (2000), Botswana (2002), Lesotho (2003), Zimbabwe (2004) and Swaziland (2012) have based their VAT systems upon that of South Africa (Lang *et al*., 2009; PwC, 2014). Reaching the objectives of this study may therefore be of importance beyond the borders of South Africa.

1.2 Research objectives

This interdisciplinary study with the main aim of making an empirical contribution is guided by the following primary research objectives:

- To recapitulate the structure of a good VAT from existing literature. As a secondary objective to also consider how VAT structures of different countries align with the structure of a good VAT.

- To determine the scope for and identify possible policy changes to the South African VAT with reference to how it is aligned with the structure of a good VAT. This has to be done taking into account the additional revenue requirements and challenges faced by South Africa.
- To develop a structural model that can be used to provide empirical evidence upon the impact of a change in VAT policy upon consumers, possibly coupled with the redistribution of tax revenue and revenue obtained from consumers. This model will therefore be used to provide the main empirical results of this study.
- To apply the identified policy changes to the structural model, analyse the results, describe these results and provide policy recommendations based upon the results.

1.3 Limitations of the study

The following substantive limitations apply to the study:

- In considering the structure of a good VAT, the study is limited in mainly considering this structure from an economic and legal perspective. Administrative and compliance matters, unless influenced by this structure, are not considered.
- The study is limited to individual households as contributors to VAT revenue. Although the majority of VAT revenue is contributed by households (or more particularly the individuals in households), firms, government and other entities also contribute to VAT revenue.[15]
- The incidence of the VAT is assumed to be the statutory incidence (this is discussed in par 4.1.3 of Chapter 4).
- The budget constraints of consumers are assumed to be linear (refer to par 4.2.1.1 in Chapter 4).
- The economic assumptions underlying utility functions apply (refer to par 4.2.1.2 in Chapter 4).
- Prices for purposes of estimating the behavioural responses of households are obtained from a separate data set and therefore are assumed to be constant for a single good, measured in a particular month in a specific province.
- Behavioural changes are limited to those of households. Supply side behavioural changes are not considered.
- Weak separability between commodity groups are assumed and not empirically tested (refer to par 4.2.4 in Chapter 4).
- Although zero observations for budget shares were greatly reduced by removing households with zero total expenditure from the sample, and by commodity grouping, some zero observations remain.
- The impact of policy changes is limited to the monetary impact upon households over the short term. Changes in consumption behaviour are therefore assumed to be weakly separable from changes in labour. The present study is focused upon a micro-level (individual households) and is not a macro-level study in Economics as a discipline.

[15] An approximation of total VAT revenue is provided in Chapter 5.

CHAPTER 2:
THE STRUCTURE OF A GOOD VAT

In this chapter I identify the structure of a good VAT and consider to which extent countries' VAT systems align with this structure. In identifying the structure of a good VAT, an understanding of the underlying form of taxation is important. This underlying form is discussed first.

2.1 The underlying form of taxation

The term 'underlying form' is borrowed from Robert Pirsig's renowned book *Zen and the Art of Motorcycle Maintenance*.[16] Pirsig (1999) divides human understanding into romantic understanding and classical understanding. A romantic understanding sees the world primarily in terms of immediate appearance. A classic understanding sees the world primarily as underlying form.

In explaining underlying form, Pirsig (1999) considers human awareness as a desert of sand. We are not conscious of all the sand; our minds simply do not allow it. We can however pick up a hand full of sand from this desert, and this then is the world of which we are conscious. Romantic understanding primarily stops here, a hand full of sand. Classic understanding is concerned with firstly dividing this hand full of sand into piles based upon shared characteristics of the grains of sand. These piles can then be divided into different smaller piles. This process can be continued until individual grains of sand remain, each grain of sand being unique. These piles are the underlying form.

In this section I consider taxation as a large pile of sand and divide this pile into different smaller piles.[17] The aim of this approach is to position the type of research conducted in this study, as well as to position the VAT. This also lays the foundation for determining the structure of a good VAT. I first consider the large pile.

[16] This book has been sold in 23 languages and is described in the press as the most widely read philosophy book in history (Pirsig, 1999).
[17] This means that as a point of departure I am already considering the classical understanding of the world, of which one pile is taxation. I therefore do not consider the romantic understanding of taxation.

2.1.1 Taxation – the large pile of sand

In describing the large pile of sand - taxation, it may be useful to identify the piles of sand from which taxation borrows. Science can be divided into three piles,[18] natural science, formal science and humanities. Taking sand from primarily natural science and humanities, but also formal science, we get a pile of sand known as social sciences (World Social Science Report, 2010). As human consciousness grows, this pile of sand gets bigger. This can be both as a result of growth in the piles it borrows from, or independent growth. The social sciences can therefore be thought of as both an interdisciplinary field of science and an independent field of science.

This can be shown by dividing social science into two groups; social science core disciplines (these can be thought of as primarily independent of other sciences) and social science crossover disciplines (these can be thought of as dependent upon other sciences). These two piles can then each be divided by disciplines belonging to them (refer to Table 2).[19] Crossover disciplines are ranked from least to most dependent upon other sciences.

[18] There are many different ways in which science can be divided.
[19] This division is taken from Bastow *et al.*, (2014) and is based upon the type of university staff involved in these disciplines.

Table 2: Division of social sciences

Core disciplines	Crossover disciplines
Academic studies in education	Finance
Accounting	Operational research
Anthropology	Statistics
Business studies	Journalism
Economics	Law
Human and social geography	Linguistics
Human resource management	Archaeology
Information services	Environmental sciences
Management studies	Information systems
Marketing	Psychology
Media studies	Architecture
Planning (urban, rural and regional)	History
Politics	Philosophy
Publicity studies	Theology
Publishing	
Social policy	
Social work	
Sociology	
Tourism, transport and travel	

Source: Bastow *et al*., 2014.

It is important to take note that taxation is not one of the disciplines in Table 2. Disciplines may be defined as "recognizable communities of scholars that develop conventions governing the conduct of research and its adjudication" (Salter and Hearn, 1996:20). As argued by Lamb *et al*., (2004) taxation is not a discipline by itself. By borrowing sand from the piles in Table 2, the interdisciplinary field of taxation is formed. To illustrate this, consider the definition of taxation by Say (1803:338) "Taxation is the transfer of a portion of the national products from the hands of individuals to those of the government, for the purpose of meeting the public consumption or expenditure."

The term "transfer" from this definition means to move from one place to another (Oxford Dictionary, 2015). This can be seen to suggest that a system for transferring will have to be in place to effect the transfer. For this feature of taxation, sand from the pile of information systems and information services could potentially be added to the taxation pile. The next term, "portion" suggests that there will be a

measurement or computation involved in determining the portion. The word accountant, initially written *accomptant*, is derived from the French word *compter* which is derived from the Latin word *computare*, meaning compute (Pixley, 1900). Taxation borrows some sand from accounting, specifically for the computation of taxes.

The portion depends upon national products. The term national product refers to the total market value of goods produced and services provided by the citizens of a country (BEA, 2007).[20] Taxation is therefore dependent upon the market value and quantity of goods and services produced, and it borrows sand from economics for this feature.

The portion is transferred from the hands of individuals. The term "individuals" is central to taxation being considered a social science. "Every social science focuses upon constantly shifting human behaviours…" (Bastow *et al*., 2014:xii). Since taxation shifts human behaviour (Lamb *et al*., 2004), it should be related to all social science disciplines. The portion is transferred to government and this suggests a relationship between taxation and politics.

It is important to consider that the purpose of transferring the portion is public consumption or expenditure. This firstly rules out portions transferred to government in exchange for private consumption or expenditure (e.g. services provided by government to selected individuals who are willing to pay for the services). Secondly, the purpose of the public consumption or expenditure is not contained in this definition of taxation.

Steyn (2012) considers twenty-two definitions of taxation and none of them include the purpose of public consumption or expenditure (only the purpose of the portion being public consumption and expenditure). This suggests that the focus of taxation is upon the transfer of the portion from individuals to government and not how government expends the portion.[21] This said, the relationship between taxation and government expenditure cannot be ignored. The amount of the government expenditure is dependent upon the portion, but the portion is also influenced by the amount of government expenditure required (Hyman, 2010).

[20] It should be noted that at the time of Say's definition, measures such as gross national product and gross domestic product were not yet developed.
[21] The expenditure of revenues is primarily considered in Economics and Politics.

An important element of taxation, as shown by Steyn (2012), not included in the definition of Say (1803), is that taxation is compulsory.[22] "Compulsory" is defined as required by law or a rule (Oxford, 2015). This further emphasises the relationship between taxation and law. The field of auditing, a sub-field of accounting, is also important in assessing whether the laws are complied with.

Taxation therefore borrows from many piles of sand to form a separate pile of sand. The purpose of this pile is to obtain revenue in a compulsory manner to provide goods and services to the shared benefit of the public (Steyn, 2012).[23] In dividing this pile, I consider four smaller piles.

Firstly, taxation can be divided into the practical application of taxation, the teaching of taxation and research in taxation. I do not consider the practical application and teaching of taxation, but only research in taxation. This should provide an idea of the amount of sand taxation borrows from the identified social science disciplines and position this study within the larger field of taxation, and consequently social sciences. Secondly, I divide taxation by considering the different economic bases that are taxed (Hyman, 2010).[24] This is done with the purpose of positioning the economic base of the VAT. Thirdly, I consider the different types of taxes, meaning the different methods used to tax the economic bases. This is done to position the role of the VAT in the tax system.[25]

Lastly, I divide taxation according to the canons of taxation. The interdisciplinary nature of taxation necessarily provides for a variety of views on taxation. Moreover, since social sciences focus upon the constantly shifting behaviour of humans, no social science can produce absolute laws that cannot change (Bastow *et al*., 2014). This said, taxation contains some canons of a good tax[26] that appear to have been largely agreed upon over an extensive period of time by social scientists.[27] For the

[22] Steyn (2012) identifies compulsory revenue raising and public benefit as common elements to the definitions of taxation.
[23] This purpose is part of a larger purpose, that of the tax and transfer system. The purpose of this system is generally considered to be the optimisation of social welfare.
[24] These are not tax bases. For the purposes of this study, tax base is defined as the extent that the economic base of a specific tax is taxed (Anderson, 2011).
[25] Tax system in this sense refers to all the taxes imposed by government.
[26] It should be noted that these canons relate to the tax system. It is not theories of taxation that relate to the tax and transfer system (Chand, 2008).
[27] Although there seems to be general consensus upon these canons, there is not necessarily agreement upon the application of these canons.

purposes of this study it is important to take these canons into account in identifying the structure of a good VAT.

2.1.1.1 Research in taxation

Research in taxation can be divided based upon the discipline from which a study originates. Lamb *et al*., (2004) considers such a division and describes tax research as law research, economic research, accounting research, politics research and social policy research. Although this may provide some indication of the social science piles that taxation borrows from the most, in positioning interdisciplinary studies (such as this study) this approach may not be ideal.

Another way in which tax research can be divided is into research areas, as discussed by Shevlin (1999). Although not mutually exclusive, most tax research can be classified as tax compliance research, tax planning research or tax policy research (Shevlin, 1999).

Tax compliance research mostly considers the judgement and decision-making paradigm with hypothesis generated from theories in psychology (Shevlin, 1999). Compliance research is therefore often concerned with the naturalistic decision-making paradigm[28], while studies that originate from economics are generally more concerned with the classical decision-making paradigm[29] (Shaban, 2012). This research mostly employs an experimental or quasi-experimental approach, although some analytical and archival studies have also been conducted (Shevlin, 1999).

Tax planning research is generally concerned with how firms and individuals respond to tax laws (Shevlin, 1999). Firms and individuals may exploit the different ways that economic bases and the components of these bases are taxed, in an attempt to minimise their tax liability or obtain other benefits. This research mostly employs an archival approach to consider how taxes influenced these observed behaviours (Shevlin, 1999).

Tax policy research is generally concerned with the efficiency costs, behavioural effects and distribution of gains and losses associated with a change in tax laws (Poterba, 1999). These results inform policy makers on outcomes of tax law changes

[28] In this paradigm human beings operate with cognitive limitations and bounded rationality.
[29] In this paradigm human beings fully understand a problem, know all alternative solutions and the consequences of these solutions and choose the optimal solution.

made (*ex post*) or, "if the research is well motivated and theory-based" (Shevlin, 1999:429), of the outcomes of considered changes in tax laws (*ex ante*). The results are generally obtained by employing an archival approach, and policy recommendations are generally only made if an empirically relevant method was used in obtaining results, the method does not critically depend upon homogeneity assumptions and the tax policy recommendations are implementable (Shevlin, 1999; Diamond and Saez, 2011).

When making tax policy recommendations, it should be kept in mind by the researcher that "political factors are a fundamental determinant of the tax system…" (Poterba, 1999:391). Poterba (1999:394) calls for tax policy research that also takes account of political factors, but also note that "[d]etermining whether a particular tax provision is part of an efficient political bargain is extremely difficult". Tax policy recommendations for *ex ante* studies should therefore acknowledge the limited picture of reality provided by the method employed (Diamond and Saez, 2011).[30]

Ex ante tax policy studies (such as this study) mostly rely upon economic theory in providing empirical results of the considered tax policy and consequently tax law changes.[31] However, taxation theory and technical discussion of the tax law itself is often required in determining what changes to the tax law should be considered (Shevlin, 1999). This study sets out to consider well-motivated changes to tax policy and consequently tax law, provide descriptive results of these policy changes and make policy recommendations based upon these results. It therefore takes sand from both the pile of tax law and the pile of economics. [32]

2.1.1.2 Economic bases of taxation

As mentioned by Say (1803) a portion of national products are taxed. This can be done by taxing the factors of production and the output of production (Anderson, 2011). The factors are land, labour and capital[33] and the output are goods and services. The economic base for taxing the factors of production can be grouped into

[30] This is also important towards a positive approach to research.
[31] As mentioned by Summers (1987) economic research makes important contributions to tax policy debates by quantifying the impact of potential tax policy changes.
[32] Although political factors are not empirically evaluated, I do consider some political factors towards how the results are presented.
[33] These are the classical factors of production. Entrepreneurship is sometimes also included as a factor of production, although not one of the classical factors.

two piles, wealth and income (Hyman, 2010). The economic base for taxing the output of production is the pile named consumption (Hyman, 2010).

Income (Y) can be divided into wages (W) and capital income (R).[34] Income can be reduced by investment (I) (this can also be called savings) or consumption (C). This can be written

$$Y \equiv W + R \equiv C + I \quad (1)$$

From the perspective of a firm, value added is $W + R - I$. The second equality in Equation (1) can be written

$$W + R - I \equiv C \quad (2)$$

Equation (2) shows that value added from the perspective of the firm is equivalent to consumption from the perspective of the individual (or consumer). The term consumption is of specific importance to this study and is therefore further described here.

In Latin the verb *consumptio*, meaning consumption, is derived from *consumere*. The English word "consume" is also derived from *consumere. Consumere* means to burn up, destroy, kill; devour or swallow up (My Etymology, 2015). As noted by Graeber (2011:491) consumption "implies something not just being thoroughly taken over but being overwhelmed in a way that dissolves away the autonomy of the object or even that destroys the object itself".[35]

The term consumption as used today does not generally take the meaning from which it is derived. As noted by Trentman (2012:3) what consumption means "is far from obvious and a product of change and contestation. What counts as consumption depends upon the observer." For the purposes of this study the observer is the economist; consumption takes the meaning that economists assign to it.

The term consumption as used in economics was first introduced by Adam Smith in *An inquiry into the Nature and the Causes of the Wealth of Nations* to describe the opposite of production (Graeber, 2011). Smith (1776) does not define consumption. It further appears that Smith distinguishes between use and consume. He writes:

[34] Capital income is the sum of risk free normal return upon capital, entrepreneurial reward for risk taking and economic rents (Cnossen, 2009).
[35] It is interesting to note that tuberculosis is known as consumption.

> "The value of any commodity, therefore, to the person who possesses it, and who means not to use or consume it himself…" (Smith, 1776:48), and
>
> "…the money that is necessary for circulating and distributing them to those who are finally to use or to consume them…" (Smith, 1776:284), and
>
> "The man who buys does not always mean to sell again, but frequently to use or to consume…" (Smith, 1776:336).

Smith also makes this distinction when he considers the taxing of consumption. He writes:

> "Consumable commodities, whether necessaries or luxuries, may be taxed in two different ways. The consumer may either pay an annual sum on account of his using or consuming goods of a certain kind, or the goods may be taxed while they remain in the hands of the dealer, and before they are delivered to the consumer. The consumable goods which last a considerable time before they are consumed altogether are most properly taxed in the one way; those of which the consumption is either immediate or more speedy, in the other" (Smith, 1776:877)[36].

By distinguishing between use and consume, it appears that in Smith's view some goods cannot be consumed. It further appears that Smith included both use and consume when describing consumption. This is specifically evident in the following statement:

> "Such stamp-duties as those in England upon cards and dice, upon newspapers and periodical pamphlets, etc., are properly taxes upon consumption; the final payment falls upon the persons who use or consume such commodities" (Smith, 1776:864).

Say (1803:294) explains consumption by writing:

> "…as by production is meant the creation, not of substance, but of utility, so by consumption is meant the destruction of utility, and not of substance, or matter… Thus, the terms, to consume, to destroy the utility, to annihilate the value of any thing, are as strictly synonymous as the opposite terms to

[36] This statement further shows that in taxing consumption, it is not the expenditure upon consumption that is taxed, but the consumption itself.

> produce, to communicate utility, to create value, and convey to the mind precisely the same idea."

It appears as if Say takes the original meaning of consume (from Latin) and applies that to utility. It is interesting to note that in *A Treatise on Political Economy,* Say (1803) does not once distinguish between use and consume. It would appear that in his view consume only relations to consumption. He writes:

> "Every product is liable to be consumed; because the value, which can be added to, can likewise be subtracted from, any object… But it cannot be more than once consumed; value once destroyed cannot be destroyed a second time. Consumption is sometimes rapid, sometimes gradual. A house, a ship, an implement of iron, are equally consumable as a loaf, a joint of meat, or a coat. Consumption again may be but partial. A horse, an article of furniture, or a house when re-sold by the possessor, has been but partially consumed; there is still a residue of value, for which an equivalent is received in exchange on the re-sale. Sometimes consumption is involuntary, and either accidental, as when a house is burnt, or a vessel shipwrecked, or contrary to the consumer's intention, as when a cargo is thrown overboard, or stores set on fire to prevent their falling into enemies' hands" (Say, 1803:294).

Therefore, all produce can be consumed, as produce creates utility. In the case where utility or value cannot be decreased, such a good cannot be consumed (Say, 1803). It is further important to distinguish between productive consumption and consumption. On this Say (1803:298) writes:

> "It may be proper here to remark, that consumption, productive of nothing beyond a present gratification, requires no skill or talent in the consumer. It requires neither labour nor ingenuity to eat a good dinner, or dress in fine clothes. On the contrary, productive consumption, besides yielding no immediate or present gratification, requires an exertion of combined labour and skill, or, of what has all along been denominated, industry."

For the purposes of this study consumption and productive consumption take the meaning as put forth by Say (1803).

2.1.1.3 Types of taxes[37]

The pile of taxation is generally divided into direct taxes and indirect taxes. Although, due to the difficulties in defining these two terms[38], I do not wish to divide the types of taxes in such a manner. Rather, I divide taxation again into the economic bases of wealth, income and consumption, and discuss how these are taxed. In dividing taxation into these three piles, a clear definition of income is required, as not doing so will make determining whether a tax forms part of the wealth pile or part of the income pile quite arbitrary (Kessler and Pestieau, 1991).

As shown in Equation (1), income can be divided between wages and capital income. This follows the Haig-Simmons as well as Musgrave and Musgrave's definition of income; income is the total accretion to a persons' wealth (Anderson, 2011).[39] Income can then be consumed or invested. The invested portion of income will be wealth, but the accretion to this investment is considered to be income (specifically capital income). Wealth therefore does not include this accretion, but rather the "stocks" of wealth of a person (Kessler and Pestieau, 1991).[40]

Considering these "stocks" of wealth, there are two modern forms of taxes. The first is by taxing wealth periodically and the second is to tax the transfer of wealth (Rudnick and Gordon, 1996; Bird, 1991). Popular taxes for taxing wealth periodically

[37] It is not the purpose of this section to give an overview of all different taxes. The purpose is to discuss how an economic base may be taxed.
[38] Chand (2008:106) considers various definitions of these two terms and agrees with Atkinson (1977) that "a direct tax is that tax whose burden is borne by the person upon whom it is levied. He cannot transfer the burden of the tax to some other person. In other words, in the case of a direct tax, both the impact and incidence of tax fall upon the same person". An indirect tax "is that tax which is initially paid by one individual but the burden of which is ultimately borne by another individual. The person who pays the tax in the first instance, transfers its burden upon the shoulder of another person". In the case of a tax upon consumption (such as the VAT) it is evident that in most instances, such a tax will be an indirect tax, although it may well be that the incidence is predominantly carried by the supplier (and payer of the tax) for certain supplies. In the case of for instance the corporate income tax (which is mostly regarded as a direct tax) the case becomes even more unclear. Although paid by the corporation, the burden of the tax is likely shifted by increased prices or lower wages. The demand for other inputs in production can also be decreased. It is therefore not self-evident whether such a tax can be regarded as direct or indirect. Similar arguments can be made for other taxes. Another popular definition is that direct taxes are taxes levied upon people, while indirect taxes are taxes charged upon goods and services. This definition also does not provide clarity since it differs from the previous definition and it will be unclear whether a tax for instance in the form of labour supplied will be a tax upon a person or upon a service.
[39] Another consequence of this definition is that all taxes are ultimately upon wealth (often referred to as revenue).
[40] The major taxes for which these definitions are important are the capital gains tax and corporate income tax.

are the property tax and net-wealth tax.[41] The transfer of wealth is generally taxed upon a transferor-base, such as the estate tax and gift tax or a recipient-base, such as the inheritance tax and gift tax.[42] As noted by Bird (1991), taxes upon wealth are generally less prominent sources of revenue[43] for countries, especially countries with lower levels of per capita income. In European Union (hereinafter "EU") countries (with generally higher levels of per capita income compared to less developed countries), wealth taxes raised about 5 percent of tax revenue on average between 2003 and 2013 (EY, 2014).

Taxes upon income are all periodical.[44] This is as a result that the transfer of income is taxed either under consumption or wealth. Examples of modern taxes upon income include the personal income tax, corporate income tax and the capital gains tax. When compared to taxes upon wealth, taxes upon income generally provide for a considerably greater amount of tax revenue. In a sample of 179 countries, taxes upon income contributed 22.4 percent of revenue on average for the period between 2003 and 2013 (World Bank, 2015).

Taxes upon consumption are either sporadic or periodical. Furthermore, the tax can be upon consumption and/or upon productive consumption. Taxes upon consumption can further be applied to the consumption of all goods and services (or nearly all), referred to as a broad-based consumption tax or only selected goods and services (referred to as a selective consumption tax from here onward). Examples of broad-based consumption taxes are the VAT (also called the Goods and Services Tax) and the Retail Sales Tax.[45] Broad-based taxes generally do not include productive consumption in their base (Cnossen, 2009).[46]

---

[41] It should be noted that there are many names for these taxes. For instance, property taxes can also be called real estate taxes or land taxes and net-wealth taxes can also be called capital levies or wealth taxes.
[42] The gift tax can be transferor-base or recipient-base as the legal responsibility of paying the tax sometimes shifts. Further the estate tax is sometimes referred to as death tax, and the gift tax as donations tax. See also Muller (2010).
[43] Bird (1991:323) uses the term "not very important".
[44] It should be noted that the tax generally becomes due as income accrues, but is only paid periodically.
[45] It should be noted that a retail sales tax is not always broad based, for instance in Canada the retail sales tax is only upon vehicles and certain insurance.
[46] This was not always the case. Older broad based taxes, such as the turnover tax in EU countries that were replaced by the VAT did not differentiate between productive consumption and consumption.

Selective consumption taxes generally do not differentiate between use for consumption or productive consumption, although some countries do have a credit scheme for productive consumption (e.g. India). Examples of such taxes are excise taxes, a tax on generally luxury goods and goods with external costs to society[47] and import duties or customs duties, as well as a tax upon imported goods. Compared to the other economic bases, consumption generally provides for the greatest amount of revenue. In a sample of 180 countries, taxes upon consumption contributed 39.5 percent of revenue on average for the period between 2003 and 2013 (World Bank, 2015).

With the VAT alone approximated at contributing 25 percent of global revenue[48] (Ebrill *et al*., 2001) and being the broad-based consumption tax of choice in more than 160 countries (Cnossen, 2015), it plays an important role in many tax systems.

2.1.1.4 Canons of taxation

Although there is evidence of taxes already being enforced as much as five thousand years ago,[49] regarding the underlying form of a good tax "[t]here is little to be garnered from ancient writings" (Jones, 1914:47)[50]. Adams (1993:8) provides inscriptions from Ancient Egyptian (pre-3000 BC to 300 BC) texts that read: "If a poor farmer is in arrears with his taxes, remit two-thirds of them" and "[i]f anyone is suffering under the pressure of taxation or is at the end of his means, you must let the case go unchecked". These inscriptions are however in contrast to a scene described upon the tomb of Khiti, where taxpayers were being violently struck by tax officials (Torgler, 2007). It is further suggested in an inscription that in the case that a farmer cannot pay his taxes, "[t]he farmer is beaten, he is bound and thrown into a well, soused and held under" (Adams 1993:7).

Perhaps the earliest indication of the underlying form of a good tax comes from the Greek historian Herodotus (484 BC – 420 BC) when he stated that "no man might be taxed beyond his ability" (Jones, 1914:53). This idea of ability is expanded upon by

[47] By this is meant goods that, as the result of consumption by one individual, create a cost for other individuals. Examples of such goods are alcohol and cigarettes. It is also sometimes argued that the purpose of these taxes is to alter behaviour.
[48] It should be noted that at the time of this estimate only 120 countries had a VAT.
[49] Clay cones excavated in Lagash, Sumer in the southernmost region of ancient Mesopotamia and dated approximately five thousand years ago say "there were the tax collectors" (Adams, 1993:2).
[50] I rely heavily upon Jones (1914) for the purposes of historical writings upon taxation. Although there are some other summaries upon these writings, Jones' summary is preferred, as he directly quotes original sources.

the Greek historian Dionysius (60 BC – 5 AD) when he wrote that "[i]t is very just, I think, and very much to the public good, that such as have large fortunes should pay largely, and such as have less in proportion" (Jones, 1914:54). Pollux (150-200 AD), a Greek scholar from Egypt, practically applied the idea of proportion by providing what many consider the first progressive scale of taxation (Jones, 1914).

The idea of proportionality is formalized by K'ung Ying-ta (574– 684 AD), a Chinese scholar when he wrote:

> "It is just the same principle as that of taxation: when both the rich and the poor are taxed, in money as well as in labour, one should tax the rich more and the poor less, up to the point that both can bear the burden; this is also the principle of equality" (Jones, 1914:58).

It further appears that these ideas towards equity were not only those of a few scholars. The Codex Justinianus, the codification of Roman law ordered by Justinian in the sixth century reads: "All public charges should be made in proportion to fortunes" (Jones, 1914:58). From approximately 500 to 1500 AD very little is written that would concern the underlying form of a good tax. This is the reason that Jones (1914:56) refers to this period as the "The Blank Period".

It appears that much of the discussion in the seventeenth century was (at least initially) not about elaborating upon the underlying form of a good tax, but rather about whether taxing people (wealth and income[51]) or goods (consumption) were better aimed towards equity. Hobbes writes: "[w]hich considered, the equality of imposition consisteth rather in the equality of that which is consumed, than of the riches of the persons that consume the same" (Jones, 1914:62).

This preference towards consumption taxes was also shared by Sir William Petty (1623-1687), an English economist, when he wrote: "Concluding therefore that every man ought to contribute according to what he taketh to himself, and actually enjoyeth" (Jones, 1914:66). It is further stated by Frecknall-Hughes (2015:20) that Petty "favoured consumption taxes above all others".

[51] I use the term income, but it should be noted that at this time in history there were not income taxes as we know them today. The term income is only used as it adheres to the definition previously provided.

This discussion however did provide some additional insight beyond equity. Samuel von Pufendorf (1632-1694), a German economist wrote: “It appears to be most convenient that people should be taxed according to what they consume, rather than according to what they get” (Jones, 1914:67).

This convenience of taxing consumption, coupled with the apparent belief that taxing consumption is more equitable, saw the late seventeenth century and eighteenth century marked with consumption taxes in the form of customs, excise and sales taxes[52] (Jones, 1914; Seligman, 1914; Sabine, 1966). It is in this period from 1688 to 1800, which is known as the “Age of Enlightenment”, that Adam Smith and others provide additional insight beyond equity and convenience towards the underlying form of a good tax (Frecknall-Hughes, 2015).

French economist François Quesnay (1694-1774) gave thought to the administrative costs in collecting taxes when he wrote “taxes…should be based upon the net return of land, and not upon the wages of men, nor upon commodities, where they would increase the expenses of collection” and “[t]he administration of finance, whether in the collection of taxes or in the expenses of government should not give rise to fortunes in money which steal a part of revenues…” (Jones, 1914:77-78).

Jakob Bielfeld (1717-1770) also considered how taxes can influence an economy when he wrote that an object of public finance is to encourage “the production of natural commodities” (Jones, 1914:79). He further provides three properties that taxes should have, namely:

1. “A proportional equality”,
2. “That payment should cause the least disturbance” and
3. That a taxpayer “should pay his portion in the most convenient manner, at a time when he is best able to pay” (Jones, 1914:80).

Marquis de Mirabeau (1715-1789) provides his own properties of taxation when he states that taxes:

1. “Should be established immediately at the source of revenue
2. Should be in known proportions, and suitable to these revenues
3. Should not be overburdened with the expenses of collection” (Jones, 1914:80).

[52] These were not broad based sales taxes but only levied upon a selected number of goods (Adams, 1993).

The French *Intendant de Finances* from 1756, Moreau de Beaumont (1715-1785), published *Mémoires concernant les impositions et droits en Europe* in 1768. In this treatise he mentions that:

1. Each individual should contribute tax payments in proportion to his/her ability to do so
2. That the burden should be equally spread (in relation to ability)
3. That taxes should be applied uniformly
4. That taxes should not contain arbitrariness, but be certain (Jones, 1914).

It was only in 1776 that Adam Smith (1723-1790) published his famous work on economics, *The Wealth of Nations,* which contains what is often regarded as the underlying form of a good tax (Frecknall-Hughes, 2015). As noted by Bastable (1917:225):

> "The maxims inseparably associated with his name were in his own day accepted by theorists and statesmen, and have by constant repetition become an indispensable part of any exposition of finance."

Smith (1776: 639-640) provides four maxims of taxation, namely:

1. "The subject of every state ought to contribute towards the support of the government, as nearly as possible, in proportion to their respective abilities - that is, in proportion to the revenue which they respectively enjoy under the protection of the State" (*This maxim is often referred to as equity*).
2. "The tax which each individual is bound to pay ought to be certain, and not arbitrary. The time of payment, the manner of payment, the quantity to be paid, ought all to be clear and plain to the contributor, and to every other person." (*This maxim is often referred to as certainty*).
3. "Every tax ought to be levied at the time, or in the manner, in which it is most likely to be convenient for the contributor to pay it." (*This maxim is often referred to as convenience*).
4. "Every tax ought to be so contrived as both to take out and to keep out of the pockets of the people as little as possible over and above what it brings into the

public treasury of the State"[53] (*This maxim is often referred to as economy or efficiency).*

Regarding the first maxim, Walker (1892) makes the point that the last word of the maxim "under the protection of the State" is in contrast to the first half of the maxim. He writes:

> "Those who derive the greatest benefit from the protection of the state are the poor and the weak—women and children and the aged; the infirm, the ignorant, the indigent" Walker (1892:328).

In response hereto Bastable (1917) argues rather convincingly that the words "under the protection of the State" are included to exclude revenue (wealth) in other countries.

In the years that follow Smith's publication, many other economists[54] also provided similar statements upon taxation to Smith's and those writers before him. One statement upon taxation not contained in Smith's maxims was provided by Jeremy Bentham (and also echoed by others such as McCulloch) when he wrote in 1789 that "Taxes ought to have no other end than the production of revenue, with as light a burden as possible[55]" (Jones, 1914:104).[56]

It may well be argued that Smith did not mention the production of revenue of taxation in his maxims, as they describe how this purpose of taxation should be achieved. There are therefore not many additional insights provided by the writers following Smith. As Bastable (1917:226) notes "Nor, indeed, was there anything very novel in the formal contributions made by the successors of Adam Smith."

Although taxes upon consumption remained popular in the nineteenth century, the modern income tax as introduced in 1798 and reintroduced in 1842 in England steadily grew in popularity (Sabine, 1966).[57] Towards the end of the nineteenth

[53] Further on in this maxim, Smith states that a tax should not "obstruct the industry of the people, and discourage them from applying to certain branches of business…" (Smith, 1776:640).
[54] These economists include Burke, Necker, Gale, Ricardo, Mill and Channing (Jones, 1914).
[55] Bentham however states in a footnote that there are some exceptions, such as the excise tax upon liquor aimed at decreasing consumption thereof (Jones, 1914).
[56] A further contribution by Bentham stemmed from his belief that taxation can only be imposed by law and should not be seen as a voluntary contribution (Frecknall-Hughes, 2015).
[57] This growth in popularity of the income tax can be partly attributed to 'free trade' – meaning restrictions upon imports and exports are lifted - being employed between many governments, resulting in a decrease in the revenue yields from customs and excise taxes, resulting in a greater reliance upon income taxes for governments.

century German economist, Adolf Wagner (1835-1917) provides his outline of the principles of taxation. Wagner (1883:11) divides nine principles into four groups. The principles are:[58]

1. "Financial principles
    a. Adequacy of yield *(Taxation should be adequate to meet expenditure)*
    b. Flexibility of taxation *(Taxation should be elastic)*
2. Economic principles
    a. Choice of correct source of taxation*…(Economic base of taxation)*
    b. Choice of the kind of tax*…(Incidence of the tax, efficiency)*
3. Principles of justice, or of the equitable distribution of taxation
    a. Universality *(General or not selective)*
    b. Equality of taxation *(Proportional to ability)*
4. Principles of tax administration
    a. Determinacy of taxation *(Certainty)*
    b. Convenience
    c. Effort to ensure to lowest possible collection cost" *(Efficiency)*

During the First World War, which was largely funded by the income tax for the countries involved (Blankson, 2007), Charles Bastable (1855-1945) surveyed most of the descriptions of the underlying form of a good tax that preceded him. He provides the following maxims[59] of taxation in order of importance:[60]

1. Taxation should produce revenue – "To keep steadily in view the idea of productiveness, and select the objects most suitable for that purpose requires firmness, as well as wide and accurate information" (Bastable, 1917:227).
2. Taxation should be economical – "Thus the rule of 'economy' is naturally subdivided into two parts, viz. (a) 'taxation should be inexpensive in collection,' and (b) 'taxation should retard as little as possible the growth of wealth" (Bastable, 1917:227).
3. Taxation should be justly distributed – "a vague and plastic proposition, which we may further explain by the interpretation that it should be measured by the

[58] Comments in brackets are my own with reference to the comments of Bastable (1917).
[59] Bastable (1917) uses the word canons as opposed to maxims, but maxims is used here so as not to be confused with the canons of taxation that follow.
[60] I personally do not agree with ordering these maxims. Certain taxes may be better at addressing certain maxims than others, and for that tax the order may be different.

comparative abilities of the contributors, and this again may be taken in general to mean 'taxation in proportion to income'" (Bastable, 1917:227).

4. Taxation should be elastic – "Where the public revenue does not admit of easy expansion or reduction according to the growth or decline of expenditure, there are sure to be financial troubles" (Bastable, 1917:227).
5. Taxation should be certain – "That the citizen in his dealings with public officials should be under the rule of settled law, not of caprice, is not only a financial but an important constitutional maxim" (Bastable, 1917:228).
6. Taxation should be convenient – "It includes the selection of suitable objects for taxation, and also the choice of convenient periods for requiring payment" (Bastable, 1917:228).

Bastable (1917:227) comments that a tax that conforms to these maxims "may without hesitation be pronounced a good one". This is therefore how he describes the underlying form of a good tax.

Groves (1948) briefly mentions the maxims, as set out by Adam Smith and others, before making a case that neutrality in taxation is a value deserving more attention. He defines neutrality as impartiality of treatment. He states that "The partiality that we are concerned with may arise from (1) unequal treatment of essentially similar taxpayers; or (2) the same treatment of essentially different taxpayers" (Groves, 1948:18). He differentiates between neutrality and equity when he contends that:

> "Neutrality has to do less with the standards applied to the over-all distribution of the tax load and more with the even application of those standards once they are chosen. There is no inference of conflict between the two canons. The thought is not that taxes should be neutral rather than equitable; they should be both. Or perhaps more accurately: taxes should be equitable and they should deviate from neutrality only for an adequate public purpose" (Groves, 1948:18).

Although other important contributions to the underlying form of a good tax were made, these focus upon a specific tax rather than taxes in general. Examples hereof are Ramsey's (1927) contribution upon consumption taxes and Mirrlees' (1971) contribution upon the income tax (which could have larger applicability). It is

therefore at this point that I provide the canons of taxation; that is the underlying form of a good tax for the purposes of this study. These canons, in no definitive order are:

1. Taxes should produce revenue for government expenditure – this is as much a canon as it is a requirement for a payment to be regarded as a tax. Stepping away from this canon means stepping away from the main purpose of taxation and should only be considered if the benefit outweighs the cost, or if taxes are producing more revenue than required.
2. Taxes should be economical[61] – taxes should distort production and consumption as little as possible in obtaining required revenue.
3. Taxes should be efficient – taxes should incur as little as possible in terms of administrative costs and compliance costs.

   Administrative costs can be defined as public sector costs in administrating and enforcing taxes, including budgetary costs of revenue departments, costs incurred by other departments in providing information, judiciary and other costs related to dispute resolution and interest (lost) costs due to lags in collection (Barbone *et al*., 2012).

   Compliance costs can be defined as costs incurred by a taxpayer in complying with a tax, including direct costs incurred by taxpayers or "taxpayer costs" (time, labour cost, expert advice, other) in complying with legal obligations ("involuntary" or unavoidable costs), in tax planning and attempting to evade ("voluntary" or avoidable costs), psychological costs (stress, anxiety, frustration) and also costs incurred by third parties (information providers, voluntary helpers) (Barbone *et al*., 2012).

4. Taxes should be neutral – taxes should be similarly applied to similar taxpayers, unless a clear public purpose exists to do otherwise. In the case where the taxpayers are consumers, this will imply that taxes should be similarly applied to similar goods and services.
5. Taxation should be equitable – taxes should be paid according to ability. Ability is not directly observable and generally measured by income, but ideally other

[61] It should be mentioned that generally (for instance in optimal tax theory) economy and efficiency are combined under the term efficiency. For the purposes of this study I find it useful to separate these two terms.

factors should also be considered such as education, the age of the taxpayer and other factors that may influence ability.

6. Taxation should be flexible - taxes should be flexible and dynamic to adjust with commercial and technological development and the revenue requirements of government.
7. Taxation should be certain – the laws governing a tax should promote certainty of tax treatment and be unambiguous. The laws should further promote the canon of efficiency.
8. Taxation should be convenient – taxes should be levied in such a manner that would not decrease efficiency and promote voluntary compliance of taxpayers.

Different taxes will provide different weights to these canons, but all taxes should adhere as best possible to these canons. The term best possible is used as it is not self-evident how a tax should be structured to adhere to these canons. In the following section I consider how a VAT can be structured to adhere as best possible to these canons. This is therefore the structure of a good VAT. In doing this I first consider the origin of the VAT, thereafter the development of the VAT and finally the structure of a good VAT.

2.2 The structure of a good VAT

2.2.1 The origin of the VAT

As the VAT is a tax upon consumption[62], its origin cannot be separated from the taxes upon consumption that preceded it. Taxes upon consumption can be traced back to as early as 3000 BC in Ancient Egypt, where the consumption of cooking oil and the importation and exportation of goods were taxed (Adams, 1993; Blankson, 2007). Also in Ancient Greece (1600 BC to 146 BC) the consumption of olive oil[63] and imports and exports collected at the ports were taxed. In both the Roman Empire (753 BC to 663 AD) and under the Qin Dynasty (221 BC) in China, the consumption of salt was taxed (Burg, 2004; Blankson, 2007).[64] It should however be

[62] It should be noted that from a legal perspective the VAT is a tax upon the supply of goods and services, but the economic base is consumption.
[63] Olive oil was a monopoly of the Greek State. The state fixed the price of olive oil and employed a fifty percent tax upon imports of olive oil (Blankson, 2007).
[64] In China there were also excise taxes upon gold, silver, tin, lead, copper, tea, rice wine and tobacco.

noted that taxes upon the consumption of goods (excluding imports and exports) were, at least until the nineteenth century, selective consumption taxes.

In 1767 Sir James Steuart proposed a tax "which would fill up the place of every other; and could it be levied, would be the best perhaps ever thought of. It is a tax, at so much per cent upon the sale of every commodity" (Jones, 1914:128). This tax as proposed by Steuart appears to be essentially a broad-based consumption tax, which shares the characteristic of a broad base with the VAT (although only upon the supply of goods).

Although Steuart suggested a broad-based consumption tax in 1767, it was only in 1921 that further characteristics more akin to a VAT were suggested. In this year German businessman Carl von Siemens wrote a paper titled '*Improving the Sales Tax'* wherein he proposed that taxes paid upon business inputs (productive consumption) should be recovered, alleviating the cascading problem of sales taxes and turnover taxes applicable at the time (James, 2011). Thomas Adams also published a paper in this year titled '*Fundamental Problems of Federal Income Taxation'* where he suggests in an alternative to the federal income tax, a tax that he calls a "tax on expenditures" (Adams, 1921:539). According to him this tax should only be levied upon personal expenditures and not expenditures for profits, which would essentially mean a tax upon consumption (Adams, 1921). He further states that expenditures upon health and education should be exempt from this tax (Adams, 1921).

After the Second World War (1948) the French government, in an attempt to improve their exports, rebated the turnover tax paid by certain exporters. Following the success of these rebates, '*le père de la TVA*' (meaning the father of VAT) Maurice Lauré wrote '*La Taxe à la Valeur Ajoutée'* in 1953 and *'Au Secours de la TVA'* in 1957. These two publications discuss, amongst others, the extension of this rebate to all levels of production, shifting the tax to the final consumer. They also formed the basis of the first broad-based VAT in Denmark in 1967, followed by France in 1968 (James, 2011). [65]

[65] It should be mentioned that a retail sales tax (the burden also only falling upon the consumer) was instituted in 1930 in Kentucky, USA (Fox, 2002). Furthermore, a VAT without the invoice credit method was introduced in Michigan, USA in 1953 and a VAT was also introduced, only to be repealed a few years later, in Japan in 1950 (de la Feria, 2012).

2.2.2 The development of the VAT

From the initial implementation of the VAT in Denmark and France, the VAT spread to Western Europe and Latin America in the remainder of the 1960's and 1970's. The spread of the VAT slowed down during the 1980's, but thereafter spread rapidly to many countries around the world (Ebrill *et al*., 2001).[66] This rapid spread was elegantly metaphorized by Tait (1988:3) when he wrote:

> "VAT may be thought of as the Mata Hari of the tax world – many are tempted, many succumb, some tremble on the brink, while others leave only to return, eventually the attraction appears irresistible."

The spread in Western Europe was largely due to member states of the then European Community following recommendations provided by the Neumark Committee, and being required to transform their then turnover taxes into VATs (de la Feria and Krever, 2012).[67] Due to the variety of different VAT structures in place after these transformations, the European Commission set out towards a directive that would provide for a harmonized VAT, legislated as the Sixth Council Directive of 1977.

Since the initial VATs included a number of tax relief measures that were carried over from the turnover taxes from which they were transformed, many of these tax relief measures were also incorporated into the Sixth Council Directive (de la Feria and Krever, 2012). Before 1984, countries that adopted the VAT based their VATs largely upon the Sixth Council Directive, alternatively called the "EU Model", including many of the tax relief measures of this model (de la Feria and Krever, 2012). In adopting this model, however, some of the shortcomings of the model were revealed (James, 2011; de la Feria and Krever, 2012).

In 1984, with the enactment of the VAT in New Zealand, a new model of VAT was introduced, commonly referred to as the "modern VAT" (James, 2011). This model addressed most of the shortcomings of the EU Model and is often regarded as the model of choice for a VAT (Ebrill *et al*., 2011). This said, not all countries that adopted a VAT post-1984 based their VAT upon this model, as some continued to base their VAT systems upon the EU Model (James, 2011). Moreover, none of the

[66] Today, the only major economy that does not apply the VAT is the United States of America.
[67] The First and Second VAT Directives of 1967 form the basis for these transformations.

countries that based their VATs upon the Modern VAT Model adopted this model without some changes similar to those found in the EU Model (de la Feria and Krever, 2012).

2.2.3 The structure of a good VAT

Similar to other taxes, the pile of sand which is VAT can be divided into two piles; a good VAT and a bad VAT. The possible basis for this division has already been discussed in Section 2.1.1.4, namely the canons of taxation. A good VAT, based upon these canons, can then be divided based upon the structural features of such a VAT. As previously mentioned, these structural features are however not self-evident. I therefore rely upon studies by experts in the field in determining and discussing these structural features.

It should further be noted that the performance of a VAT (relative to an economy) is influenced by the structure of the VAT (including the tax rate(s)), the capacity and effectiveness of tax administrations and compliance of taxpayers (Krever, 2008). The latter two are dependent upon many external variables, such as education and government, but also the structure of a tax. The discussion in this section is therefore limited to considering the capacity and effectiveness of tax administrations and compliance of taxpayers, only as it relates to the structure of a VAT.

In this section I also provide an indication of the extent that countries' VAT systems align with the structure of a good VAT. This is important to provide a wider perspective upon the South African VAT. The structural features of a good VAT, coupled with the extent that countries' VAT systems align with these features, follow.

2.2.3.1 The main aim of the VAT ought to be revenue

The first canon of taxation, namely that taxes should produce revenue for government expenditure, is the most important for the purposes of the structure of a good VAT. As noted by Cnossen (1989:1168) "It is important to bear in mind that GST (VAT) should be used only for generating revenue." The VAT does not perform particularly well in achieving other tax objectives (Bird and Gendron, 2007), but "purely from a revenue point of view, VAT is probably the best tax ever invented" (Cnossen, 1990:5).

The other tax objectives mentioned by Bird and Gendron (2007) could typically include objectives of increasing the demand for merit goods, addressing the burden

distribution of a VAT or providing special treatment for political interest groups. Selective consumption taxes such as excise duties can be implemented to alter behaviour and internalise external costs to society and import duties can provide protection to local producers. The burden distribution of taxes is also generally better addressed by the income tax.

Bird and Gendron (2007) argue that in stepping away from revenue objectives to achieve other tax objectives through a VAT (that could be better addressed with other tax or non-tax instruments), many countries have transformed their VAT into a much more complex, difficult to administer tax that facilitates evasion and corruption. Attempting to achieve these "other tax objectives" has also been shown to make administration of and compliance with a VAT more expensive (Agha and Haughton, 1996).

The revenue performance of a VAT, used as a proxy for the extent that a VAT is aimed towards revenue, is influenced by what Keen (2013) refers to as the "VAT gap", consisting of a policy gap and a compliance gap. The "gap" for this measure is an indication of the extent that policy (structure) or compliance causes VAT revenue to be less than it could be if perfectly enforced at a uniform rate on all consumption (Keen, 2013).[68] The policy gap increases by introducing policy that decreases the tax base, meaning the extent that the economic base, consumption, is taxed. The compliance gap increases as compliance to the VAT decreases.

In considering the revenue performance of a VAT system, a general indicative measure of the VAT gap is given by a ratio of actual VAT revenue generated to the Gross Domestic Product (GDP) multiplied by the standard VAT rate of a country (an indication as maximum potential VAT revenue). The GDP of a country is therefore used as an indication of the possible taxable base of goods and services for the purposes of a consumption tax.[69] This measure is generally referred to as the efficiency ratio or productivity ratio and provides a basis for comparisons of the performance of VAT systems between or among countries (Ebrill *et al*., 2001).

In interpreting the efficiency ratio of a country, a ratio of 1 means that all production is taxed under the VAT (although only when consumed) and the VAT is fully

[68] Compliance will be dependent upon, amongst others, the capacity and effectiveness of tax administration.
[69] Recent studies rather make use of consumption as an indication of the base of the tax. Such an analysis follows.

complied with. A ratio of less than one means that the full base is not taxed, or is indeed taxed, but the tax is not complied with. “A low ratio, in particular, is typically taken as *prima facie* evidence of erosion, either by exemption and reduced rates within the tax law or by imperfect enforcement” (Ebrill *et al*., 2001:40).

The results of this estimation should however be interpreted with care, as negative features of a VAT may increase the efficiency ratio. The actual VAT revenue[70] of a country could, and is likely to, include revenue collected by taxing production or investment (this is discussed in further detail later). Furthermore, if VAT refunds are not promptly paid, this would also increase VAT revenue (Ebrill *et al*., 2001) and consequently the efficiency ratio. Yet efficiency ratios provide for some indication of VAT revenue performance. To estimate the efficiency ratio (E) of a VAT I write:

$$E \equiv \frac{V}{\tau_s \, GDP} \tag{3}$$

where V is VAT revenue and τ_s is the standard statutory rate of the VAT. Estimates for a variety of countries[71] for the years 2010 to 2012 (where sufficient data was available) are provided in Table 3. Average VAT efficiencies by income group (based upon IMF classification) are also provided.

[70] This is also applicable for the other estimations in this section that make use of actual VAT revenue generated.
[71] Note that estimates for South Africa are not provided in this section as these are provided in the following chapter.

Table 3: VAT Efficiency Ratios

Country	2010	2011	2012	Country	2010	2011	2012
High income: non-OECD	**0.43**	**0.43**	**0.42**	Mauritius	0.47	0.47	0.48
Croatia	0.50	0.49	0.49	Namibia	0.42	0.57	
Cyprus	0.60	0.55	0.51	Peru	0.35	0.35	0.35
Latvia	0.31	0.31	0.34	Romania	0.32	0.35	0.35
Malta	0.40	0.42	0.43	Serbia, Republic of	0.55	0.53	0.55
Russian Federation	0.29	0.32	0.31	St. Vincent and the Grenadines	0.50	0.48	0.48
St. Kitts and Nevis		0.45	0.43	Suriname	0.07	0.07	0.06
Uruguay	0.46	0.45	0.45	Thailand	0.55	0.59	0.64
High income: OECD	**0.37**	**0.37**	**0.36**	Tunisia	0.36	0.36	
Australia	0.34	0.33	0.33	Turkey	0.32	0.34	0.32
Austria	0.39	0.39	0.39	**Lower middle income**	**0.38**	**0.39**	**0.41**
Belgium	0.33	0.33	0.33	Armenia, Republic of	0.43	0.43	0.46
Chile	0.39	0.40	0.39	Cabo Verde	0.48	0.52	
Czech Republic	0.33	0.33	0.34	Cote d'Ivoire	0.08	0.05	0.09
Denmark	0.39	0.40	0.40	El Salvador	0.51	0.52	0.59
Finland	0.38	0.39	0.39	Georgia	0.59	0.64	0.65
France	0.35	0.35	0.35	Ghana	0.27	0.31	
Germany	0.38	0.38	0.38	Guatemala	0.42	0.43	0.44
Greece	0.38	0.31	0.30	Honduras	0.36	0.38	0.37
Iceland	0.31	0.32	0.33	Indonesia	0.34	0.36	0.39
Ireland	0.29	0.27	0.25	Kyrgyz Republic	0.33	0.36	0.42
Israel	0.47	0.47	0.46	Lesotho	0.57	0.54	0.61
Italy	0.31	0.31	0.28	Moldova	0.64	0.64	0.60
Japan	0.53	0.54	0.54	Morocco	0.43	0.45	0.45
Luxembourg	0.42	0.44	0.47	Nicaragua	0.38	0.40	0.41
Netherlands	0.38	0.36	0.36	Nigeria	0.03	0.03	0.03
Norway	0.32	0.31	0.31	Paraguay	0.62	0.62	0.62
Poland	0.35	0.35	0.32	Philippines	0.16	0.16	0.18
Portugal	0.37	0.34	0.35	Sri Lanka	0.33	0.27	0.25
Slovenia	0.40	0.40	0.40	Ukraine	0.40	0.50	0.49
Spain	0.35	0.29	0.30	Zambia	0.23	0.25	
Sweden	0.36	0.36	0.36	**Low income**	**0.27**	**0.29**	**0.31**
Switzerland	0.45	0.43		Bangladesh	0.22	0.24	
United Kingdom	0.34	0.34	0.34	Benin	0.39	0.38	0.38
Upper middle income	**0.39**	**0.40**	**0.41**	Burkina Faso	0.29	0.33	0.37

Country	2010	2011	2012	Country	2010	2011	2012
Albania	0.47	0.46	0.45	Burundi	0.29	0.32	0.29
Algeria	0.22	0.20		Cambodia	0.35	0.36	0.41
Azerbaijan, Republic of	0.28	0.24	0.25	Ethiopia	0.05	0.13	
Belarus	0.49	0.45	0.43	Madagascar	0.07	0.07	
Botswana	0.41	0.39	0.42	Malawi	0.22	0.27	0.25
Bulgaria	0.44	0.44	0.46	Mali	0.31	0.34	0.30
China, P.R.: Mainland	0.34	0.34		Mozambique	0.44	0.47	
Colombia	0.33	0.33	0.32	Nepal	0.35	0.35	0.36
Dominica	0.64	0.60	0.62	Rwanda	0.22	0.23	
Dominican Republic	0.24	0.23		Sierra Leone	0.16	0.19	0.15
Grenada	0.45	0.51	0.47	Tanzania	0.28	0.29	0.28
Hungary	0.34	0.33	0.34	Togo	0.38	0.43	0.44
Macedonia	0.48	0.51	0.47	Uganda	0.21	0.22	0.21

Source: Own estimates, VAT revenue and GDP data obtained from Government Financial Statistics (IMF database), VAT rates obtained from OECD (2014); European Commission (2015) and Deloitte (2015).

From Table 3 it appears that the VAT does not seem to perform well in most countries considering their VAT efficiency ratios. When considered against maximum potential VAT revenue based upon GDP, the average efficiency ratio for sixty two percent of the countries in the sample is less than 0.5. This suggests that for the majority of countries in the sample, at least half of possible revenues are foregone due to not including all goods and services produced in the tax base, coupled with less than ideal[72] compliance. In ninety five percent of countries the efficiency ratio is less than 0.6. High income non-OECD countries on average performed the best, although there is little difference between these countries and high income OECD, upper middle income and lower middle income countries. Low income countries on average performed worse than other income groups, suggesting that either the policy gap, compliance gap or both is greater in these poorer countries.

Rather than efficiency ratios, C-efficiency measures are by far the most used tool in the literature for evaluating the revenue performance of VAT systems (Barbone *et al*., 2013). This is due to VAT not being designed as a tax upon production as indicated by GDP in the efficiency ratio, but rather consumption as included in C-efficiency measures (Ebrill *et al*., 2001).

[72] "Ideal" in this sense means full compliance with the tax by all taxpayers.

From the initial efficiency ratio, Ebrill *et al*., (2001) developed the C-efficiency performance measure (also later referred to by the OECD as the VAT Revenue Ratio). The C-efficiency provides a ratio of actual VAT revenue generated to consumption (excluding VAT) multiplied by the standard VAT rate of a country (an indication of maximum potential VAT revenue). C-efficiency therefore compares the actual VAT revenue generated to the amount of revenue that could be raised if a VAT is levied at a single rate upon all consumption (implying that all goods and services are taxed at the standard rate of VAT and that the VAT is ideally complied with).

In estimating the C-efficiency, it should be decided whether consumption should include private and public consumption, or only private consumption. Although C-efficiency is often only measured in terms of private consumption, for the purposes of my estimations I include both private and public consumption. This is done as some revenue is generated by public consumption and it is also argued later in this chapter that most of government consumption should fall into the tax base for VAT purposes.

C-efficiency (E_c) of a VAT can be calculated as follows:

$$E_c \equiv \frac{V}{\tau_s C} \tag{4}$$

where V and τ_s are as before and C is final consumption expenditure (including public expenditure, excluding VAT levied). My estimations of C-efficiency for a variety of countries for the years 2010 to 2012 (where sufficient data was available) are provided in Table 4. Average C-efficiencies by income group (based upon IMF classification) are also provided. Similar to the efficiency measure, a C-efficiency of 1 could be interpreted to mean that all consumption is taxed under the VAT and the VAT is ideally complied with.

Table 4: VAT C-Efficiency ratios

Country	2010	2011	2012	Country	2010	2011	2012
High income: non-OECD	**0.60**	**0.59**	**0.59**	Macedonia, FYR	0.57	0.61	0.55
Croatia	0.74	0.72	0.72	Mauritius	0.58	0.59	0.60
Cyprus	0.77	0.69	0.65	Namibia	0.50	0.72	
Latvia	0.41	0.41	0.48	Peru	0.54	0.55	0.54
Malta	0.56	0.58	0.58	Romania	0.44	0.51	0.49
Russian Federation	0.46	0.52	0.50	Serbia, Republic of	0.62	0.62	0.64
St. Kitts and Nevis		0.57	0.55	St. Vincent and the Grenadines	0.51	0.49	0.47
Uruguay	0.65	0.64	0.65	Thailand	0.87	0.93	0.99
High income: OECD	**0.55**	**0.55**	**0.54**	Turkey	0.40	0.43	0.41
Australia	0.50	0.49	0.47	**Lower middle income**	**0.45**	**0.47**	**0.48**
Austria	0.59	0.59	0.60	Armenia, Republic of	0.50	0.49	0.50
Belgium	0.47	0.47	0.47	Cabo Verde	0.65	0.71	
Chile	0.61	0.61	0.57	Cote d'Ivoire	0.10	0.06	0.11
Czech Republic	0.53	0.54	0.54	El Salvador	0.53	0.53	0.61
Denmark	0.58	0.59	0.59	Georgia	0.69	0.79	0.83
Finland	0.53	0.54	0.54	Ghana	0.32	0.42	
France	0.46	0.47	0.46	Guatemala	0.46	0.48	0.48
Germany	0.54	0.55	0.55	Honduras	0.39	0.43	0.42
Greece	0.45	0.36	0.36	Indonesia	0.54	0.59	0.65
Iceland	0.45	0.46	0.47	Kyrgyz Republic	0.34	0.38	0.39
Ireland	0.48	0.46	0.45	Lesotho	0.43	0.42	0.48
Israel	0.65	0.65	0.64	Moldova	0.62	0.61	0.58
Italy	0.41	0.41	0.38	Morocco	0.65	0.66	0.64
Japan	0.69	0.69	0.69	Nicaragua	0.43	0.46	0.47
Luxembourg	0.98	1.04	1.10	Nigeria	0.04	0.04	0.04
Netherlands	0.57	0.55	0.54	Paraguay	0.84	0.81	0.79
Norway	0.56	0.56	0.57	Philippines	0.20	0.19	0.22
Poland	0.48	0.49	0.44	Sri Lanka	0.43	0.34	0.32
Portugal	0.47	0.44	0.46	Ukraine	0.52	0.66	0.63
Slovenia	0.58	0.58	0.57	Zambia	0.36	0.37	
Spain	0.47	0.39	0.41	**Low income**	**0.30**	**0.33**	**0.36**
Sweden	0.58	0.58	0.56	Bangladesh	0.29	0.32	
Switzerland	0.72	0.71		Benin	0.46	0.46	0.46
United Kingdom	0.43	0.43	0.43	Burkina Faso	0.38	0.42	0.48
Upper middle income	**0.58**	**0.59**	**0.60**	Burundi	0.31	0.36	0.33

Country	2010	2011	2012	Country	2010	2011	2012
Albania	0.60	0.62		Ethiopia	0.06	0.14	
Algeria	0.46	0.42		Madagascar	0.07	0.07	
Azerbaijan, Republic of	0.61	0.56	0.54	Malawi	0.22	0.26	0.25
Belarus	0.80	0.85	0.82	Mali	0.36	0.43	0.36
Botswana	0.70	0.64	0.62	Mozambique	0.53	0.55	
Bulgaria	0.63	0.63	0.63	Nepal	0.41	0.42	0.41
China, P.R.: Mainland	0.81	0.80		Rwanda	0.23	0.25	
Colombia	0.44	0.45	0.44	Sierra Leone	0.18	0.20	0.20
Dominica	0.72	0.72	0.81	Tanzania	0.38	0.38	0.36
Dominican Republic	0.26	0.26		Togo	0.42	0.45	0.48
Grenada	0.47	0.52	0.47	Uganda	0.25	0.25	0.24
Hungary	0.52	0.52	0.52				

Source: Own estimates, VAT revenue and final consumption data obtained from Government Financial Statistics (IMF database), VAT rates obtained from OECD (2014); European Commission (2015) and Deloitte (2015).

It is evident from Table 4 that countries perform better when their VAT performance is considered against consumption as opposed to GDP. From the sample in Table 4, fifty two percent of countries have an average C-efficiency of less than 0.5, suggesting that half of maximum potential VAT revenues are foregone, due to not all consumption being taxed and the VAT not being ideally complied with. Only six percent of countries have an average C-efficiency greater than 0.8, suggesting that at least eighty percent of maximum potential VAT revenue is collected. High income and upper income countries' C-efficiency is fairly similar on average, while lower income groups have on average lower C-efficiencies.

Another measure that is less often used as a VAT performance measurement is buoyancy. VAT buoyancy refers to the ratio between real growth in VAT revenue to the real growth in GDP per annum. This measure provides an indication of the extent that the VAT revenues keep up with the growth of the economy of a country (Shome, 1988). Generally, it would be regarded as satisfactory if the VAT revenue of a country grows at least to the same extent as the economy, meaning a VAT buoyancy ratio of 1 or higher (Shome, 1988).

VAT buoyancy[73] can be calculated as follows:

[73] It should be noted that tax buoyancy measures generally do not control for changes in the structure of the VAT or changes in compliance to the VAT. It is therefore only useful as an indication of growth in VAT revenues and not the cause of this growth.

$$\ln(VR_i) = c + \ln(GDP_i) \quad (5)$$

where VR is the VAT revenue for every i country. The coefficients of GDP would therefore indicate the percentage growth in VAT revenues for every one percent change in GDP (the log 10 form of VR and GDP allows for this interpretation). Table 5 provides the GDP coefficients (where sufficient data was available) based upon data from 2002 to 2012.

Table 5: VAT buoyancy measured in terms of GDP

Country	VAT Buoyancy	Country	VAT Buoyancy	Country	VAT Buoyancy
Albania	1.57**	Fiji	0.38	Norway	0.83**
Algeria	1.13**	Georgia	1.72**	Paraguay	1.52**
Argentina	2.32**	Ghana	1.07**	Peru	1.23**
Armenia, Republic of	1.55**	Guatemala	0.95**	Philippines	1.25**
Azerbaijan, Republic of	0.4	Honduras	1.11**	Poland	1.35**
Bangladesh	1.19**	Hungary	1.1**	Romania	1.1**
Barbados	1.25**	Iceland	0.69**	Russian Federation	0.85**
Belarus	1.03**	Indonesia	2.13**	Rwanda	0.75*
Benin	1.12**	Israel	0.88**	Senegal	1.19
Bolivia	1.19**	Japan	0.15	Serbia, Republic of	0.81**
Botswana	1.23**	Kazakhstan	0.77**	Seychelles	0.83**
Brazil	1.21**	Kenya	1.15**	Sri Lanka	1.02**
Bulgaria	1.07**	Korea, Republic of	0.92**	Suriname	1.7
Burkina Faso	1.42**	Kyrgyz Republic	0.88**	Sweden	0.9**
Burundi	1.02**	Latvia	1.05**	Switzerland	1.3**
Cabo Verde	0.94**	Lebanon	1.16**	Tanzania	1.07**
Cambodia	1.37**	Lesotho	1.06**	Thailand	1.28**
Canada	0.56	Lithuania	1.17**	Togo	1.51**
Chile	0.92**	Macedonia, FYR	0.95**	Trinidad and Tobago	1.03**
China, P.R.: Mainland	0.77**	Madagascar	0.8**	Tunisia	1.01**
Colombia	1.09**	Malawi	1.12**	Turkey	1.22**
Congo, Republic of	0.43**	Mali	0.89**	Uganda	1.06**
Cote d'Ivoire	1**	Moldova	1.23**	Ukraine	1.39**

Country	VAT Buoyancy	Country	VAT Buoyancy	Country	VAT Buoyancy
Croatia	0.9**	Mongolia	1.1**	United Kingdom	1.05**
Czech Republic	1.37**	Morocco	1.9**	Uruguay	1.23**
Denmark	1.13**	Namibia	1.38**	Vietnam	1.62**
Dominican Republic	1.18**	New Zealand	1.32**	Zambia	0.83**
El Salvador	1.4**	Nicaragua	0.94**		
Ethiopia	1.1**	Nigeria	0.78**		

Source: Own estimates, VAT revenue and GDP data obtained from Government Financial Statistics (IMF database). ** = p<0.05; * = p<0.1.

From Table 5 it is evident that VAT buoyancy is positive for all countries in the sample, meaning that VAT revenues are estimated to grow as GDP increases. Sixty four percent of countries have a VAT buoyancy greater than one, meaning for every one percent increase in GDP, VAT revenue is estimated to increase by more than one percent. For thirty six percent of countries VAT revenues are estimated to increase at a lower rate than GDP growth.

Similar to the efficiency – C-efficiency arguments made above, it could be argued that the growth in VAT should be aligned with the growth in consumption of a country (a better indication of the tax base). This would provide an indication of whether, over a period of time, the base of the VAT has been kept intact[74] and the tax has been satisfactorily complied with. A VAT buoyancy of one could be interpreted, with caution, to mean that the base and compliance to the tax remained the same over a period of time. To achieve plausible results and to avoid a near singular matrix the following notation is used:

$$\ln(VR_i) = c + Year \quad (6)$$

$$\ln(Con_i) = c + Year \quad (7)$$

where VR is as before for every i country, $Year$ is the year from 2002 to 2012 and Con is consumption expenditure. The coefficient of $Year$ in Equation (6) would, therefore, represent the percentage growth of VAT revenue and the coefficients of $Year$ in Equation (7) would represent the percentage growth in consumption. VAT buoyancy measured against consumption is obtained by dividing the growth in VAT

[74] The rather unlikely case of a decrease in the VAT rate can also result in a decreased VAT buoyancy measure. An increase in the VAT rate will similarly result in an increase of the VAT buoyancy measure.

revenue by the growth in consumption. These estimates are provided in Table 6 (where sufficient data was available).

Table 6: VAT Buoyancy measured against consumption

Country	VAT Buoyancy	Country	VAT Buoyancy	Country	VAT Buoyancy
Albania	1.4**	Finland	0.88**	Nicaragua	1.02**
Algeria	1.18**	France	0.82*	Nigeria	0.9**
Argentina	2.16**	Georgia	1.47**	Norway	0.96**
Armenia, Republic of	1.38**	Germany	2.06**	Paraguay	1.21**
Austria	1.04**	Ghana	1.73**	Peru	1.42**
Azerbaijan, Republic of	0.26	Guatemala	0.91**	Philippines	1.26**
Bangladesh	1.17**	Honduras	0.99**	Poland	1.49**
Barbados	1.39**	Hungary	1.34**	Portugal	1.03*
Belarus	1.13**	Iceland	0.72**	Romania	1.21**
Belgium	1**	Indonesia	2.7**	Russian Federation	0.85**
Benin	1.11**	Iran, Islamic Republic o	10.3**	Rwanda	0.57
Bolivia	1.43**	Israel	0.93**	Senegal	0.99
Botswana	0.99**	Italy	0.95*	Serbia, Republic of	0.49*
Brazil	1.26**	Japan	7.6	Seychelles	4.12**
Bulgaria	1.19**	Kazakhstan	0.82**	Spain	0.43
Burkina Faso	1.87**	Kenya	1.13**	Sri Lanka	0.68**
Burundi	1.1*	Korea, Republic of	0.95**	Suriname	0.51**
Cabo Verde	1.27**	Kyrgyz Republic	0.84**	Sweden	1.28**
Cambodia	1.35**	Latvia	1.01**	Switzerland	1.12
Canada	0.66	Lebanon	1.21**	Tanzania	1.19**
Chile	0.92**	Lesotho	1.22**	Thailand	1.26**
China, P.R.: Mainland	0.88**	Lithuania	1.2**	Togo	1.84**
Colombia	1.21**	Luxembourg	1.8**	Trinidad and Tobago	1.03**
Congo, Republic of	0.7**	Macedonia, FYR	0.92**	Tunisia	0.94**
Cote d'Ivoire	0.9*	Madagascar	0.79**	Turkey	0.93**
Croatia	0.92**	Malawi	0.99**	Uganda	1.07**
Czech Republic	1.26**	Mali	0.84**	Ukraine	1.25**

Country	VAT Buoyancy	Country	VAT Buoyancy	Country	VAT Buoyancy
Denmark	0.9**	Moldova	1.11**	United Kingdom	1**
Dominican Republic	0.87**	Mongolia	1.26**	Uruguay	1.28**
El Salvador	1.22**	Morocco	1.85**	Vietnam	1.27**
Equatorial Guinea	1.43*	Namibia	1.3**	Zambia	0.94**
Ethiopia	1.24**	Netherlands	0.95**		
Fiji	1.99	New Zealand	1.52**		

Source: Own estimates, VAT revenue and consumption data obtained from Government Financial Statistics (IMF database). ** = p<0.05; * = p<0.1.

When considering VAT buoyancy measured against consumption (refer to Table 6), all countries' VAT buoyancy is positive, indicating that VAT revenues increase when consumption increases. Fifty nine percent of the countries in the sample have a VAT buoyancy rate greater than one. For these countries' it is estimated that a one percent increase in consumption will give rise to a more than one percent increase in VAT revenues. Again, all countries' VAT buoyancy is positive, indicating that VAT revenues increase when consumption increases. The percentage of countries (41%) with a VAT buoyancy below one is however concerning - albeit a limited sample. It is likely that for these countries the base of the tax has eroded and/or tax compliance has decreased over the data period (2002-2012).[75]

From the estimations of revenue performance provided above, it appears that the VATs found in most countries do not provide as much revenue as they potentially could. It could be argued that this is due to less than ideal compliance, but as a self-assessment tax, a well-designed and administered VAT has proven to provide for a satisfactory level of compliance (Agha and Haughton, 1996; Duverne, 1990; Grandcolas, 2008). It is therefore likely that some structural features of these VATs are decreasing their revenue performance. These features can therefore be argued as not being aimed towards revenue and thus step away from the first canon[76] of taxation.

However, stepping away from the first canon of taxation is not always undesirable. As is discussed in much of the remainder of this chapter, a VAT that only adheres to the first canon of taxation is unlikely to be a good VAT. For some structural features

[75] It is also possible, although unlikely, that the VAT rate decreased during the data period.
[76] Taxes should produce revenue for government expenditure.

of the VAT, experts agree that greater weight should be given to the other canons of taxation.

Of course, there are also instances where stepping away from the first canon of taxation is undesirable. This could be as a result of structural features that give greater weight to the other canons of taxation, when experts agree that the first canon of taxation should be preferred. In some cases it may be that the underlying form of a bad tax (this is not discussed in this study, but canons such as political influence and creating opportunity for corruption may be included) is given greater weight than the first canon of taxation.

The remainder of this chapter is therefore concerned with the structural features of a VAT for which other canons of taxation (besides the first canon) should be preferred, and structural features for which the first canon of taxation should be preferred, but is generally not.

2.2.3.2 Tax consumption, not production

It would appear that in 1771, Verri already had concerns regarding the effect that taxes could have upon the economy when he wrote that taxes should not interfere between a seller and a buyer (Jones, 1914). In addition, one of the key features of the VAT envisioned by Von Siemens and Adams is that it would, as far as possible, not tax production (Adams, 1921; James, 2011). The VAT was therefore designed by Maurice Lauré as a tax upon consumption, but is levied at multiple stages of production. This design also aligns with the Diamond-Mirrlees (1971) Production Efficiency Theorem.

Excluding the production sector from the base of the VAT provides for a tax that is highly neutral when considering producer and consumer choices, with the amount of tax not influenced by the number of stages that the good passed through before reaching the consumer (Cnossen, 2009). The tax is further neutral between capital- and labour-intensive methods of production (Cnossen, 2009).

This structural feature requires suppliers[77] to charge VAT (so-called “output VAT” or “output tax”) upon all their sales (this amount of tax is paid to the supplier by the buyer) and also allows a deduction to suppliers of the VAT that has been charged

[77] The word supplier is used in this and the following sections, as this is the law term often used. The economic term will be producer.

upon their inputs (so-called “input VAT” or “input tax”). The final consumer of the goods or services however is not entitled to a deduction, allowing the tax to fall upon consumption. Table 7 illustrates this process:

Table 7: Workings of a VAT (assumed at a standard rate of 10 percent)

Production – Distribution Chain	Purchases incl. VAT ($)	Sales incl. VAT ($)	VAT deduction ($)	VAT charged ($)	Net VAT ($)
Producer	0	100	0	10	10
Manufacturer	100	300	10	30	30
Retailer	300	500	30	50	50
Consumer	500	0	0	0	50

From Table 7 it is evident that the total amount of value added in the entire production and distribution chain is $500 and the tax collected is equal to $50. Furthermore, as a tax deduction is allowed to all suppliers of the good, the incidence of the tax falls only upon the consumer who pays $500 to the retailer, of which $50 is VAT. This shows the important feature of the tax of not violating production efficiency, allowing the economy to be on its production possibility frontier (Diamond and Mirrlees, 1971).

It should be mentioned that in practice, the consumer’s incidence of a VAT would unlikely be $50 as suggested by Table 7. Table 7 shows the statutory incidence, but the economic (true) incidence of the VAT is not only determined by the structure of the tax, but by market circumstances such as the price elasticity of supply and demand of the goods or services supplied and competition between suppliers. Since the tax charged between VAT vendors is refunded, this feature of the VAT does not distort producer prices (buying and selling from each other) (Ebrill *et al*., 2001). When selling to final consumers (who will not be permitted an input VAT) the mentioned market circumstances may well affect the incidence of the VAT to partly shift towards the supplier (distorting consumer prices).[78] This means that although there is some economical concern, the structural feature of allowing input VAT to

[78] As mentioned by Mirrlees (2010), there is little hard evidence of the extent of this shift in incidence to supplier with current evidence indicating that the incidence is fully upon the consumer (does not shift to the supplier).

producers makes the VAT more economical and neutral (the second and fourth canon of taxation).[79]

Producer and consumer prices will however be distorted if the VAT is not applied consistently to all goods and services, or when an input tax deduction to suppliers is denied.[80] Not allowing a tax deduction to suppliers would result in a tax incidence shift[81] towards production and this requires specific emphasis. Besides the seemingly obvious that a consumption tax should tax consumption, if the tax falls upon intermediate production inputs, it is most likely that a cascading effect (as buyers would include the tax expense in their selling price) would result in a distortion of both input decisions and consumer decisions. This would in turn result in a reduction in market efficiency, production efficiency and ultimately economic efficiency (Diamond and Mirrlees, 1971). The possible vertical integration of VAT vendors, so as to avoid the cascaded tax by producing the inputs upon which these taxes fall themselves, may also reduce production efficiency.

In some instances a tax deduction to suppliers is denied upon investment goods, resulting in either a “product-type” VAT or an “income-type” VAT. Under a “product-type” VAT a deduction of investment goods is denied, meaning that the base of the VAT is both consumption and gross investments. Under an “income-type” VAT a deduction is allowed, but only upon the depreciated part of the investment goods, meaning that the base of the VAT is consumption and net investments (Shoup, 1990). It is also possible that a country imposes administrative restrictions where a deduction upon investment goods is carried forward to be set off against future tax charges with the result similar to an “income-type” VAT. Both of these types of VAT will distort producer decisions, as less capital intensive production methods will be preferred (Diamond and Mirrlees, 1971).

More commonly, a deduction is denied to suppliers where it is generally difficult to determine whether the goods or services purchased are for productive consumption or consumption purposes. These supplies would typically include entertainment and

[79] This is of course at the cost of some revenue that would have been collected on the supplies between producers.
[80] This essentially means that decreasing the neutrality of the VAT in this manner will result in a decrease in the economy of the VAT.
[81] This is both statutory and economic incidence, although there is little evidence of the extent of the economic incidence shift.

motor vehicles, but some other supplies can also be included (Schenk and Oldman, 2007). The denial of deductions upon these supplies could in some cases ensure that consumption is correctly taxed (e.g. where a motor vehicle is used by the director of a motor dealership for personal use), but in some cases may incorrectly tax production (e.g. where only clients are entertained towards obtaining supplier contracts). A difficult decision is to be taken between optimising revenue and influencing the economy and neutrality of the tax. This decision has, to the best of my knowledge, not been considered empirically.[82]

Excluding the production sector comes at a cost of revenue, but it appears that experts (and countries which transformed their turnover taxes to VATs) agree that for this structural feature, the second canon (taxes should be economical) and the fourth canon (taxes should be neutral) should be given greater weight than the first canon of taxation (taxes should produce revenue). Although this suffices as a general rule, there are some instances where experts agree that other canons of taxation should be given a greater weight than revenue, economy and neutrality. This means that there are instances where experts agree that production should be taxed. These instances are discussed in the next section.[83] The extent that countries VATs are aligned with the structural features discussed in this section, as well as the next section, are provided in the next section.

2.2.3.3 Apply to the broadest base possible

“The defining characteristic of a VAT is that it is, in principle … a broad based tax on all commodity sales” (Keen, 2006: 863).

As discussed in the previous section, a VAT should as a general rule not tax production. On the other hand, “[a] ‘good’ VAT should tax the broadest possible range of goods and services” which are consumed (Cnossen, 1998:403). This aligns with the principle that taxes should be as broad as possible at lower rates (OECD, 2010). The word “possible” is perhaps arbitrary and for the purposes of this section can rather be replaced with “recommended by experts”.[84]This section is therefore concerned with providing motivation to why the tax base of the VAT should be as

[82] I also was not able to find any theoretical consideration of this decision.
[83] The next section is also concerned with instances in which both production and consumption are not taxed.
[84] It would perhaps be better if it were replaced with “based upon empirical evidence”, but for some of the recommendations of experts, there exists very little (direct) empirical evidence.

close as possible to the economic base of consumption and also to identify instances where this should not be the case.

There are two structural features that exclude certain consumption (economic base) from the tax base of the VAT. The first is exemptions. In the case of an exemption, no output tax is levied by the supplier of the goods or services and input tax is also denied, meaning that the incidence of the tax is carried by the supplier (and potentially shifted towards other suppliers and ultimately the consumer). This means that exemptions cause the VAT to tax production (at least statutorily), resulting in a VAT with a tax base of both the economic bases of consumption and production.

The second is by zero rating the supply of goods and services. In the case of a zero rate, output tax is levied at nil percent by the supplier, but an input tax is allowed to the supplier, meaning the incidence of the VAT falls upon no-one. This means that a VAT with only zero-rated supplies and standard-rated supplies (but no exemptions), will only tax the economic base of consumption, but not the entire economic base. Zero rating can also be distinguished between non-export zero rating and export zero rating under the destination principle (discussed in section 2.2.3.3.2).

Both exemptions and zero ratings will have a number of undesired effects that go against the canons of taxation. These are considered next.

2.2.3.3.1 The effects of exemptions and zero ratings

2.2.3.3.1.1 A change in revenue

In the case where a certain supply of goods or services is zero-rated, a decrease in revenue can be expected, stepping away from the first canon of taxation. A VAT vendor will be allowed an input tax credit without collecting an amount of output tax (as a result of the zero percent rate) upon the relevant supply, meaning that any VAT consequences are theoretically removed from the transaction. In the case of exempting the supply of goods or services, an estimation of the base and revenue becomes complicated (MacKenzie, 1991), but some guidelines do exist.

The revenue consequences of a break of the VAT chain due to the exemption of a supply of goods or services is dependent upon where in the supply chain the break occurs (Ebrill *et al*., 2001). In the case where the supply of goods or services to the consumer is exempt, the tax upon the value added in this final stage is lost, resulting in an overall decrease of tax revenue. In the case where the supply of goods or

services is exempt at an earlier stage in the supply chain, the disallowed input credit upon the exempt supply will likely be shifted towards the purchaser of the exempt supply. VAT would therefore be collected upon the value added in the supply chain up to the exempt supplier, and also from the exempt supplier to the final consumer. As the VAT vendor making the exempt supply would attempt to recoup the disallowed input credit by increasing the sales price of the exempt supply, this could result in tax cascading (VAT on VAT).[85]

In the case of exported goods, an exemption in the production chain before exportation would compromise the destination principle (discussed later), as some revenues are attributed to the country of production and can therefore be seen as a "tax on exporters" (Cnossen and Gendron, 2012:3).

To avoid the additional tax burden that arises as a result of disallowing an input credit upon the purchase of an exempt supply (and thereby have a more competitively priced product), VAT vendors would have an incentive to vertically integrate (Cnossen and Gendron, 2012). The self-supply of goods by means of vertical integration can be expected to reduce revenue (Ebrill *et al*., 2001). The amount of tax that would have been shifted towards the final consumer price would effectively be lost, meaning that the total value added in the production chain would decrease.

2.2.3.3.1.2 Reduce the economy and neutrality of the VAT

Both non-export zero rating and exemption will decrease the economy and neutrality of the VAT. In the case of non-export zero-rated supplies, these supplies do not include VAT and non-registered suppliers (who are unable to claim input tax) will be incentivised to use zero-rated inputs.[86] Similarly, consumer decisions[87] are influenced, potentially[88] distorting demand and consequently supply between non-

[85] This could mean an increase in revenue, but at an economic and neutrality cost.
[86] Zero-rated supplies between producers do not result in a reduction of the economy and neutrality of the VAT. Although not discussed in this section, zero rating supplies between producers can be beneficial to increasing the efficiency of the VAT. A cash flow benefit will be obtained by the buyer of these zero-rated goods and this approach, when supplies are between registered vendors, can be recommended. A common zero rating of this nature is the zero rating of a business supplied as a going concern. General zero rating of goods or services that can be purchased by registered or non-registered purchasers or consumers is however not recommended.
[87] It should be mentioned that for welfare reasons this may be an attractive feature of the VAT.
[88] This will largely depend upon the rate of tax and the price elasticity of the goods.

export zero-rated and standard-rated supplies.[89]Distorting consumption choices may also decrease labour incentives, stepping away from an optimal income tax (Atkinson and Stiglitz, 1976).[90]

The disallowance of an input credit in the case of an exempt supply will also reduce the economy and neutrality of the VAT, as producers may be induced to purchase other inputs (Ebrill *et al*., 2001). These changes in production can have an effect upon not only the production efficiency of the VAT vendor opting for other (possibly less ideal) inputs, but also upon VAT vendors in other sectors that utilise the originally produced good. This may in turn put pressure upon government to introduce additional exemptions. One exemption may therefore lead to more exemptions. This is referred to as "exemption creep" (Ebrill *et al*., 2001:89).

2.2.3.3.1.3 Decrease in efficiency and certainty of the VAT

Both zero ratings and exemptions will contribute to an increase in the compliance and administrative burden of the VAT, meaning a less efficient tax (the third canon of taxation). This is as a result of the compliance and administrative burden that arises from differentiating between different tax treatments for different supplies (Crawford *et al*., 2010). In general, zero ratings and exemptions can also cause the VAT to be less certain, as these "exceptions to the rule"[91] can in some instances result in complex laws.

Exemptions also provide for an input credit compliance burden to partially exempt vendors. As previously mentioned, one structural feature of a good VAT is that a VAT vendor would be entitled to an input credit in the case that the goods or services purchased would contribute to an output tax[92] being charged upon a supply (meaning productive consumption). A compliance burden, however, arises when a single input contributes to both exempt supplies and supplies upon which output tax

[89] It should be noted that these distortions, as a result of the difference between the prices of supplies, may well be worst when a supply is zero-rated, compared to when it is exempted. This is as a result of at least some VAT (although shifted and not directly observable) being included for exempt supplies (while no VAT is included for zero-rated supplies).
[90] Although the discussion of optimal income tax theory is not within the scope of this study, this is an important point for the purposes of this study. This is one of the reasons why goods and services should be taxed at a single rate (assuming a well-functioning income tax exists). The disincentives created under optimal income tax theory are minimised when goods and services are taxed at a uniform rate.
[91] The rule here is that all consumption should be included in the base of the VAT.
[92] It should be kept in mind that since zero-rated supplies are taxed at 0%, they are also considered to be supplies upon which output tax is levied.

is charged (e.g. commercial accommodation is a typical input of this nature). In most cases, VAT vendors would be expected to accurately determine to what extent they made taxable supplies and the input tax would only be allowed to such an extent. This provides for both a compliance burden for VAT vendors and an administrative burden in auditing these calculations for revenue services. Besides these efficiency costs, this also decreases the certainty of the VAT (the seventh canon of taxation).

From the above it appears that zero ratings and exemptions go against the first, second, third, fourth and seventh canon of taxation.[93] Although the negative effects of zero ratings and exemptions are known, some zero ratings are recommended by experts and some exemptions are inevitable or recommended. I first discuss the recommended zero ratings (2.2.3.3.2). This is followed by the inevitable or recommended exemptions (2.2.3.3.3). These include broad entity exemptions, economic sector exemptions and specific transaction exemptions[94] (Cnossen and Gendron, 2012).

2.2.3.3.2 Apply the destination principle

The design of a VAT in regard to international trade would adopt either the destination principle or the origin principle (see Bird and Gendron, 2007; Cnossen, 1992; Ebrill *et al*., 2001; Keen, 2006; Metcalf, 1995; OECD, 2006). Under a destination principle VAT, an input credit is allowed and an output tax is required to be levied at a zero rate on the supply of exported goods or services. Under an origin principle VAT, an input credit is allowed and an output tax is required to be levied at the standard rate on the value of the exported goods.

As the VAT is a transaction tax that aims to tax final consumption through a staged payment process, the division of revenue between producing countries under the origin principle seems out of place (OECD, 2006). As the origin principle results in a tax on production it does not adhere as well as the destination principle to the Diamond-Mirlees theorem of production efficiency (Ebrill et al., 2001). The taxing of value-added at different rates under the destination principle may also create a risk of transfer pricing abuse. Further, under an origin principle VAT the value of exported

[93] Revenue, economy, efficiency, neutrality and certainty.
[94] Broad entity exemptions will include exemptions due to a threshold required to register as a VAT vendor. Economic sector exemptions will include the exemption of certain sectors of the economy, such as the public sector. Specific transaction exemptions apply to a type or method of supply by any vendor, such as the supply of educational services.

goods and services would have to be determined to obtain the amount of value added in the exporting country. A tax invoice would have to be coupled with the exported goods or services to allow for an input credit in the importing country (Cnossen, 1992). As each jurisdiction could apply a different tax rate, the audit of these invoices would create a great compliance and administrative burden (decreasing the efficiency of the VAT). Further, as there is an incentive for exporting countries to increase the value of the goods (who receive an output) and importing countries to decrease the value of the goods (who pay an input), this may cause unnecessary tax competition.

Although the destination principle may see for a decrease in revenue for the exporting country, there are economy, efficiency and neutrality gains in applying this principle. For these reasons, the destination principle is "considered the international norm and is sanctioned by the World Trade Organisation rules" (OECD, 2012:34).

2.2.3.3.3 Inevitable or recommended exemptions

2.2.3.3.3.1 An appropriate registration threshold

Bird and Gendron (2007:3) state that "[o]ne of the most critical VAT design decisions is the level of the threshold above which VAT vendors must register". As a rule of thumb, ten percent of all VAT vendors commonly account for ninety percent of all taxable supplies for a specific country (Bird and Gendron, 2007). The first point of consideration is therefore whether the VAT compliance costs for small traders (which would negatively influence small traders' growth) and the administrative burden that would be associated with these small traders (efficiency cost) outweigh the revenue that would be obtained from registering these small traders.

For very small traders, who often contribute a net negative towards revenue,[95] it would appear to make little sense to register these traders as VAT vendors (Ebrill *et al*., 2001). As the amount of taxable supplies by small traders increase, it would at a certain point make sense to register these small traders. This will be approximately where the benefit of the potential revenue exceeds the efficiency cost related to

[95] There are potentially a number of factors that could contribute to this, for example large capital inputs for new small traders and failed businesses that claimed input VAT, but were unable to supply their goods or services at a profit.

registering these small traders. Keen and Mintz (2004) provide a model for this estimation when discussing the optimal threshold for a VAT.

The second point of consideration is the economic and neutrality cost[96] associated with not allowing small traders to register. If a small trader is not allowed to register, that trader will not be allowed to claim input VAT (and would not charge output VAT). Similar to other exemptions, the incidence of the VAT will, therefore, shift to production and decrease production efficiency (Mirrlees, 1971). A competitive advantage can be obtained by small traders by registering as VAT vendors in the case where they purchase from VAT vendors and are allowed to claim an input tax and supply to producers. Non-registered small traders may obtain a competitive advantage in the case where they purchase from non-vendors and supply to consumers (de la Feria and Krever, 2012). A viable voluntary threshold[97] could, therefore, assist in limiting economic and neutrality costs (de la Feria and Krever, 2012) but these costs should also be taken into consideration in setting the compulsory threshold. Keen and Mintz (2004) extend their model to also include these costs in setting the optimal threshold.

Using this model, Keen and Mintz (2004) show that for Canada, more than half of the small traders should be exempt from registering under the VAT (GST).[98] In some countries where administrative resources are scarce, it may be recommended that an even higher threshold is set (Cnossen, 2009), even though some information considering small businesses may be lost (de la Feria and Krever, 2012).

2.2.3.3.3.2 Exempt certain persons who are not regarded as making a supply from the definition of a VAT vendor

Besides the broad entity exemption of small traders, it is also inevitable to exempt certain persons that are generally not intended to be included in the tax base and are therefore considered as persons who are not regarded as making a supply. These

[96] There is also an equity aspect, but as noted by Keen and Mintz (2004), since it is smaller traders and therefore likely poorer individuals who are not required (or allowed) to register, this is not a concern.
[97] Such a threshold could also be of importance when considering cyclical changes in taxable supplies by small traders, meaning supplies by a small trader may exceed the compulsory threshold in one year and be below it the next (which will mean that the trader will have to deregister). It can perhaps also be mentioned that a voluntary threshold of nil may be preferred for neutrality and economy reasons. Other measures relating to an investigation of the likely success of the small traders business should however be implemented.
[98] The remaining vendors that should be registered account for around ninety percent of output.

persons are generally exempt by excluding them from the definition of a VAT vendor (also commonly referred to as an "entity" or "enterprise").

"Every wage earner provides services and could be regarded as a taxable supplier of them" (Schenk and Oldman, 2007:47). However requiring every wage earner to register for VAT (if compelled to) would likely involve significant efficiency costs for a potential decrease in revenue.[99] A further argument can also be made that the value added by wage earners will in most instances be taxed indirectly through the supplies made by their employers. For these reasons it is appropriate to exclude wage earners from the definition of a VAT vendor (Schenk and Oldman, 2007).

Private households and certain other persons who make supplies, but are not involved in economic activities should also not be included in the VAT base.[100] This however does not mean that all persons not involved in economic activities should be excluded from the definition of a VAT vendor. The meaning of "economic activities" should include VAT vendors that play intermediary roles without resulting directly in consumption, otherwise such VAT vendors would claim input tax that cannot be recovered (de la Feria and Krever, 2012).

2.2.3.3.3.3 Only exempt health and basic education in the PNC Sector

"The goods and services supplied by the sector that consists of government entities, public sector bodies, non-profit organisations, charitable organisations and similar tax-exempt bodies continue to elude the best practice under the value added tax: full taxation of goods and services supplied by the PNC Sector …" (Gendron, 2010:477).

Although most countries currently adopt a model whereby public sector bodies, non-profit organisations, charitable organisations and similar VAT-exempt bodies

[99] If the general rule of excluding production from the base of the VAT were to apply, wage earners would be entitled to an input tax deduction upon goods and services productively consumed. Wage earners will charge output VAT upon their services supplied, but as wage earners are inputs into the production process, their employers will, if registered, be allowed to claim an input VAT for these services. This means that the value added in the production process as a result of the registration of wage earners will not increase.

[100] It should be mentioned that this is a law perspective with economic activity being synonymous with production. As mentioned previously, Adam Smith used the term consumption to mean the opposite of production. It therefore stands to reason that if there is no production, there should not be consumption. It can however be argued that private households are creating utility (by for instance cooking and cleaning) and are therefore producing. From an economic perspective it is perhaps better argued that the efficiency and possible equity costs of including private households in the VAT will exceed the possible revenue obtained. From a law perspective, the issue can be partly avoided by stating that the economic activities should be continuous or regular (and this is often done), but the terms continuous and regular are arbitrary and do not necessarily exclude all activities of private households.

(referred to hereinafter as "the PNC Sector") are exempted from the VAT,[101] convincing arguments have been made towards applying the standard rate to most, if not all, goods and services supplied by this sector (refer to Cnossen and Gendron, 2012; de la Feria, 2009; de la Feria and Krever, 2012; Ebrill *et al*., 2001; Gendron, 2010).

In the case where the PNC Sector is exempted from VAT, the previous arguments against exemptions apply. Exemptions violate the logic of the VAT as a tax upon consumption. Input credits for the PNC Sector will not be allowed, resulting in a break in the VAT chain at the final stage of production. The revenue upon the value added in the final stage of production is therefore not collected. Although revenue is collected upon the value added before this "break", it is done in a "messy and inefficient way" (Cnossen and Gendron, 2012:21). This inefficiency is of particular concern where certain goods and services supplied by the PNC Sector are not exempted and an input credit calculation is required.

Economics, Copenhagen and Others (2011) also show that not allowing an input credit leads to incentives to self-supply and competitive distortions between the private and public sector for similar supplies, as the public supplier is not required to charge VAT upon these supplies. To avoid these economic and neutrality costs to the VAT, Economics, Copenhagen and Others (2011) do not recommend the popular approach of exempting the PNC Sector.

Applying the zero rate to the PNC Sector would also not be ideal. Although zero rating the PNC Sector would greatly support this sector, as input tax deductions are allowed, potentially alleviating the self-supply incentive, this approach has several drawbacks. Although production is not taxed, consumption remains untaxed. The amount of revenue collected will likely be less than under the option of exemption, as a result of allowing an input credit without an output tax being levied. The allowance of the input credit could also greatly increase the compliance and administrative costs of the VAT (decreasing efficiency) (Bird and Gendron, 2007).

Furthermore, the essential issues with regard to the PNC Sector versus the private sector, namely competitive distortion (and economy and neutrality issues paired with these distortions) are not alleviated. In some cases these distortions may be worse

[101] This is done by either excluding the PNC Sector from the definition of a VAT vendor or specifically exempting this sector.

than in the case of exemptions, as the input credit that is allowed in the case of zero rating can be expected to provide for a lower retail price than in the case of the disallowed credit in the case of exemptions. To relieve these distortions, in some cases the zero ratings may carry over to other sectors outside of the PNC Sector, further decreasing revenue.

Many experts in the field therefore recommend that a full taxation model should be applied to the PNC Sector. Applying the standard rate to the PNC Sector seems to be the "most attractive solution to eliminating the distortions caused by differential VAT treatments of public and private entities" (Economics, Copenhagen and Others, 2011:35). It is likely to reduce compliance costs and provide for significant economic gains (Cnossen and Gendron, 2012). Apart from potentially political problems, "full taxation offers many advantages and virtually no disadvantages" (de la Feria, 2009: 163).

To address these political problems it may be recommended that certain merit goods supplied by the PNC Sector are exempted. These exemptions should however be limited to health and basic education (Cnossen, 2009; Gendron, 2010). The external benefits that are associated with health and basic education often result in their being subsidized and, although the standard rate could be preferred from a theoretical point of view, it remains practically difficult to implement (Cnossen, 2009; Ebrill *et al*., 2001). The Fiscal Affairs Department of the IMF also recommends the exemption of these two supplies (Ebrill *et al*., 2001).

It should however be mentioned (perhaps as a disclaimer) that although the VAT treatment of the PNC Sector as described above is recommended, Bird and Gendron (2007:124) warn:

> "[D]eveloping and transitional countries should not try to pioneer in these areas. Exempting sectors – and thus subjecting them to VAT on their inputs – is probably about all that most such countries can or should do. To be true to VAT's internal logic[102] and introduce zero-rating may…invite administrative disaster. To follow the equally logical, but opposite, path of subjecting such sectors to the full rate would be unenforceable in most countries and might constitute political suicide."

[102] Bird and Gendron (2007) refer here to not taxing production.

2.2.3.3.3.4 Exempt hard-to-tax sectors

Although Atkinson and Stiglitz (1976) suggest that optimal taxes upon consumption are equal across all goods and services[103] and Diamond and Mirrlees (1971) suggest that production should not be taxed, some sectors under the VAT unfortunately do not allow for this treatment. For mostly practical,[104] efficiency and equity reasons (at the cost of revenue, economy, neutrality, certainty and possibly equity[105]) some sectors remain hard-to-tax. These sectors include and should be limited to immovable property, financial services and, in the case of developing countries, farmers.

Immovable property

From a theoretical point of view, immovable property used for commercial or residential purposes should be included in the VAT base – the consumption thereof is no different from clothing or food (Cnossen, 1998). In the case of immovable property used for commercial purposes (this can also be seen as production), the input credit allowed to the owner or occupier of the property allows the supplies[106] relating to these properties to be included in the tax base. The value added by the commercial immovable property can be reasonably expected to be included in the sale price of supplies and therefore sufficiently taxed (Cnossen and Gendron, 2012).

Residential[107] property can be either leased out or owner occupied. In the case where the property is leased out, the amount of the lease can be seen as consideration for the consumption of the services provided by the property[108] and

[103] This is not always the case. If a country does not have a well-functioning income tax, this approach will not be optimal.
[104] Practical in this sense means that "we know what needs to be done, but we don't know how or cannot do it (yet)".
[105] To the best of my knowledge there is no hard evidence upon the equity impact of these exemptions. The exemptions upon immovable property and financial services can in some countries result in a more regressive tax than would be the case if the standard rate applied to these supplies. This can perhaps be the case in countries where a large proportion of the consumers cannot afford these supplies.
[106] These supplies can for instance be a lease of the commercial property or produced goods or services as a result of using the commercial property.
[107] Distinguishing between residential and commercial immovable property from a legal perspective can result in compliance and administrative costs. Some immovable property such as hotels can be argued as being used for both purposes and the treatment hereof may differ between jurisdictions.
[108] This is important as it is not the immovable property itself that is consumed (the value thereof generally does not decrease), the immovable property rather produces a service which is consumed. This service can be consumed by the owner (owner occupied property) or be supplied to a person besides the owner in terms of a lease contract.

therefore be subjected to the standard rate of VAT.[109] As will be seen, this is generally not the case.

For owner-occupied property, efficiency reasons prohibit taxing the consumption of the property at the standard rate. The continuous service provided by immovable property means that for owner occupied property, an imputed rental value will have to be calculated (as an estimate of the services supplied by the property). If this approach is followed, all consumers of this service will be registered for VAT[110] and allowed an input credit upon the acquisition of the property (as the property produces the service). The consumer of the service provided by the property (the owner) will then be required to pay an output tax upon the imputed rental value. The efficiency costs with such an approach are apparent.

To avoid these costs it is suggested by Cnossen (1996, 1998), Bird and Gendron (2007) and de la Feria and Krever (2012) that the imputed residential rental value be exempted from the tax base. To not provide a tax benefit to owner occupied property and the negative politically sensitive equity concerns potentially paired with such a benefit, cause these authors to also suggest that the rental values in the case of letting of residential immovable property should be exempt. There could also arise administrative and compliance difficulties in taxing rental values, as changes in use of these rental property to being owner occupied would result in an input tax credit that may be difficult to comply with and enforce (Poddar, 2009).

To limit the amount of revenue lost as a result of these exemptions, it is recommended by de la Feria and Krever (2012) that the supply of newly-built or developed residential property be subjected to the standard rate VAT.[111] The initial value of the asset upon the date of acquisition would in this case be equal to the present value of all future consumption over the life of the asset. The VAT is therefore collected by a pre-collection method (Poddar, 2009). If the initial purchaser who paid the VAT were to sell the residential property, he would likely do so at the depreciated value of the tax inclusive price, thereby 'receiving' some VAT back and spreading the VAT liability over the consumption of the property (de la Feria and

[109] To collect the VAT, all lessors of residential property will have to be registered for VAT (with supplies above the threshold), an obvious efficiency cost.
[110] There may be some consumers that remain below the registration threshold and revenue will not be collected from these consumers.
[111] This approach also has the attractive property of not taxing the producers of residential property.

Krever, 2012). To avoid a double taxation upon the consumption of the residential property, the sale of second-hand residential property should also be exempted. By following this approach, the taxing of increases in residential property values remain the only major frontier in taxing immovable property under the VAT (Poddar, 2009).

Although a potential increase in the value of a residential property would have the result of a loss in revenue[112] and this approach will see a decrease in neutrality between commercial and residential property and possible legal disputes upon whether a property constitutes commercial or residential property, it appears to be preferred to the efficiency, equity and related political issues that will arise by including imputed rental values and rental values in the tax base.[113]

Financial services

Financial services, which include deposits, lending, issuance of financial securities, long term insurance, brokerage, advisory services and many other services "is the major remaining frontier for the value added tax" (Gendron, 2008:494). Although there is general consensus that financial services should fall within the ambit of a consumption tax, "no convincing conceptually correct and practical solution for capturing the bulk of financial services under the VAT has yet been developed anywhere" (Bird and Gendron, 2007:97).[114]

The difficulty in correctly taxing financial services is that the consideration paid by way of an intermediation charge for services supplied is included in the full margin remunerated. This full margin is paid towards, besides the intermediation charge, the opportunity cost of funds, risk premiums and profits (Cnossen and Gendron, 2012). Identifying and separating the intermediation charge from the full margin efficiently and practically remains problematic (de la Feria and Krever, 2012). This is of course not an issue for services for which the consideration is a fixed or calculated one based upon a variable fee.

[112] It is suggested by Cnossen (2013) that the increase in value should be taxed by a separate tax similar to transfer duty.
[113] It can perhaps be mentioned that this has not received any empirical attention that I am aware of and it may well be that under optimal taxation theory this may not be the case. One issue of concern, perhaps, is that the role of the registration threshold seems largely ignored in the arguments made above. It is however not in the scope of this study to attempt to resolve these concerns, as empirical estimation would most likely be required.
[114] This remains the case at present.

Although many approaches, namely the addition method, net operating income, full invoicing, separate tax rates, taxing gross interest, zero rating, cash-flow method and the modified reverse charge, have been proposed (Cnossen and Gendron, 2012), the efficiency costs of these approaches have been generally agreed to exceed the revenue obtained from taxing the value added by financial institutions (Crawford *et al*., 2010). In most instances it is therefore advised to exempt non-fee based financial services (including life insurance), but to tax fee-based financial services (Ebrill *et al*., 2001).

It is however important that in taxing fee-based financial services, the country in question has the administrative capacity to ensure that undue credits are not claimed in relation to exempt supplies (Krever, 2008). This means that special consideration should be given to the manner in which financial institutions are required to apportion input tax credits between taxable supplies (fee-based) and non-taxable supplies (other financial services). Not doing so may result in significant efficiency costs. It may also be advisable to allow for a partial formula-based input credit in relation to the supply of exempt financial services (Cnossen and Gendron, 2012).

Farming

"The best approach to the taxation of the agricultural sector, found in some industrial countries, is to treat farmers like any other VAT-liable business …this approach may not be feasible however in most developing countries" (Cnossen, 1998:409).

The negative effect of exemptions, discussed in Section 2.2.3.3.1, also applies to farming. Efficiency concerns may however make it difficult to subject this sector (or at least the smaller traders in this sector) in developing countries to the generally recommended approach of subjecting this sector to the standard rate of VAT. As an exception to the rule, it is often advised that farming be exempted in developing countries.

In many developing countries, agricultural producers are found in the informal sector and only a few farmers keep accurate records of turnover. Farming processes are also often conducted in remote areas and the seasonality of farming may cause difficulty in matching inputs with outputs. These factors provide for high administrative and compliance costs. Some equity (or perhaps political) concerns also accompany the taxing of agriculture where the value added by this sector is

paid by poorer consumers[115] and potentially shifted towards poorer producers (which can also be an economy concern).[116] In the case of basic foodstuffs, mostly produced by the agricultural sector, an increase in the price to consumers will be (at least from the perspective of politicians) seen as regressive. The same will apply if the tax is carried by poor farmers (Ebrill *et al*., 2001).

It should be emphasised that the long term objective should be to fully tax agriculture as any other business (Bird and Gendron, 2007), but in the light of a current resource restricted administration in developing countries, the exemption may be preferred.[117] It should however be mentioned that an appropriately high registration threshold, coupled with the presence of a properly set and administered voluntary threshold, largely circumvents the preference towards the exemption.

Although the exemptions in this section are currently acceptable as rational, pragmatic and/or practical, they compromise both the logic and functioning of the VAT, and a move towards full taxation should be upon the VAT policy agenda of many developed countries. For developing countries such a move to full taxation may provide for administrative simplification, increased revenue and a more economical and neutral VAT.

In the following sub-section I consider how the tax bases of VAT systems align with the structural features of a good VAT, as discussed in Sections 2.2.3.2 to 2.2.3.3.3.

2.2.3.3.4 Tax bases of VAT systems

In Section 2.2.3.1 I argued that the main aim of the VAT ought to be revenue. In Section 2.2.3.2 I argued that as a general rule, production should not be included in the tax base of the VAT. In Section 2.2.3.3 I argued that the broadest possible range of goods and services that are consumed should be included in the tax base of the VAT. In an attempt to explain “possible”, I also argued in that section that applying the destination principle, meaning zero rating the exportation of goods and services, is neccessary.[118] Furthermore, exempting small traders by setting an appropriate

[115] The value added in the agricultural sector will be reflected in the price of foods and other supplies produced by this sector. It should be noted that exempting this sector will exclude the value added by the agricultural sector, but not the VAT paid upon inputs in the final price.
[116] It can be expected that small farmers (who are likely poorer) will not be able to compete with larger farmers and absorb some of the incidence of the VAT to provide for more competitive prices.
[117] The exemption is preferred above the zero rate, as the zero rate will require that farmers register to be able to claim input tax, incurring an efficiency cost.
[118] I also mention that all countries with a VAT currently apply the destination principle.

registration threshold is recommended. Exempting non-suppliers (wage earners and suppliers not involved in economic activities), only health and basic education in the PNC Sector, residential immovable property, non-fee based financial services and farming in developing countries is inevitable or recommended.

The arguments in the previous sections provide for a framework to explore whether and to what extent the tax bases of countries' VAT systems align with the structure of the base of a good VAT. By doing this I will also explore structural features that do not align with the structure of the base of a good VAT.

For purposes of this discussion I divide the pile of sand that is VAT systems into three piles based upon major structural aspects[119] of these VAT systems: the registration threshold of VAT systems, the tax base of VAT systems[120] and the rate of tax of VAT systems. The first two of these are discussed in this section.[121]

2.2.3.3.4.1 Registration thresholds

The initial implementation of a VAT has failed in the cases of Malta, Grenada and Ghana. For Malta the VAT initially failed due to mostly political pressures, and upon reinstatement, the main structural change was a higher registration threshold. In the cases of both Grenada and Ghana, a too low registration threshold is cited as a reason for the failure of their respective VAT systems (Grandcolas, 2005).

Although policy makers initially thought that a registration threshold of zero was appropriate, conventional wisdom changed to setting a threshold in most countries – in many cases at quite a considerable level (Bird and Gendron, 2007). This is evident in Turnier's 1984 paper that calls for a decrease in VAT vendors towards a more efficient VAT (Turnier, 1984). In this paper he notes that 69.15 percent of vendors in the UK contributed only 4.48 percent of VAT revenue, while the compliance costs of these vendors constituted about 42.6 percent of total VAT compliance costs.

Although the model of Keen and Mintz (2004) theoretically allows for the estimation of the optimal threshold for VAT, data limitations generally prohibit the estimation of

[119] There are some smaller structural aspects that are discussed in Section 2.2.3.5.
[120] The registration threshold is also a base issue, but for reasons that will become apparent I discuss this separately.
[121] The theory regarding the rate of tax (a distinct structural feature of a good VAT from the base of the VAT) is discussed in Section 2.2.3.4. The rate of tax of VAT systems (a separate major structural aspect of VAT systems) is also provided in that section.

this model.[122] Limited data is available upon the compliance and administrative costs of the VAT (in isolation), both key elements in Keen and Mintz's (2004) model. Although there are some studies that apply the "simple rule"[123] with the use of an estimate of compliance and administrative cost provided by Cnossen (1994), the results of these studies can be regarded as unreliable[124] and are therefore not reported here. No studies could be found that apply Keen and Mintz's model with the use of actual compliance and administrative cost data.

A questionnaire completed by the IMF's Fiscal Affairs Department staff ('FAD') upon countries to which technical assistance has been given, provides maybe the best indication of the thresholds found in VAT systems around the world, compared to a recommended threshold (as suggested by FAD staff). Table 8 provides the results of this questionnaire relating to VAT thresholds.

[122] Keen and Mintz (2004) also base their calculations in showing the application of the model upon certain assumptions.
[123] As previously mentioned, this is the simplified model of Keen and Mintz (2004) that does not consider economic and neutrality costs. The model only considers revenue, administrative and compliance costs (and the marginal cost of public funds).
[124] It is difficult to imagine that a single (and outdated) estimate of compliance and administrative cost can apply to all countries.

Table 8: VAT Thresholds: Actual, recommended and percentage of recommended

Country	Actual (US $)	Recommended (US $)	Percentage
Albania	32,000	50,000	64%
Bangladesh	32,609	34,900	93%
Benin	80,000	80,000	100%
Bulgaria	42,000	50,000	84%
Burkina Faso	80,000	80,000	100%
Cameroon	80,000	60,000	133%
China	300–1,200	10,500	11%
Croatia	8,000	40,000	20%
El Salvador	6,000	12,000	50%
Georgia	2,400	12,000	20%
Mauritania	46,000	55,000	84%
Mongolia	18,750	18,750	100%
Pakistan	22,700	70,000	32%
Philippines	14,000	14,000	100%
Sri Lanka	33,000	30,000	110%
Uganda	50,000	20,000	250%
Vietnam	(a) Zero for state and foreign enterprises and invoice method vendors; (b) 1.5 times minimum civil servant salary for individuals.	52,000	-

Source: Ebrill *et al*., (2001:114).

As can be seen from Table 8, the actual thresholds of countries are in most instances less than the recommended threshold. “On average, those adopted are less than 80 percent of those recommended” (Ebrill *et al*., 2001:113). These low thresholds could prove troublesome, especially in the case of developing countries that establish and maintain low thresholds, thereby increasing the burden on likely overburdened administrations (International Tax Dialogue, 2009).

It is further evident from Table 8 that there exists a significant variation in the amount of thresholds set. This significant variation in thresholds can also be found when considering OECD countries, where fifteen countries have relatively high thresholds, fourteen countries have relatively low thresholds and four countries have no threshold at all (OECD, 2012). The case is similar for EU countries where the threshold varies from zero for the Netherlands, Spain and Sweden, to €95 411 for the United Kingdom (European Union, 2014). It can therefore be argued that

although advice upon a high threshold seems fairly consistent, this advice is not consistently followed.

Another area of variation is in the structure of the threshold. The structure of most countries' thresholds is that of a compulsory and voluntary threshold. Other alternative structures include applying different thresholds to different types of enterprises (e.g. suppliers of services) and also sliding scales of tax liability to vendors just above or below the threshold (International Tax Dialogue, 2009). It remains unclear whether these alternative structures provide benefits in excess of the likely rise in efficiency costs that accompany them, although the FAD generally recommends against such structures (Ebrill *et al*., 2001).

2.2.3.3.4.2 Tax base structural features

"VAT systems applied around the world are – to different degrees - imperfect with exemptions, an anathema to the logic of the VAT" (de la Feria and Krever, 2012:4).

The pile of tax base structural features of VAT systems can be divided into two piles – EU Model tax base structural features and modern VAT tax base structural features. As discussed in Section 2.2.2, when introducing a VAT, countries generally either based their VATs on the EU Model or the Modern VAT Model (Ebrill *et al*., 2011).

According to de la Feria and Krever (2012) the EU Model VAT was greatly challenged by politicians and consumers, and as a result includes a variety of exemptions and differential rates (aimed at subsidies of a sort). The complexities of the EU Model experienced by countries outside the EU with weaker administrations called for a simpler, single standard rate and broader based VAT and so the modern VAT was developed (de la Feria and Krever, 2012).

The modern VAT's (initially introduced in New Zealand) main differentiating characteristics from the EU Model are therefore that it only makes use of a single standard rate and limits exemptions to allow for the broadest base possible (Bird and Gendron, 2007; Krever, 2008). This makes the modern VAT (amongst various other benefits) easier to administer than the EU Model (Muir, 1993).

Since its introduction the modern VAT spread to amongst others Canada, Singapore, South Africa and Australia, albeit not in the pure form found in New Zealand (Krever, 2008). Most non-european countries have followed the Modern VAT Model in the

case of a single standard rate, although the same cannot be said for many countries in terms of allowing the broadest base possible (de la Feria and Krever, 2012; Krever, 2008).

To give an indication of the tax base structural features of VAT systems, I divide VAT systems between those based upon the EU Model and those based upon the Modern VAT Model. As it would be a tedious task that is beyond the scope of this study to consider every VAT system, I consider three VAT directives for regional groupings that are based upon the EU Model and the VAT systems of New Zealand, Australia and Canada (based upon the Modern VAT Model).[125]

The three regional groupings are the European Union (EU), the *Union Économique et Monétaire de l'Ouest Africain* (UEMOA, also sometimes referred to as WAEMU) and the *Communauté Économique et Monétaire de l'Afrique Centrale* (CEMAC).[126]

In the case of the EU, the Council Directive 2006/112/EC (referred to as the EU Directive) provides as a general rule - there are a few exceptions - that all exemptions are mandatory (de la Feria and Krever, 2012). In the case of UEMOA, Directive No. 02/98/CM/UEMOA (referred to as the UEMOA Directive) provides that member states may only apply the listed exemptions, although in practice many member countries exempt the items listed, but also additional exemptions (Krever, 2008). For CEMAC countries, Directive No. 1/99/CEMAC-028-CM-03 (referred to as the CEMAC Directive) provides that member states must apply the listed exemptions and may not apply additional exemptions. Table 9 provides a summary of the exemptions.

[125] I also only consider exemptions and not zero ratings. Zero ratings for reasons other than applying the destination principle or supplies between registered vendors (that can be recommended in some instances) for the directives are uncommon. For the countries considered, I provide the non-recommended zero ratings.

[126] The EU comprises Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. UEMOA comprises Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. CEMAC comprises Cameroon, the Central African Republic, Chad, the Republic of Congo, Equatorial Guinea, and Gabon.

Table 9: Exemptions found in EU Model VAT systems

Supply	EU	UEMOA	CEMAC
Definition of taxable person / firm / enterprise			
Non-supplies	Any person not conducting an economic activity is exempt. Employees are also exempt.	Any person not carrying out the economic activities of producers, traders and persons supplying services and all operations related thereto are exempt.	Any person not conducting an economic activity is exempt.
All public bodies	Exempt for activities engaged in as public authorities, unless this leads to significant distortion of competition. A specific list of exemptions is also applied (see below).	Exempt if not activities similar to those performed in private sector. A specific list of activities is not provided.	Exempt for activities engaged in as public authorities, unless this leads to distortion of competition. A specific list of exemptions is also applied (see below).
Specifically listed exemptions			
Transport	For sick or injured people.	Own discretion can be applied.	
Public postal services	Exempt, other than transport and telecommunication.		
Health goods and services	Exempt	Exempt	Exempt
Human organs, blood and milk	Exempt		
Non-profit organisations and groups	Exempt in nearly all instances.	Although not listed, many countries do exempt these supplies (Krever, 2008).	Exempt, unless supplied in a competitive industry.
Welfare activities	Exempt	Although not listed, many countries do exempt these supplies (Krever, 2008).	Exempt, unless supplied in a competitive industry.
Education	Both services and related goods exempt. All levels of education.	Services exempt. All levels of education.	Services exempt. All levels of education. School books are also exempt.
Religious activities	Exempt	Although not listed, many countries do exempt these supplies (Krever, 2008).	Exempt, unless supplied in a competitive industry.
Cultural activities	Exempt	Although not listed, many countries do exempt these supplies (Krever, 2008).	Exempt, unless supplied in a competitive industry.

Supply	EU	UEMOA	CEMAC
Public radio and televisions	Exempt, unless of a commercial nature.		
Water and Electricity		'Social portion' as determined by members are exempted.	'Social portion' as determined by members are exempted.
Buildings	Exempt, but not if supplied before first occupation.	Exempt	Exempt, unless sold by developer.
Land	Exempt if not built on or will be built on.	Exempt	Exempt if subject to transfer duty.
Leasing of immovable property	Exempt, unless in hotel sector, for parking of vehicles, constitutes equipment or safes.	Exempt if unfurnished.	Exempt if unfurnished.
Financial and insurance services	Exempt	Exempt	Exempt
Agriculture		Own discretion can be applied.	Exempt if sold to consumers and supplies does not exceed a set limit. These include supplies by farmers, ranchers, fishermen and hunters. Inputs are also exempt in the case of livestock and fishing products used by exempt suppliers. Agricultural machinery and equipment is also exempt.
Postage stamps	Exempt		Exempt
Gambling	Exempt		Exempt
Imported goods	Certain imported goods are exempt.	Certain imported goods are exempt.	Certain imported goods are exempt.
Unprocessed foodstuffs		Exempt	
Primary necessity foodstuffs		Exempt	Exempt
Business as a going concern		Exempt	
Books, newspapers and periodicals		Exempt	Exempt
Original art work		Exempt if sold by artist.	
Mining activities and goods	Investment gold is exempt.	Own discretion can be applied.	Exempt. These include most goods relating to mining (refer to Appendix 4 of the directive).

Supply	EU	UEMOA	CEMAC
Entertainment			Exempt
Certain services by a central bank to treasuries			Exempt
Small fishing equipment			Exempt
Other "necessities" besides foodstuffs			Exempt. These include insecticides, pesticides, fertilizer, and books (other than textbooks).

Sources: Council Directive 2006/112/EC, Directive No. 02/98/CM/UEMOA, Directive No. 1/99/CEMAC-028-CM-03.

Table 9 provides some perspective of the exemptions found in VAT systems that are based upon the EU Model. Regarding non-supplies, all three directives provide for exemptions to persons not performing "economic activities" and these would typically include private households. In most jurisdictions the term "economic activity" is left to case law to define and this may provide for certain supplies to be wrongfully excluded from VAT (de la Feria and Krever, 2012). It should further be noted that only in terms of the EU Directive are the services supplied by employees specifically excluded as taxable supplies. If this exclusion is not applied in UEMOA and CEMAC countries, it would result in a less efficient VAT.[127]

For the PNC Sector, in nearly all instances the supplies from this sector are exempt from tax. All directives include provisions that disallow an exemption in the case of distortion of competition, indicating an awareness of some of the issues that this exemption may provide. It seems however likely that in many instances the application of these provisions will only be made as a consequence of some legal dispute, decreasing the efficiency of the VAT. It also seems likely that exemptions, beyond that of basic education and health, will continue to exist in this sector.

In respect of immovable property, it should be noted that none of the directives make provision for differentiating between immovable property used for commercial and residential purposes. This would mean that at best, only the value added by developers of immovable property would be included in the VAT base and not the value added from the services supplied by immovable property.[128] This is the case

[127] This will especially be the case if a low compulsory registration threshold is applied in these countries.
[128] This is not a concern for residential property (as this is the current advised approach), but may well be one for commercial property.

for EU and CEMAC countries where the supply of buildings is not exempt if sold before first occupation or by developers. In the case of UEMOA countries, it seems that the value added by developers of immovable property is not included in the base. If UEMOA countries follow this approach, there may be significant economic costs involved in taxing the inputs to the production of immovable property.

For the purposes of leasing immovable property, it appears that generally the leasing of residential property will be exempt (the current preferred approach). If strictly interpreting the directives, this will not be the case for UEMOA and CEMAC countries if the residential property is furnished. This is likely an attempt at including the leasing of commercial property in the tax base, although perhaps a rather elementary attempt. The EU Directive does not allow the exemption of the letting of immovable property in the hotel sector, for parking of vehicles and where it constitutes equipment or safes. Member countries may also at their own discretion include the supply of leasing or letting of immovable property in the tax base that may provide for the inclusion of the letting or leasing of other commercial property (Council Directive 2006/112/EC).

For the supply of financial services, the general approach of exempting these supplies is adopted by all three directives. None of the directives however apply to VAT fee-based financial services. It may be advisable that fee-based financial services be included in the VAT base for countries that have the administrative capacity to administer this inclusion (EU countries seem likely to be good candidates).

Concerning agriculture, the EU Directive treats this sector as any VAT-liable business (the preferred approach for developed countries). In the case of UEMOA countries, each member country may decide upon the treatment of this sector, therefore the developing countries can exempt this sector if required.

In terms of the provisions relating to agriculture for CEMAC countries, smaller farmers are exempt from the VAT, whilst farmers above a set threshold are not exempted.[129] Moreover, the majority of farming inputs are exempted if supplied to exempt suppliers. Machinery and equipment is however exempt, irrespective of to whom it is supplied. It is likely that these provisions decrease the efficiency of the

[129] This can be viewed as a full taxation approach with a separate registration threshold for farmers.

VAT and result in production distortions. It may be preferred to simplify the treatment of agriculture in CEMAC countries by applying the exemption to the entire sector, combined with a zero rate of farming inputs or, if countries have the necessary administrative capacity, to include the entire sector in the tax base.[130]

From the above it appears that the base structural features of VAT systems based upon the EU Model (included in the sample) do not align with the base structural features of a good VAT. This point is amplified when considering the exemptions found in these directives that cannot be regarded as structural features of a good VAT. The most prominent of these include exemptions for unprocessed and primary necessity foodstuffs, newspapers, books and periodicals, art, small fishing equipment and other "necessities".

In the case of exemptions of unprocessed and primary necessity foodstuffs, as well as small fishing equipment and other necessities, it is likely that these items are exempted in an attempt to alleviate the distributional consequences of a VAT. Newspapers and books are likely to be exempted as these provide some external benefit as a result of use (also referred to as a merit good[131]) (Ebrill *et al*., 2001). These types of non-standard exemptions are common in many countries that apply the EU Model, but to a lesser extent in countries that apply a modern VAT (Ebrill *et al*., 2001).

To give an indication of the exemptions found in VAT systems that apply a modern VAT, I consider the exemptions found in the New Zealand VAT, Australian Goods and Services Tax and Canadian Harmonized Sales Tax in Table 10.[132]

[130] If the entire sector is included in the base, the compulsory VAT threshold will continue to exclude smaller farmers from the base.
[131] The exemption of merit goods may appear appealing, but the economic, neutrality, revenue and efficiency costs of exempting these goods may well exceed the external benefit obtained from not including the value added in the final stage of production into the tax base.
[132] The South African VAT is considered in Chapter 3.

Table 10: Exemptions found in modern VAT systems

Supply	New Zealand	Australia	Canada
Definition of taxable person / firm / enterprise			
Non-supplies	Any person not making a supply in the course or furtherance of a taxable activity. Private recreational supplies and employees are specifically excluded.	Any person not making supplies for a consideration made in the course or furtherance of an enterprise. Enterprise does not include private recreational supplies, employees or non-profit organisations that consist only of individuals and partnerships of individuals.	Any person not making a supply in the course of a commercial activity. An employee is not regarded as a business and therefore not regarded as conducting commercial activities.
All public bodies		Activities of members of local governing bodies are not made in the course or furtherance of an enterprise and therefore excluded from VAT.	
Specifically listed exemptions			
All public bodies			Generally the supplies by public sector bodies are exempt. Some special rules do apply.
Health goods and services			Health services generally exempt.
Welfare activities			Supplies by charities are generally exempt.
Education			Most educational services are exempt.
Buildings	Exempt if residential accommodation that has been used for 5 years solely for the purpose of leasing immovable property.	Exempt if residential premises that are not new and not to be used for commercial purposes.	Exempt if residential accommodation that are used homes or residential rents. Some special rules do apply.
Land	Exempt if leasehold land that has been used for 5 years solely for the purpose of leasing immovable property.	Exempt if part of exempt residential premises.	Exempt if forming part of exempt residential accommodation.
Leasing of immovable property	Exempt if dwelling is leased. Dwelling only includes residential	Exempt if residential premises.	Exempt, if leased for at least a month or the consideration for the

Supply	New Zealand	Australia	Canada
	accommodation.		supply does not exceed $20 per day.
Financial and insurance services	Exempt	Exempt	Exempt. Some fee based services are not exempt.
Precious metals	Exempt for dealers in fine metal.	Exempt if not the first sale after refinement (otherwise zero-rated).	
School tuck-shops		Exempt if supply is made by non-profit body.	
Imported goods		Certain imports are exempt.	
Child and personal care			Exempt to children and persons with limited capabilities.
Legal aid services			Exempt if supplied under legal aid plan administered by a government.
Ferry, road and bridge tolls			Exempt

Source: New Zealand Goods and Services Act, 1985, A New Tax System (Goods and Services Tax) Act 1999, Canadian Excise Tax Act (R.S.C., 1985, c.E-15).

It appears from Table 10 that modern VAT systems generally could be considered as having fewer exemptions than those VAT systems based upon the EU Model. It is further evident that the initial modern VAT, that of New Zealand, has the least exemptions. VAT systems that followed this initial implementation of the Modern VAT Model, again introduced a number of exemptions not found in the New Zealand VAT.

Regarding non-supplies, in the case of all three countries, employees and private households (non-commercial activities) are excluded from a taxable activity/enterprise/commercial activity. The same difficulty regarding the definition of "economic activity" could be experienced with these terms. Furthermore, while Australia excludes the activities of local governing bodies from the VAT and the Canadian legislation provides for a specific exemption that exempts most public bodies' supplies, New Zealand does not exempt any supplies from the PNC.[133]

The treatment of immovable property by the three countries considered aligns with this base structural feature for a good VAT. These legislations provide for a clear distinction between the treatment of residential and other (commercial) property. In

[133] As mentioned by Gendron (2010), full taxation of the PNC Sector is the preferred approach.

the case of New Zealand, only the letting of residential property and the sale of property used for such purposes is exempt from VAT. The sale of residential property that has not been leased for five years for residential accommodation purposes would therefore be subject to VAT. It is however the Inland Revenue Department's policy that supplies of private dwellings not be considered a taxable activity (IRD, 2007).

Financial services are also exempt in all three instances, but only Canada collects some revenue upon certain fee-based financial services. Agriculture is not exempt in any of these three developed countries, although outputs from farming activities are zero-rated in Canada (discussed below). Australia and Canada also apply a few non-standard exemptions, including the supplies of school tuck shops, the supply of child and personal care and legal aid services and ferry, road and bridge tolls.

A number of non-standard zero-rated supplies, meaning supplies not zero-rated in applying the destination principle, supplies between registered vendors for efficiency reasons or investment gold (similar to financial services), are also applied in Australia and Canada. Australia applies a zero rate to the supply of certain basic foodstuffs, health goods and services, educational goods and services, child care, religious services, non-commercial activities as well as raffles and bingo conducted by charitable institutions, water and sewerage, farmland and cars used by disabled persons (A New Tax System (Goods and Services Tax) Act, 1999). In Canada a zero rate is applied to certain basic foodstuffs, prescription drugs and biologicals, medical and assistive devices and agriculture and fishing outputs (Canadian Excise Tax Act (R.S.C., 1985, c.E-15)).

From the above it seems evident that non-standard exemptions and zero ratings (in the case of some modern VAT countries, although some EU Model countries also have these) is a common feature of VAT systems. In addition, none of the directives or countries considered have a VAT system that is aligned with the base structural features of a good VAT.[134] This means that production is often taxed and the largest possible base of goods and services consumed is not taxed.

[134] New Zealand's VAT is very near to being aligned, the only instance where this VAT system differs is in the treatment of fee-based financial services.

In the following sub-section I consider another structural feature of a good VAT, applying a single non-zero rate. I also consider the third pile of the major structural aspect of VAT systems - the rates of tax applied.

2.2.3.4 Apply a single non-zero rate

"Most experts recommend that an ideal VAT should generally be imposed with a single non-zero rate" (Grinberg, 2009:20).

There are a number of arguments for implementing a VAT with a multiple rate structure. For instance, to reduce the dead-weight loss for society from introducing a consumption tax, the "inverse elasticity rule" of Ramsey (1927) for levying higher taxes upon supplies that are inelastic and lower taxes upon supplies that are elastic may be applied. There may also be an argument to tax at higher rates certain supplies that create external costs to society, or to discourage non-beneficial behaviour by individuals. For equity reasons it may be beneficial to tax goods at a higher rate, that have a greater expenditure share for wealthier consumers, compared to poor consumers (Ebrill *et al*., 2001).

Although these arguments set out to achieve important economic, efficiency and equity considerations, other tax tools, if properly administered, may achieve the same objectives. An excise tax can effectively tax supplies of which the demand is inelastic[135] or more expended upon by wealthier individuals. Besides revenue objectives, an excise tax's specific rates are ideal to internalise external costs of society to the taxpayer and also attempt to change behaviour. A proper functioning and flexible income tax could also be better suited towards equity objectives[136], especially in developed countries (Mirrlees, 1971; Atkinson and Stiglitz, 1976; Deaton and Stern, 1986; and Besley and Jewitt, 1990).

There are further arguments against a multiple rate structure. Multiple rates are associated with distortion of choices and a loss to social welfare (Agha and Haughton, 1996). This loss in social welfare is due to the disincentive effects of achieving the optimal distribution of after-tax income amongst individuals not being minimised if consumer decisions are distorted (Atkinson and Stiglitz, 1976).

[135] This will likely exclude supplies towards basic needs as such a tax can be expected to be regressive and inequitable.
[136] Equity objectives can be achieved with less economic and efficiency costs.

Empirical evidence also indicates that a multiple rate structure is associated with higher administrative costs, higher compliance costs and that tax disputes are more likely to arise, resulting in a less efficient VAT (Cnossen, 1989; Tait, 1991).

Multiple rates can further provide for a tax credit problem where the input credit exceeds the output tax charged for certain types of enterprises (Duverne, 1990). Some evidence also suggests that fraudulent activities are more likely under a multiple-rate VAT (Agha and Haughton, 1996; Duverne, 1990). For these reasons "expert advice upon VAT rates is simple: there should only be one rate" (Bird and Gendron, 2007: 108).

This does not mean that this expert advice is consistently followed. Although all modern VAT systems and most VAT systems adopted in recent years based upon either the EU Model or the Modern VAT Model apply only one standard VAT rate, multiple standard rates are still found in many countries (Crawford *et al*., 2010). Countries which apply multiple standard rates, together with these standard rates, are listed in Table 11.

Table 11: Countries with multiple standard rates

Country	General rate	Other rates
Algeria	17%	7%
Antigua and Barbuda	15%	12.5%
Argentina	21%	10.5% 27%
Austria	20%	10% 12%
Bangladesh	15%	1.5% 2.25% 4.5% 5% 9%
Barbados	17.5%	7.5%
Belarus	20%	0.5% 10% 24%
Belgium	21%	6% 12%
Bulgaria	20%	9%
Cape Verde	15%	6%
Central African Republic	19%	5%
China	17%	13%
Colombia	16%	1.6% 10%
Costa Rica	13%	5% 10%
Croatia	25%	5% 13%
Cyprus	19%	5% 9%
Czech Republic	21%	10% 15%
Dominica	15%	10%
Estonia	20%	9%
Finland	24%	10% 14%
France	20%	2.1% 5.5% 10%
Gabon	18%	10%
Germany	19%	7%
Greece	23%	6.5% 13%
Grenada	15%	10%
Hungary	27%	5% 18%
Iceland	25.5%	7%
India	12.5% to 15%	1% 4% 5%
Ireland	23%	4.8% 9% 13.5%
Isle of Man	20%	5%
Italy	22%	4% 10%
Jamaica	16.5%	10% 20%
Latvia	21%	12%
Lesotho	14%	5%
Liechtenstein	8%	2.5% 3.8%
Lithuania	21%	5% 9%

Country	General rate	Other rates
Luxembourg	15%	3% 6% 12%
Macedonia	18%	5%
Malta	18%	5% 7%
Moldova	20%	6% 8%
Montenegro	17%	7%
Morocco	20%	7% 10% 14%
Netherlands	21%	6%
Norway	25%	8% 15%
Paraguay	10%	5%
Poland	23%	5% 8%
Portugal	23%	6% 13%
Romania	24%	5% 9%
Russian Federation	18%	10%
Serbia	20%	10%
Seychelles	15%	7% 10% 12%
Slovak Republic	20%	10%
Slovenia	22%	9.5%
Spain	21%	4% 10%
Sweden	25%	6% 12%
Switzerland	8%	2.5% 3.8%
Tunisia	18%	6% 12%
Turkey	18%	1% 8%
United Kingdom	20%	5%
Uruguay	22%	10%
Venezuela	12%	8% 19%
Vietnam	10%	5%

Source: Deloitte (2015).

As can be seen from Table 11, while some countries (in the sample) only apply a general rate and a single reduced rate, many countries apply multiple reduced rates. Bangladesh as an example applies a general rate of 15%, but some services are taxed at 1.5%, 2.25%, 4.5%, 5% or 9% (NBR, 2015). While increased rates are not often applied, Argentina (telecoms, domestic gas, water and industrial supplies), Belarus (white sugar), Jamaica (telephone services) and Venezuela (goods regarded as luxuries) make use of such increased rates (Deloitte, 2015).

Although it is suggested that countries, especially those with a well-functioning excise and income tax system, should consider a single standard rate VAT for

economy, neutrality, efficiency, fraud and other reasons, experience "shows that moving towards a uniform VAT rate structure is not easy once differentiation has been admitted" (Crawford *et al*., 2010:301). For instance, the Slovak Republic successfully changed from a multiple standard to a single standard rate in 2004, but a multiple rate was reintroduced in 2007 upon selected pharmaceutical products, medical aids and books (Singh, 2014).

Ebrill *et al*., (2001) show empirically that (1) the number of rates when a VAT is introduced have a lasting effect upon the number of rates applied, (2) the older the VAT, the more likely it is that the VAT applies multiple rates, and (3) the number of additional rates, once allowed, tend to increase over time, appropriately called a "slippery slope". This "slippery slope" is often the result of political pressures as government may seem to become more open to persuasion (Ebrill *et al*., 2001). From this evidence a strong case can be made to avoid multiple standard rates from date of introduction in the design of a VAT.

In the following section I consider the remaining structural features of a good VAT and alignment between what can be considered minor[137] structural aspects of VAT systems and these structural features.

2.2.3.5 Use the invoice credit method and the accrual basis

2.2.3.5.1 The invoice credit method

There are two main methods currently implemented in calculating the VAT liability of VAT vendors (although other methods also exist), namely the subtraction method and the invoice credit method (refer to Bird and Gendron, 2007; Cnossen, 1993; Ebrill *et al*., 2001; Grinberg, 2009; Keen, 2006; Metcalf, 1995; Schenk and Oldman, 2007 and Shoup, 1990).

The subtraction method follows an accounting-based method of calculating the value added for each VAT vendor by taking the receipt of sales after deducting allowable expenditure upon purchases from other suppliers, whether registered for VAT or not. This measure of value added is then taxed at the applicable tax rate for each VAT vendor, meaning that the tax is calculated per entity. As the next VAT vendor in the

[137] This division between major and minor is largely based upon the extent that countries' VAT structures are aligned (or not aligned) with these structural features of a good VAT.

chain will be able to subtract the tax paid from the receipt of sales, the tax falls upon consumption. Table 12 provides an illustration of the subtraction method.

Table 12: Illustration of the subtraction method (10 percent VAT rate)

Production – Distribution Chain	Expenditures incl. VAT ($)	Revenue incl. VAT ($)	Value added ($)	VAT liability ($)	Net VAT ($)
Producer	0	100	100	10	10
Manufacturer	100	300	200	20	30
Retailer	300	500	200	20	50
Consumer	500	0	0	0	50

As the tax will not be indicated upon an invoice to the consumer, the subtraction method has the political virtue of looking like a corporate income tax, although the tax incidence is shifted towards and carried by the consumer. The amount spent by the consumer will therefore consist of $450 towards the goods purchased and $50 of VAT.

Under the invoice credit method each supplier will charge output tax upon the supply of a good or service and this amount of output tax is then indicated upon a tax invoice passed to the purchaser.[138] The tax is therefore calculated upon specific goods and services and not upon an entity (as is the case with the subtraction method). In the case where the purchaser would charge output VAT upon his/her own sales and the goods or services purchased would contribute towards these sales, the purchaser is entitled to an input tax credit against his/her sales. Therefore, only when the goods or services are applied for purposes other than productive consumption, will an input credit be denied (in most cases). Table 13 provides an illustration of the invoice credit method.

Table 13: Illustration of the invoice credit method (10 percent VAT rate)

Production – Distribution Chain	Purchases incl. VAT ($)	Sales incl. VAT ($)	VAT input ($)	VAT output ($)	Net VAT ($)
Producer	0	100	0	10	10
Manufacturer	100	300	10	30	30
Retailer	300	500	30	50	50
Consumer	500	0	0	0	50

[138] More than one supply can be combined upon one invoice, although each supply needs to be separately shown upon the invoice.

From Table 13 it is evident that the end result will be identical to the subtraction method, meaning that the final consumer will pay $50 of output tax to the retailer. In each case the net VAT liability (output less input) of each VAT vendor is equal to the value added by that VAT vendor, the same as in the case of the subtraction method. Although the net result of these two methods seems identical from the illustrations provided, there are some differences.

The invoice requirement of the invoice credit method is the "key substantive difference" between the two methods (Grinberg, 2009:9). For purposes of the subtraction method revenue services are likely to audit the accounting records used for income tax purposes to determine whether the correct amount of VAT was paid. This is likely to provide some compliance cost benefit to VAT vendors. However, to evade the VAT as well as the income tax (providing a greater benefit for a single risk), VAT vendors can understate or not report the amount of revenue received from a sale or overstate the amount of expenditure upon purchases.

Under the invoice credit method the purchaser would want to ensure that the correct amount is indicated upon the invoice, as this will determine the amount of his/her input credit. When audited, this invoice can be cross checked against the seller's invoice. Also, the seller would not want to inflate the invoice, as this will lead to a higher VAT liability by him without receiving additional consideration from the purchaser. Both the seller and the purchaser would therefore have to be in agreement to evade the tax, since the tax is recorded in two accounting records (Bird and Gendron, 2007). Tax evasion is therefore less likely under the invoice credit method (Ebrill *et al*., 2001).

Considering the methods used for calculating VAT liability found in VAT systems, all national-level VAT systems, except that of Japan, apply the invoice credit method (Grinberg, 2009). Under the Japanese VAT, the tax liability is calculated from accounting records, as opposed to invoices. Furthermore, although output tax is calculated similarly to the invoice credit method, input tax is calculated upon a subtraction-type method where data upon taxable purchases is used, whether these purchases are from vendors or non-vendors, to calculate the liability (Schenk, 2007).

2.2.3.5.2 The accrual basis

VAT payments can be accounted for either upon a cash basis, an accrual basis or an invoice basis. Under the cash basis the time of supply is triggered when payment is made or received, in relation to the supply of goods or services. The accrual basis generally allows for a time of supply upon the earliest of the supply or receipt of goods or services, or the payment of those goods or services, or in some cases the issue or receipt of an invoice. Similar to the accrual basis, the invoice basis allows for a time of supply upon the earliest of the issue or receipt of an invoice for goods or services, or the payment of those goods or services. It must be kept in mind that although the tax liability arises at the time of supply, the tax will only be payable (or receivable if inputs exceed outputs) at the end of the accounting period in which liability arises (Schenk and Oldman, 2007).

Sunley and Summers (1995) argue that the accrual basis should be preferred, as it accords with a tax upon consumption, meaning consumption is more likely to take place upon the accrual of goods or services than when payment is made. Moreover, they mention that the main problem with the cash basis is the lengthy delays in payment that decrease the neutrality of the VAT. This is due to the time value of money and would provide for different effective tax rates between similar VAT vendors.

The accrual basis and invoice basis also provide for administrative benefits for establishing the time of supply, the delivery of goods or services, or the issue of an invoice, and can be directly linked to the relevant invoice(s). In the case of the cash basis it may be more difficult to determine whether payment has been made or received.

It should also be noted that where more than one method is allowed, a mismatch between outputs (that are deferred as payment is received) and inputs (that are immediately claimable), can cause cash flow problems for revenue services. This will especially be the case if the cash basis is allowed for VAT vendors with a high turnover. Although very little is written upon the topic, commentators seem to prefer the use of the accrual basis, which would likely include the invoice basis due to its similarities (Ebrill *et al*., 2001; Schenk and Oldman, 2007; Sunley and Summers, 1995).

Regarding the accounting basis of VAT systems, Schenk (2007) reports that most countries require taxpayers to account for VAT upon the accrual or invoice method. Many countries however, "permit specific businesses to report VAT on the cash (or payments) method of accounting" (Schenk, 2007:235). In most instances the specific businesses referred to are determined by taxable supplies not exceeding a set threshold (Schenk, 2007).

The structure of a good VAT, as set out thus far in this chapter, should be aimed towards revenue by taxing at a single non-zero rate the largest possible base of goods and services consumed, and generally not tax production. This VAT should be an invoice credit method VAT that generally uses the accrual or invoice basis of accounting.

The above description of the structure of a good VAT does not make mention of whether, or to what extent, the aim of revenue should give way for the fifth canon of taxation – taxes should be equitable. I consider this in the following sub-section.

2.2.3.6 The structure of a good VAT and equity

A major reason that the VAT has not been adopted in the United States is the perceived regressivity of a VAT (Caspersen and Metcalf, 1994). The "simple" argument made towards this perceived regressivity follows. As income rises, the amount of savings (investment) of individuals tends to increase, decreasing consumption and therefore the percentage of income expended upon taxable goods and services. There are numerous studies considering the distribution of a VAT burden and the evidence suggests that, when measured against income, most VAT systems appear to be regressive.

Warren (2008), for instance, considered 13 studies measuring the burden distribution of the VAT in OECD countries. Based upon the results of these studies, he argues that "consumption taxes have a significant regressive impact upon the distribution of household disposable income" (Warren, 2008:4). Similarly, Lora (2007) considered studies upon the VAT for seven Latin American countries and found that on average, VAT systems in these countries are strongly regressive when measured against income. However, in the case of Colombia and Guatemala, VAT systems were found

to be slightly progressive (Lora, 2007).[139] Decoster (2010) also shows that in the case of Belgium, Greece, Hungary, Ireland and the UK, the VAT is regressive when measured against income.

From these results it seems that the argument made above towards the perceived regressivity of the VAT holds true in most instances. There are however potentially a few gaps in this argument.

The first and major gap in this argument is that it is not the VAT in isolation that has an impact upon the welfare (income in this instance) of individuals, but rather the entire tax and transfer system. Governments have a variety of tax and transfer tools that can be used to obtain tax revenue in an equitable manner. Increased tax revenues allow for increased public expenditures, a portion of which can be transferred to lower ability individuals. A regressive VAT, coupled with good expenditure policies, may therefore in some instances assist towards a more progressive tax system (Ebrill *et al*., 2001).

The second gap is that when measuring the distribution of a tax burden at a single point in time, the impact of the tax over an individual's lifetime is not considered (Levhari and Sheshinski, 1972). An individual may only temporarily have a low income and such a measure would therefore not be indicative of his/her welfare (OECD, 2012). Furthermore, when considering the income of individuals, this measure could in some instances be a poor indication of an individual's ability to consume (Caspersen and Metcalf, 1994). Consumption could therefore be regarded as a better measure of welfare and has been proposed by Poterba (1989) as a measure to indicate life-time income.

Taking this last 'gap' into account, the following argument can be made: as consumption rises, welfare rises and a flat tax upon all consumption would therefore be proportional. From this argument it follows that exemption and zero-rated items introduced for distributional reasons could provide for a progressive VAT (when measured against consumption). I consider whether this argument holds empirically.

[139] Lora (2007) does not provide reasons for this progressivity. In the case of Colombia, an increased rate is applied to luxury goods (similar to an excise tax) and this could potentially be responsible for this progressivity. In the case of Guatemala it is less apparent, based upon the structure of the VAT, as to what the cause or causes of the progressivity could be.

Both Steiner and Soto (1999) and Zapata and Ariza (2005) found the Colombian VAT to be slightly progressive when measured against consumption. Similar results were found by Refaqat (2003) for the VAT in Pakistan. The VAT was found to be progressive when measured against consumption by Sahn and Younger (1998) for Côte d'Ivoire, Guinea and Tanzania. The same applies to the VAT systems of Madagascar, Ethiopia, Russia and the Dominican Republic (Younger *et al*., 1999; Muñoz and Cho, 2003; Decoster and Verbina, 2003; Jenkins *et al*., 2006). Recently Decoster (2010) showed that in the case of Belgium, Greece, Hungary, Ireland and the UK, the VAT is proportional or progressive when measured against consumption.

From these results it can be argued that "recent work is challenging any notion that the VAT is an inherently regressive tax" (Ebrill *et al*., 2001:110). Rather, when considered against consumption, the VAT appears to be a proportional or progressive tax.

From the above arguments it would appear that the canon of equity is of lesser importance when considering the structural features of a good VAT. It should however be kept in mind that these features are provided from the perspective of economy and law. As suggested by Poterba (1999), tax policy researchers may do well to also consider political factors, since these factors are a fundamental determinant of the tax system. Although this study is primarily concerned with an economic and legal perspective, the perspective of politicians towards the importance of equity in the VAT should perhaps not be ignored.

Farnham (1990) reviewed the theories upon political decision-making from a psychological perspective and described one dominant feature of political decision-making as acceptability. Farnham (1990:97) writes:

> Obviously, a political approach to decision-making will be directed at the achievement of effective action in the political context. The dominant concern of the political decision maker therefore will necessarily be whatever best promotes such effectiveness. In the political context that quality is acceptability. Alexander George, for example, has described the basic requirement for effective political action as "…the need to achieve sufficient consensus in support of … policies and decisions..." That is to say, in order to be effective in the political context, a decision must be acceptable to some

> minimum number of relevant individuals and groups… This dominant concern with acceptability distinguishes a political decision-maker from an analytical one whose behaviour is driven by the need to maximize utility in general.

Farnham (1990) further contends that the realities of power are always to a certain degree behind the need for acceptability. She writes:

> In fact, in the political context the concepts of power and acceptability are inextricably connected. Even in a democratic society, the need for consensus does not spring solely from a democratic ethos or a constitutional requirement. Ultimately, it is the fact that groups and individuals possess some degree of power that makes their consent a requirement of effective action (Farnham, 1990:97).

It would therefore appear that in considering the structure of a good VAT, and perhaps more relevant to this study, considering policy changes based upon this structure, it should be deliberated whether policy changes will be politically acceptable. This acceptability is not by the politicians themselves, but by groups and individuals.

Considering equity and the VAT it therefore seems most likely that these “groups and individuals” who in a democratic society should include ordinary citizens, do not all take the economists’ view that equity should be considered taking into account the tax and transfer system. They may further also not take the view that consumption may be a better base to determine the equity of the VAT. It appears by taking into account political acceptability, we may well be back at the “simple” argument of the perceived regressivity of the VAT.

2.3 Conclusion

Although the structure discussed in the chapter goes some way towards describing a good VAT, tax policy can never be the case of “one size fits all” (Bird, 2005). Each country faces its own unique political, administrative, compliance and other problems and good tax policy should take account of such factors. This said, changes from the structure of a good VAT as described, should be based upon good empirical evidence, coupled with an understanding of the impact of those changes and whether the VAT is the best tax tool in meeting the objectives that these changes set out to achieve.

Based upon the canons of taxation, in this chapter I described the structure of a good VAT. From the evidence upon the extent that VAT systems align with the structure of a good VAT, it would appear that VAT systems employ some questionable policies. VAT systems often tax production, do not apply the largest possible base of goods and services consumed and apply too low registration thresholds.

In addition VAT systems, and especially VAT systems based upon the EU Model, are riddled with non-standard exemptions and zero ratings and many make use of multiple standard rates. These structural features go against the logic of the VAT. There are therefore likely revenue, economy, neutrality and efficiency gains that could be obtained by better aligning VAT systems with the structure of a good VAT.

In the following chapter I consider the pile of sand that is South African VAT and how this pile is aligned with the structure of a good VAT.

CHAPTER 3:
THE SOUTH AFRICAN VAT

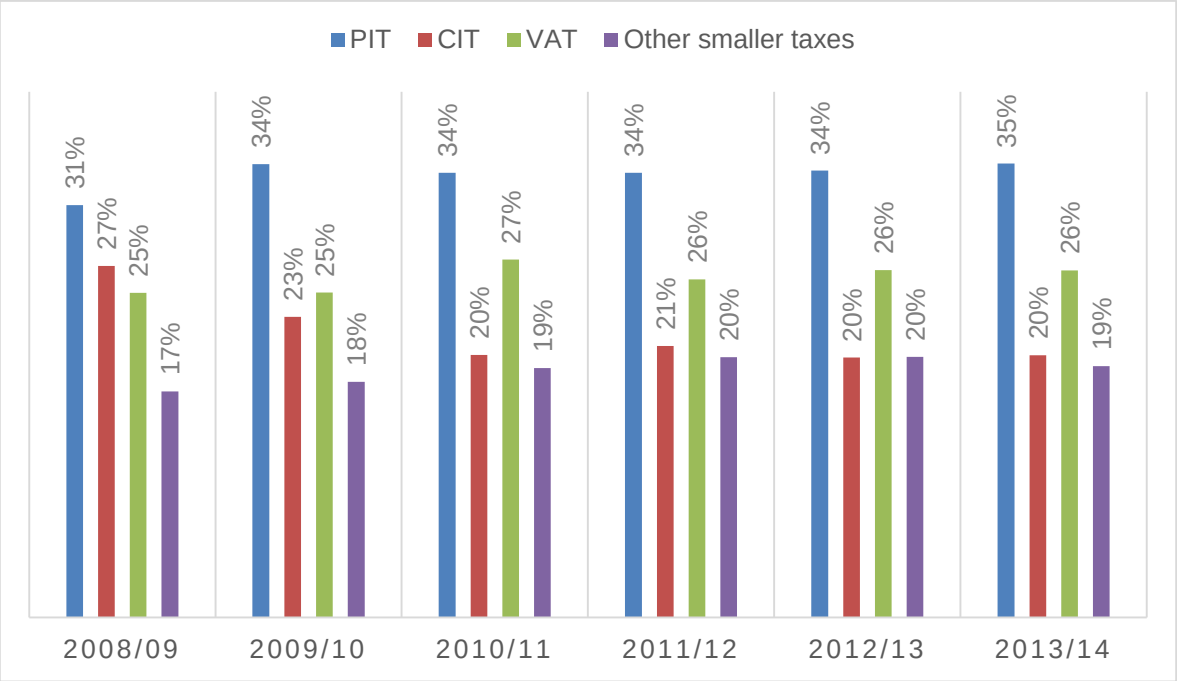
In the previous chapter I divided the pile of sand that is a good VAT into different structural features used to describe this pile. The main aim of this chapter is to divide the pile of sand that is the South African VAT (for the remainder of the study referred to as "the VAT") based upon its structural features, and thereby determine the extent that it aligns with the structure of a good VAT. The purpose of this approach is to identify policy changes that can be considered in addressing the challenges faced by South Africa. Moving towards this purpose, I first provide context to the VAT by briefly establishing its role in one pile of sand of which it is a part – the South African tax system, as well as giving a brief overview of the origin and development of the VAT.

3.1 The role of VAT in the South African tax system

The South African tax system[140] can be divided into four piles. The personal income tax[141], the corporate income tax, the VAT and other smaller taxes. The economic base of the personal income tax and the corporate income tax is income. The economic base of the VAT is (primarily) consumption. The economic bases of the smaller taxes (these include fuel levies, customs duties, excise taxes, transfer duty, and estate duty) is wealth or selective consumption. These four piles are generally accountable for approximately 90 percent of consolidated tax revenue (Tax Statistics, 2014).[142] The first three of these four piles are generally accountable for approximately 80 percent of the total tax revenue (refer to Figure 1).

[140] I do not consider taxes charged at a municipal level.
[141] This includes withholding taxes upon wages by corporations.
[142] Consolidated revenue includes tax revenue, non-tax revenue (for instance mining leases and ownerships) and revenue from provinces, social security and selected public entities. Payments to the Southern African Customs Union (SACU) are deducted from these revenues to obtain consolidated revenue.

Figure 1: Contribution of taxes to total tax revenue



Source: Tax Statistics, 2014. PIT = Personal income tax, CIT = Corporate income tax.

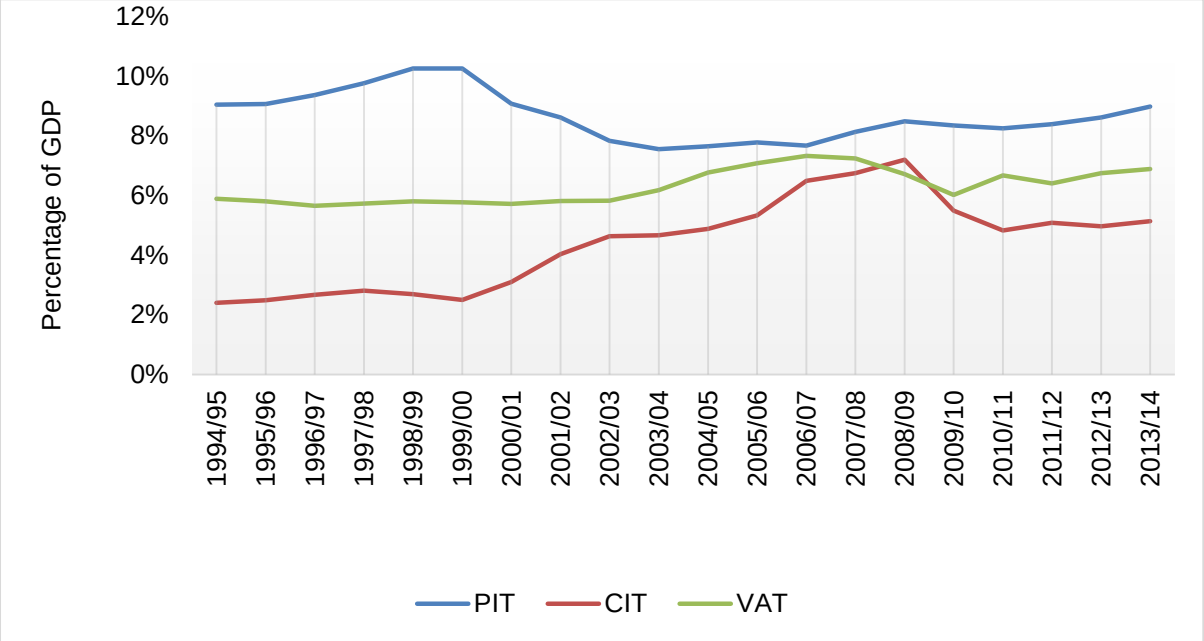
It is evident from Figure 1 that for the 2014 year of assessment, personal income taxes accounted for 35 percent of total tax revenue, which was paid by 5.2 million individuals from the South African population of approximately 55 million individuals (Tax Statistics, 2014). Over the same period, corporate income taxes accounted for 20 percent of total tax revenue, paid by 625 808 companies. The VAT accounted for 26 percent of the total tax revenue and is most likely the only one of the three major taxes that is paid by all (or very nearly all) citizens.[143]

The VAT is also consistently (except for a brief period between 2008 and 2010) the second largest contributor to tax revenue (refer to Figure 2). It can further be seen in Figure 2 that revenue collected from the corporate income tax sharply decreased between 2008 and 2011 and has since not greatly increased. This decrease in the revenue from the corporate income tax potentially shifted pressure onto the VAT and personal income tax to maintain the revenue collected from the South African tax

[143] It may well be argued that corporate income taxes are shifted towards consumers and therefore indirectly paid by consumers. Paid therefore means a visible payment of the tax (not necessarily to revenue services).

system.[144] The VAT therefore plays an important role in the South African tax system.

Figure 2: The revenue collected from South African taxes



Source: Tax Statistics, 2014.

In the following section I consider the origin and development of the VAT.

3.2 An overview of the origin and development of the South African VAT

Following a detailed enquiry by the *Commission of Enquiry into Fiscal and Monetary Policy in South Africa* (referred to as the "Franzsen Commission") it was recommended in a report, published in 1968, that a greater emphasis be placed upon indirect taxes (Franzsen Commission, 1968). At this time South Africa levied indirect taxes in the form of customs duties, excise duties, stamp duties, transfer duties and a securities tax.

In placing a greater emphasis upon indirect taxes, the Franzsen Commission considered the introduction of a VAT, but stated:

> "As regards a value-added tax, it would appear, as far as the Commission is able to judge at this juncture, that the advantages which it offers over the other systems would not at present compensate for the higher administrative costs which it involves. Since South Africa has not had any practical

[144] It is likely that government adjusted expenditure in response to the increase in tax revenues before the decrease in revenues from the corporate income tax in the period between 2008 and 2011. It may be difficult to cut these expenditures from the budget.

> experience of a sales tax, it would be advisable to start with a reasonably simple system" (Franzsen Commission, 1968: 41).

Following the report of the Franzsen Commission, South Africa first introduced a selective sales tax (upon mostly luxury goods) followed by a general sales tax (as it was called), the latter implemented upon 3 July 1978 (Hanlon, 1986). In introducing the general sales tax, the then Minister of Finance proposed that one of the main objectives of this tax was to keep the tax rate as low as possible and the base of the tax as broad as possible (Margo Commission, 1987). Furthermore, the tax would be levied upon all purchases not intended for resale or processing and have a constant aim of excluding production from the tax base (Margo Commission, 1987).

In 1987, almost ten years after the introduction of the general sales tax, the *Commission of Enquiry into the Tax Structure of the Republic of South Africa* (referred to as the Margo Commission) reconsidered whether the general sales tax should be the preferred broad based consumption tax for South Africa. In so doing, the Margo Commission mentioned some disadvantages of a sales tax, including that "it is generally regressive, it may lead to double taxation, and it can be relatively easily evaded by understatement of sales" (Margo Commission, 1987).

In considering these disadvantages it was mentioned that "in the case of South Africa, although the general sales tax is regressive[145], it is not nearly as marked as would be expected" (Margo Commission, 1987:332). Regarding double taxation, the Margo Commission suggested that if the rate of the general sales tax were to increase, tax cascading would become problematic. It also mentioned that "evasion under the general sales tax is a serious concern, although the advantage of not taxing production outweighs this disadvantage" (Margo Commission, 1987).

Based upon these observations, the Margo Commission recommended to government either a rate decrease in the general sales tax, or the introduction of a VAT. Two major reasons for the introduction of a VAT were given. The first was that a VAT cannot be as easily evaded as the general sales tax.[146] The second was that if a VAT was introduced, it might be "easier" (perhaps meaning more acceptable

[145] This was based upon the proportion of income expended upon the tax.
[146] This is due to the matching of inputs and outputs under the VAT by way of invoices. The general sales tax was designed as a retail stage tax (although in practice business inputs were often taxed).

from a political perspective) to apply a broader base to this new tax than broadening the base of the general sales tax (Margo Commission, 1987).

Government accepted the recommendation of the Margo Commission to introduce a VAT and a draft Value-Added Tax Bill was released upon 18 June 1990, containing the "Government's preliminary proposals for the introduction of the tax" (VATCOM, 1991:2). In this bill it is mentioned that the intention was to introduce a VAT with a single non-zero rate, which applies the destination principle, it is not levied upon production (as the then general sales tax often was) and follow the invoice credit method. The base of the VAT should be as broad as possible and not allow for favoured treatment of certain goods and services or groups of people by way of zero rate or exemption (VATCOM, 1991). The government's preliminary proposals upon VAT were fundamentally based upon the Modern VAT Model.

A Value-Added Tax Committee[147] (referred to as VATCOM) was appointed to consider the comments and representations made in relation to the draft Value-Added Tax Bill. VATCOM recommended a single standard rate at 10 percent and agreed in principle with the government's preliminary proposals. VATCOM further recommended that a limited number of basic foodstuffs[148], certain farming inputs, goods consumed outside the Republic and fuel be zero-rated. In addition the committee recommended that supplies by the state, educational services, financial services (including fee-based financial services), supply of residential accommodation in terms of an agreement of letting and transport services be exempt.

The VAT[149] consequently replaced the general sales tax upon 30 September 1991. This VAT initially applied a single standard rate of 10 percent which increased to 14 percent in 1993. The VAT further applied the destination principle and used the invoice credit method and accrual basis[150] of accounting. After initial implementation

[147] This committee was appointed by the then Minister of Finance upon 19 February 1991. The committee consisted of sixteen members and the Chairman was Dr G. Marais.
[148] The VATCOM Report mentions maize products, rice, bread and milk powder in this regard.
[149] I do not consider the major structural aspects (besides the rate) of the VAT here, as much of the remainder of this chapter is aimed towards doing so.
[150] VAT vendors with taxable supplies less than R2.5 million may apply to the Commissioner to make use of the cash basis of accounting. It should perhaps be mentioned that from practical experience I have come to the perception that the Commissioner does not always (or easily) allow for this basis to be used.

the only considerable[151] changes in structure of the VAT were the inclusion of most fee-based financial services in 1996 following a report by the *Commission of Inquiry into Certain Aspects of the Tax Structure of South Africa* (referred to as the Katz Commission), an increase of the compulsory registration threshold (from R300 000 to R1 million) in 2008 and the voluntary registration threshold (from R20 000 to R50 000) in 2010.

3.3 The South African VAT structure and the structure of a good VAT

In this section I first consider the extent that the VAT is aimed towards revenue by exploring its revenue performance. Hereafter I divide the VAT based upon its structural features by using the same division of major structural aspects of VAT systems described in Section 2.2.3.3.4. These are the registration threshold and the tax base. It has already been mentioned that the VAT applies a single non-zero rate of 14 percent and the rate will therefore not receive any further attention in this chapter.[152] Lastly, I also consider "the structure of the South African VAT and equity".

3.3.1 Revenue performance of the South African VAT

In exploring the revenue performance of the South African VAT, I first consider the VAT revenue collected and the main sources of VAT revenue, followed by the efficiency and C-efficiency measures and the buoyancy of the VAT.

3.3.1.1 VAT revenue and the main sources of VAT revenue

The latest available figures (refer to Table 14) indicate that the VAT makes a consistent contribution to revenue (the average year-on-year growth in revenue is 9.4%[153]) and in 2013/2014 it contributed approximately R237.7 bn of total tax revenue (R900 bn) (Tax Statistics, 2014). Of this amount, import VAT contributes R131 bn. The remainder can be attributed to the economic sectors within South Africa. Table 15 indicates the net contributions (VAT outputs less VAT inputs) for each economic sector and the size of each sector (as a % of contribution towards GDP[154]) for the 2014 financial year.

---

[151] Considerable in this context means changes that are not for the purpose of clarification of how the VAT law should be interpreted.
[152] It has also been mentioned that the VAT applies the destination principle, the invoice credit method and the accrual basis[152] of accounting and these features will not be revisited.
[153] This is based upon the total net VAT for each year in Table 2.
[154] Data provided is for quarter three of 2014.

Table 14: VAT revenue collected in R million

Year	Domestic VAT	Import VAT	Gross	VAT refunds	Total net VAT
2008/09	187 171	92 010	**279 181**	-124 838	**154 343**
2009/10	195 050	70 320	**265 370**	-117 428	**147 941**
2010/11	205 029	82 189	**287 217**	-103 646	**183 571**
2011/12	220 215	101 813	**322 028**	-131 008	**191 020**
2012/13	242 416	111 427	**353 843**	-138 820	**215 023**
2013/14	263 461	131 085	**394 546**	-156 879	**237 667**

Source: Tax Statistics, 2014.

Table 15: Net VAT contribution by economic sector in 2014

Sector	Sector size (% of GDP)	Net Contribution
Agriculture, forestry and fishing	2.6	- R4,2bn
Mining and quarrying	8.8	- R24,7bn
Manufacturing	13.4	R11,4bn
Electricity, gas and water	3.8	R2,7bn
Construction	4.0	R12,3bn
Wholesale, retail, catering and accommodation	14.4	R12,6bn
Transport, storage and communication	10.1	R12,1bn
Finance, real estate and business services	20.3	R74,9bn
Community, social and personal services	5.8	R6,9bn
All other sectors (mainly government services)	16.8	R18bn

Source: Data obtained from Statistics South Africa, 2014 and Tax Statistics, 2014.

From Table 15 it is evident that the finance, real estate and business services sector made the largest VAT revenue contribution. Besides being the largest economic sector in South Africa, there are generally fewer input credits for services as opposed to goods and a large amount of value added by the performing of services.

The mining and quarrying sector contributed 8.8 percent towards GDP, but generated a VAT loss of R24.7 bn. This is likely due to input deduction allowed on investments, coupled with a large amount of exported and therefore zero-rated items supplied in this sector. It should be noted that although this can be argued as a ‘cost’ in using the destination principle, the value added to imported products in export countries (who also use the destination principle), contributes to VAT revenue in the form of import VAT. Furthermore, not applying exemptions or disallowing inputs in this sector is likely to incentivise investment and potentially increase tax revenue from the corporate income tax.

The tax loss in the agriculture, foresty and fishing sector can likely be ascribed to a combination of input credits coupled with exported goods and the supply of foodstuffs of which many are zero-rated. The same argument as above can be made in respect of the exported goods, but the local supply of zero-rated foodstuffs is a pure tax loss. This and other tax losses are indicated by refering to the efficiency and C-efficiency measures of the VAT.

3.3.1.2 The efficiency, C-efficiency and buoyancy of the South African VAT

Similar to the indications of revenue performance of VATs in the previous chapter, I provide estimates of the efficiency and C-efficiency of the VAT for the past five years with respect to all supplies. I also provide estimates of the buoyancy of the South African VAT for the period from 2002 to 2012, measured against GDP and consumption. The results of these estimations are provided in Table 16 and 17 (the notations for these estimations are Notations 3 to 7, provided in the previous chapter).

Table 16: Efficiency and C-efficiency of the South African VAT

Year	GDP (Bn)	Consumption (Bn)	VAT Revenue (Bn)	VAT rate	Efficiency	C-Efficiency
08/09	R2 395.969	R1 727.850	R154.3997	14%	0.46	0.64
09/10	R2 664.269	R1 896.098	R161.65035	14%	0.43	0.61
10/11	R2 964.261	R2 079.820	R183.377776	14%	0.44	0.63
11/12	R3 155.195	R2 273.335	R190.86105	14%	0.43	0.60
12/13	R3 385.369	R2 465.507	R214.850064	14%	0.45	0.62

Source: Data obtained from International Financial Statistics (IMF database), the Government Financial Statistics (IMF database) and National Treasury and SARS (2010-2013).

Table 17: Buoyancy of the South African VAT

Variable	Coefficient	Standard error	Probability.
GDP	1.017327	0.073702	0
Consumption	1.02217	0.067724	0

Source: International Financial Statistics (IMF database) and the Government Financial Statistics (IMF database).

Referring to Table 16 it is evident that the South African VAT has a better efficiency and C-efficiency when compared to the average efficiency and C-efficiency of any income group of countries (refer to Table 3 and Table 4 in the previous chapter). From all the countries considered, South Africa's efficiency and C-efficiency is on average 28th and 19th highest, respectively.

In the past five years, the South African Value-Added Tax Act 89 of 1991 (herein after referred to as the "VAT Act") has been amended (for the purposes of clearer interpretation of the tax law), by an increase in the compulsory threshold in 2008 and an increase in the voluntary threshold in 2010 (mentioned in Section 3.2). The only zero ratings or exemptions introduced concern exempting the supply of goods or services to members from bargaining councils or political parties with membership contributions as consideration (introduced in 2012/2013).

It is interesting to note that the C-efficiency decreased in 09/10 and again in 11/12 (the year following the increase in thresholds). Since increasing the threshold will decrease the tax base and potentially[155] revenue, it is possible that the decrease in C-efficiency is partly as a result of the change in thresholds. Changes in C-efficiency could also be as a result of a change in compliance to the VAT (since the VAT gap is influenced by the policy gap and the compliance gap).[156]

It is further evident that although the VAT revenue is growing at a rate greater than one[157] (refer to Table 17), the amount of revenue that the VAT generates is not at its theoretical optimum, since the efficiency ratio and C-efficiency is less than one. An exploration of the major structural aspects of the VAT is likely to provide additional insight into these measures. I first consider the registration threshold.

3.3.2 The South African VAT registration threshold

A vendor for the purposes of the VAT is any person who is registered for VAT or is required to be registered for VAT. The VAT has a compulsory registration threshold of R1 000 000 taxable supplies over a period of 12 months[158] or R50 000 taxable

[155] It is also possible that vendors who may or have to deregister, claimed input taxes exceeding output tax (although it may be potentially challenging to get these firms deregistered).
[156] It should be noted that an empirical estimation of the compliance gap (which is beyond the scope of this study) as provided by Keen (2013) would provide a better indication of this suggestion.
[157] A VAT buoyancy greater than one was mentioned to be regarded as sufficient in the previous chapter.
[158] The period of 12 months is both the coming 12 months and the preceding 12 months. This means that if a person made taxable supplies exceeding R1 000 000 in the preceding 12 months, that person must register for VAT. Also, if a person is expected to make taxable supplies in the coming 12 months, that person must register for VAT at the beginning of the 12 month period. The latter mentioned approach (coming 12 months approach) has seen a great administrative burden arise for vendors that did not register at the beginning of the 12 month period. Since a vendor includes a person who is required to be registered for VAT, a person is regarded as having been a vendor from the beginning of the 12 months. In most instances, such a person did not include VAT in invoicing the supply of goods and services. As the VAT that should have been invoiced is required to be paid, such a person would have to re-invoice all supplies in the period between when the person was required to register and when they actually registered.

supplies a month in the case of persons supplying electronic services from outside South Africa. Persons can also register voluntarily if they made, or it is expected that they will make, taxable supplies in excess of R50 000 over a period of 12 months. Table 18 provides data upon the VAT revenue per turnover group[159] for the 2014 financial year.

Table 18: VAT revenue by turnover group (2014)

Turnover group (Annual turnover)	Number of vendors	Payments (R mil)	Refunds (R mil)	Revenue net of refunds (R mil)
= 0	28 180	2 060.93	-5 141.88	-3 080.95
1 to 50 000	12 044	71.01	-800.10	-729.09
50 001 to 100 000	13 642	121.55	-796.21	-674.66
100 001 to 200 000	21 776	282.92	-772.56	-489.63
200 001 to 300 000	18 104	361.41	-548.15	-186.73
300 001 to 500 000	28 876	846.59	-605.76	240.83
500 001 to 700 000	23 286	967.51	-960.74	6.77
700 001 to 1 000 000	28 227	1 575.29	-633.35	941.94
1 000 001 to 2 000 000	62 235	5 694.38	-1 692.08	4 002.30
2 000 001 to 3 000 000	35 945	5 199.32	-1 307.22	3 892.11
3 000 001 to 5 000 000	39 881	8 461.27	-2 127.54	6 333.73
5 000 001 to 10 000 000	40 608	13 737.17	-3 573.82	10 163.35
10 000 001+	14 650	222 755.67	-139 024.02	83 731.65
Total	**367 454**	**262 135.02**	**-157 983.43**	**104 151.62**

Source: Tax Statistics, 2014.

From Table 18 it can be calculated that of the 367 454 (total number of vendors in Table 18) economically active registered vendors, 174 135 (47.4%) had a turnover of less than R1 000 000 and are therefore voluntarily registered. These voluntarily registered vendors made a net revenue contribution (rather a loss) of minus R 3 971.52 million. Allowing persons to voluntarily register, although increasing the economy and neutrality of the VAT, results in a tax loss for South Africa. It should also be kept in mind that administrative costs and compliance costs for these 47.4 percent of vendors can be added to this revenue loss.

The greater part of this tax loss is attributable to vendors who are voluntarily registered, but whose turnover does not (yet) exceed R50 000. This group of vendors consists of vendors who are correctly registered, their turnover is expected

[159] Turnover is based upon the amount of taxable supplies under the VAT in a period of 12 months. Import VAT is not included in this table since it is collected primarily by customs and postal offices.

to exceed R50 000 in a period of 12 months, and vendors who are registered, but should be deregistered. These 40 244 (10.9%) vendors made a net revenue contribution (loss) of minus R3 810.04 million. It can be expected that a large portion of this amount is due to start-up capital costs[160] (perhaps especially in the mining and quarrying sector), but due to data limitations, it is not possible to determine the extent that these losses should be a point of concern.[161]

Vendors (52.6%) who are compelled to register (turnover exceeding R1 000 000) made a net revenue contribution of R108 123 million (103.8%). Vendors (3.9%) with a turnover exceeding R10 000 000 made a net revenue contribution of R83 731 million, that is 80 percent of total VAT revenue.

Although an analysis of the optimal VAT threshold, taking into account the compliance costs, marginal cost of public funds and administrative costs (refer to Keen and Mintz, 2004), is required for South Africa, due to data limitations it is beyond the scope of this study to do so. Yet with reference to Table 18 it appears that the compulsory registration threshold is set at an adequate level. Without additional data (that is unfortunately not available), it is difficult to gauge whether the voluntary threshold is set at an adequate level and whether its benefits exceed its costs.[162]

3.3.3 The South African VAT base

In terms of the basic charging provision (Section 7) of the VAT Act, all supplies of goods and services by a vendor in the course or furtherance of an enterprise, as well as imported goods by any person, are taxable. Imported services by any vendor are also taxable to the extent that they are imported for purposes other than making taxable supplies (commonly referred to as the “reverse-charge rule”). Imported services by non-vendors are taxable by way of self-assessment. Certain supplies of goods or services are also zero-rated (Section 11) or exempt (Section 1 and Section 12) from VAT. Table 19 provides a detailed summary of these supplies (in order of

[160] This is likely also the main reason for the negative revenue net of refunds for other turnover groups in Table 18 (turnover below R300 000). Export zero ratings likely also add to the negative revenue net of refunds for these turnover groups.
[161] There is no data readily available regarding the type of vendors that received the input VAT that resulted in this tax loss.
[162] It should be considered that once a person registers for VAT, the output tax paid upon the capital investments of that vendor before registration will become deductible. If the voluntary threshold is removed, much of the current tax losses associated with vendors who are currently voluntarily registered can be expected to result in tax losses when compulsorily registered.

subsections in the VAT Act). The purpose/reason of these zero ratings and exemptions are also keyed, with [D] = destination principle, [EC] = economy, [EF] = efficiency, [EQ] = equity, [PNC] = PNC Sector, [HTT] = Hard-to-tax, [NS] = non-supply.[163]

Table 19: Zero ratings and exemptions under the South African VAT

Zero ratings (Section 11 of the VAT Act)	General exemptions (Section 1)
Exported goods and services, together with goods and services supplied as part of exportation [D]	Any person who is either not a vendor or not making taxable supplies in the course or furtherance of an enterprise. Employees and private recreational supplies are specifically excluded [NS]
Supplies in an export country (except land) [D]	Public bodies are not regarded as vendors, unless required to register due to competing with other vendors (in this case referred to as designated entities) [PNC]
Supply of a going concern or part of a going concern [EF]	Religious institutions are not regarded as vendors to the extent that they do not charge a consideration for goods and services [PNC]
Supplies for the purposes of producing currency [PNC]	**Specifically listed exemptions (Section 12)**
Supplies of goods used for farming purposes [EF] [EQ]	Supply of non-fee based financial services [HTT]
Supply of fuel and similar oils used for travel or heating [EC]	Some supplies by registered associations not for gain [PNC]
Supply of basic foodstuffs [EQ]	Supply of residential accommodation and land under an agreement of letting and hiring thereof [HTT]
Supply of certain gold coins that can be used as currency, although not actual currency [NS]	Supply of land in export country [D]
Supplies to a customs control area enterprise [D]	Management services of a body corporate, share block company or housing development scheme paid by way of levies [NS]
Certain triangular supplies if full input credits will be granted [EF]	Supply of transport services in South Africa to fare paying passengers upon road or rail [EF] [EQ]
Supplies of 'controlled animals' to public authority [PNC]	Supply of educational services [PNC]
Land reclaims [NS]	Supply by employee or membership organizations to members [NS]

[163] These groupings were done with reference to explanatory memoranda and notices issued by SARS, as well as reports by previous tax committees of South Africa, especially VATCOM. In instances where no explanation towards a base change was available, I referred to general consensus found in the literature as to the reason for a base change, such as Bird and Gendron, 2007 and Ebrill *et al*., 2001.

Supplies of inbound duty and tax free shops [D]	Supplies by a crèche or after school care [PNC] [EQ] [EF][164]
Transport services with an international connection and other services surrounding this service [D]	Supplies by non-residents to customs storage warehouses [D]
Services to foreign rail way trains [D]	
Certain services supplied to non-residents [D]	
Intellectual property rights for use outside of South Africa [D]	
Services of a welfare organization [PNC]	
Vocational training of foreign employees [D]	
Certain services supplied to a public authority or municipality [PNC]	
Certain supplies that should not be regarded as services supplied [NS]	

Source: The South African Value-Added Tax Act 89 of 1991 (as amended).

In the previous chapter I argued that the tax base structure of a good VAT should have a main aim of taxing revenue, production should generally not be included (in the tax base) and the broadest possible range of goods and services that are consumed should be included (in the tax base). I further argued that the destination principle should be applied and that exempting non-supplies, only health and basic education in the PNC Sector, residential immovable property, non-fee based financial services and farming in developing countries is inevitable or recommended.

It is evident from Table 19 that the application of the destination principle accounts for eight zero ratings and two exemptions. Furthermore, exempting non-supplies accounts for three exemptions. With regard to immovable property, the supply or letting of commercial property is subject to VAT at the standard rate. The letting (including imputed rental values) of residential property is exempt (hard-to-tax). Similar to New Zealand, the supply of residential property is subject to VAT at the standard rate, but it is the practice of SARS to exempt the supply of residential immovable property, unless that property is newly developed or sold by a developer. Financial services, excluding fee-based financial services, are exempt (hard-to-tax)

[164] This is not discussed later, but many after school and crèche services in South Africa are performed by public schools (which are exempt from VAT). Only exempting the public schools crèche and after school services will therefore result in economic and neutrality costs. Some crèche and after school services are located in rural areas that may involve large administrative costs in collecting VAT from their supplies.

and inputs to farming are zero-rated. All these zero ratings and exemptions are aligned with the structure of a good VAT.[165]

There are also two zero ratings that only apply if the supply is between registered vendors. This is the supply of a going concern and certain triangular supplies. As mentioned in the previous chapter, zero ratings between registered vendors will not create an economical, neutrality or revenue cost and could likely increase efficiency as a result of a cash flow benefit to purchasing vendors (the vendor would have paid the output tax and claimed the input VAT). These zero ratings could therefore be regarded as associated with the structure of a good VAT.

There are also three zero ratings that can be viewed as providing clearer interpretation to certain supplies that should not be regarded as a taxable supply in terms of the VAT Act (non-supplies). The first is the supply of certain gold coins, similar to currency. The supply of currency is not regarded as a supply of goods or services in terms of the VAT Act, and VAT should therefore not be charged upon these supplies.

The second is a supply as a result of a land reclaim. Such a supply does not constitute a supply in the course or furtherance of an enterprise (Section 19). An enterprise is defined in Section 1 of the VAT Act as "…any activity that is carried on continuously or regularly by any person in the Republic…" Since a land reclaim would not constitute a continuous or regular activity, a supply of land by way of reclaim is not charged with VAT.[166] The last of non-supplies regards services that are not supplied by a person (e.g. that are supplied by a horse) or services which are taxed when imported (in terms of import VAT).

After removing the zero ratings and exemptions that align or are associated with the structure of a good VAT, or are non-supplies from Table 19, I obtain Table 20. This table therefore identifies the zero ratings and exemptions that do not align with the structure of a good VAT.

[165] South Africa is a developing country and although the farming sector is not exempt (which is mentioned to be the long term objective to taxing farming in Chapter 2), zero rating the inputs to farming may be recommended in a developing country (discussed in Chapter 2).
[166] This is zero-rated, for if it were exempt and a vendor purchased the land for commercial purposes, the input tax claimed by such a vendor would have to be refunded upon the reclaim of the land.

Table 20: Zero ratings and exemptions that do not align with the structure of a good VAT

Zero ratings (Section 11 of the VAT Act)	General exemptions (Section 1)
Supplies for the purposes of producing currency [PNC]	Public bodies are not regarded as vendors, unless required to register due to competing with other vendors (in this case referred to as designated entities) [PNC]
Supplies of 'controlled animals' to public authority [PNC]	Religious institutions are not regarded as vendors to the extent that they do not charge a consideration for goods and services [PNC]
Services of a welfare organization [PNC]	**Specifically listed exemptions (Section 12)**
Certain services supplied to a public authority or municipality [PNC]	Some supplies by registered associations not for gain [PNC]
Supply of fuel and similar oils used for travel or heating [EC] [EQ]	Supply of educational services [PNC]
Supply of basic foodstuffs [EQ]	Supply of transport services in South Africa to fare paying passengers upon road or rail [EF] [EQ]
	Supplies by a crèche or after school care [PNC] [EQ] [EF]

From Table 20 it is evident that the majority of zero ratings and exemptions that do not align with the structure of a good VAT relate to supplies by/to the PNC Sector. As discussed in Section 2.2.3.3.3.3, under a good VAT only health and basic education in the PNC Sector should be exempt. South Africa therefore may do well to move towards full taxation in this sector. It is however also mentioned that developing and transitional countries should not pioneer in this area and that full taxation could constitute political suicide. For the purposes of this study, I therefore do not regard full taxation of the PNC Sector as a viable policy change to be considered.[167]

Disregarding the supplies relating to the PNC Sector leaves only two zero ratings and one exemption that do not align with the structure of a good VAT. The exemption is for the supply of transport services in South Africa to fare paying passengers upon road or rail. As previously mentioned, this exemption was recommended by VATCOM (1991) and two main reasons are provided for this exemption. The first is that collecting VAT from the suppliers of transport services (especially smaller traders and minibus drivers that mainly operate on a cash basis and do not invoice customers) will create large administrative and compliance costs,

[167] It may well be necessary for developed countries to "pioneer" in this area, before such a tax policy change should be considered.

decreasing the efficiency of the VAT (VATCOM, 1991).[168] Exempting these supplies will have a lower efficiency cost, but also ensure that revenue is contributed by these supplies (as opposed to zero rating these supplies). The second is that many poorer individuals make use of these transport services (not owning a motor vehicle) and taxing these supplies will therefore be regressive (and maybe not acceptable from a political perspective) (VATCOM, 1991).

The first of two zero ratings that are not aligned with the structure of a good VAT, is the supply of fuel and oil for travel or heating. This zero rating was also recommended by VATCOM. The reason for the zero rating is that upon the introduction of the VAT, South Africa already had an efficient fuel levy[169] being charged upon the sale of fuel (VATCOM, 1991). It is argued by VATCOM (1991) that the fuel levy can be regarded as similar to taxing fuel under the VAT and may provide for "tighter control" in the collection of the tax. If zero-rated, there will not be any compliance costs for fuelling stations.[170]

The second zero rating that does not align with the structure of a good VAT is the zero rating of basic foodstuffs. The reason for this zero rating is to decrease the burden of the VAT upon poorer individuals (VATCOM, 1991). At the time of the introduction of the VAT, South Africa had a narrow social expenditure system, only contributing approximately 1.7 percent of GDP towards social protection (van der Berg and Sieberts, 2012). VATCOM (1991) mentions that if all foodstuffs are to be subjected to the standard rate, effective and targeted assistance towards the needy must be in place before the tax is introduced. As this was not the case (in the opinion of VATCOM), it was recommended that maize products, rice, bread and milk powder be zero-rated. Upon introduction of the VAT, the number of zero-rated foodstuffs in the VAT Act far exceeded those recommended by VATCOM. Also, since the introduction of the VAT, targeted assistance towards the needy in the form of social grants have seen a marked increase, with more than 4 percent of GDP expended upon social grants alone.

[168] With many minibus drivers only working upon a cash basis and not providing invoices, the opportunity for evasion is apparent.
[169] This levy is paid by fuel companies per litre of fuel sold and shifted towards consumers. The levy takes into account the purchase of crude oil by petrol companies. If these fuels are purchased for heating, the fuel levy will be included in the purchase price.
[170] The levy is paid by petrol companies and these companies also claim the input tax (since they make the zero-rated supply of fuel).

The cost of zero-rated supplies to a consumer (or person unable to claim input tax) is discussed in depth in Chapter 2. These include a decrease in revenue, economy, efficiency, neutrality and certainty of the tax. VATCOM (1991) also mentioned that evasion under the VAT may increase. The benefit of zero-rated supplies, if sufficiently targeted at individuals with less ability to pay, is an increase in the equity of the tax. As noted by VATCOM (1991), if this benefit can be obtained by way of targeted assistance to the needy, then there remains no reason to implement the zero rate. The importance of this equity benefit would logically be dependent upon burden distribution of the VAT, considered in the following section.

3.4 The structure of the South African VAT and equity

As a point of departure, the economic perspective of equity is considered. As discussed in the previous chapter, it is not the equity of a single tax that is of major importance, but rather the equity of the entire tax and transfer system. The canon of equity relates to taxes being collected according to ability to pay and from the work of Mirrlees (1971), the ability to pay is influenced by the transfer system. When considering the South African tax and transfer system, it is highly progressive (World Bank, 2014).[171]

Although empirically estimated by the World Bank (2014), with only 5.5 million personal income taxpayers (from a population of approximately 55 million) and the income tax (with a progressive tax scale) providing more revenue than the VAT, little empirical estimation is required to conclude that the tax system is progressive.[172] Moreover, with direct cash transfers, free basic services and education and health spending accounting for more than 40 percent of total government spending (World Bank, 2014) and being targeted towards predominantly the needy (that likely do not pay income taxes) it appears self-evident that the tax and transfer system is highly progressive. This means that from a purely theoretical equity perspective, increasing the regressivity of the VAT (or similarly decreasing the progressivity of the income

[171] The World Bank (2014) considered the personal income tax, the VAT, excise taxes and the fuel levy. Also upon the expenditure side, the World Bank (2014) considered direct cash transfers, free basic services, and education and health spending.
[172] It can perhaps be added that much of the incidence of the corporate income tax can be expected to fall upon wealthier individuals who have shares in these corporations.

tax), could better align the tax and transfer system with the ability of individuals to pay.[173]

This said, the burden distribution of the VAT is important for two major reasons. The first is that the increasing level of income inequality is a major challenge for South Africa (as discussed in Chapter 1). Increasing this level of income inequality by decreasing the progressivity of the tax system may provide for a more equitable tax system, but may also result in an increase in conflict, a reduction in economic growth, weakened social cohesion and security and a negative effect upon sustainable development (World Economic Forum, 2015).

The second reason is that a change in VAT policy may well only be legislated if it adheres to the dominant concern of politicians, namely acceptability (Farnham, 1990). Political acceptability is likely to be closely related to income inequality, since much of the power, especially in a democratic society (like South Africa), is held by needy individuals. The consent of these individuals is potentially a requirement of effective action (Farnham, 1990) and for South Africa, the level of income inequality suggests that a great percentage of individuals are needy.[174] It may well be politically unacceptable for government to increase the regressivity of the VAT, unless perhaps this increase can be accompanied by a politically acceptable change in policy.

The burden distribution of a VAT is commonly estimated by means of a general equilibrium model or consumption model. In addition the burden distribution can be measured against income, disposable income (income less taxes plus direct transfers), a life-cycle model or consumption as an indication of life-time income (Caspersen and Metcalf, 1994).

By using a computable general equilibrium (CGE) model of South Africa with 10 representative households, each from a different income decile, Go *et al*., (2005) have found the VAT to be mildly regressive when measured against income. This study is however limited by the number of households represented and the common

[173] This is based upon the assumption that ability to pay is measured by income. This argument can also be stated as follows: If a tax and transfer system is highly progressive it means that wealthier individuals are contributing more than their ability to pay, in relation to poorer individuals (who are contributing less than their ability to pay, in relation to wealthier individuals). It should further be noted that from a social welfare perspective, depending upon the chosen social welfare function, increasing the regressivity of the VAT may provide for a decrease in social welfare.
[174] It is further well known that a large percentage of South Africans are poverty stricken (World Bank, 2014).

assumption under CGE models that the distribution of income between households, within a single decile, follows some statistical law[175] (Colombo, 2010). A similar CGE approach with similar results was adopted by Kearney (2004).

Fourie and Owen (1993) estimate the amount of VAT paid for households with the use of a consumption model measured against income, and also suggest that the VAT is mildly regressive. Although this approach can perhaps be preferred[176] to the approach adopted by Go *et al.,* (2005) and Kearney (2004), the results could be regarded as dated, especially as they relate to a period where apartheid was enforced in South Africa[177]. A more recent use of a consumption model was done by Casale (2012). This study is not orientated towards measuring the burden distribution of the entire VAT, but rather studied the distribution between specific types of taxpayers based upon consumption (Casale, 2012).

The World Bank also recently published a document regarding fiscal policy and redistribution in South Africa (World Bank, 2014). This document contains an estimation of the VAT burden distribution of individuals based upon disposable income and makes use of the same data set as the research reported in this study (IES 2010/2011). To obtain the disposable income per individual (used for purposes of income decile division), the researchers divided total household income by the number of individuals in a household (provided in the IES 2010/2011 data set). The burden distribution of the VAT was then calculated based upon the share of tax collected from each income decile to the share of total income a decile receives. By following this approach this study found the VAT to be only slightly progressive.

In measuring the total VAT burden distribution, no studies could be found that use a consumption model in the post-apartheid (i.e. post-27 April 1994) era. Furthermore, the total VAT burden distribution has not been measured against consumption (as a measure of life time income) with a comparison to income. Measuring the burden

[175] Colombo (2010) provides a number of examples of studies that specified lognormal within group distributions with exogenous variables. The mean for a group is also commonly used.
[176] Since the sample for these studies is not divided into groups, the limitation of applying a statistical law to groups does not apply.
[177] Although the Value-Added Tax Act 89 of 1991 has not seen any amendments post 27 April 1994 (the date of South Africa's first non-racial democratic elections) specifically aimed to address the regressivity of the VAT, some programmes (such as Black Economic Empowerment) have been launched to redress the inequalities of apartheid. The economic privileges provided to previously disadvantaged groups, coupled with their consumption behaviour, could influence the burden distribution of the VAT.

based upon individual households, as opposed to income deciles, could also provide for different results.

I therefore estimate the South African VAT burden distribution with reference to income and consumption by means of the structural model described in the next chapter. This model is for the purposes of this estimation the same as a consumption model and calculates the burden for each household based upon the VAT paid upon 899 expenditure items over the period of one year.

To do this I first estimate the amount of VAT paid per household (V_h) for each good i calculated as:

$$V_{hi} = \frac{E_i \tau_i}{100 + \tau_i} \tag{8}$$

where E_i is the expenditure upon good i and τ_i is the statutory tax rate applicable to good i.

The total amount of VAT paid for each household is

$$V_h = \sum_{i=1}^{N} V_{hi}, \dots, V_{hn} \tag{9}$$

Afterwards V_h is divided by the total income[178] per household to obtain the percentage of income expended upon VAT and also divided by total consumption per household to obtain the percentage of consumption expended upon VAT. First, I graph the amount of VAT paid by each household (V_h) against the total income and consumption for each household. The results are provided in Figure 3 and Figure 4.

[178] Income includes all monetary income. Since in-kind income is not valued in the IES 2010/2011 data set, it is not included in income.

Figure 3: Relationship between total VAT paid and total income per household

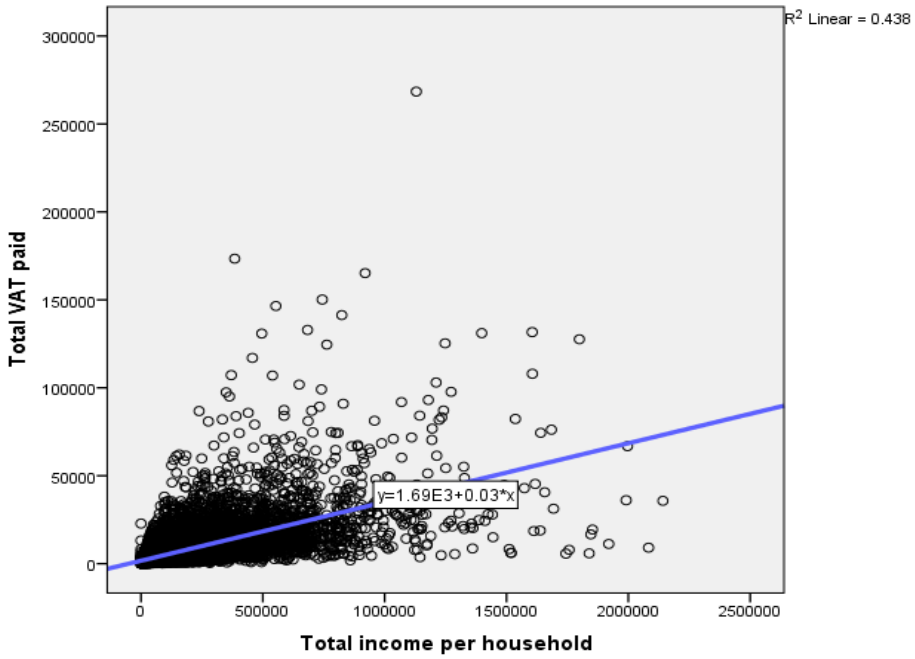
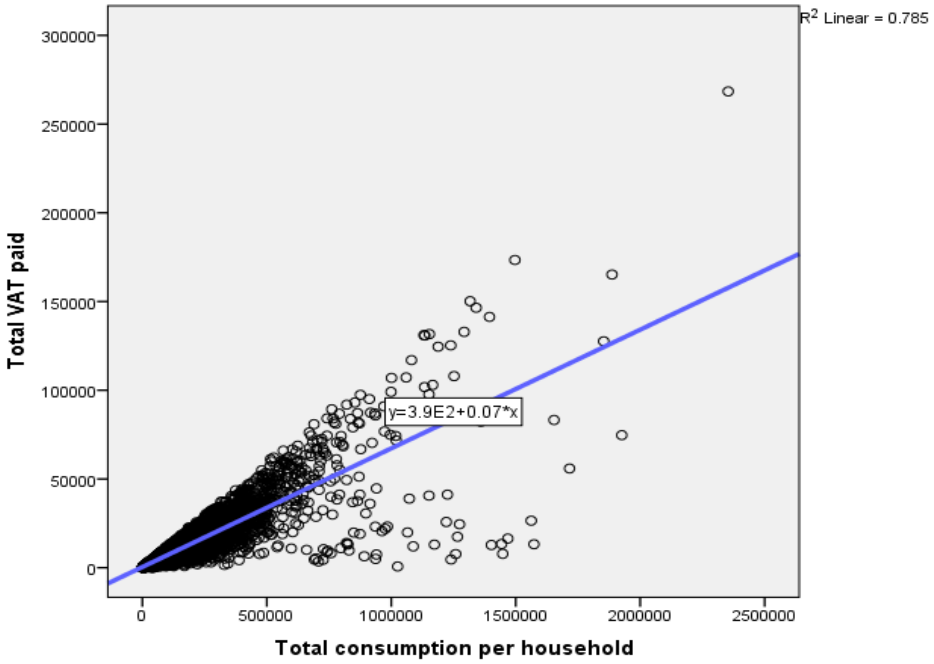


Figure 4: Relationship between total VAT paid and total consumption per household



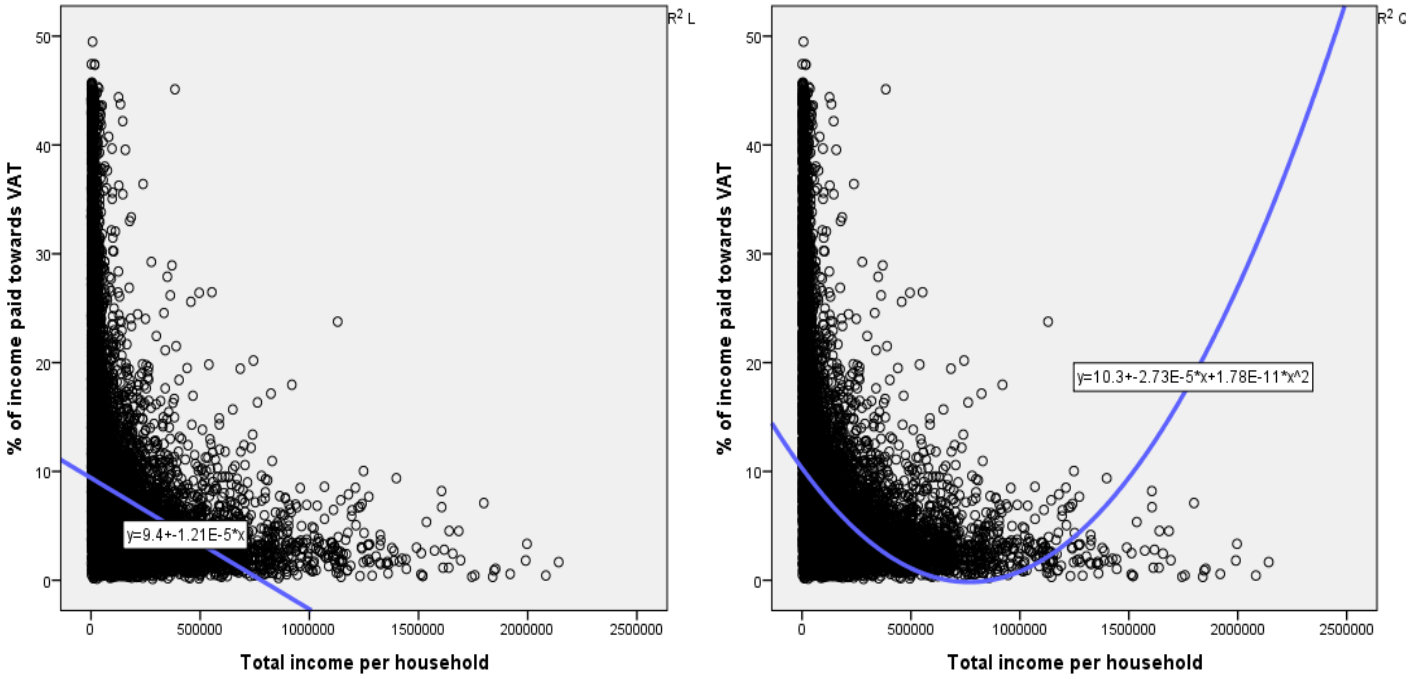
The results presented in Figures 3 and 4 are as expected. As income or consumption rise, the total VAT paid rises. This means that wealthier households on average make a greater absolute contribution to VAT revenue when compared to poorer households. What is further evident is that the VAT paid is expected to rise faster with reference to consumption than income (with reference to the slopes of the

straight lines). This is as a result of a proportion of income being saved by households.

As the VAT is a tax upon consumption, the slope of the straight line in Figure 4 will indicate which percentage of additional consumption is on average expended by households upon VAT, meaning the average effective rate of VAT. From Figure 4 it is evident that the average effective rate of VAT for South Africa is estimated at 7 percent.

Next, to indicate the burden distribution if income is taken as the measure of households' ability to contribute to revenue, I graph the percentage of income expended towards VAT against the total income. The results are provided in Figure 5.

Figure 5: Relationship between the percentage of income paid towards VAT and total income per household

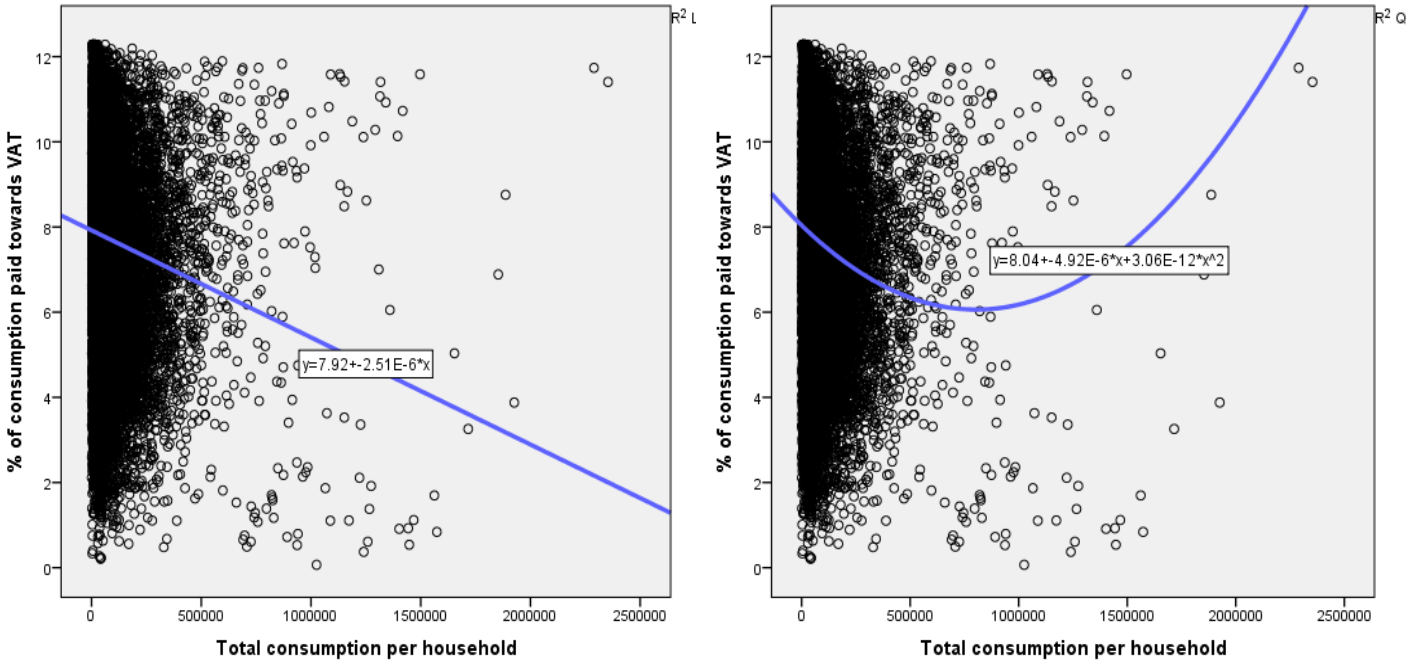


From Figure 5, it is evident from the left hand side graph that when considering the percentage of income paid towards VAT, the South African VAT can be regarded to be regressive (justified by the negative slope of the straight line). The quadratic line in the right hand side graph indicates that the VAT is progressive when only considering households earning more than approximately R750 000 a year. This is perhaps as a result of wealthier households expending more upon expensive (standard-rated) luxury items (although this is barely evident from the graph).

The large number of households in Figure 5 that spent more than 14 percent (the standard VAT rate) of their income upon VAT should also be taken note of. Since the VAT is a tax upon consumption, a household that spends more than the standard rate of income (14%) upon VAT would have consumption that exceeds income. It is therefore likely that these households are creating debt in expending. This implies that although these households currently do not earn a large amount of income, they are expected (by the financial institution providing the loan amounts and possibly by themselves) to earn a larger amount of income over their lifetime.

To get an estimate of the burden distribution when considering the ability to pay as the life time income of households (consumption as a proxy), I graph the percentage of consumption expended towards VAT against total consumption per household. The results are provided in Figure 6.

Figure 6: Relationship between the percentage of consumption expenditure upon VAT and total consumption expenditure per household



From Figure 6 it is evident that the South African VAT remains regressive when measured against consumption, although less regressive than when measured against income. Ebrill (2001:109) argues that a broad base, simple rate structured VAT (such as the South African VAT) measured against income, would be regressive (as the above results show), but the same VAT measured against consumption would be broadly proportional. To argue this point, the author refers to

empirical evidence of Denmark, the Netherlands and Sweden, which are all developed countries. It is further argued that rate differentiations and exemptions can make the VAT progressive (as in the case of the United Kingdom).

Ebrill (2001) states that despite the fact that only a few studies upon the VAT burden distribution for developing countries exist, the "VAT can be strongly progressive" when measured against consumption (Ebrill, 2001:109). The author refers to evidence from Madagascar, Côte d'Ivoire, Guinea and Tanzania. It is however stated that the progressivity of the VAT when measured against consumption cannot be accepted as a given.

The question remains, if most empirical results for developed and developing countries find that the VAT is neutral or progressive when measured against consumption, which tax base features are driving the regressivity of the South African VAT?

In answering this question it should first be noted that, ignoring compliance, in the case of a VAT that is applied at a single standard rate to all goods and services, the VAT will be proportional to consumption (all plots will be upon a straight line at the standard VAT rate in Figure 6). Any change from the standard rate of VAT is due to zero ratings and exemptions. The straight line in Figure 6 therefore indicates that a household with a higher consumption is getting a bigger benefit from the zero ratings and exemptions when considering their percentage consumption, than households with a lower consumption.

The question is therefore which zero ratings and exemptions are driving this trend? To identify these zero ratings and exemptions, I divide the zero ratings and exemptions in Table 19 into three groups. The first is $CRegressive$ and the zero rating of basic foodstuffs and exemption of transport services[179] are included in this group. The second group is (for the lack of a better collective name) $CEfficiency$ and the exemption of hard-to-tax sectors and non-supplies are included in this group. The final group is $COther$ and all other zero ratings and exemptions (besides those

[179] It should be noted that the exemption of transport services may well have belonged to the efficiency group, but as it is likely to increase the progressivity of the VAT, I included it in the regressivity group.

for purposes of the destination principle[180]) are included in this group. [181]The following notation can be used:

$$PCVAT = \frac{\tau_s C}{C} - \frac{\tau_s CRegressive}{C} - \frac{\tau_s CEfficiency}{C} - \frac{\tau_s COther}{C} \quad (10)$$

where $PCVAT$ is the percentage of consumption (C) expended upon VAT and τ_s is the standard rate.

To evaluate and isolate the impact of each category of zero ratings and exemptions identified above upon $PCVAT$:

$$PCVAT_r = \frac{\tau_s C}{C} - \frac{\tau_s CRegressive}{C} \quad (11)$$

$$PCVAT_e = \frac{\tau_s C}{C} - \frac{\tau_s CEfficiency}{C} \quad (12)$$

$$PCVAT_o = \frac{\tau_s C}{C} - \frac{\tau_s COther}{C} \quad (13)$$

Each of these isolated estimations is then graphed against consumption. The results are provided in Figure 7.

[180] It should be noted that the data does not contain households' expenditures upon goods or services that are zero-rated or exempt in complying with the destination principle, as these goods are consumed outside of South Africa and it was not possible to obtain the source of the goods.
[181] There are obviously certain supplies, such as the supply of a going concern, which are not included as VAT upon these supplies which are never paid by households.

Figure 7: Relationship between PCVAT_r,PCVAT_e and PCVAT_o and total consumption per household

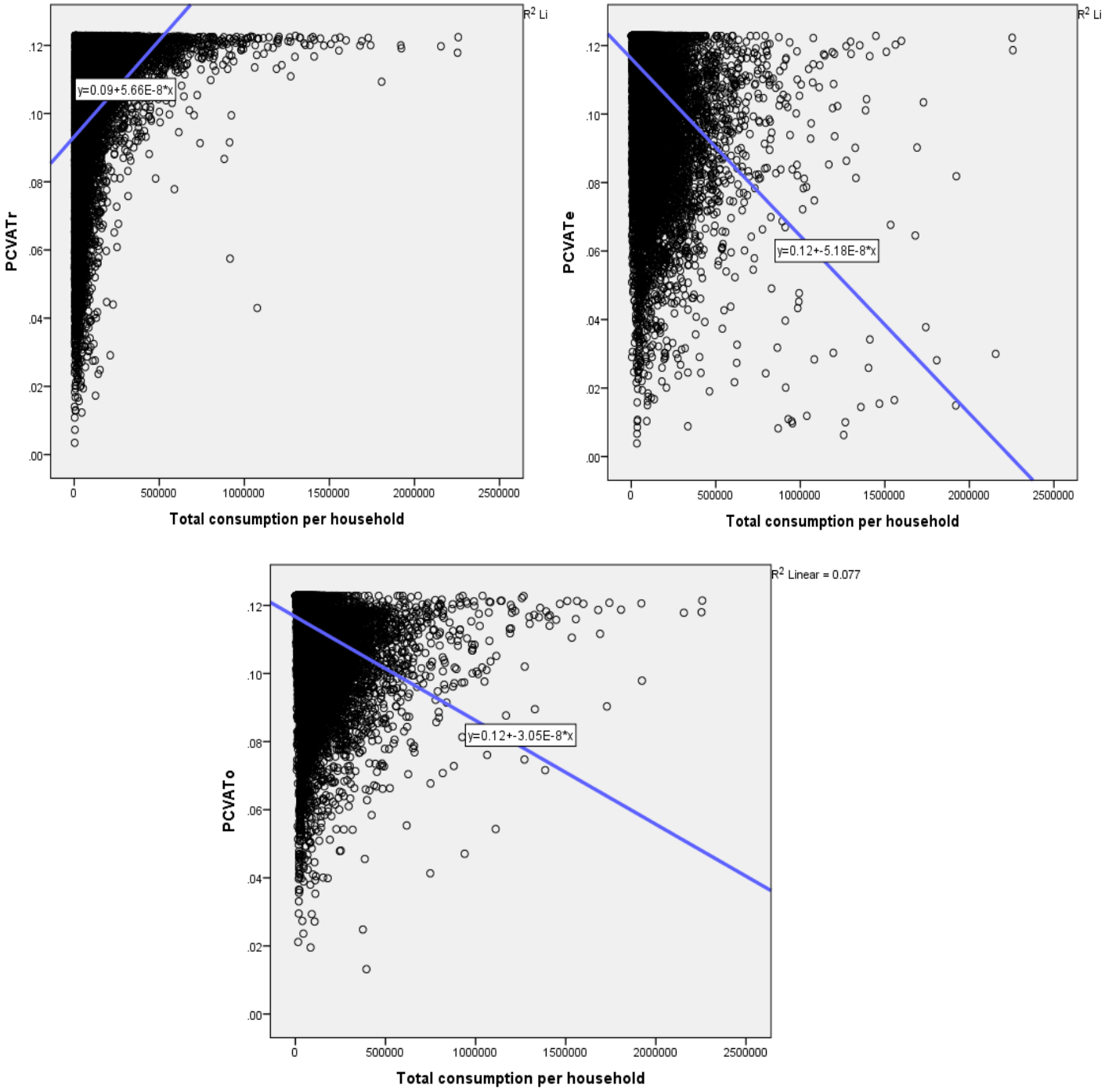


Figure 7 presents some evidence upon what drives the regressivity of the South African VAT when measured in terms of consumption. It is evident from the left hand side graph that zero ratings and exemptions aimed at addressing the regressivity of the VAT are doing so successfully. As the consumption of households rises, the benefit from the zero ratings and exemptions included to address the regressivity of the VAT decreases. Alternatively stated, the percentage of consumption expended

upon VAT rises as the total consumption of a household rises (when isolating for zero ratings and exemptions included to address the regressivity of the VAT).

From the same graph it is also evident that not only households with a low total consumption benefit from these provisions. Many higher consuming households also pay less than the standard VAT rate (less than $PCVAT_r$ of 12.28) of their consumption upon VAT (when isolating for zero ratings and exemptions included to address the regressivity of the VAT). It therefore may well be argued that these zero ratings and exemptions, although decreasing the regressivity of the VAT, are not well targeted towards only the needy.

From the middle and right hand side graph it is evident that zero ratings and exemptions that are included for efficiency or other reasons are increasing the regressivity of the VAT. As the consumption of households rises, their percentage of consumption expended upon VAT decreases. The middle graph further indicates that the exemption of hard-to-tax sectors and non-supplies is likely the most prominent cause of the regressivity of the VAT. It may well therefore be argued that a solution in taxing the hard-to-tax sector may, besides many other benefits (see Chapter 2), decrease the regressivity of the VAT.[182]

3.5 Conclusions

In this chapter I showed that the South African VAT aligns fairly well with the structure of a good VAT. Firstly, it makes use of a single, non-zero standard rate, it applies the input credit method and the accrual basis of accounting and follows the destination principle. Secondly, it makes a large contribution to South African tax revenue and does so fairly consistently with a better revenue performance than most VAT's in other countries. Thirdly, it has a fairly broad base that mostly taxes consumption and has not eroded to a large extent since implementation in 1991. Lastly, the compulsory registration threshold seems adequately high for the purpose of optimising revenue, although further research is required to establish whether it is optimal in considering administrative and compliance costs.

[182] Considering residential accommodation, only 17.69 percent of the bottom 10 percent (based upon consumption) of households in the data set consumed this item. This suggests that households with a low total consumption cannot afford to rent or own residential accommodation. A similar case can be made for financial services. Again considering the bottom 10 percent of consuming households, only 0.28 percent consumed financial services. It therefore appears that the inability of poorer households to expend upon certain goods and services that are not included in the VAT base is contributing to the regressivity of the South African VAT.

The voluntary threshold may well also need further attention, specifically relating to the necessity of a monetary threshold as opposed to only qualifying non-monetary requirements. The monetary threshold changes a supposed zero rating for a small business who are unable to register into an exemption (e.g. a small bakery).

However, not all the base structural features of the VAT align with the base structure of a good VAT. Exempting the PNC Sector and transport services by road or rail and zero rating fuel and oil and basic foodstuffs do not align with the structure of a good VAT. As mentioned, although the long term objective should be to standard rate the PNC Sector, it is perhaps not advised that a developing country such as South Africa pioneer in this area. The exemption of transport services is perhaps understandable and warranted, based upon the efficiency concerns in collecting VAT from these supplies. The same can be said for the supply of fuel, which is already taxed in terms of an efficient fuel levy.

The zero rating of basic foodstuffs is perhaps the most questionable deviation from the structure of a good VAT. At the time of the implementation of the VAT, this zero rating perhaps served a purpose (since social grants were not adequately in place), but with social grants being paid to a large number of individuals (approximately 16 million (van der Berg and Sieberts, 2012)) it may well be necessary to reconsider this zero rate.

One approach towards additional revenue is to exempt the currently zero-rated foodstuffs, although this approach will not see the negative impacts of zero ratings or exemptions be alleviated. The preferred approach would be to standard rate the currently zero-rated foodstuffs and thereby better align the South African VAT with the structure of a good VAT. It should however be kept in mind that income inequality and political acceptability are challenges to standard rating basic foodstuffs.

With the current South African government budget deficit of 3.8 percent of GDP (Trading Economics, 2015), the standard rating of basic foodstuffs could potentially provide additional revenue to address this deficit. The economy, neutrality and efficiency of the VAT could also increase and the complexity will decrease. Another policy option towards additional revenue is to increase the standard VAT rate.

These policy options raise a number of questions. Firstly, whether the preferred approach to an increase in revenue would be to increase the standard rate of the VAT, or to standard rate basic foodstuffs which are currently zero-rated? When standard rating basic foodstuffs, should all basic foodstuffs be standard-rated, or only a selection of basic foodstuffs? Furthermore, what role could direct cash transfers (social grants) play when considering income inequality and political acceptability in relation to standard rating a selection or all basic foodstuffs?

I am not the first to ask these questions. In 1996, following an investigation of the South African tax system, the Katz Commission stated the following:

> "The question of VAT reform should be further investigated, both with respect to an increase in the standard rate and a narrowing of the set of zero-rated items. The scope for appropriate poverty relief to accompany VAT reform should be evaluated" (JSCOF, 1996:9).

To date this question has not been answered. In the following chapter I describe a structural model of the South African VAT which can be used to address VAT reform with reference to the issues raised by the commission.

CHAPTER 4:
METHODOLOGY

This chapter reviews the quantitative research approach followed in obtaining the main empirical results of an increase in the standard rate and of narrowing the set of zero-rated items (provided in Chapter 5 and Chapter 6). A structural VAT model has been developed incorporating consumer demand behavioural responses to a change in prices and income. This model is used to obtain empirical results of VAT policy changes that are further analysed in Chapter 5 and Chapter 6. No study conducted by National Treasury, SARS, Statistics South Africa or any other institutions or scholar could be found that uses such a model with the focus of measuring the impact of VAT policy changes upon South African households. This chapter's main focus is therefore upon the development of this model, called SAVATMOD (for ease of reference).

This chapter is divided into four sections. The first section discusses the design of the base structure of SAVATMOD, used to obtain most of the results presented in the previous chapter. The second section discusses the estimation and incorporation of household demand behaviour into the base structure of the model. In the third section an illustrative example of the workings of SAVATMOD is provided. The fourth section concludes this chapter.

4.1 Development of the base structure of SAVATMOD

4.1.1 Data used in developing the base structure

For the purposes of developing the base structure, use was made of the 2010/2011 Income and Expenditure Survey of Households (IES 2010/2011) of South Africa. This survey was conducted by Statistics South Africa and used three data collection instruments; a household questionnaire, a weekly diary and a summary questionnaire (Statistics South Africa, 2012).

The household questionnaire consisted of four modules. The first module recorded a variety of demographic variables of each household. The second to fourth modules collected information upon different categories of expenditure covering education, health, dwellings and services, clothing, footwear, expenditure when away from home, domestic workers, furniture and equipment, transport, computer,

telecommunications, finance and banking, as well as particulars of income (Statistics South Africa, 2012).

The weekly diary (completed for two weeks by each household) consisted of a booklet wherein households recorded their daily expenditures, where they incurred these expenditures and the purpose of the expenditure (e.g. own consumption or a gift). The summary questionnaire consisted of questions that were only used by the interviewer. The purpose of this questionnaire was to assign consumption according to purpose (COICOP) codes to the weekly diary expenditures of households, and to ensure accuracy and completeness of the diary (Statistics South Africa, 2012).

This survey was conducted over a period of one year, with each household being in the sample for a period of four weeks. The sampling frame was obtained from Statistics South Africa's Master Sample, which provides a national coverage of all households in South Africa, excluding certain institutions (e.g. prisons). Although an initial sample of 33 420 households were identified, only 82.8 percent where in scope and of these households the overall response rate was 91.6 percent (Statistics South Africa, 2012).

In organising the data obtained from the survey for meaningful analysis, the diary data was multiplied by 26 weeks and the questionnaire data by 12 months (where applicable) to obtain an annual value. In order to benchmark the collected expenditure data, all expenditures incurred before March 2011 were inflated and all expenditures incurred after March 2011 were deflated with the use of the consumer price index. Weights (with reference to South Africa's population) were also calculated for each household, based upon the reciprocal of the probability of selection and adjustments for segmentation, areas with fewer than 25 households and for non-response (Statistics South Africa, 2012).

This IES 2010/2011 was preferred for the purposes of this study, as it is the largest recent survey of its kind for South Africa. It is also the only large survey in South Africa that attempts to capture all consumption expenditure by households. It appears that an appropriate methodology was followed in obtaining the data and the data is representative of the population of South Africa. It is also the only large

sample survey that provides data upon specific expenditure items, allowing the accurate application of the applicable rate of VAT to each expenditure item. [183]

4.1.2 Restructuring of the IES 2010/2011 for the purposes of the base structure of SAVATMOD

The survey results of the IES 2010/2011 were captured by Statistics South Africa per household identifier and COICOP code (there are 899 of these in total), with each row in the data set containing the expenditure of one household upon one COICOP item. The data as received from Statistics South Africa therefore contained 1 298 446 rows of data and had to be restructured for the purposes of this study.

In restructuring the data, IBM's SPSS Statistics 22 recode syntax was used to create 899 new variables (one for each COICOP code) and code the expenditures per household into these variables. The aggregate command was used to aggregate the sum of expenditure per item per household, so that each household is represented in a single row. Lastly, demographic variables, provided in a separate data set, were matched to each household, based upon a household identification number.

4.1.3 Incorporating VAT policy into the base model

To enable the model to measure the current VAT burden distribution per household and per expenditure item, the current South African VAT legislation was incorporated into the model. This was done with reference to the Value Added Tax Act 89 of 1991. The rate of tax applicable to each of the 899 expenditure items was determined, being either the standard rate of 14 percent or 0 percent in the case of zero-rated items. For exempt supplies the 'rate' of tax is nil, since these supplies are not regarded as taxable supplies.

The expenditures captured in the IES 2010/2011 include the VAT paid for each expense. It was therefore necessary in the case of standard-rated goods and services to adjust the standard VAT rate to the VAT inclusive rate, 12.28 percent (i.e. 14/114).

It should be noted that although these statutory rates are used, the economic incidence[184] of the VAT is unlikely to be 12.28 percent in the case of standard-rated supplies or nil in the case of exempt supplies. Metcalf and Fullerton (2002:1) state:

[183] The other large sample survey for South Africa, the National Income Dynamics Study, provides a time series data set that captures selective consumption expenditures.

> "Economic incidence differs from statutory incidence because of changes in behaviour and consequent changes in equilibrium prices. Consumers buy less of a taxed product, so firms produce less and buy fewer inputs – which changes the net price or return to each input."

For standard-rated supplies, this difference between before tax prices and net prices after a tax indicates the economic incidence carried by a firm. In the case of exempt supplies it can be expected that firms will not carry the burden of the tax without increasing consumer prices to some extent.[185]

To accurately estimate the economic incidence of a tax, the price elasticities of demand and of supply for, ideally, each expenditure item need to be determined. Alternatively, these elasticities can be estimated for groups of expenditure items that are taxed similarly under the VAT. Although the elasticities of demand are estimated in this study (discussed in Section 4.2), the groupings of expenditure items are not made based upon how items are taxed under the VAT. Doing so could potentially result in grouping of expenditure items that are not weakly separable, also discussed in Section 4.2.4 (e.g. some types of fruit are zero-rated and other fruit items are standard-rated). This could result in unreliable demand elasticities.

Data limitations do not allow for the estimation of the elasticities of supply for all expenditure items (or alternatively groups of expenditure items) in my data set. This study therefore makes the general assumption (which is also a limitation) that the incidence of the VAT is the statutory incidence. The extent of this limitation is not evident. As Mirrlees (2010:279) notes "It is simply assumed that the incidence is fully upon consumers, which such evidence as there is suggests is not unreasonable, at least for the longer run."

4.1.4 Running the base structure of SAVATMOD

The base structure is run by means of macros created in Microsoft Excel. The first macro calculates the VAT paid per expenditure item for each household, by multiplying the rate applicable to that item with the expenditure upon that item. The second macro calculates the total VAT paid per household, by summing the VAT

[184] The change in economic welfare arising from a tax (Metcalf and Fullerton, 2002).
[185] It is interesting to note that in measuring the difference between statutory and economic incidence, Smart and Bird (2009) found that Canadian provinces' sales taxes' economic incidence are to a large extent the same as its statutory incidence.

paid per item for all items. The final macro clears the cells generated by the model (used for applying various policy changes).

To increase the efficiency of the base structure, certain of the standard-rated expenditure items (other than foods) were combined and summed into bigger categories, resulting in 200 expenditure items. After running the model the VAT burden per household and per each of the 200 expenditure items are calculated.

4.2 The estimation and incorporation of demand behaviour for each household

4.2.1 Consumer demand theory

As a departure point of the estimation of demand behaviour of households, a brief overview of the classical, preference based approach to consumer demand as it relates to this study is provided. This includes an overview of budget constraints and demand functions, preference relations and utility functions and utility maximization and expenditure minimization.

4.2.1.1 Budget constraints and demand functions

The budget constraint of a consumer is for a great deal of demand analysis assumed to be linear (Deaton and Muellbauer, 1980b), written

$$m = \sum_{K} p_K q_K \tag{14}$$

where m is total expenditure (also named total outlay), p_K is prices of all items and q_K is quantities of all items. This linearity means it is assumed that the consumer cannot satisfy all his/her wants within the budget constraint. This assumption rules out non-linear, indivisible, uncertain and interdependent budget constraints (Deaton and Muellbauer, 1980b).

A consumer has a set of rules that he/she follows in deciding the quantity of a specific item purchased (q_i), faced with his/her total outlay and the prices of all items. This provides a demand function, called Marshallian demand, written

$$q_i = g_i(m, p) \tag{15}$$

Substituting (15) into (14) for the quantities of all items gives

$$m = \sum_{K} p_K g_K(m, p) \tag{16}$$

(16) is known as the adding-up restriction of demand, requiring that a consumer's spending exhausts the total budget (Levin, 2009).

Moreover, if prices and total expenditure of the consumer scale by the same factor, this will not affect purchases and consequently quantities demanded, written

$$g_i(\theta m, \theta p) = g_i(m, p) \tag{17}$$

(17) is known as the homogeneity restriction of demand, implying that demand functions are homogeneous of degree zero. The underlying assumption of this restriction is that prices and total outlay do not influence choices, other than determining the budget constraint of the consumer (Deaton and Muellbauer, 1980b).

Taking (15) and absorbing prices into the functional form gives

$$q_i = g_i^*(m) \tag{18}$$

The relationship in (18) is referred to as Engel curves, which can be used to classify goods as luxuries, necessities and inferior goods (Deaton and Muellbauer, 1980b). Working (1943) estimated (18) in the form

$$w_i = \alpha_i + \beta_i \ln m \tag{19}$$

where Beta indicates parameters to be estimated and w_i is the budget share of commodity i, written

$$w_i = \frac{p_i q_i}{m} \tag{20}$$

The adding-up restriction in (16) for this estimation requires $\sum w_i = 1$, which is the case where $\sum \alpha_i = 1$ and $\sum \beta_i = 0$ and is satisfied automatically in estimation.

4.2.1.2 Preference relations and utility functions

A utility function exists where a set of axioms of choice can be accepted (Deaton and Muellbauer, 1980b). These axioms[186] refer to a consumers' preference over different goods or bundle of goods (where q_1 is the first bundle and q_2 the second bundle etc.) in providing for a consumer that can be regarded as rational or optimal. The

[186] Not all axioms are discussed here, but only those that are most important for the estimations in this chapter.

preferences are commonly indicated by the symbol $\gtrsim$, which means 'at least as good as'.

Preference ordering axioms of choice can be summarised as reflexivity ($q_1 \gtrsim q_1$), completeness ($q_1 \gtrsim q_2$ or $q_2 \gtrsim q_1$ or both) and consistency ($q_1 \gtrsim q_2$ and $q_2 \gtrsim q_3$, then $q_1 \gtrsim q_3$) (Deaton and Muellbauer, 1980b; Mas-Colell *et al*., 1995). Allowing for numbering of preference orders requires the axiom of continuity ($q_1 \gtrsim q_2$ and q_3 is within ε radius of q_2, then $q_1 \gtrsim q_3$). The axiom of continuity entails that the consumers' preferences cannot exhibit 'jumps' by suddenly reversing preferences (Mas-Colell *et al*., 1995).

The preference ordering and continuity axioms allow for preferences to be represented by a utility function, $v(q)$. This means that if $v(q_1) \geq v(q_2)$ then $q_1 \gtrsim q_2$. Mathematical tools can therefore be used with $v(q)$ (the highest value being the optimal choice) and consequently preferences (Deaton and Muellbauer, 1980b).

These preferences are further restricted by non-satiation so that the optimal choice for the consumer lies on his/her budget constraint, meaning there is always another bundle arbitrarily close that is preferred (and will give more utility) to the current bundle (Mas-Colell *et al*., 1995).

4.2.1.3 Utility maximization and expenditure minimization.

Optimal (rational) consumers have preferences (based upon the axioms of choice) that aim to maximize utility, facing a budget constraint. This can be written

$$\text{Max } u = v(q) \text{ subject to } \sum_K p_K q_K = m \tag{21}$$

From (21) it is evident that the total outlay of the consumer will give some level of utility (u). This can be reformulated by saying that the consumer will choose goods to minimise the outlay to obtain u (Deaton and Muellbauer, 1980b). The consumer therefore aims to minimize expenditure in obtaining a certain level of utility, referred to as duality. This can be written

$$\text{Min } m = \sum_K p_K q_K \text{ subject to } v(q) = u \tag{22}$$

For both utility maximization and expenditure minimization the outlay vector of commodities and utility will be the same (Deaton and Muellbauer, 1980b). The

difference is that where for utility maximization the determining variables are total outlay and prices (Marshallian demand), for expenditure minimization the determining variables are utility and prices. This gives a second demand function, known as Hicksian demand, $h(u,p)$. Hicksian demand also includes the adding-up restriction and homogeneity, but contains a further restriction that cross-price derivatives are symmetric (also known as Slutsky's Symmetry) that can be written

$$\frac{\partial h_i(u,p)}{\partial p_j} = \frac{\partial h_j(u,p)}{\partial p_i} \tag{23}$$

Since utility maximization and expenditure minimization give the same vector of commodities (Deaton and Muellbauer, 1980b), the demand function can be written

$$q_i = g_i(m,p) = h_i(u,p) \tag{24}$$

Substituting the Marshallian demand function into (21) gives

$$u = v(q_1, q_2 \ldots, q_n) = v[g_1(m,p), g_2(m,p), \ldots, g_n(m,p) = u(m,p) \tag{25}$$

$u(m,p)$ in (25) indicates the maximum level of utility that a consumer can obtain given total expenditure and prices. This is called the indirect utility function. Substituting the Hicksian demand function into (22) gives

$$m = \sum_K p_K h_K(u,p) = e(u,p) \tag{26}$$

$e(u,p)$ in (26) indicates the minimum expenditure required to obtain maximum utility at given prices. This is called the expenditure (or cost) function. Since $u(m,p)$ and $e(u,p)$ are essentially two different ways of writing the same information, these two functions can be rearranged or inverted (Deaton and Muellbauer, 1980b).

4.2.2 Data required for the estimation of the demand systems.

The estimation of the demand systems in this study required data upon the budget share for each good (or category of goods) in the demand system, and the price faced by households in deciding upon whether and what amount to expend upon that good (or category of goods) or other goods (or categories of goods) in the demand system. Demographic variables were also added.

Budget shares for each household for each category or group of goods were obtained from the IES 2010/2011. To accurately reflect the amount expended in

relation to the price paid, the IES 2010/2011 expenditure data was readjusted with the CPI to represent the actual amount expended per item. The IES 2010/2011 (as well as any other large sample data set currently collected in South Africa) does not include price or quantity purchase data, but only expenditure data. It was thus required to estimate the prices faced by households from another data set, of which the best data set available is the data set used in calculating the South African Consumer Price Index (CPI data set).[187]

The CPI data set is obtained by way of field-based and head office collections. Field-based collection entails the use of fieldworkers who record actual prices at sample outlets (enumerator method of collection). This collection is carried out monthly and mostly includes prices of goods, although some prices for services are also included. Head office collections make use of staff based at the Statistics South Africa head office and mostly collect prices upon services by means of telephone, internet, e-mail or other similar methods. These collections are done monthly for certain services and at other intervals for other services (Statistics South Africa, 2013).

The CPI data set also required some minor restructuring. This data set provides for prices measured each month upon a large variety of items per province. The items measured vary per province and it was therefore necessary to only include data upon similar items for each province. This was done by running a Microsoft query in Microsoft Excel. This data set was further simplified to only represent the data applicable to the period in which the IES 2010/2011 was conducted.

The prices of a few services (i.e. electricity and rent) are not included in the CPI data set (and also in no other data set). To obtain a representative price, the mean amount expended per household per month and per province as per the IES 2010/2011 (not readjusted with the CPI) was used to obtain the prices of these services. The obtained amount therefore indicated the price of these services upon 1 March 2011 (as the CPI adjusted IES 2010/2011 was used) for one month. As almost all of the excluded services are paid upon a monthly basis, although not ideal, this method should provide an indication of the mean prices faced by consumers for the services. The CPI was used to readjust the mean price of these services to obtain a monthly price per province for each service.

[187] It should be noted that this approach, although done as accurately as possible, remains a limitation to this study.

4.2.3 The calculation of prices of the demand systems' categories and groups

Since the demand systems are estimated for categories or groups of goods, the weighted average price faced by each household for the category or group of goods was determined. This average price should not only consider items upon which households expended. Since zero expenditure would indicate that a price is higher than a household reservation price, the prices of zero expenditure items also need to be considered. The determined price therefore indicates the price faced by households in making expenditure decisions and not the price paid (which will only include items upon which the households decided to expend).

It is also suggested that equal consideration is not given to the price of every good in the demand system by households. Goods upon which households expend more regularly are likely to receive more consideration by households. Thus expenditure items upon which households expend a greater amount of their income should carry a greater weight than items less expended upon, in establishing an average price faced. To incorporate this, weights were obtained from the CPI that were determined by Statistics South Africa with reference to the IES 2010/2011.

Weights are provided for each sub-sub category (i.e. fish), sub-category (i.e. meat and fish) and category (i.e. foods) of goods. These weights were applied to the obtained expenditure item prices for each sub-sub category, sub-category and category of expenditure items. The weighted average price for each of the food groups in the nutritional goods demand system and each of the expenditure categories in the complete demand system were calculated. These prices are provided in Annexure 1 and Annexure 2.

4.2.4 The grouping of goods in forming the expenditure categories and nutritional goods groups

In Utility Maximisation Theory, a consumer or household allocates its budget to all goods taking into account the price of a specific good, the price of all other goods and its own income (Varian, 2010). Due to the complexity of empirically analysing the budget allocation of each consumer upon all goods, these goods are mostly grouped into larger commodity groups.[188]

[188] In particular, multicollinearity between prices tends to become more problematic when not grouping commodities.

One of two approaches is generally applied in grouping commodities. The first is the Generalized Composite Commodity Theorem (Hicks, 1936; Lewbel, 1996) that treats goods whose prices increase or decrease similarly as a single good. Due to relative prices fluctuating considerably in practice, the Composite Commodity Theorem usefulness is limited for empirical analysis (Deaton and Muellbauer, 1980b). The second approach is named separability, according to which commodities are grouped in accordance with consumer preferences. Commodities are grouped so that "preferences within a group can be described independently of the quantities in other groups" (Deaton and Muellbauer, 1980b:122). If preferences for specific goods are weakly separable, those commodities are grouped.

Although weak separability can be tested empirically, these tests are largely limited to time series data, not used for the purposes of this study. Furthermore, multicollinearity in aggregate price data limits the usefulness of these tests (Bopape and Myers, 2007). Weak separability is therefore commonly assumed and also assumed for the purposes of this study. This means that it is assumed that sub-utility functions can be defined for each group of commodities, so that the sum of the value of each of these sub-utilities will give total utility.

A general problem in estimating demand systems is observed zero expenditures upon categories or groups of goods. Such zero expenditure categories or groups result in inaccurately estimated coefficients, and deleting households with zero expenditure categories will be subject to selection bias. Certain methods have been proposed to address the observed zero expenditure problem when establishing the market demand (for a recent example refer to Shonkwiler and Yen, 1999), but these methods are not employed. Although the market demand is estimated, it is the objective of this study to estimate the demand of individual households. To address the zero expenditure problem in this study, certain separable groups of commodities (transport and communication; edible oils and other nutritional goods) which contained observed zero expenditures were grouped together.[189]

Following the weakly separability assumption in grouping commodities and also addressing the problem of observed zero expenditures, the first demand system contains eight expenditure categories and the second demand system five nutritional

[189] As previously mentioned, households without any expenditure were removed from the data set and this also addresses the zero expenditure problem.

goods groups. The expenditure categories are nutritional goods; clothing; housing and utilities; household content; health; transport and communication; recreation (including dining at restaurants); and other goods and services. The five nutritional goods groups are grains, bread and cereals; meat and fish; dairy; fruit and vegetables; and other nutritional goods.

The two demand systems allow for the estimation of a two-stage budgeting process followed by households concerning nutritional goods expenditures. Closely related to the concept of a utility tree, as proposed by Strotz (1957), two stage budgeting works with the premises that consumers first allocate their expenditure to broad groups of goods (or in my case expenditure categories) and thereafter allocate the expenditure upon that group of goods to the goods in that group (in my case the nutritional goods groups).

4.2.5 The estimation of the two demand systems

Based upon the economic theory discussed in Section 4.2.1, a number of models for estimating consumer demand have been proposed. This includes the linear expenditure system (see Stone, 1954), the Rotterdam Model (see Theil, 1965), the Translog Model (see Christensen *et al*., 1975), the almost ideal demand system (see Deaton and Muellbauer, 1980a) and the CBS demand system (see Keller and van Driel, 1985). More recent models include the quadratic almost ideal demand system (see Banks *et al*., 1997) and the EASI demand system (see Lewbel and Krishna, 2009). Although the use of each of these models for demand system estimation has received attention in the literature, in recent years most demand systems are estimated by either a linear approximated form of the almost ideal demand system (LA/AIDS) (Deaton and Muellbauer, 1980a), the almost ideal demand system (AIDS) or the quadratic almost ideal demand system (QUAIDS).

The popularity of the AIDS Model, of which the LA/AIDS and QUAIDS are extensions, for demand analysis, can be ascribed to a number of reasons. The AIDS Model builds upon the Rotterdam and Translog Models with advantages over these two models. The AIDS Model “gives an arbitrary first-order approximation to any demand system; it satisfies the axioms of choice exactly; it aggregates perfectly over consumers without invoking parallel linear Engel curves; it has a functional form which is consistent with known household-budget data; it is simple to estimate,

largely avoiding the need for non-linear estimation and it can be used to test the restrictions of homogeneity and symmetry through linear restrictions on fixed parameters" (Deaton and Muellbauer, 1980a:312). This model has also shown to perform well when estimating known elasticities (Barnett and Seck, 2008).

Within the South African context, Alderman and del Ninno (1999) as well as Dune and Edkins (2008) applied the AIDS Model in estimating the demand for different food groups. Also estimating the demand for food groups, Agbola (2003) applied the LA/AIDS Model, while Bopape and Myers (2007) applied the QUAIDS Model (only to data for KwaZulu-Natal). The LA/AIDS Model was applied by both Taljaard *et al*., (2004), in estimating the demand for meat, and by Van Schalkwyk *et al*., (2005), in estimating the demand for oilseeds. Finally, Selvanathan and Selvanathan (2004) estimated a complete consumer demand system by a comparison between the CBS demand system and the AIDS Model.

For purposes of modelling the household behavioural changes in SAVATMOD, the AIDS Model or the QUAIDS Model (depending upon the obtained estimates) were preferred. In this sub-section both these models, together with the results of the demand estimations for the two demand systems are reported. It should be kept in mind that although the mean results for the calculated elasticities of demand are reported, these results are not incorporated into SAVATMOD. For the purposes of SAVATMOD, the estimated coefficients of the model are used to calculate the price and expenditure elasticities for each individual household. These elasticities are used for demand equations which are included in SAVATMOD. This approach ensures that each household has unique demand behaviour.

The research reported in this sub-section contributes to the previous literature upon demand estimation for South Africa, as no study could be found that applies the QUAIDS Model to all goods and services or to all nutritional goods in South Africa. This is an important contribution since, as is shown in the results in this sub-section and by Bopape and Myers (2007), South African household expenditure is non-linear and the QUAIDS Model accounts for this non-linearity. This section also distinguishes itself from the previously mentioned studies by allowing for a two-stage budgeting process. It is the only study (for South Africa) that makes use of actual price data. Lastly, when considering the previous use of the QUAIDS Model by

Bopape and Myers (2007), the research reported in this sub-section provides a larger number of statistically significant results.

4.2.5.1 The AIDS and QUAIDS Model

The AIDS Model is an extension of Working's (1943) model discussed in Section 4.2.1.1 (Notation (19)). The AIDS Model however allows for the prices faced by consumers to differ between consumers and is therefore not limited to computing expenditure elasticities (Deaton and Muellbauer, 1980b).

For purposes of the AIDS Model, demand preferences are represented by an expenditure function, $e(u,p)$ defined as

$$\ln e(u,p) = (1-u)\ln[a(p)] + u\ln[b(p)] \tag{27}$$

Where u is utility and p is a price vector. In most instances, u will be between 0 and 1, with 0 indicating subsistence and 1 indicating bliss (Deaton and Muellbauer, 1980a). Therefore $a(p)$ can be regarded as the cost of subsistence and $b(p)$ the cost of bliss. As a functional form for $a(p)$, Deaton and Muellbauer (1980a) select

$$\ln a(p) = \alpha_0 + \sum_{i=1}^{K} \alpha_i \ln p_i + \frac{1}{2}\sum_{i=1}^{K}\sum_{j=1}^{K} \gamma_{ij} \ln p_i \ln p_j \tag{28}$$

As a functional form for $b(p)$, Deaton and Muellbauer (1980a) select

$$\ln b(p) = \ln a(p) + \beta_0 \prod_{i=1}^{K} p_i^{\beta_i} \tag{29}$$

Incorporating these functional forms the AIDS cost function is written

$$\ln e(u,p) = \alpha_0 + \sum_{i=1}^{K} \alpha_i \ln p_i + \frac{1}{2}\sum_{i=1}^{K}\sum_{j=1}^{K} \gamma_{ij} \ln p_i \ln p_j + u\beta_0 \prod_{i=1}^{K} p_i^{\beta_i} \tag{30}$$

Where p_i is the price of the group of goods i, p_j is the price of the group of goods j and Greek letters indicate parameters. The expenditure functions' price derivatives are the quantities (q) demanded (Deaton and Muellbauer, 1980a), written as

$$\frac{\partial e(u,p)}{\partial p_i} = q_i \tag{31}$$

(31) multiplied by $\frac{p_i}{e(u,p)}$ upon both sides gives

$$\frac{\partial \ln e(u,p)}{\partial \ln p_i} = \frac{p_i q_i}{e(u,p)} = w_i \tag{32}$$

For an utility maximizing consumer, total expenditure (m) is equal to the expenditure function $(e(u,p))$ and w_i is therefore the budget share of group of goods i. The logarithmic differentiation of (30) gives the budget shares as a function of prices and utility, written

$$w_i = \alpha_i + \sum_{j=1}^{K} \gamma_{ij} \ln p_j + \beta_i u \beta_0 \prod_{i=1}^{K} p_i^{\beta_i} \tag{33}$$

where

$$\gamma_{ij} = \frac{1}{2}(\gamma_{ij} + \gamma_{ji}) \tag{34}$$

Since m equals $e(u,p)$, this equality can be inverted to give $u(p,m)$, the indirect utility function. Doing this in (30) and substituting the result into (33) gives budget shares as a function of prices and total expenditure; the AIDS demand functions in budget share form, written:

$$w_i = \alpha_i + \sum_{j=1}^{K} \gamma_{ij} \ln p_j + \beta_i \ln \left[\frac{m}{a(p)}\right] \tag{35}$$

where $i = 1, 2, \ldots n$ (the expenditure categories) and $a(p)$ is a price index used to deflate total expenditure defined as

$$\ln a(p) \equiv \alpha_0 + \sum_{i=1}^{K} \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1}^{K} \sum_{j=1}^{K} \gamma_{ij} \ln p_i \ln p_j \tag{36}$$

Equation (30) and (34) need to adhere to economic restrictions previously discussed. This implies that (35) and (36) also need to adhere to these restrictions. Adding-up conditions require that

$$\sum_{i=1}^{K} \alpha_i = 1 \qquad \sum_{i=1}^{K} \beta_i = 0 \qquad \sum_{i=1}^{K} \gamma_{ij} = 0 \quad \forall j \tag{37}$$

Homogeneity conditions require that

$$\sum_{j=1}^{K} \gamma_{ij} = 0 \quad \forall j \tag{38}$$

Lastly, Slutsky's Symmetry requires that

$$\gamma_{ij} = \gamma_{ji} \tag{39}$$

The restrictions in (37), (38) and (39) ensure that (36) defines $a(p)$ as a linearly homogeneous function of the individual prices. Furthermore, in the case where the restrictions in (37), (38) and (39) hold, (35) provides a system of demand functions which add up to total expenditure ($\sum w_i = 1$), are homogeneous of degree zero in prices and total expenditure and which adhere to the Slutsky's Symmetry Theory (Deaton and Muellbauer, 1980a). The AIDS Model can therefore be interpreted that if relative prices (p_j) and "real" expenditure $(\frac{m}{a(p)})$ do not change, the expenditure shares (w_i) are constant (a_i).

In contrast to the AIDS Model, the QUAIDS Model proposed by Banks *et al*., (1997) provides for expenditure share Engel curves that are non-linear and thereby permitting commodities to be necessities at some expenditure level and luxuries at others. This is done by extending the AIDS Model by adding a quadratic term in the logarithm of expenditure to give (in its budget share form):

$$w_i = \alpha_i + \sum_{j=1}^{K} \gamma_{ij} \ln p_j + \beta_i \ln\left[\frac{m}{a(p)}\right] + \frac{\lambda_i}{b(p)}\left\{\ln\left[\frac{m}{a(p)}\right]\right\}^2 \tag{40}$$

Where all terms are as in (35) and $b(p)$ is the simple Cobb-Douglas price aggregator defined as

$$b(p) = \prod_{i=1}^{K} p_i^{\beta_i} \tag{41}$$

To still adhere to the adding-up restriction (the sum of all expenditure elasticities should equal unity) an additional condition is required to the conditions in (24):

$$\sum_{i=1}^{K} \lambda_i = 0 \tag{42}$$

From the above it is evident that the QUAIDS Model will be equal to the AIDS Model when all the $\lambda's$ are zero across all equations. Statistical significance testing of the $\lambda's$ would therefore indicate whether the QUAIDS Model is preferable or not to the AIDS Model for the data considered.

For purposes of the research reported in this study, I added a set of demographic variables for each household using Ray's (1983) method that uses an expenditure function of the form

$$e(p,z,u) = m_0(p,z,u) \times e^R(p,u) \tag{43}$$

where z represents a vector of s household characteristics, $e^R(p,u)$ is the expenditure function of a reference household and $m_0(p,z,u)$ scales the expenditure function to account for household characteristics and can be decomposed as

$$m_0(p,z,u) = \overline{m_0}(z) \times \phi(p,z,u) \tag{44}$$

where $\overline{m_0}$ measures the increase in a household's expenditures as a function of z and ϕ controls for changes in relative prices and the actual goods consumed. Further $\overline{m_0}(z)$ is parameterized as

$$\overline{m_0}(z) = 1 + \acute{\rho} z \tag{45}$$

where ρ as a vector of parameters to be estimated. $\phi(p,z,u)$ is parameterized as

$$\ln \phi(p,z,u) = \frac{\prod_{j=1}^{K} p_j^{\beta_j} \left(\prod_{j=1}^{K} p_j^{\acute{\eta}_i z} - 1 \right)}{\frac{1}{u} - \sum_{j=1}^{K} \lambda_j \ln p_j} \tag{46}$$

where η_j represents the jth column of $s \times k$ parameter matrix η. A further adding-up condition is required given as

$$\sum_{j=1}^{K} \eta_{rj} = 0 \tag{47}$$

for $r = 1, 2, \ldots, s$. The QUAIDS Model for purposes of my estimation therefore takes the form

$$\begin{aligned} w_i = \alpha_i + \sum_{j=1}^{K} \gamma_{ij} \ln p_j \\ + (\beta_i + \acute{\eta}_i z) \ln \left[\frac{m}{a(p)\overline{m_0}(z)} \right] + \frac{\lambda_i}{b(p)c(p,z)} \left\{ \ln \left[\frac{m}{a(p)\overline{m_0}(z)} \right] \right\}^2 \\ + \varepsilon \end{aligned} \tag{48}$$

where

$$c(p,z) = \prod_{j=1}^{K} p_j^{\acute{\eta}_i z} \tag{49}$$

In the case where the economic theory restrictions in Notation (37), (38), (39), (42) and (47) hold, (48) provides a system of demand functions which add up to total expenditure ($\sum w_i = 1$), are homogeneous of degree zero in prices and total expenditure and which adhere to the Slutsky's Symmetry Theory (Poi, 2012). The QUAIDS Model can therefore be interpreted that if relative prices (p_j) ,"real" expenditure ($\frac{m}{a(p)}$) and demographic variables do not change, the expenditure shares (w_i) are constant (a_0).

Subsequent to estimating the QUAIDS Model, the obtained coefficients can be used to calculate price and expenditure elasticities of the categories and groups of goods. This is important for the purposes of this study, since the demand equations of households are based upon these elasticities. The uncompensated (Marshallian demand) price elasticity of group of good i with respect to changes in the price of group of good j is

$$\epsilon_{ij}^{u} = -\delta_{ij} + \frac{1}{w_i}\left(\gamma_{ij} - \left[\beta_i + \acute{\eta}_i z + \frac{2\lambda_i}{b(p)c(p,z)} \ln\left\{\frac{m}{a(p)\overline{m_0}(z)}\right\}\right] \times \left(\alpha_j + \sum_l \gamma_{jl} \ln p_l\right) - \frac{(\beta_j + \acute{\eta}_j z)\lambda_i}{b(p)c(p,z)}\left[\ln\left\{\frac{m}{a(p)\overline{m_0}(z)}\right\}\right]^2\right) \tag{50}$$

where δ_{ij} is the Kronecker delta taking the value of $\delta_{ij} = 1$ if $i = j$ and $\delta_{ij} = 0$ if $i \neq j$. The expenditure elasticity for group of good i is

$$\mu_i = 1 + \frac{1}{w_i}\left[\beta_i + \acute{\eta}_i z + \frac{2\lambda_i}{b(p)c(p,z)} \ln\left\{\frac{m}{a(p)\overline{m_0}(z)}\right\}\right] \tag{51}$$

By invoking the Slutksy equation the compensated (Hicksian demand) price elasticity's are calculated as

$$\epsilon_{ij}^{c} = \epsilon_{ij}^{u} + w_j \mu_i \tag{52}$$

Notations (27) to (39) are borrowed directly from Deaton and Muellbauer (1980a) and notations (40) to (52) are borrowed directly from Poi (2012) with reference to Banks *et al*., (1997).

4.2.5.2 Results pertaining to the complete demand system

The parameters of the QUAIDS Model were estimated in Stata 12 by iterated feasible generalized non-linear least-squares estimation, with the theoretical restrictions of adding-up, homogeneity and symmetry automatically imposed during estimation. This method aims to address heteroskedasticity in the residuals while adhering to economic theory. Although there exists some multicollinearity between prices of commodity groups,[190] this should only influence the standard errors of the estimates, resulting in less significant estimates.[191]The total sample size were 24 785 households.

Table 21 indicates the coefficients estimated for the complete demand system - 94 of the 112 coefficients estimated are statistically significant at the 1 percent level of significance.

[190] Three of the group prices for the complete demand system have variance inflation factors (VIF) greater than ten.
[191] This tends to be less of an issue in larger data sets, such as the one used for this study.

Table 21: Complete demand system coefficients estimated by QUAIDS

	NG	CL	HU	HC	HE	TR	RE	OGS
Constant	0.1195	0.1694	0.0677	0.1490	0.0642	-0.1292	0.0332	0.5262
	(0.0398)	(0.0193)	(0.0166)	(0.0206)	(0.0097)	(0.0337)	(0.0178)	(0.0223)
PNG	0.1250	0.0123	0.0658	0.0496	-0.0028	-0.1225	-0.0590	-0.0684
	(0.0115)	(0.0071)	(0.0055)	(0.0062)	(0.0029)	(0.0102)	(0.005)	(0.0069)
PCL	0.0123	0.0050	-0.0570	-0.0161	0.0112	0.0073	0.0285	0.0089
	(0.0071)	(0.0055)	(0.0034)	(0.004)	(0.002)	(0.0065)	(0.0034)	(0.0037)
PHU	0.0658	-0.0570	0.0707	-0.0114	-0.0142	0.0030	-0.0397	-0.0173
	(0.0055)	(0.0034)	(0.0044)	(0.0034)	(0.0019)	(0.0057)	(0.003)	(0.0044)
PHC	0.0496	-0.0161	-0.0114	0.0010	-0.0095	0.0119	0.0103	-0.0357
	(0.0062)	(0.004)	(0.0034)	(0.0059)	(0.002)	(0.0067)	(0.0035)	(0.0039)
PHE	-0.0028	0.0112	-0.0142	-0.0095	-0.0056	-0.0189	0.0234	0.0164
	(0.0029)	(0.002)	(0.0019)	(0.002)	(0.0016)	(0.0031)	(0.0016)	(0.0017)
PTR	-0.1225	0.0073	0.0030	0.0119	-0.0189	0.0807	0.0194	0.0191
	(0.0102)	(0.0065)	(0.0057)	(0.0067)	(0.0031)	(0.015)	(0.0058)	(0.0073)
PRE	-0.0590	0.0285	-0.0397	0.0103	0.0234	0.0194	0.0318	-0.0148
	(0.005)	(0.0034)	(0.003)	(0.0035)	(0.0016)	(0.0058)	(0.004)	(0.0033)
POGS	-0.0684	0.0089	-0.0173	-0.0357	0.0164	0.0191	-0.0148	0.0917
	(0.0069)	(0.0037)	(0.0044)	(0.0039)	(0.0017)	(0.0073)	(0.0033)	(0.009)
Expenditure	-0.1316	-0.0250	-0.0158	-0.0188	0.0012	0.0205	-0.0095	0.1790
	(0.0044)	(0.002)	(0.0033)	(0.0021)	(0.0008)	(0.0039)	(0.0018)	(0.0057)
Quadratic expenditure	-0.0029	-0.0020	0.0004	-0.0049	0.0008	-0.0049	-0.0032	0.0167
	(0.001)	(0.0004)	(0.0008)	(0.0005)	(0.0002)	(0.0009)	(0.0004)	(0.0011)
Settlement type	-0.0081	0.0027	0.0131	-0.0025	0.0003	0.0009	0.0008	-0.0073
	(0.001)	(0.0003)	(0.0006)	(0.0003)	(0.0001)	(0.0006)	(0.0003)	(0.0007)
Household size	0.0012	-0.0013	0.0021	-0.0005	0.0000	-0.0010	0.0004	-0.0011
	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0)	(0.0001)	(0.0001)	(0.0001)
Income decile	0.0020	0.0000	-0.0009	0.0002	-0.0001	-0.0005	0.0000	-0.0006
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0)	(0.0001)	(0)	(0.0001)

Notes: (1) Greyed estimated coefficients represent statistical significance at the 1 percent level, (2) Estimated standard errors are in parenthesis, (3) All prices are in logarithm form with P= price, (4) NG = nutritional goods, CL = clothing, HU = Housing and utilities, HC = Household contents, HE = health, TR = transport and communication, RE = recreation, and OGS = Other goods and services.

In determining whether the QUAIDS Model is preferable to the AIDS Model for the data set, the quadratic expenditure term is relevant. As is evident from Table 21 the quadratic expenditure terms ($\lambda's$) are all, except in the case of housing and utilities, significant at the 1 percent level. Consequently a Wald's test was performed to test whether the sum of the quadratic expenditure coefficients are significantly different from

zero. This test statistic is 373.42 (p-value = 0.0000). As it is rejected that the quadratic expenditure terms are equal to zero, the QUAIDS Model is preferred to the AIDS Model for the data set.

To incorporate household demand into SAVATMOD, expenditure, own and cross price elasticity of demand are required. Table 22 provides the expenditure elasticity for the expenditure categories and Table 23 and Table 24 provide the uncompensated and compensated own and cross price elasticities respectively. All elasticities are measured at the mean.

Table 22: Expenditure elasticity

	NG	CL	HU	HC	HE	TR	RE	OGS
Expenditure elasticity	0.5618	0.5082	0.9304	0.3112	1.3095	0.9669	0.4443	2.1366

Table 23: Uncompensated elasticity

	NG	CL	HU	HC	HE	TR	RE	OGS
NG	-0.6351	0.0370	0.2558	0.1760	-0.0036	-0.2837	-0.1775	0.0751
CL	0.0945	-0.9407	-0.7266	-0.2062	0.1577	0.2383	0.4033	0.4888
HU	0.5338	-0.4637	-0.4181	-0.0901	-0.1149	0.0424	-0.3202	-0.1014
HC	0.6827	-0.2918	-0.1317	-0.9741	-0.1493	0.4069	0.1961	0.0016
HE	-0.0976	0.7588	-0.9707	-0.6331	-1.3791	-1.3579	1.5468	0.7892
TR	-0.7443	0.0356	0.0197	0.0656	-0.1090	-0.5148	0.1125	0.1855
RE	-1.6394	0.7051	-0.9628	0.2679	0.6044	0.6664	-0.1709	0.1363
OGS	-0.1407	0.0633	-0.1806	-0.1925	0.0620	-0.2366	-0.1107	-1.4501

Note: The entry in row i, column j of the matrix indicates the percentage change in the quantity of good i consumed for a 1 percent change in the price of good j.

Table 24: Compensated elasticity

	NG	CL	HU	HC	HE	TR	RE	OGS
NG	-0.4644	0.0786	0.3248	0.2096	0.0048	-0.1868	-0.1554	0.1948
CL	0.2489	-0.9031	-0.6642	-0.1759	0.1654	0.3259	0.4233	0.5970
HU	0.8164	-0.3948	-0.3038	-0.0346	-0.1009	0.2028	-0.2836	0.0967
HC	0.7772	-0.2688	-0.0935	-0.9555	-0.1446	0.4606	0.2083	0.0679
HE	0.3001	0.8557	-0.8099	-0.5549	-1.3594	-1.1321	1.5982	1.0681
TR	-0.4506	0.1072	0.1384	0.1233	-0.0944	-0.3481	0.1505	0.3915
RE	-1.5045	0.7380	-0.9083	0.2944	0.6111	0.7430	-0.1535	0.2309
OGS	0.5083	0.2215	0.0817	-0.0649	0.0941	0.1318	-0.0268	-0.9951

Note: The entry in row i, column j of the matrix indicates the percentage change in the quantity of good i consumed for a 1 percent change in the price of good j.

As is evident from Table 22, none of the expenditure categories' expenditure elasticity can be associated with inferior goods, as all expenditure elasticities are positive. All expenditure categories' expenditure elasticities are associated with normal goods, except for health and other goods and services in which case expenditure elasticities are associated with luxury goods.

Regarding the view that health is a luxury item, it should be taken into account that most medicine and hospital fees are subsidised by the state by means of public hospitals and only 17 percent of South African households (IES 2010/2011) are members of a medical aid fund. Expenditure upon health items is arguably that upon items not subsidised by the state and not covered by a medical aid. Most items that are generally considered to be luxury items are included in the other goods and services expenditure category.

Economic theory requires that all own price elasticities are negative and this requirement is upheld as is evident from the diagonal of Table 23. Moreover, the own price elasticities seem plausible in magnitude, with nutritional goods, housing and utilities, transport and communication and interestingly, recreation, being relatively inelastic. Clothing, household contents and other goods and services are relatively unit elastic and health is relatively elastic.

The finding of recreation expenditure being inelastic seems to suggest that despite the increase in prices, consumers are slower to respond to the higher cost of recreation or unwilling to decrease expenditures upon recreational items. This result is similar to the results of Selvanathan and Selvanathan (2004), the only other study that could be found that also considers the demand for recreation (in totality) in South Africa.

The magnitude and patterns of cross-price elasticity evident from the off-diagonal of Table 23 and Table 24, indicating substitution and complementary expenditure categories, seems plausible. Many of the cross-price elasticities are close to zero, which would indicate that the two applicable expenditure categories are independent. A positive cross-price elasticity, as in the case of household content and nutritional goods, indicates substitutes. Negative cross-price elasticities, as with recreation and nutritional goods, indicate complementarities (Varian, 2010).

4.2.5.3 Results pertaining to the nutritional goods demand system

The same model (QUAIDS) and method used for the estimation of the expenditure categories previously described was used in estimating the parameters for the five nutritional goods groups. These results, of which 42 of 55 of the estimated coefficients are significant at the 1 percent level of significance, are provided in Table 25.

Table 25: Demand for nutritional goods coefficients estimated by QUAIDS

	GBC	MF	DA	FV	ONG
Constant	0.4617	-0.0534	0.0200	0.2002	0.3715
	(0.0218)	(0.0328)	(0.0207)	(0.0170)	(0.0301)
PGBC	0.1416	-0.0832	0.0281	-0.0589	-0.0276
	(0.0206)	(0.0174)	(0.0124)	(0.0121)	(0.0168)
PMF	-0.0832	0.2138	0.0655	-0.0384	-0.1577
	(0.0174)	(0.0265)	(0.0173)	(0.0141)	(0.0251)
PDA	0.0281	0.0655	-0.0927	0.0523	-0.0532
	(0.0124)	(0.0173)	(0.0250)	(0.0127)	(0.0274)
PFV	-0.0589	-0.0384	0.0523	0.0005	0.0445
	(0.0121)	(0.0141)	(0.0127)	(0.0137)	(0.0159)
PONG	-0.0276	-0.1577	-0.0532	0.0445	0.1941
	(0.0168)	(0.0251)	(0.0274)	(0.0159)	(0.0409)
Expenditure	-0.0524	0.0720	0.0013	-0.0270	0.0062
	(0.0029)	(0.0032)	(0.0018)	(0.0020)	(0.0024)
Quadratic expenditure	0.0017	-0.0037	-0.0072	0.0051	0.0041
	(0.0011)	(0.0012)	(0.0006)	(0.0007)	(0.0009)
Settlement type	0.0479	-0.0320	-0.0091	-0.0068	-0.0001
	(0.0019)	(0.0020)	(0.0012)	(0.0011)	(0.0014)
Household size	0.0062	-0.0027	-0.0024	-0.0024	0.0012
	(0.0004)	(0.0004)	(0.0002)	(0.0002)	(0.0002)
Income decile	-0.0053	0.0007	0.0036	0.0019	-0.0009
	(0.0004)	(0.0003)	(0.0002)	(0.0002)	(0.0002)

Notes: (1) Greyed estimated coefficients represent statistical significance at the 1 percent level, (2) Estimated standard errors are in parenthesis, (3) All prices are in logarithm form with P= price, (4) GBC = grains, bread and cereals, MF = meat and fish, DA = dairy, FV = fruit and vegetables and ONG= other nutritional goods.

Consequent to estimation, a Wald's test was performed to test whether the sum of the quadratic expenditure coefficients are significantly different from zero. This test statistic is 157.36 (p-value = 0.0000). The QUAIDS Model is therefore also preferred for this estimation. Similar to the above, Table 26, Table 27 and Table 28 provide the

mean expenditure, own and cross-price elasticity of demand for the nutritional goods groups.

Table 26: Expenditure elasticity

	GBC	MF	DA	FV	ONG
Expenditure elasticity	0.9162	1.0464	0.3077	1.2300	1.2609

Table 27: Uncompensated elasticity

	GBC	MF	DA	FV	ONG
GBC	-0.46119	-0.28928	0.106064	-0.18982	-0.0838
MF	-0.33678	-0.20751	0.237596	-0.15876	-0.57686
DA	0.40561	0.910578	-1.78413	0.543658	-0.36252
FV	-0.45449	-0.40507	0.343244	-0.99848	0.273569
ONG	-0.19803	-0.88804	-0.3018	0.201032	-0.08041

Note: The entry in row i, column j of the table indicates the percentage change in the quantity of good i consumed for a 1 percent change in the price of good j.

Table 28: Compensated elasticity

	GBC	MF	DA	FV	ONG
GBC	-0.20246	-0.0364	0.202305	-0.06424	0.098995
MF	-0.0413	0.08129	0.347505	-0.01534	-0.36811
DA	0.492495	0.995501	-1.75181	0.585832	-0.30114
FV	-0.10717	-0.06559	0.472441	-0.82989	0.518955
ONG	0.158035	-0.54001	-0.16935	0.373866	0.171149

Note: The entry in row i, column j of the table indicates the percentage change in the quantity of good i consumed for a 1 percent change in the price of good j.

It is evident from Table 26 that all of the nutritional goods groups are normal goods. Grains, bread and cereals, together with dairy products, are necessities. Meat and fish has an expenditure elasticity coefficient of one and can therefore be regarded as a necessity or a luxury good. Fruits and vegetables and other nutritional goods are luxury goods.

It is further evident from Table 27 that all uncompensated own price elasticities are negative (adhering to economic theory (Varian, 2010)) and the cross-price elasticities provided in Table 27 and Table 28 seem plausible in magnitude and sign.

4.2.6 Incorporating the calculated elasticities into SAVATMOD

As previously mentioned, the coefficients estimated for the two demand systems with use of the QUAIDS Model, was used to calculate the expenditure, own and cross-

price elasticities of demand for each household. To incorporate these calculated elasticities into SAVATMOD, a demand equation was estimated for every expenditure category and nutritional goods group for each household (in total approximately 325 000 equations). The demand equation for each expenditure category i and each household is

$$lnQ_{d_i} = \alpha + \epsilon_i^u lnp_i + \epsilon_{ij}^u lnp_j + \cdots + \epsilon_{ik}^u lnp_k + \mu_i lnE \quad (53)$$

where Q_{d_i} is the quantity demanded for expenditure category i, ϵ_i^u is the uncompensated own price elasticity, p_i is the price of i, $\epsilon_{ij}^u, \ldots, \epsilon_{ik}^u$, is the uncompensated cross-price elasticity of the other expenditure categories in the demand system, $p_j, \ldots, p_k$ is the price of the other expenditure categories in the demand system, μ_i is the expenditure elasticity and E is the expenditure (consumption) upon all expenditure categories in the demand system.

The demand equation for each nutritional goods group i for each household is

$$lnQ_{d_i} = \alpha + \epsilon_i^u lnp_i + \epsilon_{ij}^u lnp_j + \cdots + \epsilon_{ik}^u lnp_k + \mu_i lnFE \quad (54)$$

where all terms are as in (53) and

$$FE = Q_{d_{nutritional\ goods}} p_{nutritional\ goods} \quad (55)$$

where $Q_{d_{nutritional\ goods}}$ is the quantity of nutritional goods demanded estimated in the complete demand equation and $p_{nutritional\ goods}$ is the price for nutritional goods used in the complete demand equation.

For every household, Q_d for every expenditure category and nutritional goods group are multiplied by the adjusted price for that category or nutritional goods group to calculate the expenditure per category or group. This expenditure (except for in the case of the nutritional goods expenditure category) is then fed back to the 200 expenditure items in SAVATMOD. As previously mentioned, empirically estimating the demand for single goods or services is highly complex and, due to a large amount of observed zero expenditures, unreliable. It is therefore assumed that households decrease or increase their expenditure upon the goods or services in an expenditure category or nutritional goods group proportionally to their original expenditure upon that good or service.

From the above it can be seen that a change in the price (or similarly a change in the VAT rate) of a good or service, or a change in expenditure would change the quantity demanded by a household for that good or service and all other goods and services (as the household faces a budget constraint).

4.2.7 Changing the VAT rate and consequently prices in SAVATMOD

It should be noted that in this analysis, a change in the standard VAT rate or a change in the rate at which a specific commodity is taxed, will similarly affect the prices faced by each household. The extent to which a change in the VAT rates influence category or group prices faced by households, will however depend upon whether the expenditures upon specific commodities by that household bear VAT.

To incorporate the true extent of the change in prices faced by each household, SAVATMOD considers the change in the percentage of the effective VAT rate (VAT paid divided by expenditure) paid per category or group for each household, while keeping expenditure constant. This therefore indicates the change in percentage of the price faced by each household. The initial demand equation for each household can therefore be changed by increasing or decreasing the price faced for each household, by the change in effective VAT rate as a result of the change in VAT rates.

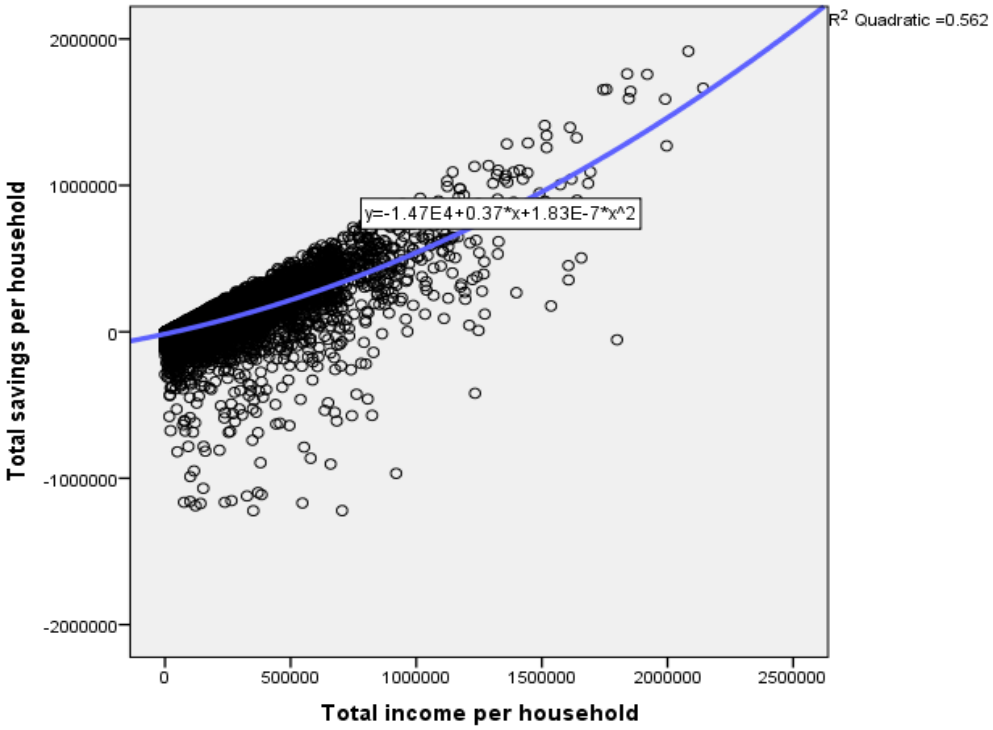
4.2.8 Changing the total expenditure for each household in SAVATMOD

Although the total expenditure of a household can be estimated over the long term, for instance as a result of job status and consequently income, such estimations are beyond the scope of this study. Changes in total expenditure are therefore limited to changes in income due to an increase in state subsidies (which is controlled by the user of SAVATMOD). This also means that SAVATMOD is only aimed at estimating the impact of a change in policy over the short term (as income and household preferences can be expected to change over the long term).

In estimating the amount that total expenditure (consumption) will change due to a change in state subsidy (income), the amount of savings by each household is considered. Households are assumed to linearly change their amount of savings in relation to their income. If a households' expenditure exceeded its income before any changes made to prices or expenditure, that household is assumed to expend all their additional income (savings remains nil). These assumptions seem plausible

when considering the relationship between income and savings for all households, provided in Figure 8.

Figure 8: Relationship between income and savings for all households



It can be seen from Figure 8 that the quadratic line is fairly linear. It is also evident from the R-squared provided, that an assumption that all households follow a similar trend when considering their amount of savings in relation to income, would not have provided accurate results. The assumption that households linearly adjust their savings is likely to provide a better estimate of actual household savings.

A percentage of savings was therefore calculated for each household to estimate the amount of savings after a change in income. This amount of savings is deducted from the adjusted amount of income, to estimate the amount of expenditure after a change in income. The workings of SAVATMOD are perhaps best described by way of an illustrative example.

4.3 An illustrative example of the workings of SAVATMOD

Due to the complexity in understanding the workings of SAVATMOD and as the model itself cannot be included in this document, an illustrative example is provided, following a single household taken from the sample of households in SAVATMOD.

The household drawn from the sample is located in an urban formal area in the Western Cape. The household consists of a single African black male, with a highest education level of Grade 4 (Standard 2). He lives in an informal dwelling and has a yearly income of R 22 096 (income Decile 3). Table 29 indicates his yearly expenditure before any changes are made to VAT policy:

Table 29: Expenditure before change in VAT policy

Commodity	Expenditure (R)	Commodity	Expenditure (R)
Brown bread	484	Aerated cold drinks	569.76
Maize flour	672	Cigarettes	2755.78
Poultry	558.85	Clothing	501.57
Other fish products	647.58	Rent of dwelling	2395.62
Milk	352.40	Paraffin	766.67
Other milk products	325.21	Household contents	2958.96
Eggs	379.58	Medical services	209.17
Potatoes	128.33	Minibus taxi	3615.76
Peanut butter	189.39	Communication	2384.06
Sugar	168.26	Restaurants	754.53
Jam	260.61	Other exempt services	1570.48
Coffee and tea	273.92		

By running the base structure of SAVATMOD (no behavioural changes) I obtain the yearly VAT burden for this household before any change to policy. The model calculates this as R1 542.18.

Next, I provide the unique demand equation estimates for this household for each of the expenditure categories and nutritional goods groups in Table 30 and 31:

Table 30: Demand equation estimates for expenditure categories

	NG	CL	HU	HC	HE	TR	RE	OGS
Constant	0.75	8.75	-1.78	-0.38	0.2	-3.04	-2.31	-14.27
ENG	-0.69	0.32	0.47	0.32	-0.16	-0.50	-1.99	-0.40
ECL	0.03	-0.81	-0.42	-0.14	1.27	0.02	0.85	0.23
EHU	0.23	-2.50	-0.47	-0.06	-1.61	0.01	-1.16	-0.58
EHC	0.15	-0.73	-0.08	-0.99	-1.05	0.04	0.32	-0.56
EHE	0.00	0.54	-0.10	-0.07	-1.63	-0.07	0.73	0.19
ETR	-0.24	0.80	0.06	0.19	-2.27	-0.68	0.82	-0.80
ERE	-0.15	1.38	-0.29	0.09	2.58	0.07	0.01	-0.37
EOGS	0.08	1.61	-0.05	-0.01	1.32	0.11	0.20	-2.52

EEX	0.60	-0.55	0.87	0.70	1.49	0.99	0.30	4.64

Notes: (1) E= Elasticity, (2) NG = nutritional goods, CL = clothing, HU = Housing and utilities, HC = Household contents, HE = health, TR = transport and communication, RE = recreation, OGS = Other goods and services and EX = Expenditure.

Table 31: Demand equation estimates for nutritional good groups

	GBC	MF	DA	FV	ONG
Constant	-0.04	-3.99	-0.75	-9.20	-1.96
EGBC	-0.30	-0.43	0.16	-2.31	-0.12
EMF	-0.33	-0.11	0.46	-2.28	-0.61
EDA	0.14	0.26	-1.39	1.81	-0.21
EFV	-0.22	-0.19	0.27	-1.04	0.14
ENG	-0.08	-0.68	-0.19	1.48	-0.37
EEX	0.78	1.15	0.69	2.27	1.16

Notes: (1) E = Elasticity, (2) GBC = grains, bread and cereals, MF = meat and fish, DA = dairy, FV = fruit and vegetables, ONG= other nutritional goods and EX = Expenditure.

Next, for illustrative purposes, I use SAVATMOD to simulate a change in the standard VAT rate from 14 percent to 20 percent, while keeping expenditure constant. The first process involves establishing the new prices that this household will face. This is done by comparing the effective VAT rate paid per expenditure category and nutritional goods group, when the base structure is run with a standard VAT rate of 14 percent and 20 percent (12.28 percent and 16.67 percent if already included). The static change (without behavioural changes) in VAT paid if the standard VAT rate increased to 20 percent can also be obtained and, for interest sake, is R2 092.95. Table 32 and 33 indicate the percentage increase in prices that the household will face:

Table 32: Percentage increase in expenditure categories' prices

	NG	CL	HU	HC	HE	TR	RE	OGS
Percentage increase	3.25	4.39	0.00	4.39	4.39	1.74	4.39	0.00

Table 33: Percentage increase in nutritional good groups' prices

	GBC	MF	DA	FV	ONG
Percentage increase	0.00	4.39	1.35	0.00	4.39

It is evident from Table 32 and 33 that the percentage increase in price that a household will face will be unique for each household, as it is dependent upon whether the household expended upon zero-rated or exempt VAT commodities and the amount of expenditure upon these commodities. In my current illustration the highest possible increase is 4.39 percent (16.67 percent - 12.28 percent) and this will

be the case if the household only expended upon standard-rated items. If the household only expended upon zero-rated or exempt items, the increase in price will be 0 percent.

The next process involves increasing the prices faced by the household with the indicated percentages. This will result in firstly the 8 expenditure category demand equations and thereafter the 5 nutritional goods group demand equations, estimating the quantity purchased for each expenditure category (except the nutritional goods category) and each nutritional goods group category as a result of the change in VAT policy. These changes are then fed back into SAVATMOD. The resulting expenditure per commodity is provided in Table 34:

Table 34: Expenditure after change in policy

Commodity	Expenditure (R)	Commodity	Expenditure (R)
Brown bread	465.91	Aerated cold drinks	557.66
Maize flour	646.88	Cigarettes	2968.08
Poultry	554.96	Clothing	487.90
Other fish products	643.08	Rent of dwelling	2330.33
Milk	346.64	Paraffin	745.78
Other milk products	319.90	Household contents	2878.31
Eggs	373.38	Medical services	203.47
Potatoes	125.55	Minibus taxi	3517.21
Peanut butter	185.37	Communication	2319.08
Sugar	164.69	Restaurants	733.97
Jam	255.08	Other exempt services	1527.68
Coffee and tea	268.10		

Although the total amount of expenditure remained unchanged[192], the way in which that amount was spent has changed and the total quantity of commodities purchased (utility of the household) decreased.

Finally SAVATMOD runs with the new expenditures per commodity and the increased VAT rate. After the household responded to the change in prices, the total VAT burden for the year is R2089.95. The household was therefore able to lower its total VAT burden compared to what it would have been had it not changed its expenditure pattern (R2092.95). The difference may seem small, but it should be

[192] This is important to take note of, in that SAVATMOD is based upon the assumption that consumption behaviour and labour are weakly separable.

kept in mind that this is a low income and therefore low consumption household and that when considering the total revenue generated from the South African VAT, the impact of behavioural changes may be much larger.

4.4 Conclusion

In Chapter I provide the methods used in developing SAVATMOD, a structural model to be used in providing the empirical results in the next chapters. The first part of this chapter is dedicated to describing the base structure of SAVATMOD. This base structure can be used to assess the impact of the VAT currently levied and administered upon South African households. The results pertaining to the use of this base structure are provided in Chapter 3.

The estimation of the impact of a change in VAT policy upon South African households is a more difficult task. Changes in VAT policy will result in changes in prices. Changes in prices will consequently result in households making behavioural changes in adapting to these new prices (to remain within their budget while maximizing utility). Furthermore, policies can also be implemented that increase the budget of a household and this will also result in behavioural changes. To incorporate these behavioural changes, two consumer demand systems were estimated with the use of the QUAIDS Model.

The price and expenditure elasticities obtained from the results of the QUAIDS Model estimation allow for the estimation of behavioural equations for each household, estimating their expenditure upon goods and services after a change in policy. By applying VAT rates (that gave rise to a change in prices) to these new expenditures, SAVATMOD calculates the VAT paid per household and also the total amount of VAT paid by households (after the change in policy). Moreover, it is possible to determine the increase in VAT paid per household, as a result of a change in policy by comparing these results to the base structure results of SAVATMOD.

This increase in VAT paid is important as this serves as an indication of the impact of the change in policy for a household, especially when considered against the ability of households to pay the increase in VAT. From this, the type of household that will be impacted to a greater or lesser extent due to a change in policy can be estimated. The results of different changes in policies can also be compared.

The results of changes in policy for South Africa measured by SAVATMOD, with reference to the discussion in Chapter 3, are provided in Chapters 5 and 6.

CHAPTER 5:
AN ANALYSIS OF AN INCREASE OF THE VAT RATE

This chapter is aimed at motivating why a VAT rate increase should be considered for the purpose of describing the results to policy makers, and also to describe the results of an increase in the VAT rate.[193] Whether a VAT rate increase is to be recommended is discussed in Chapter 7 with reference to the results in this chapter.

In the background to the study, provided in Chapter 1, a brief case for additional tax revenue, and specifically VAT revenue, is made. It is also mentioned in Chapter 3 that the Katz Commission recommended that a VAT rate increase be investigated. In this chapter, I first provide additional arguments to motivate why a VAT rate increase should be considered. Thereafter, I provide the (limited) evidence upon what rate of VAT should be considered. Following this, the impact of an increase in the VAT rate on households, with reference to the results provided by SAVATMOD, is described.

5.1 The case for considering a VAT rate increase

The case for considering a VAT rate increase in this study can perhaps best be made with reference to the first interim report of the Davis Tax Committee.[194] In this report the Davis Tax Committee (2014:8) states that the South African tax system has to "support the realisation of our first National Development Plan to 2030…"[195] One objective of the National Development Plan (NDP) is to phase in National Health Insurance (NHI) and according to the NDP, South Africa's NHI will initially be based upon delivery by the public sector and mainly tax-funded (Davis Tax Committee, 2014).

A further objective of the NDP is a wide-ranging system of social protection and, to this end, the NDP (2012:366) (in Davis Tax Committee, 2014:11) states:

[193] It is therefore not the aim of this section to propose or justify a VAT rate increase.
[194] As mentioned in Chapter 1, this is a current tax review committee of the South African tax system. The 11 members of this committee were appointed by the Minister of Finance. Besides this report, there are no studies that provide strong evidence as to why an increase in the VAT rate should be considered. There are however multiple news articles and tax web articles mentioning that additional tax revenue is required and that the VAT rate may soon be increased.
[195] "The National Development Plan 2030 released in August 2012 is the first long term development plan in South Africa. It significantly extends the planning horizon beyond the five year medium term timespan of the existing departmental five year strategic plans, setting out long term objectives and aiming to strengthen policy coherence" (Davis Tax Committee, 2014:9).

"Based upon the current labour market participation and tax base estimates, there clearly would not be enough tax payers and contributors to ensure state provision, maintenance and sustainability of decent social protection. Social protection benefits will be competing with other priorities for a small pool of funds. And with technology and other advances in medicine, life expectancy is projected to increase, which will require increased spending in the health sector."

The Davis Tax Committee (2014) also mentions that additional public resources will be required to meet other objectives, such as increasing further education and training throughput, incentives for research and development, public transport and tax subsidies to businesses that employ youth mentorship programmes.

With the objectives of the NDP and the revenue that meeting these objectives will require in mind, the current and estimated budget deficit is important. Table 35 includes this deficit, together with actual and estimated revenue and expenditure.

Table 35: Main budget deficit (actual and estimated)

	Actual outcome (R bn)					Estimate(R bn)			
	08/09	**09/10**	**10/11**	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**
Revenue	608.8	579.7	672.8	745.3	799.8	886.2	962.8	1058.1	1 172.6
Expenditure	636	747.2	806.0	889.9	965.5	1049.1	1 142.6	1 232.6	1 323.6
Budget deficit	-27.2	-167.5	-133.2	-144.6	-165.7	-162.9	-179.8	-174.5	-151.0
Budget deficit (% of GDP)	1.02	6.11	4.8	4.9	5.2	4.7	4.7	4.2	3.3

Source: Adjusted from National Treasury (2014:38).

From Table 35 it is evident that the budget deficit has increased greatly from 2008/09 and it is estimated that it will not greatly decrease in the medium term. It is further estimated that net debt will continue to increase. In 2005/06 to 2008/09 net debt was stable at approximately 25 percent of GDP. Since 2008/09 net debt has increased to approximately 35 percent of GDP in 2012/13 and it is estimated by National Treasury (2014) that net debt will increase to approximately 45 percent of GDP by 2017/18.

After considering the NDP objectives, the current and estimated budget deficit and the net debt, the Davis Tax Committee (2014: 43) states:

"It is clear that the fiscus may need to generate additional tax revenue at some point in the future. In particular, if National Health Insurance and/or Comprehensive Social

Security are to become a reality, the tax to GDP ratio will need to rise quite significantly."

Based upon this conclusion, the Davis Tax Committee requested that National Treasury should estimate an increase in the VAT rate, as well as the personal income tax and corporate income tax rates, by way of a macroeconomic model (Davis Tax Committee, 2014). The results of these estimations indicate that an increase in the VAT rate will be least distortionary with the smallest impact upon economic growth. This economic benefit of the VAT however also comes at a cost of increasing income inequality (Davis Tax Committee, 2014). The Davis Tax Committee (2014:44) concludes that:

> "This modelling work underscores the efficiency[196] of collecting additional tax revenue via the VAT system. At the same time, it points to the fact that VAT is less progressive than the other tax handles. Given this trade-off between efficiency and equity, if there is a need for additional revenue it would be advisable to adjust more than one tax rate upwards[197], rather than relying solely on an increase from one tax handle."

From the above it appears that a description of the results from an increase in the standard VAT rate (obtained from SAVATMOD) may be informative to policymakers and it is feasible that such a policy change may be implemented. There are currently no micro-level studies (of which I am aware) that consider an increase in the South African VAT rate. Furthermore, the results in this chapter are important for the purpose of comparison with the results in the following chapter and these comparisons are likely to be informative to policy makers (discussed in the next chapter).

5.2 The rate of VAT to consider

There is unfortunately no hard evidence upon the rate of VAT that should be considered. The Davis Tax Committee (2014) requested National Treasury to increase tax revenues by R45 billion. It is mentioned by the Davis Tax Committee

[196] As previously mentioned, for the purposes of this study, I divide efficiency into economy and efficiency.

[197] As mentioned in Chapter 1, South Africa may face challenges in increasing either the personal income tax or corporate income tax rates. While increasing either of these taxes' rates, together with an increase in the VAT rate may perhaps be more politically acceptable than only a VAT rate increase, tax morale, base erosion and profit shifting challenges may see that such an approach is difficult to implement.

(2014:43) that "there was no particular rationale for the size of the increase in tax revenue – the example is simply illustrative". To increase tax revenues by R45 billion, National Treasury increased the VAT rate from 14 to 17 percent, but since the increase was only illustrative it does not provide an indication of the VAT rate to consider.

Fortunately, by providing two rate increases that are one percentage point apart, the result of an additional percentage point increase may fairly accurately be approximated. In other words, by providing two points, a fairly accurate straight line can be approximated to obtain the results of an additional percentage point increase. This is due to the growth in effective VAT rate being very near to a constant factor, with this factor only changing as a result of behavioural changes in SAVATMOD (and these are relatively small changes as will be seen).[198]

I therefore consider a one percent and two percent increase in the standard VAT rate.

5.3 A one percent increase in the standard rate

5.3.1 Additional VAT revenue as a result of the rate increase

Before making any changes to SAVATMOD, the total weighted VAT payments by households are calculated by SAVATMOD as R84.6 billion (effective VAT rate at 7.12 percent).[199] This amount seems plausible when considering the domestic VAT payments (excluding import VAT) in South Africa over the same period as the survey period, being approximately R98.5 billion (Tax Statistics, 2011; Tax Statistics, 2012).[200] It should be kept in mind that businesses not registered for VAT and businesses making exempt supplies will also contribute to the total domestic VAT payments.

After applying a standard rate of 15 percent to SAVATMOD and allowing for behavioural changes to the unique change in prices faced by each household, the total weighted VAT revenue from households increased to R90.1 billion (effective

[198] Since all standard rated goods' prices rise with a percentage point of VAT, the behavioural changes are much less, compared to a change in the base that only changes a selection of prices.
[199] It should be kept in mind that all additional VAT due to tax policy changes in this study are in addition to this amount.
[200] It should be noted that this amount cannot be obtained with reference to Chapter 3. The IES 2010/2011 data was surveyed over a period of 12 months starting in September 2010 and ending in August 2011 (whereas the data in Chapter 3 are for 12 months, but for a different period).

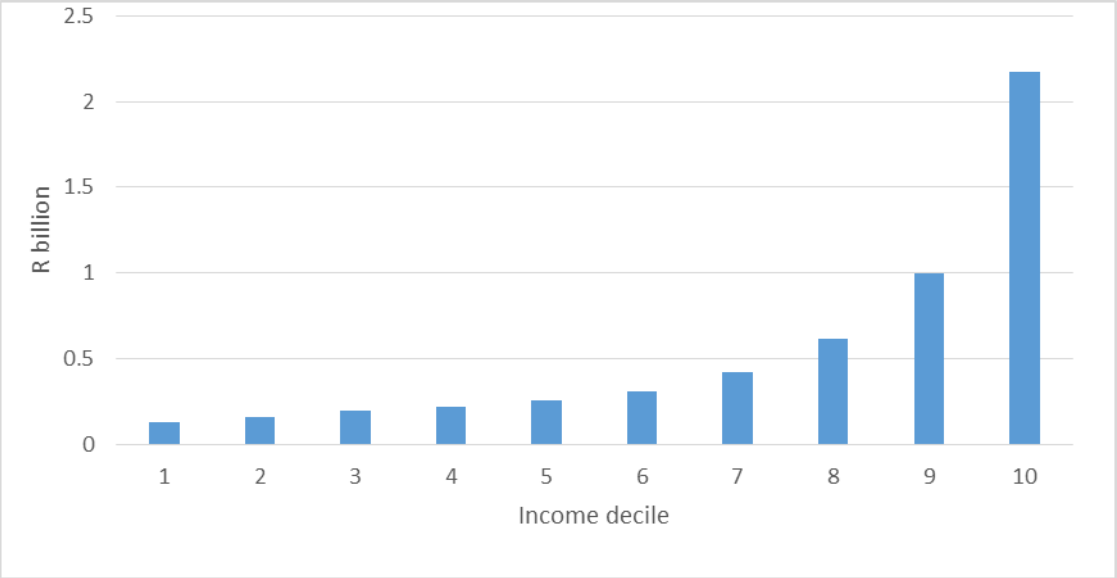
VAT rate at 7.58 percent). It is therefore estimated that a one percent increase in the VAT rate will result in a 0.46 percent increase in the effective VAT rate for the average household. The increase in VAT revenue of R5.5 billion can be adjusted with the use of the CPI[201] and is estimated at R6.92 billion in current terms.

The total VAT revenue as provided by Tax Statistics (2011, 2012) for the period that the IES 2010/2011 was conducted (R187.295 billion) divided by the amount of VAT revenue in terms of SAVATMOD before any policy change (R84.6 billion) gives a multiplication factor of 2.21. The estimated amount (in current terms) can be multiplied with this factor to approximate the total additional VAT revenue (including all domestic VAT and import VAT) as a result of a policy change. Multiplying R6.92 billion with 2.21 gives a total VAT revenue increase as a result of a one percent increase in the standard rate of R15.29 billion. Multiplying this amount with three (to approximate a three percent increase in the VAT rate) gives a total VAT revenue of R45.87 billion. This is very near the R45 billion estimation of National Treasury reported by the Davis Tax Committee (2014) and provides some further external validity to SAVATMOD and the use of 2.21 as a multiplier.[202]

I next consider the increase in VAT revenue per income decile, provided in Figure 9.[203]

[201] This adjustment is based upon the growth in the total CPI from the end of the survey period to the end of March, 2015. The data necessary for this calculation was obtained from Statistics South Africa.
[202] It should perhaps be mentioned that a general shortcoming with the type of models similar to SAVATMOD is in providing external validity to the model. There is unfortunately no information that I could find on the external validity of the National Treasury Model, but it seems likely that a model that is used by National Treasury will be well validated.
[203] It should be noted that although some information may be lost by providing these results per income decile, this approach is preferred for comparative purposes with results presented in the next chapter.

Figure 9: Additional VAT revenue per income decile



From Figure 9 it is evident that the additional revenue as a result of an increase of the VAT rate to 15 percent, will largely be contributed by higher income households. Figure 9 however only considers the amount of VAT paid and not which type of households will be more or less impacted by the increase in the VAT rate.

5.3.2 The impact of a rate increase

The impact that a VAT rate increase will have upon a household will depend upon the ability of that household to contribute additional revenue. A measure of impact based upon income (Pi) is therefore determined for each household and the notation is as follows:

$$Pi = \left(\frac{VATn - VATo}{I}\right) \times 100 \tag{56}$$

where $VATn$ is the amount of VAT paid after the policy change, $VATo$ is the amount of VAT paid before the policy change and I is income.

The extent of the impact that a policy change has upon a household will depend upon what and how many goods and services that household consumes, meaning the household's consumption behaviour. From the literature, various factors can be identified that influence consumer behaviour. These factors can be summarised

under personal, psychological, social, cultural and market factors.[204] Table 36 contains examples of sub-factors to each of these factors.

Table 36: Factors and sub-factors that influence consumption behaviour

Factors	Sub-factors
Personal	Occupation, economic situation, age, sex and place of domicile.
Psychological	Perceptions, learning or experience, motivation, personality and self-consciousness.
Social	Social class, family and groups.
Cultural	Basic values, wants and behaviours, nationality, religion, racial group and geographical regions.
Market	Product, price, placement, price of substitute goods, price of complementary goods, income and preferences.

Source: Adjusted from Furaiji, Łatuszyńska and Wawrzyniak (2012), Stávková, Stejskal and Toufarová (2008).

From the IES 2010/2011 a number of variables or proxies (hereafter referred to as variables) for consumer behaviour of households can be identified. These can then be used to estimate which types of households were impacted to a greater or lesser extent by the change in policy. It is therefore estimated whether a change in policy will be equitable when considering factors besides income, such as education, gender of household head, number of children and so forth. The variables (limited to those available in the data set) used for this purpose, together with the consumer behaviour factor they aim to be an indication towards, are provided in Table 37.

Table 37: Variables used for estimation

Factors	Variable or proxy
Personal	Income, consumption, value of dwelling, education, gender of household head, dominant gender in household, average age of adults, average age of children.
Psychological	Education, average age of adults, members employed.
Social	Education, number of adults, number of children
Cultural	Dominant race of household, province, settlement type.
Market	Province, season surveyed, average effective price increase.

As can be seen from Table 37, many variables can be argued to be related with more than one factor. Education as an example could influence a person's economic situation, perceptions and social class. Province, on the other hand, can provide

[204] Refer to Table 1 in Furaiji, Łatuszyńska and Wawrzyniak (2012) for a list of the important literature contributions to these factors.

some indication towards the culture of a household, but also the market in which households are involved.

To obtain the variables at a household level, some calculations were required. Income and consumption are taken as the total amount generated or consumed by the household. Education is taken as the average years of education of household members older than 18 years. Only members older than 18 years are considered, as the number of children could otherwise influence this measure. The members employed variable refers to household members 15 years and older who are employed. Only members 15 years and older are considered, as this is the legal age of employment in South Africa. The average effective price increase is the average price increase that each household will face due to a change in policy as used for the purposes of SAVATMOD.

Furthermore, the average age of adults and children are considered separately, as only indicating the average age of the household could potentially provide a poorer indication of consumption behaviour. Households with young children can be expected to have a different consumption behaviour than households with older children. Also households with young adults may consume differently to households with older adults. The dominant race and gender of a household was also calculated from the variables provided in the IES 2010/2011 data set.

In the following section an estimation of the impact of a one percent increase in the VAT rate is provided.

5.3.3 Estimation of the impact of a one percent increase in the VAT rate

In this section I first provide some discussion on initial problems in estimation and how these were dealt with. Thereafter, the sample and descriptive statistics for the purposes of this estimation are provided. Lastly, the results of the estimation are provided, coupled with a discussion of these results.

Initially the estimated residuals of the estimation were not normally distributed and heteroskedastic. In an attempt to address these issues and also increase the linearity between the dependant variable and independent variables, the distribution of the variables and whether they could benefit from transforming were firstly considered. Table 38 provides results of the Kolmogorov-Smirnov test for normality for the continuous variables in the estimation.

Table 38: Kolmogorov-Smirnov test results of untransformed continuous variables

	Kolmogorov-Smirnov		
	Statistic	**df**	**Sig.**
P_i15	.486	24673	.000
I	.271	24673	.000
C	.305	24673	.000
VD	.318	24673	.000
EDU	.094	24673	.000
AGEA	.093	24673	.000
AGEC	.239	24673	.000
EMP	.236	24673	.000
ADULT	.252	24673	.000
CHILD	.205	24673	.000
PI15	.060	24673	.000

Evident from Table 38 is that none of the continuous variables are normally distributed (indicated by a test statistic of zero), including the dependant variable (P_i15). To establish which variables to transform and which transformation would provide for the closest to normal distribution, each variable was transformed to their log10[205] and compared to the initial Kolmogorov-Smirnov test statistic. This approach provided for residuals to be near normally distributed and improved the heteroskedasticity in the residuals and linearity between the dependant variable and independent variables.

Further investigation indicated that outliers also contribute to a non-normal distribution of and heteroskedasticity in the residuals. In addressing outliers, cases with studentized residuals greater than three or less than minus three were firstly removed from the data set. Secondly, cases with Mahalanobis distances with a probability of less than 0.001 were removed from the data set.

Households with a Mahalanobis distance probability of less than 0.001 are in most cases those with low income and high consumption levels. This could be as a result of a measurement error, or possibly households who are not currently earning income, besides interest, and living upon savings. A few households also did not

[205] For variables that have many zero observations, that is number of children and age of children, a constant was added (0.5) to only provide for non-zero values.

report any income, value of dwelling or did not have any adults and these households were removed for estimation purposes.

Table 39 provides for the final sample composition for this estimation. This is followed by the frequencies of the discrete variables used in estimations in Table 40 and the descriptive statistics for the independent continuous variables in Table 41. Lastly, the descriptive statistics are provided for the impact variable of an increase in the VAT rate to 15 percent (referred to as $P_i 15)$ in Table 42.

Table 39: Sample composition

Change to data set	**N**
Data set of SAVATMOD (excludes households with zero expenditure and zero food expenditures)	24750
Treatment of outliers studentized residuals >3 and <-3	(410)
Treatment of outliers Mahalanobis distance p<0.001	(959)
Households with zero income	(77)
Households with zero value of dwelling	(2)
Households without adults	(70)
Remaining cases	23232
Percentage ratio of remaining cases to raw data set sample size	91.6%

Table 40: Frequencies for discrete variables

Gender of household head				
	Frequency	Percent	Valid Percent	Cumulative Percent
Male	12909	55.6	55.6	55.6
Female	10323	44.4	44.4	100.0
Total	23232	100.0	100.0	
Dominant gender of household				
	Frequency	Percent	Valid Percent	Cumulative Percent
Male	8447	36.4	36.4	36.4
Female	9433	40.6	40.6	77.0
Split household	5352	23.0	23.0	100.0
Total	23232	100.0	100.0	
Dominant race of household				
	Frequency	Percent	Valid Percent	Cumulative Percent
African Black	18891	81.3	81.3	81.3
Coloured	2564	11.0	11.0	92.4
White	1777	7.6	7.6	100.0
Total	23232	100.0	100.0	
Province				
	Frequency	Percent	Valid Percent	Cumulative Percent
Western Cape	2747	11.8	11.8	11.8
Eastern Cape	3106	13.4	13.4	25.2
Northern Cape	1021	4.4	4.4	29.6
Free State	2032	8.7	8.7	38.3
KwaZulu-Natal	3124	13.4	13.4	51.8
North West	2333	10.0	10.0	61.8
Gauteng	3603	15.5	15.5	77.3
Mpumalanga	2141	9.2	9.2	86.5
Limpopo	3125	13.5	13.5	100.0
Total	23232	100.0	100.0	
Settlement type				
	Frequency	Percent	Valid Percent	Cumulative Percent
Urban formal	13370	57.5	57.5	57.5
Urban informal	1601	6.9	6.9	64.4
Traditional area	7741	33.3	33.3	97.8
Rural formal	520	2.2	2.2	100.0
Total	23232	100.0	100.0	

Season surveyed				
	Frequency	Percent	Valid Percent	Cumulative Percent
Winter	5622	24.2	24.2	24.2
Spring	5935	25.5	25.5	49.7
Summer	6235	26.8	26.8	76.6
Autumn	5440	23.4	23.4	100.0
Total	23232	100.0	100.0	

Table 41: Descriptive statistics of independent continuous variables

	N	Minimum	Maximum	Mean	Std. Deviation
Log of income	23232	1.90	6.61	4.6474	.54424
Log of consumption	23232	3.05	6.66	4.5952	.45747
Log of value of dwelling	23232	2.18	6.78	4.8696	.69977
Education of members in years	23232	0	27	9.20	3.929
Log of age of adults	23232	1.26	1.98	1.5875	.12883
Log of age of children	23232	-.30	1.24	.4319	.62101
Number of members employed	23232	0	5	.83	.841
Log of number of adults	23232	.00	1.04	.3126	.23188
Log of number of children	23232	-.30	1.16	.1365	.37733
Effective price increase for VAT at 15	23232	.0003	.0086	.005488	.0010070

Table 42: Descriptive statistics of dependant variables

	N	Minimum	Maximum	Mean	Std. Deviation
Log of impact over income for VAT at 15	23232	-2.14	1.94	-.3699	.38236

From the above variables, the discrete variables were coded into dummy variables and the dummy with the highest frequency was excluded from the model for purposes of estimation. The model for estimation purposes is written as:

$$LnP_i15 = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PI15 + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (57)$$

where P_i15 is the impact of the policy change to 15 percent, $I\ to\ PI15$ follows the order as the variables presented in Table 40, FHD is female household head, MHS is male household, SHS is split household, CR is coloured race, IAR is Indian and Asian race, WHR is white race, $WC\ to\ LP$ is the provinces in South Africa, UI is urban

informal settlement, TA is traditional area settlement, RF is rural formal settlement, WR is winter, SG is spring and AN is autumn. The results of this estimation are provided in Table 43.

Table 43: Regression of impact of policy change to 15 percent[206]

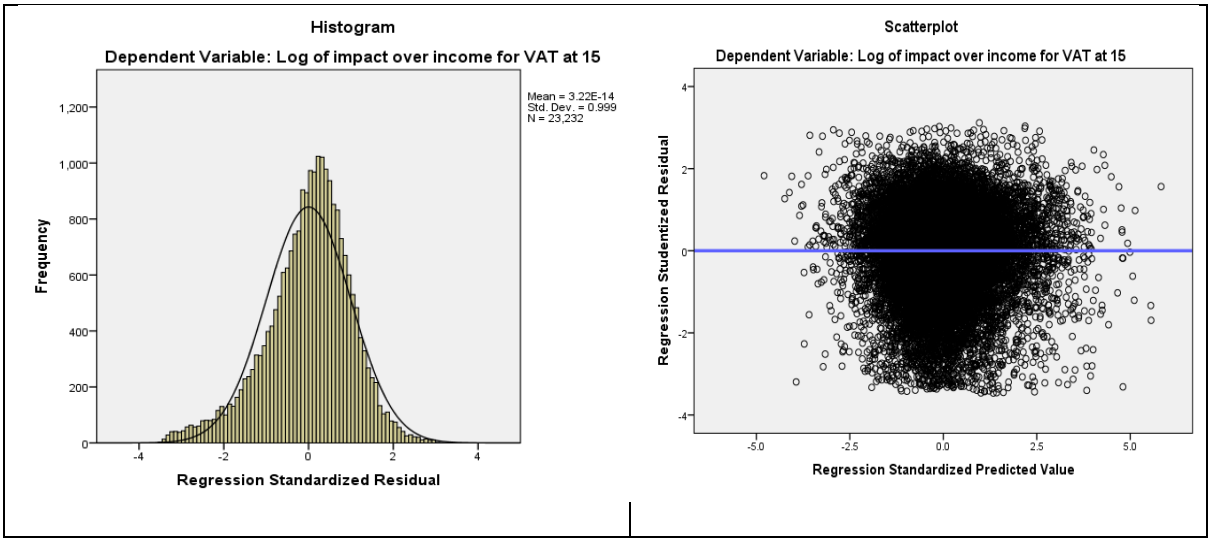
Source	SS	df	MS
Model	3166.37114	29	109.185212
Residual	230.005769	23202	.009913187
Total	3396.37691	23231	.146200203

Number of obs = 23232
F(29, 23202) =11014.14
Prob > F = 0.0000
R-squared = 0.9323
Adj R-squared = 0.9322
Root MSE = .09956

LnP_i15	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	-.997417	.0020958	-475.91	0.000	-1.001525	-.9933091
LnC	.9464198	.0024394	387.98	0.000	.9416385	.9512011
LnVD	-.0080501	.0012698	-6.34	0.000	-.0105389	-.0055613
EDU	-.0011298	.0002276	-4.96	0.000	-.0015759	-.0006836
LnAGEA	.0551373	.0060026	9.19	0.000	.0433718	.0669027
LnAGEC	-.0185802	.0021816	-8.52	0.000	-.0228563	-.0143041
EMP	-.007487	.0009615	-7.79	0.000	-.0093715	-.0056024
LnADULT	.0092146	.0033235	2.77	0.006	.0027004	.0157289
LnCHILD	.018788	.0037659	4.99	0.000	.0114066	.0261695
PI15	62.77348	.6920928	90.70	0.000	61.41693	64.13002
FHD	.0047273	.0015445	3.06	0.002	.0017	.0077546
MHS	.007541	.0016964	4.45	0.000	.004216	.010866
SHS	.0024931	.0017973	1.39	0.165	-.0010297	.0060159
CR	.0131418	.0027651	4.75	0.000	.007722	.0185617
IAR	0	(omitted)				
WHR	-.0047332	.0030458	-1.55	0.120	-.0107033	.0012369
WC	.0194901	.0029389	6.63	0.000	.0137297	.0252505
EC	.0186867	.0026132	7.15	0.000	.0135647	.0238087
NC	.0382189	.0037549	10.18	0.000	.0308591	.0455787
FS	.0277752	.0028378	9.79	0.000	.022213	.0333374
KZN	.0095655	.0026191	3.65	0.000	.0044318	.0146992
NW	.0203424	.002808	7.24	0.000	.0148386	.0258462
MP	.0168583	.0028201	5.98	0.000	.0113308	.0223859
LP	.0232782	.0027766	8.38	0.000	.017836	.0287205
UI	.0056539	.0028258	2.00	0.045	.0001151	.0111927
TA	.0024272	.0019225	1.26	0.207	-.0013409	.0061954
RF	.0178728	.0045796	3.90	0.000	.0088965	.026849
WR	-.0044529	.0018415	-2.42	0.016	-.0080623	-.0008434
SG	-.0009398	.0018092	-0.52	0.603	-.0044859	.0026064
AN	-.005822	.001851	-3.15	0.002	-.0094501	-.0021939
_cons	-.4794303	.0125321	-38.26	0.000	-.503994	-.4548665

Variable	VIF	1/VIF
LnCHILD	4.73	0.211327
LnAGEC	4.30	0.232483
LnI	3.05	0.327996
LnC	2.92	0.342657
WC	2.11	0.473854
LP	2.10	0.475431
TA	1.92	0.519642
EDU	1.87	0.533565
KZN	1.87	0.534446
EC	1.85	0.539511
LnVD	1.85	0.540487
CR	1.76	0.568398
NW	1.67	0.599061
MHS	1.56	0.640801
MP	1.56	0.641296
WHR	1.54	0.651130
EMP	1.53	0.652261
FS	1.51	0.663876
SG	1.46	0.685381
WR	1.46	0.685968
AN	1.44	0.694475
LnAGEA	1.40	0.713569
LnADULT	1.39	0.718530
NC	1.39	0.720305
FHD	1.38	0.724492
SHS	1.34	0.745045
UI	1.20	0.832799
PI15	1.14	0.878612
RF	1.08	0.929802
Mean VIF	1.88	

[206] It should be noted that as a matter of preference I provide regression results directly as provided by the Statistical Software package (Stata 12). Although it may be argued that this is less desirable towards the appearance of the results, it is my opinion that it increases the validity of the results since the results cannot be edited by the researcher and the results may be easier to read.



I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-Number of children, PI-Price increase, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

From the results it seems that the assumption for normality of residuals (although not required for the estimate to be regarded as best linear unbiased estimator (BLUE) in terms of the Gauss-Markov Theorem) are nearly complied with. More importantly for the estimate to be BLUE, the residuals have a mean of zero, are uncorrelated as evident from the collinearity statistics[207] (all variables have a tolerance level above .2) and there does not appear to be any heteroskedasticity present. To test for heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test for heteroskedasticity was performed in Stata and the results follow.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of LnP_i15

         chi2(1)      =     0.00
         Prob > chi2  =   0.9763
```

From the results of this test it is evident that the null hypothesis should be accepted, meaning that the residuals have a constant variance and are therefore homoscedastic. The estimates provided in this results section are therefore BLUE.

[207] The variable for Indian and Asian households was dropped from the estimation due to collinearity. This is likely due to the small number of these households in the sample and the number of discrete variables.

From the R-squared statistic it is evident that 93.2 percent of the dependant variables' variance is explained by the model. This high R-squared also indicates that this model could accurately predict the impact of a change in VAT to 15 percent for households. The model is also significant at the 1 percent level when considered in entirety, as indicated by the F-statistic.

The constant for the regression line can be interpreted that the log of impact for a change of VAT to 15 percent is estimated to be -.479 for a black dominant household who has a male head, a female dominant gender, who lives in Gauteng in a urban formal settlement and was surveyed during summer, if this household had a zero value for all the continuous variables.

All other variables, besides split household (dummy for gender of household), white race (dummy for dominant race of household), traditional area (dummy for settlement type) and spring (dummy for season) are significant at the 5 percent level (majority at the 1 percent level).

The coefficient of income (-.997) serves as an indicator of the progressivity or regressivity of the change in policy (when P_i is the dependant variable) while controlling for all other variables. As is evident from the results, for every one percent increase in income the impact of the policy is estimated to be .997 percent less (this interpretation is possible since both variables are in log form). This indicates that this change in policy is regressive when considered against the income of households.

The results further indicate that the impact of the change in policy will be statistically significantly greater for households with older adults, more adults and more children (larger households). The impact of the change in policy will be less for households with higher valued dwellings, a higher average amount of years of education, older children and more household members employed.

Compared to a household represented by the constant, the impact of the change in policy will be greater for households with female heads, male dominant households, coloured households, households situated in any other province to Gauteng and households living in urban informal and rural formal settlement types.

In considering the coefficient for consumption it may appear that the policy change is progressive when measured against consumption, but such an interpretation would be incorrect. To determine whether the policy change is progressive or regressive

against consumption (C), an impact estimate for consumption needs to be calculated. For this the notation is as follows:

$$Pc = (\frac{VATn - VATo}{C}) \times 100 \quad (58)$$

A regression estimation similar to the estimation with $P_i 15$ and with the same independent variables, but with $P_c 15$ as the dependent variable, is run to determine whether the change in policy is regressive or progressive when measured against consumption. Only the coefficient of LnC is provided here and this coefficient is estimated as -.049 (significance .000) with the constant estimated as -.478.[208] This indicates that this change in policy is also regressive when measured against consumption. For every one percent increase in consumption the impact of the policy is estimated to be .049 percent less. This is however much less regressive than when considered against income (.997 percent)[209].

These results indicate that a change in policy to a VAT at 15 percent can be regarded as regressive when considered against income or consumption. This result seems logical as taking a regressive tax (as the South African VAT was shown to be in Chapter 3) and increasing the rate of the tax, without making any adjustment to the tax and transfer system, will have a regressive impact.

The results provided in this section are replicated with the VAT rate at 16 percent in the following section.

5.4 A two percent increase in the standard rate

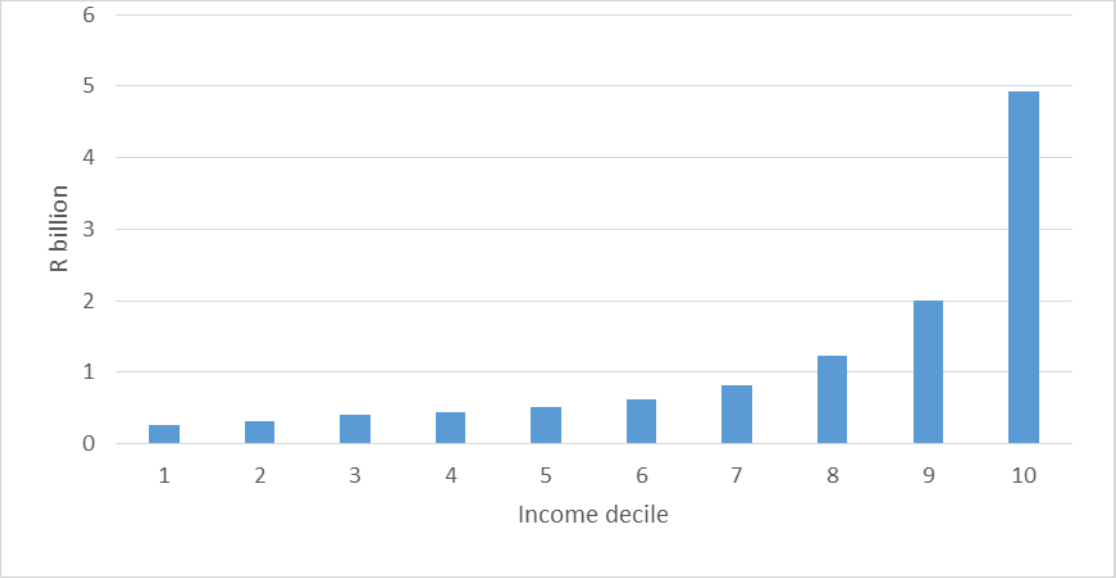
5.4.1 Additional VAT revenue as a result of the rate increase

By increasing the standard rate of VAT to 16 percent, SAVATMOD calculates the total amount of VAT revenue contributed by households as R96.1 billion (effective rate of 8.09 percent). This suggests that increasing the VAT rate to 16 percent will increase revenue by R11.5 billion (approximately R14.4 billion in current terms) and the effective rate of VAT by 0.97 percent.[210] The total additional VAT revenue is

[208] This approach of only providing the coefficients for the income impact estimation are followed for the remainder of this study. This is due to the other coefficients for the consumption impact estimation being very similar to income impact estimation.
[209] Due to the constants of these two regression estimations being very near to identical, this comparison can be made.
[210] The increase in the effective VAT for a standard VAT rate increase from 15 percent to 16 percent is therefore 0.51 percent. This is slightly greater than the increase in the effective VAT rate from 14

approximated at R31.82 billion (R14.4 billion multiplied with 2.21). Figure 10 provides the increase in VAT revenue per income decile.

Figure 10: Additional VAT revenue per income decile



From Figure 10 it is evident that similar to a one percent increase in the standard rate, most of the additional VAT revenue will be contributed by higher income households. It should however be noted that all income deciles will make a greater absolute contribution towards additional VAT revenue. The types of households that will be impacted to a greater or lesser extent by this change are estimated next.

5.4.2 Estimation of the impact of a two percent increase in the VAT rate

For the purposes of the estimation of the OLS regression for $Pi16$, the starting sample was kept unchanged from the estimation for $Pi15$. This was done as many of the issues in estimating $Pi15$ could likely be present for the estimation of $Pi16$. An additional 149 households with studentized residuals greater than three and less than minus three were removed from the data set. All variables are left unchanged from the estimation of $Pi15$, besides the dependant variable and the effective price increase variable. The descriptive statistics for these two variables are provided in Table 44.

---

percent to 15 percent, namely 0.46 percent. This can be expected since the growth in effective VAT rate is fairly constant, meaning that the effective VAT rate will increase by a greater proportion for every additional percentage point increase in the standard rate. To illustrate this point, the effective VAT rate grew by 0.93% (7.12/7.58) for a one percent increase in the standard rate. It grew again by 0.93% (7.58/8.09) for a two percent increase in the standard VAT rate. From this it can be estimated that for a three percent increase in the VAT rate, the effective VAT rate will be very near to 8.84% (8.09 x 1.093).

Table 44: Descriptive statistics of changed variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_i16	23083	-1.67	2.23	-.0711	.38150
PI16	23083	.00	.02	.0109	.00199

After incorporating these changed variables, the notation for the final estimation can be written as:

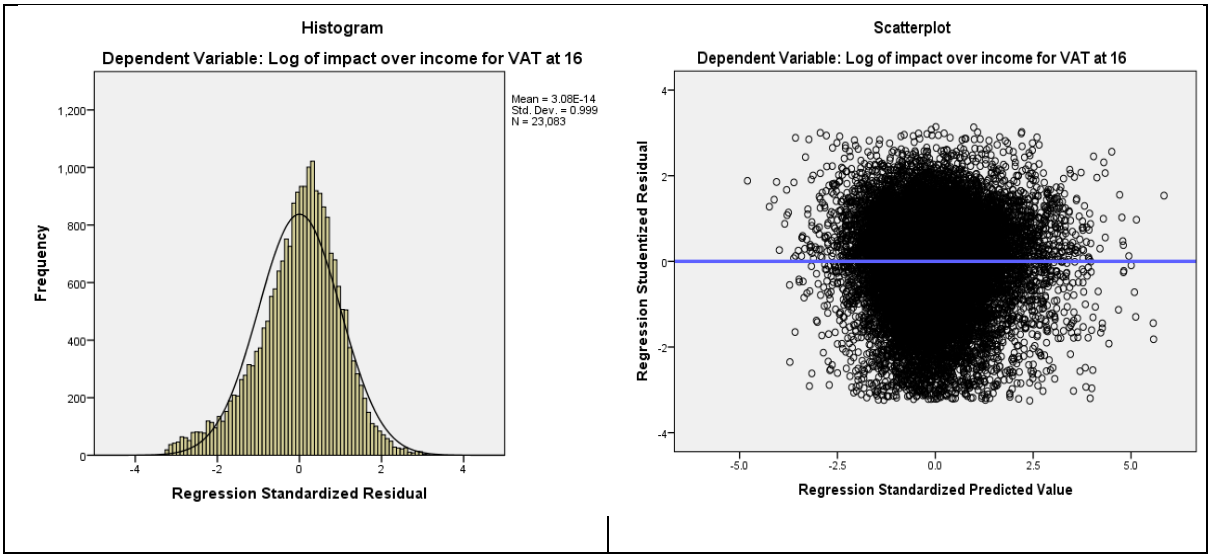
$$LnP_i16 = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PI16 + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (59)$$

The results of the regression of this model are provided in Table 45.

Table 45: Regression of impact of policy change to 16 percent

Source	SS	df	MS	Number of obs = 23083
				F(29, 23053) =11564.70
Model	3143.37373	29	108.392197	Prob > F = 0.0000
Residual	216.068251	23053	.009372674	R-squared = 0.9357
				Adj R-squared = 0.9356
Total	3359.44198	23082	.145543799	Root MSE = .09681

LnP_i16	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	-.9991981	.0020502	-487.36	0.000	-1.003217	-.9951795
LnC	.950823	.0023844	398.77	0.000	.9461494	.9554965
LnVD	-.0080122	.0012386	-6.47	0.000	-.0104399	-.0055845
EDU	-.0011828	.0002221	-5.32	0.000	-.0016182	-.0007474
LnAGEA	.0522712	.0058614	8.92	0.000	.0407826	.0637599
LnAGEC	-.0183348	.0021289	-8.61	0.000	-.0225077	-.014162
EMP	-.0079057	.0009379	-8.43	0.000	-.009744	-.0060674
LnADULT	.0084531	.0032407	2.61	0.009	.0021011	.0148052
LnCHILD	.0169926	.0036734	4.63	0.000	.0097926	.0241926
PI16	30.96036	.3408133	90.84	0.000	30.29235	31.62838
FHD	.0051966	.0015067	3.45	0.001	.0022433	.0081499
MHS	.0077918	.0016551	4.71	0.000	.0045477	.0110358
SHS	.0030337	.0017536	1.73	0.084	-.0004035	.0064709
CR	.0114064	.0026973	4.23	0.000	.0061195	.0166933
IAR	0	(omitted)				
WHR	-.0045344	.0029792	-1.52	0.128	-.0103738	.0013049
WC	.0211064	.0028685	7.36	0.000	.0154838	.0267289
EC	.0197519	.0025492	7.75	0.000	.0147553	.0247485
NC	.0411492	.003672	11.21	0.000	.0339519	.0483465
FS	.0290664	.0027679	10.50	0.000	.0236411	.0344917
KZN	.0113507	.0025563	4.44	0.000	.0063402	.0163612
NW	.0217736	.0027397	7.95	0.000	.0164036	.0271435
MP	.0172682	.0027488	6.28	0.000	.0118803	.022656
LP	.0250642	.0027096	9.25	0.000	.0197532	.0303752
UI	.0058034	.0027574	2.10	0.035	.0003987	.0112081
TA	.0015588	.0018748	0.83	0.406	-.0021159	.0052336
RF	.019277	.0044806	4.30	0.000	.0104947	.0280592
WR	-.0045737	.001797	-2.55	0.011	-.008096	-.0010515
SG	-.0019308	.0017644	-1.09	0.274	-.0053892	.0015276
AN	-.0058081	.0018058	-3.22	0.001	-.0093476	-.0022686
_cons	-.1797206	.0122308	-14.69	0.000	-.2036939	-.1557473



I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-Number of children, PI-Price increase, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It appears that the residuals are nearly normally distributed, have a mean of zero, are uncorrelated (refer to the VIF statistics for the estimation of P_i15) and do not seem to be heteroskedastic. The results of the Breusch-Pagan/Cook Weisberg test for heteroskedasticity follow.

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of LnP_i16

         chi2(1)      =     2.73
         Prob > chi2  =   0.0985
```

As indicated by this test, the null hypothesis can be accepted at the five percent level and the residuals are homoskedastic (at least to an extent that it is unlikely to cause serious problems regarding the test statistics). The estimates of this model are therefore BLUE. Similar to the estimation of P_i15, the R-square of this model (0.935) provides an indication that this model can be used to predict the impact of a VAT change to 16 percent upon households.

The coefficients for this model, as could be expected, are very similar to those provided in the estimation of $Pi15$, with the only major difference being the constant. The increase in the constant from -.479 ($Pi15$ estimation) to -.179 (P_i16 estimation) is important as it indicates that the mean impact for all households will be greater. A change in the VAT rate to 16 per cent is estimated to be slightly more regressive

than a change to 15 per cent (refer to the coefficient of LnI). The remainder of the results are close to identical to the results of the $Pi15$ estimation and will therefore not be further discussed here. It can likely be confidently assumed that a three percent increase in the standard rate will also provide similar estimations (besides the constant that will further increase).

The impact of the policy (P_c) will also be regressive to the same extent than a change in the VAT rate to 15 per cent when measured against consumption (LnC = -.049, significance .000), although the constant will differ for this estimation (-.180).

From the results presented in this chapter the following conclusions can be drawn:

5.5 Conclusion

This chapter provides and describes the results for a one percent and a two percent increase in the VAT rate. From these results a larger increase in the VAT rate can also be approximated. The results of Chapter 5 are summarised in Table 46.

Table 46: Summary of results of Chapter 5

Changes in revenue	**VAT rate at 15%**	**VAT rate at 16%**
Additional VAT revenue from households	R6.92 billion	R14.4 billion
Total additional VAT revenue	R15.29 billion	R31.82 billion
Regressive or progressive		
Regressive or progressive against income	Regressive	Regressive
Regressive or progressive against consumption	Slightly regressive	Slightly regressive
Statistical significantly greater impact on households		
Households with older adults	√	√
Households with more adults	√	√
Households with more children	√	√
Households with female heads	√	√
Male dominant households	√	√
Coloured households	√	√
Households not situated in Gauteng	√	√
Households living in urban informal settlements	√	√
Households living in rural formal settlements	√	√
Statistical significantly lesser impact on households		
Households with higher valued dwellings	√	√
Households with higher level of education	√	√
Households with older children	√	√
Households with more members employed	√	√

Table 46 show that if South Africa were to increase the VAT rate to 15 percent, it is estimated that additional revenue of approximately R6.92 billion will be contributed by households and total VAT revenue will increase by approximately R15.29 billion. Additional revenue will also be obtained from inputs purchased from businesses who make exempt supplies and businesses who are not registered.

The additional revenue from households will be provided in a regressive manner when considered against both income and consumption. This change in policy will have a greater impact upon households with lower valued dwellings (these households may well have additional expenditure obligations towards maintaining or perhaps obtaining safe and secure housing). Similarly households with less education are impacted to a greater extent (these households most likely have less opportunity towards future incomes), as are households with younger children and

more children (these households are likely to have increased expenditure in raising these children).

Furthermore, households with female heads are more affected (it may well be that female workers in the labour market have fewer opportunities to get jobs). Households outside of urban formal areas (situated in urban informal and rural formal areas) are also more affected (there may be less work opportunities or increased costs in expenditures for these households). It may therefore be argued that the change in policy will affect households with less ability to pay to a greater extent.

An increase in the standard VAT rate (if viewed in isolation) may well be argued as not meeting the canon of equity. Perhaps more importantly, an increase in the standard rate would not improve the alignment between the VAT and the other canons of taxation, being economy, efficiency, neutrality, flexibility, certainty and convenience.

This chapter provides an answer to the first part of the question of the Katz Commission, an increase in the VAT rate. In the following chapter I provide an answer to the second part of that question, narrowing the set of zero-rated (basic foodstuffs) items and investigating the scope for poverty relief to accompany this change in policy.

CHAPTER 6:
AN ANALYSIS OF STANDARD RATING BASIC FOODSTUFFS

In Chapter 3, I argue that the zero-rating of basic foodstuffs is perhaps the most questionable deviation from the structure of a good VAT (identified in Chapter 2). Zero-rated supplies between registered vendors and consumers decreases revenue from the VAT and affects the economy, neutrality and efficiency of the VAT. The complexity of the VAT is increased and evasion becomes more likely. The progressivity of the VAT may well be increased, but as was argued, with the highly progressive tax and transfer system of South Africa, from a purely theoretical equity perspective, the South African VAT may need to be more regressive.

Although this appears to be a strong argument towards standard rating basic foodstuffs, the challenges faced by South Africa (as discussed in Chapter 1) may provide that this argument does not hold, at the very least from a political perspective (concerned about acceptability). Further empirical evidence will however provide additional information to be considered by policy makers. This is the main motivation towards providing and describing the results in this chapter.

There are also secondary motivations to the results in this chapter, discussed in Section 6.2. This section also describes the different policy changes that will be considered. The rationale that the selection of different policy changes is based upon, that is the expenditure patterns of households upon zero-rated basic foodstuffs, is provided in Section 6.1. The remainder of the chapter provides and describes the results of the selection of policy changes considered.

6.1 The expenditure patterns of households upon zero-rated basic foodstuffs

As a departure point in providing the rationale for the specific policy changes considered, I provide the relationship between the expenditures of households upon all zero-rated basic foodstuffs and income as well as consumption.[211] These relationships are provided in Figure 11 and Figure 12.

[211] The reasons for considering the burden distribution of the VAT against both income and consumption are discussed in Chapter 3. The expenditures upon zero-rated foodstuffs are directly related to the burden distribution of the VAT.

Figure 11 and 12: Relationship between expenditures upon zero-rated foodstuffs and income/consumption

Figure 11: All zero-rated foodstuffs - Income

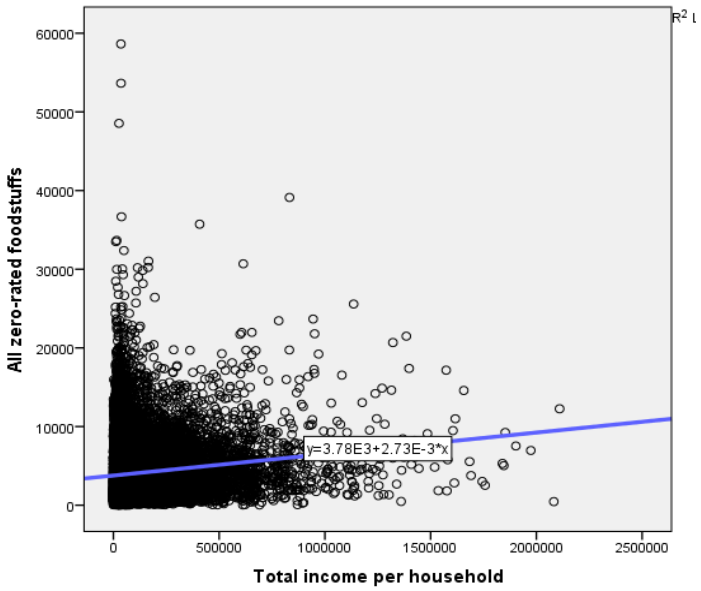
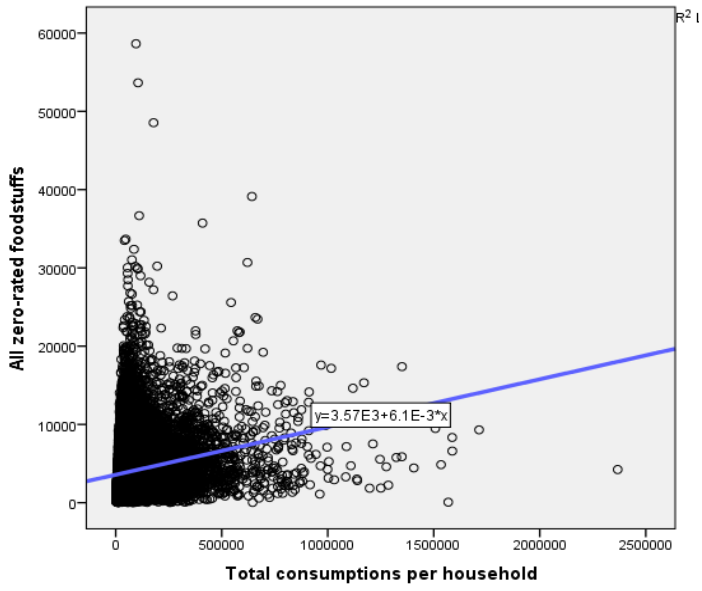


Figure 12: All zero-rated foodstuffs - Consumption



In Figure 11 and 12 as well as Figures 13 to 28 (below) a positive slope of the regression line can be interpreted to mean that wealthier households expend more on zero-rated goods and therefore obtain a greater tax benefit from these expenditures. Similarly, a flat regression line would mean that expenditure on zero-rated goods are the same irrespective of wealth and a negative regression line would mean that poorer households obtain a greater tax benefit from these expenditures.

From Figure 11 and 12 it is evident that wealthier households (both measured against income and consumption) on average enjoy a greater tax benefit in absolute terms due to the current zero-ratings upon basic foodstuffs. For every additional percentage of income, the average household expend 0.13 percent more on zero-rated foodstuffs. Similarly, for every additional percentage of consumption, the average household expend 0.30 percent more on zero-rated foodstuffs. This however does not necessarily mean that all zero-rated foodstuffs are expended more upon by wealthier households.

The zero-rated basic foodstuffs can be divided into the eight main categories of foodstuffs. It should be noted that not all food items within a category are zero-rated (Annexure 3 provides figures that describe the relationship between expenditures upon a zero-rated food item, and income as well as consumption for every individual

food item).The main categories of foodstuffs are bread, grains, fish, dairy products, fruit, vegetables, oil and legumes (Part B of Schedule 2 of the VAT Act). In this order I consider the expenditure patterns upon these categories of food items with reference to the relationship between the expenditure upon a category of zero-rated foodstuffs and income as well as consumption. These relationships are provided in Figure 13 to Figure 28.

Figure 13 to 28: Expenditure upon categories of zero-rated food items against income and consumption

Figure 13: Bread - Income

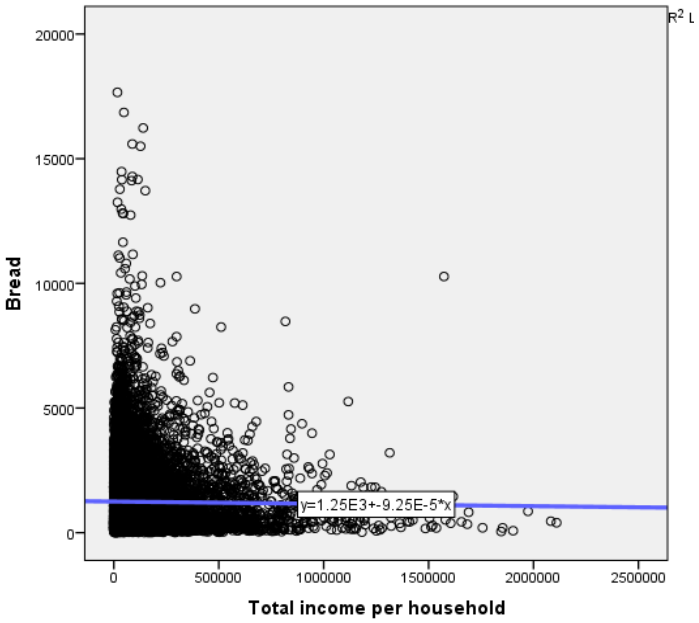


Figure 14: Bread - Consumption

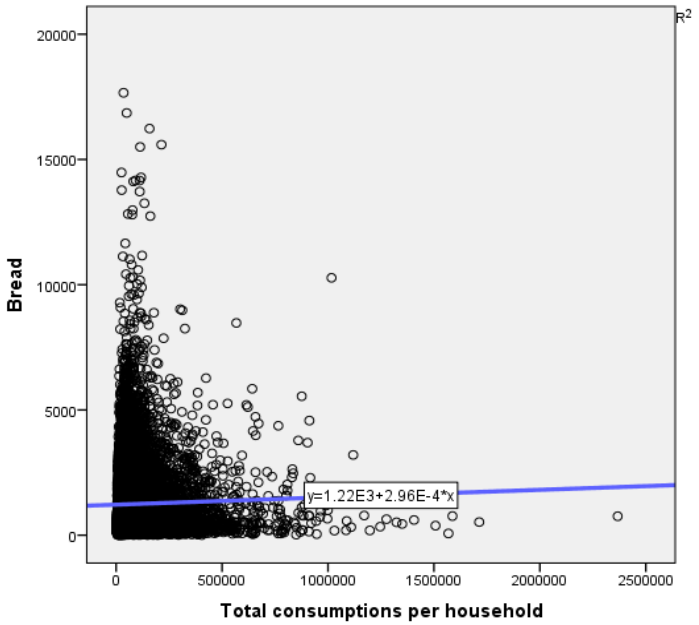


Figure 15: Grain - Income

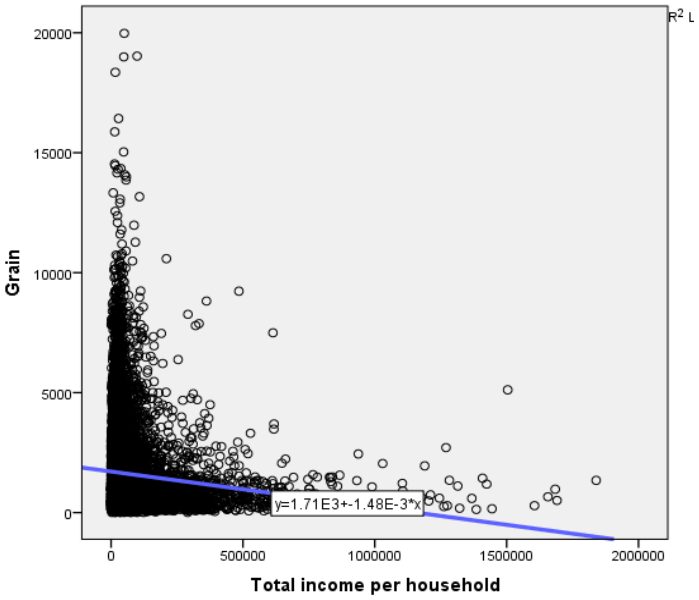


Figure 16: Grain - Consumption

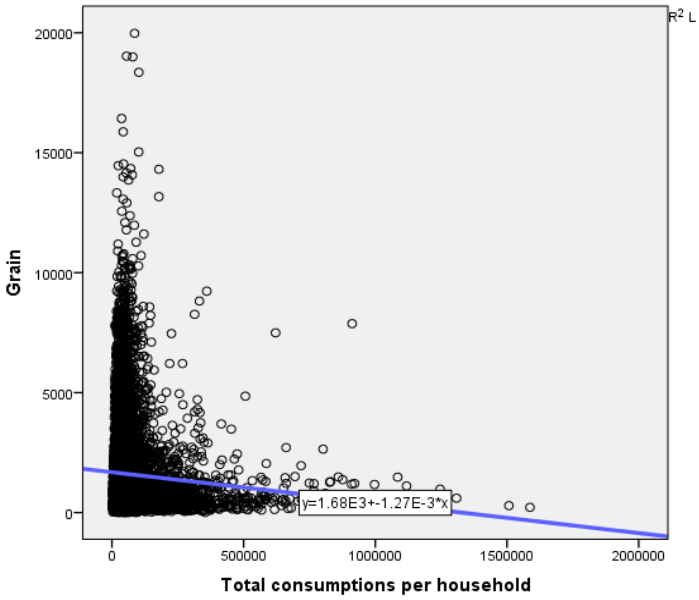


Figure 17: Fish - Income

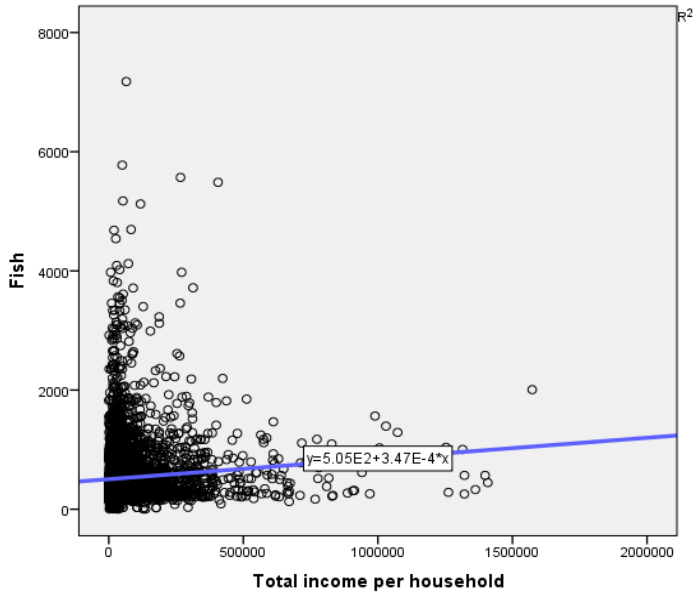


Figure 18: Fish - Consumption

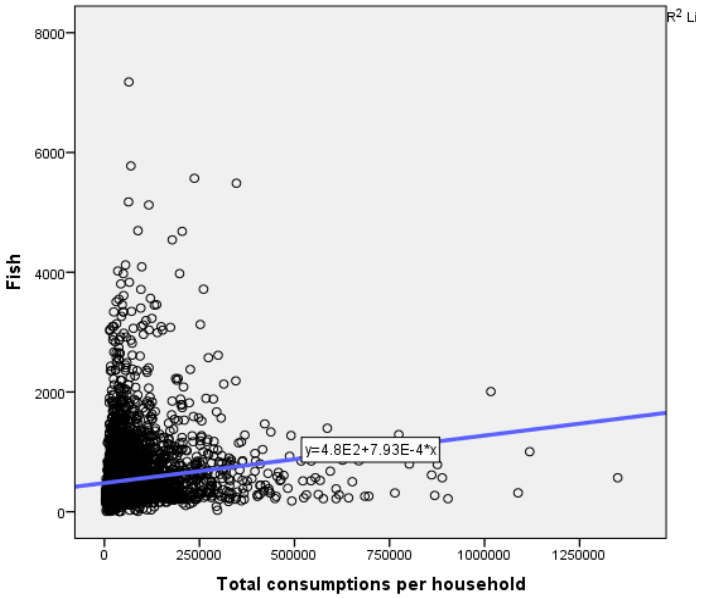


Figure 19: Dairy - Income

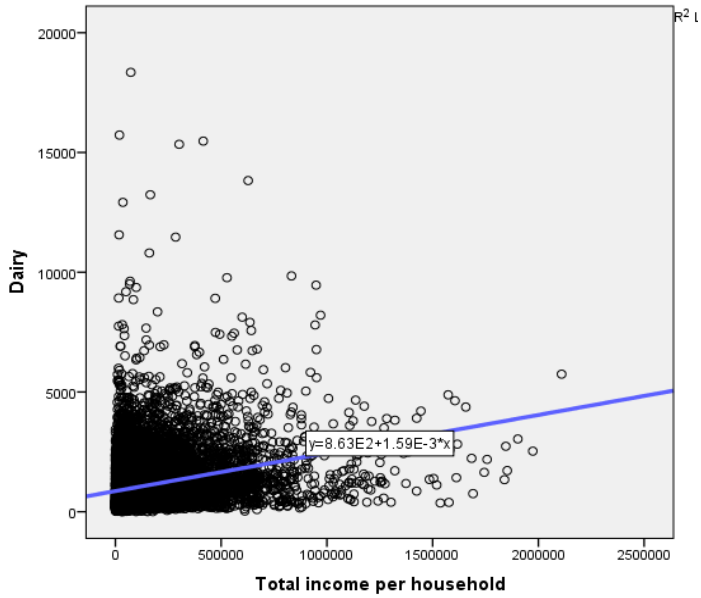


Figure 20: Dairy - Consumption

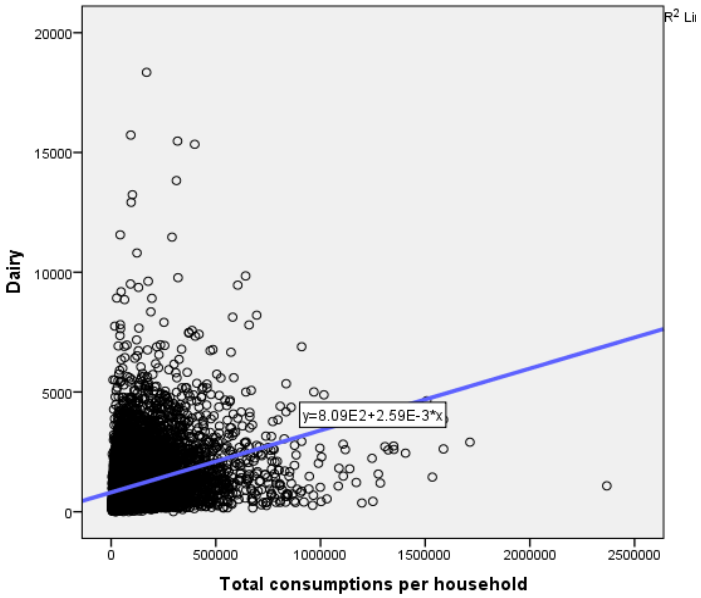


Figure 21: Fruit - Income

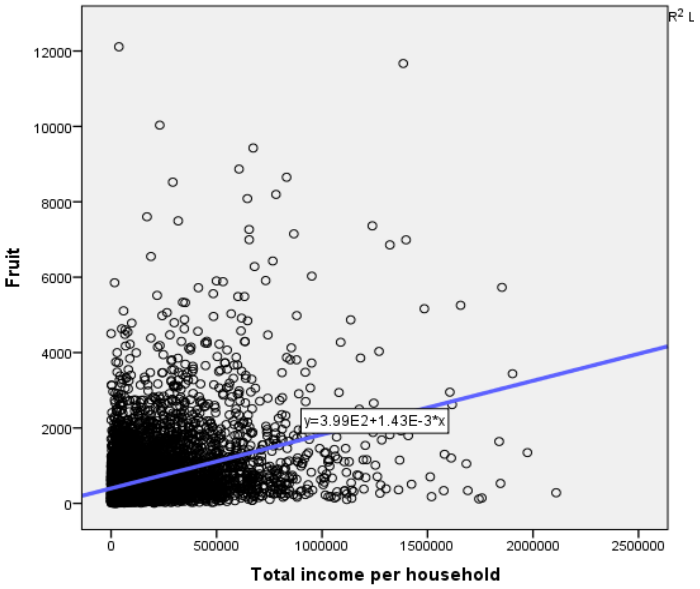


Figure 22: Fruit - Consumption

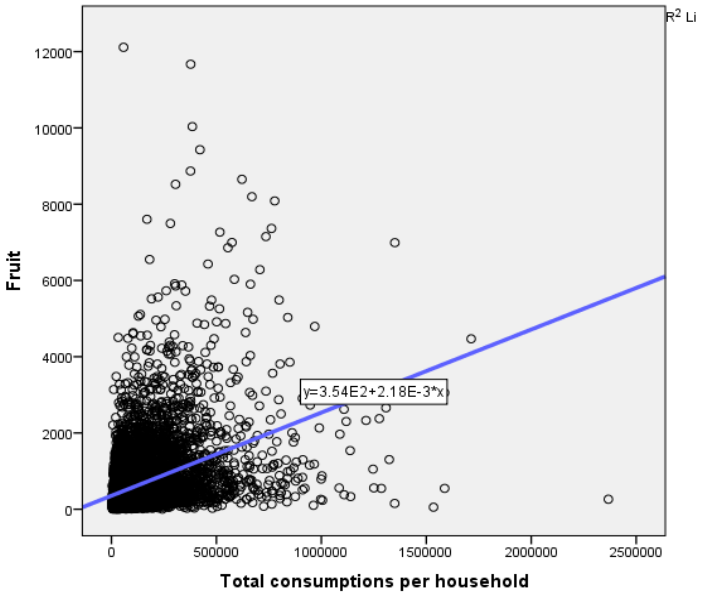


Figure 23: Vegetables - Income

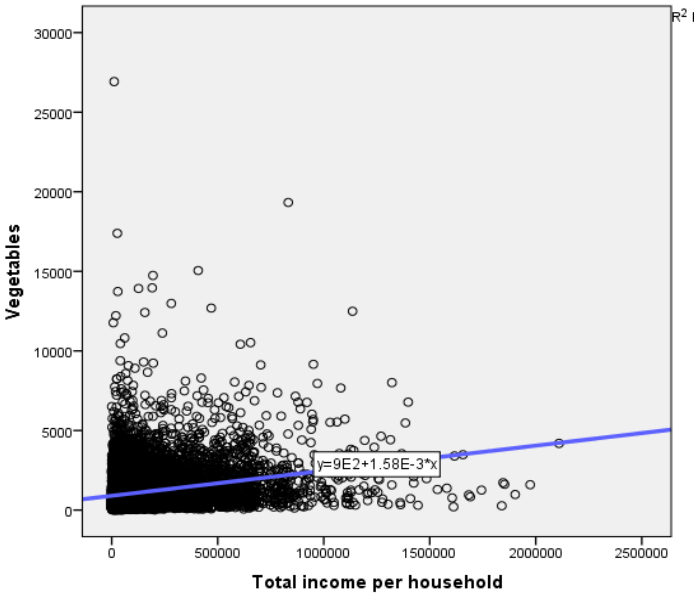


Figure 24: Vegetables - Consumption

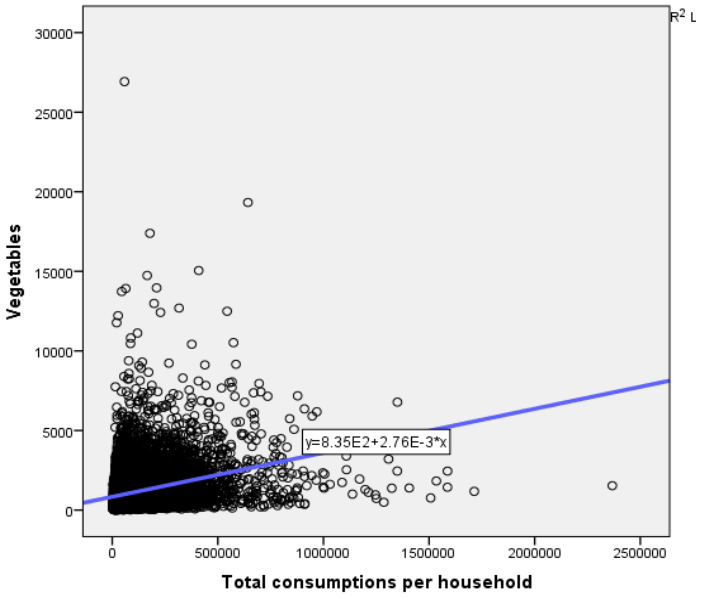


Figure 25: Oil - Income

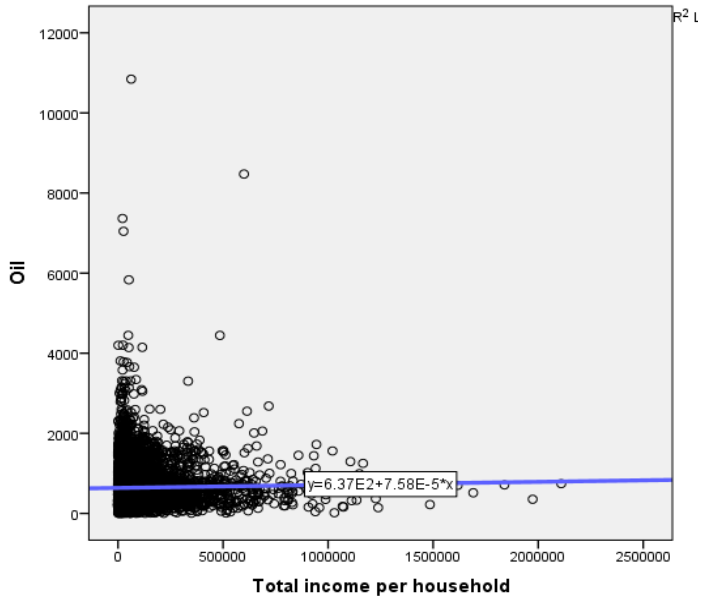


Figure 26: Oil - Consumption

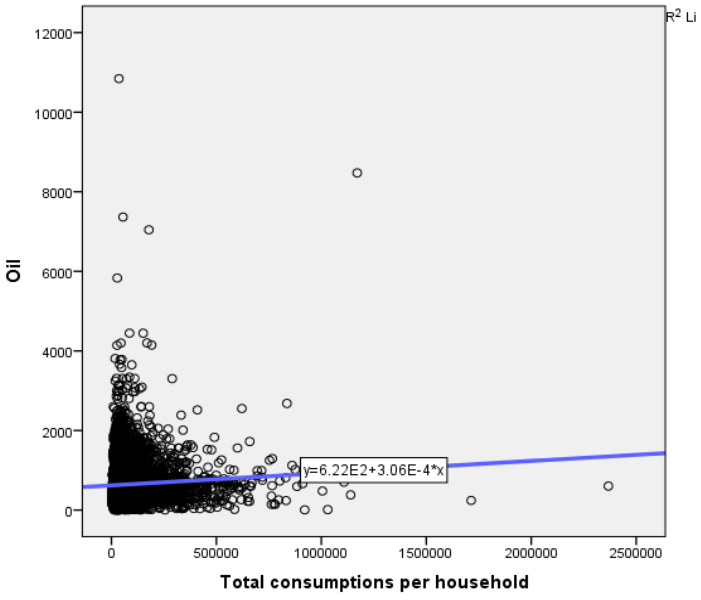


Figure 27: Legumes - Income

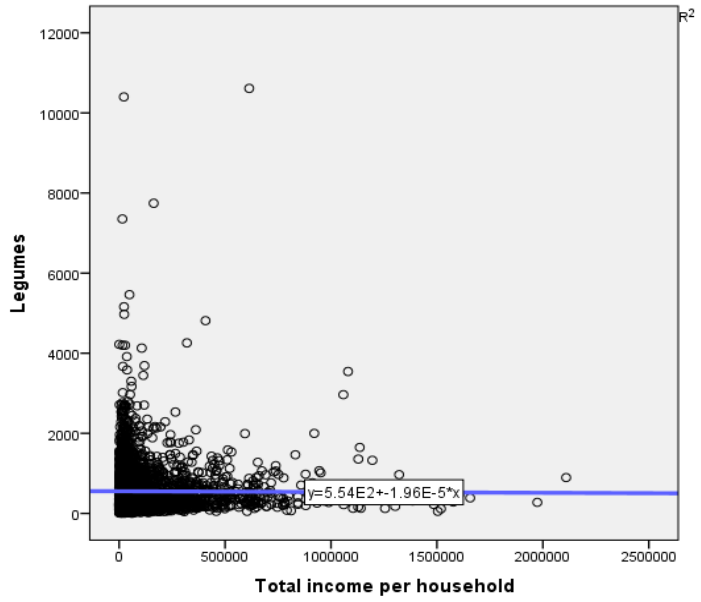
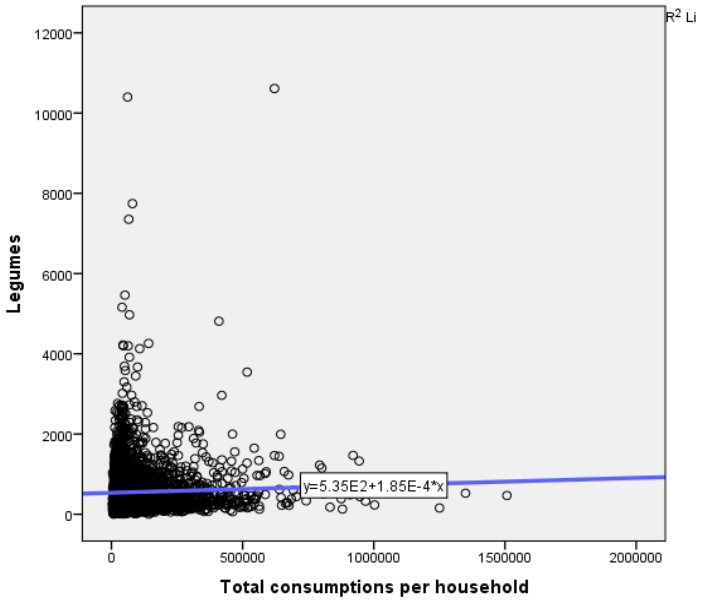


Figure 28: Legumes - Consumption



It is evident from the figures above that only the grains category (Figure 13 and 14) provides on average a greater tax benefit to poorer than richer households when measured against both income and consumption. With reference to Annexure 3 it can be seen that this is due to maize flour, rice and samp being expended upon more by poorer households than richer households. It can therefore be argued that the zero rating of the grains category of foodstuffs is well targeted towards assisting the needy.[212]

Some of the other categories are fairly equally (on average) expended upon by households when considered against income. This includes bread (Figure 13), oil (Figure 25) and legumes (Figure 27). From these categories, with reference to Annexure 3, only dried beans are on average expended upon more by poorer households than richer households when measured against income. This said, the bread, oil and legumes categories can likely not be persuasively argued as poorly targeted towards assisting the needy.

For the remaining categories, that is fish (Figure 17 and 18), dairy (Figure 19 and 20), fruit (Figure 21 and 22) and vegetables (Figure 23 and 24), households with greater income or consumption expend on average a greater amount upon food items in these categories. In these categories, with reference to Annexure 3, only cabbage and green mealies[213] are expended upon more by poorer households than richer households. It could therefore be argued that the zero rating of fish, dairy, fruit and vegetables is generally not well targeted towards assisting the needy. It is further evident that the zero rating of fruit can be argued to be least well targeted towards assisting the needy, followed by dairy, vegetables and lastly fish (refer to the slopes of the straight lines taking the constants into consideration for Figure 17 to Figure 24).

Based upon this rationale, different VAT policy changes can be considered and measured against SAVATMOD.

6.2 VAT policy changes considered

In the previous section it was shown that the zero rating of fruit, dairy, vegetables and fish can be argued as the least well targeted towards assisting the needy. The

[212] It should be noted that even if this zero rate is well targeted, it does not necessarily mean that it should not rather be standard-rated.
[213] This is the South African English word for maize.

argument of zero rates (or reduced rates) upon food not being well targeted is not new to this study. In referring to the United States sales tax, Due and Mikesell (1994: 79) argue that:

> "food exemption is perhaps the largest mistake the states have made in their sales tax structures, costing substantial revenue, adding administrative and compliance problems, and deviating from the basic rule of uniformity of treatment of all consumption expenditures. Large volumes of expenditure of persons above the lowest income levels are freed from tax for no justification whatsoever."

The OECD (2012) argues that it is questionable whether reduced rates upon food are an effective method of achieving distributional objectives. The OECD states:

"This raises the question of whether removing reduced VAT rates and using direct transfers to poorer households to achieve distributional objectives would be a more effective policy" (OECD 2012:71).

Dr Keen, Deputy Director of the IMF's Fiscal Affairs Department, suggests that rate reductions upon food are so poorly targeted at the poor that fiscal expenditure does not have to be much better targeted to provide a benefit to the poor (Business Day, 2014). It is also mentioned in Ebrill *et al*., (2001:102) that "expenditure policies may be better targeted to poverty relief than departures from uniform taxation…"

This argument has also been raised in a South African context. With reference to the then general sales tax (that preceded VAT) the Margo Commission (1987:336) states that:

> "It is obvious…that, whereas the motivation for the exemptions of foodstuffs from GST was to relieve hardship in the case of the needy, the bulk of the exemption has actually benefited persons other than the target group."

The Margo Commission (1987) further mentions that the exemption of foodstuffs is decreasing the efficiency of the tax (general sale tax) by increasing compliance and administrative costs. This commission recommended that the exemption of basic foodstuffs had to be repealed and that relief to the needy rather be provided by the expenditure side of the budget. It should however be mentioned that this suggestion

was not based upon empirical evidence, which may be one reason why it didn't realise.[214]

VATCOM (1991) had similar arguments to the Margo Commission. VATCOM (1991: 15) states:

> "The use of the tax system to achieve social objectives such as providing relief to the needy by exemptions of basic foodstuffs is a very inefficient means, unless the exemption is restricted to foodstuffs which are used predominantly or exclusively by the needy."

VATCOM (1991) further mentions when discussing the VAT and equity that the VAT should not employ favoured treatment of goods and services or groups of consumers. Concessions in the VAT are a relatively ineffective means of helping lower income groups, as the assistance cannot be targeted (VATCOM, 1991). It is also (interestingly) stated by VATCOM (1991:6) that:

> "Government believes that the problem of regressivity cannot be efficiently solved by means of exemptions, zero rates and multiple rates. The needy must as far as possible be assisted outside the tax system by means of targeted budgetary relief."

Again, it should be noted that this belief of government was not based upon empirical evidence. Furthermore, this belief of government seems to not have been very concrete, since the VAT when implemented contained a much greater number of zero-rated basic foodstuffs, compared to the zero-rated basic foodstuffs recommended by VATCOM (1991).

The Katz Commission (1996) also made this argument (as already mentioned in Chapter 3) and also stated in an earlier report that "… it might be possible, based upon equity considerations, to improve upon the present basket of zero-rated goods" (Katz Commission 1994:123). In response to the Katz Commission reports the Joint Standing Committee on Finance (1996) compiled a report and herein requested that "an evaluation be made of revenue forfeited through zero-rating vis-a-vis the benefits of targeting poverty and development programmes through the use of such revenue" (JSCOF, 1996:10).

[214] It is mentioned by the Davis Tax Committee (2014) that a critique upon previous tax committees is the lack of empirical evidence supporting recommendations.

Although there exist estimations with similar results as presented in Section 6.1 (for instance in the very recent Davis Tax Committee (2015) report), no study that employs a similar method[215] could be found that considers the results of standard rating currently exempt, reduced rated or zero-rated foodstuffs. Moreover, no study could be found that considers addressing the arising equity concerns with the use of the tax transfer system.

From the above arguments by Due and Mikesell (1994), Keen (Business Day, 2014), the OECD (2012) and the previous South African commission reports, it seems that there are two main arguments regarding the exemption, zero rating or reduced rates upon foodstuffs. The first is the cost of revenue foregone by allowing for favoured treatment of foodstuffs by way of exemption, zero rating, or reduced rates. The second is that the regressivity of a VAT may potentially be better addressed by the transfer system. In the following two sub-sections I consider these two arguments from a South African perspective.

6.2.1 Argument 1: Cost of revenue not collected

This argument poses the question whether currently zero-rated foodstuffs should be considered to be brought into the tax base. The benefits, besides increasing revenue from the VAT, obtained by standard rating these foodstuffs, have been discussed in much depth in Chapters 2 and 3 and are repeated in the introduction of this chapter. As also previously mentioned in Chapter 3, the challenges faced by South Africa (including political acceptability) may be a barrier towards standard rating basic foodstuffs.

In an attempt to overcome this barrier, it could be considered to standard rate certain categories of zero-rated foodstuffs and attempt to address the distributional consequences of this standard rating by means of the transfer system. An increase in direct cash transfers[216] received by poorer households, approximately equal to the additional VAT burden faced by these households, could potentially be sufficient to

[215] I was not able to find any study that considers similar results to what are described in this chapter. It may however be that there is a macro level study that I am not aware of and was unable to find. I am certain that, at the very least, there exists no study that considers similar results for South Africa.
[216] It should be mentioned that South Africa does not have a food stamp or similar system. This system may be beneficial, but there may also be concerns that the food stamps become a currency used for purchasing perhaps less desirable goods (such as alcohol) that contain an external social cost. This may even be the case if physical food is provided to households; these foodstuffs may well be sold just to obtain other perhaps less desirable goods.

address the distributional consequences of the standard-rated foodstuffs and also provide for additional revenue. This revenue could also potentially be raised in a more equitable manner than an increase in the VAT rate.

I therefore firstly consider a number of VAT policy changes aimed at increasing revenue (together with the other benefits of standard rating zero-rated foodstuffs) and address the additional burden distribution of the VAT as a result of the change in policy. The first change in policy considered is to apply the standard rate to fruit and dairy (which were shown to be the two least well aimed categories of zero-rated foodstuffs) and increase social grants (the South Africa direct cash transfer system) with a proportion of the additional revenue as a result of this standard rating (discussed later).

The second change in policy, with the same objectives as the first change in policy (as described in the previous paragraph) is to extend the standard rate to include fruit, dairy, fish and vegetables (shown to be the four least well targeted categories of zero-rated foodstuffs), coupled with a further increase in social grants. It should be noted that, of course, the more categories of foodstuffs that are standard-rated, the greater the benefits (as discussed in Chapters 2 and 3 as well as the introduction to this chapter) will be of not applying the zero rate. For instance, when only considering the efficiency of the VAT, in the case of fish, only one item (canned pilchards) is currently zero-rated and distinguishing this item from other fish items could be an administrative and compliance burden. Also, since fruit is already standard-rated in the first change in policy, extending the standard rate to vegetables will also disregard the need to distinguish between these items in complying with and administrating the VAT.

The third and last policy change considered under argument one is applying the standard rate to all currently zero-rated foodstuffs and further increasing social grants. Although this change in policy will therefore include a number of categories that were shown to not be badly targeted, richer households do expend more upon currently zero-rated foodstuffs (refer to Figure 11 and 12 of this chapter). Additionally, standard rating all foodstuffs will provide the greatest benefits for the VAT (with reference to the discussions in Chapters 2 and 3 as well as the introduction to this chapter).

6.2.2 Argument 2: Addressing regressivity with the transfer system

The zero rating of basic foodstuffs is only aimed at addressing the regressivity of the VAT (VATCOM, 1991). The second group of policy changes are not considered with obtaining additional revenue from the VAT (this can perhaps be done with a rate increase), but only with improving the alignment of the VAT with the structure of a good VAT (discussed in Chapter 2).

These policy changes are similar to the previous group of policy changes (standard rate fruit and dairy; fruit, dairy, fish and vegetables; and all zero-rated foodstuffs), but for each of these changes social grants are increased by the full amount of the additional revenue as a result of these changes in policy. The results of these policy changes therefore respond to the request of the Joint Standing Committee on Finance (1996) and determine whether and when the regressivity of the VAT could potentially be better addressed by the transfer system than the zero rating of foodstuffs currently administered.

The results for the policy changes considered under Argument 1 are provided and described first, followed by the results of the policy changes considered under Argument 2.

6.3 Results of policy changes considered under Argument 1

In this section I provide the results of the policy changes considered under Argument 1. The policy changes considered are standard rating fruit and dairy with a partial increase in social grants, standard rating fruit, dairy, vegetables and fish with a partial increase in social grants and standard rating all currently zero-rated foodstuffs with a partial increase in social grants.

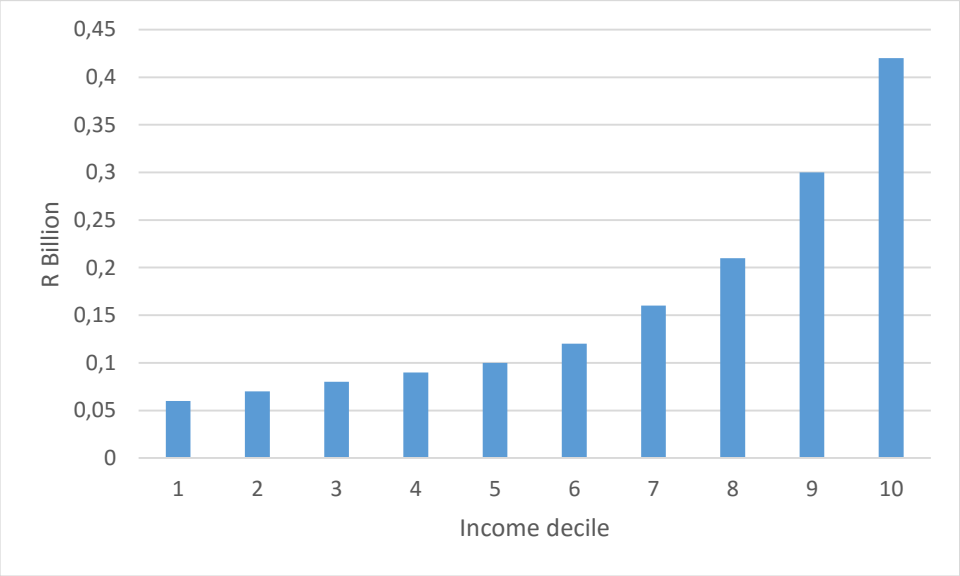
6.3.1 Standard rate fruit and dairy with a partial increase in social grants

In this sub-section I firstly consider the additional VAT revenue from and distribution of standard rating fruit and dairy without any increase in social grants. This is followed by a discussion of the South African social grant system, limited to its applicability to this study. Next, I consider the additional VAT revenue from and distribution of standard rating fruit and dairy with a partial increase in social grants. Lastly, the impact of this last mentioned change in policy is estimated and described.

6.3.1.1 Additional VAT revenue from and distribution of standard rating fruit and dairy

After applying a standard rate of 14 percent upon fruit and dairy (before increasing social grants) to SAVATMOD and allowing for behavioural changes to the unique change in prices faced by each household, the total weighted VAT revenue from households increased to R86.20 billion (effective VAT rate of 7.25 percent). It is therefore estimated that standard rating fruit and dairy will result in a 0.13 percentage increase in the effective VAT rate for the average household. The increase in VAT revenue of R1.60 billion when inflated by the CPI is estimated at R2 billion in current terms.[217] I next consider the increase in VAT revenue per income decile, provided in Figure 29.

Figure 29: Standard-rated fruit and dairy without grant increase



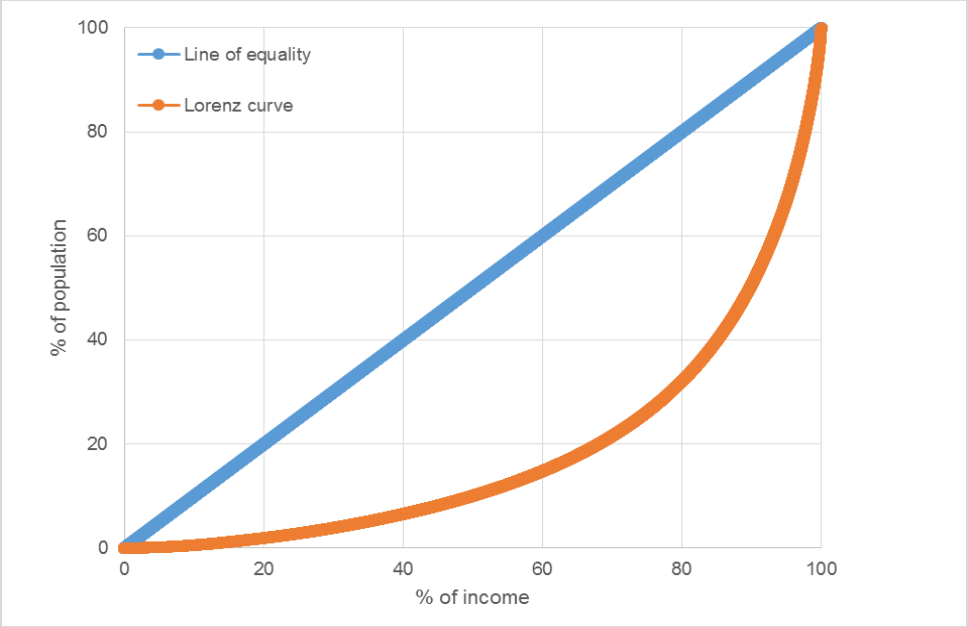
It is evident from Figure 29 that although higher income households will contribute more towards the additional revenue as a result of the policy change, the burden appears to be more evenly spread than in the case of a rate increase (see Figure 9 in Chapter 5). Although this spread most likely indicates that generating additional revenue by standard rating fruit and dairy (without an increase in social grants) would do so in a more regressive manner than an increase in the standard rate, this

[217] It should be noted that the 2.21 multiplier used in Chapter 5 is most likely inaccurate if applied here. For standard rating basic foodstuffs, it is likely that there is some additional revenue that would be obtained from input VAT (although all zero-rated foodstuffs are locally produced), but the great majority of additional VAT will be paid by households. There is not VAT paid by businesses to consider. It is therefore likely that the amount of additional VAT revenue provided in this section is near to what the total additional VAT revenue will be.

is not conclusively shown. To provide a better indication of whether this is the case, I calculate regressive coefficients (Reg_c) for each of the two mentioned changes in policy.

To calculate Reg_c for each change in policy, I start with the estimation of a Lorenz curve for my data set. A Lorenz curve is a graphical representation of the cumulative distribution function of the proportional distribution of income and indicates which proportion of income is earned by which percentage of the population. For the purposes of estimation of the Lorenz curve, the income of households is ranked. I also provide the line of equality, meaning the spread of income earned is exactly proportional in the population. The Lorenz curve and line of equality are provided in Figure 30.

Figure 30: Lorenz curve and line of equality for South African households

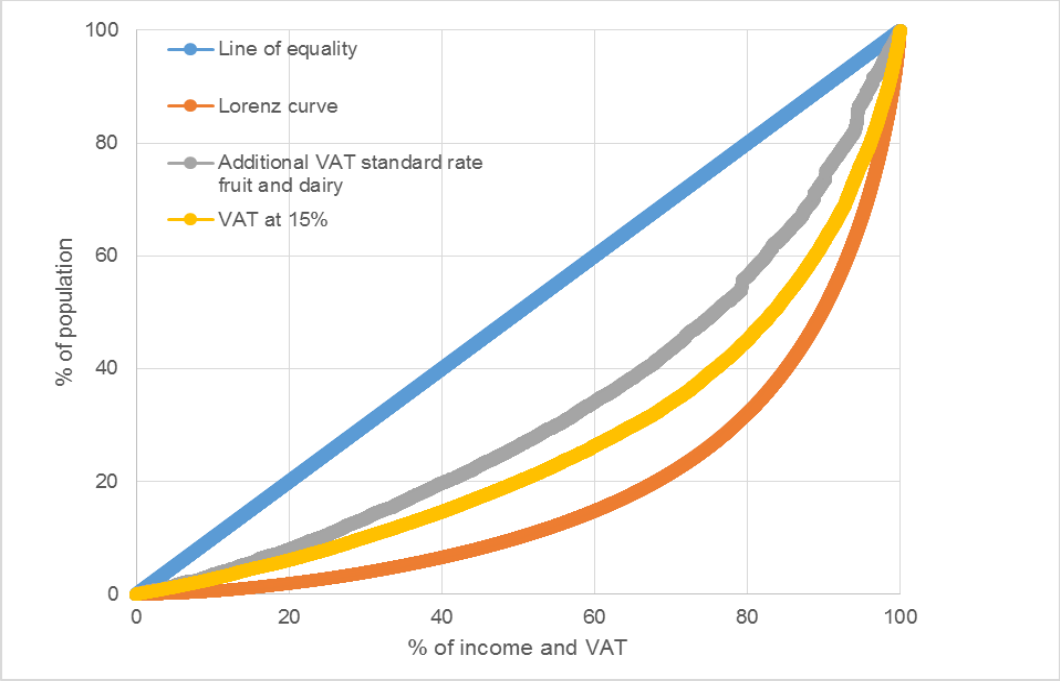


From Figure 30 it appears that South Africa has a high income inequality, as the Lorenz curve indicates that approximately 70 percent of the income earned by households is earned by 20 percent of households. A better indication of this inequality, the Gini coefficient, can be calculated as the area between the line of equality and the Lorenz curve, divided by the area below the line of equality (where the area below the line of equality is always equal to 0.5). This is calculated from my data set at 0.633.[218]

[218] This estimate is not exactly the same as the estimate of the World Bank provided in Chapter 1. It is likely that the World Bank made use of another data set in obtaining its estimates.

By matching the amount of VAT paid by each household to their income (the amount of VAT paid is therefore ranked by income) and calculating the percentage of VAT paid by each household to the total VAT, it is possible to draw similar curves that indicate the spread or distribution of VAT paid in relation to income for the population. Such a curve for the additional VAT paid in standard rating fruit and dairy, and for an increase in the VAT standard rate of one percent[219] is provided in Figure 31. The Lorenz curve and line of equality are also included in this figure.

Figure 31: Distribution of VAT for standard rating fruit and dairy and VAT at 15 percent



In interpreting the curves provided in Figure 31, it should firstly be understood that the further a VAT curve is away from the line of equality (closer to the Lorenz curve) the less regressive that VAT will be. This is due to a larger percentage of VAT being contributed by higher income earning households, similar to a higher percentage of total income earned by higher income earning households in the case of the Gini coefficient. If the VAT curve is upon the Lorenz curve, the VAT will be proportional. This is as a result of the mathematical fact that the VAT paid, divided by income, will

[219] It should be noted that the curve for VAT paid before any change to policy, an increase of VAT of one percent or a two percent increase in VAT will be identical ($Reg_c = 0.467$). Only the behavioural changes of households will influence these curves. These changes have a bigger impact upon the total VAT as a result of a change in policy than the distribution of the VAT, and are for the purposes of these curves therefore negligible.

be the same for all households. A VAT curve that is upon the right side of the Lorenz curve will be progressive.

It therefore appears from Figure 31 that standard rating fruit and dairy will provide for additional revenue in a more regressive manner than a one percent increase in the VAT rate. To provide for an accurate measure of regressivity, I calculate from these curves, in the same manner as the Gini-coefficient, the Reg_c for each curve. Since the VAT is less regressive the further away its curve is from the line of equality, a higher Reg_c will indicate a less regressive VAT[220].

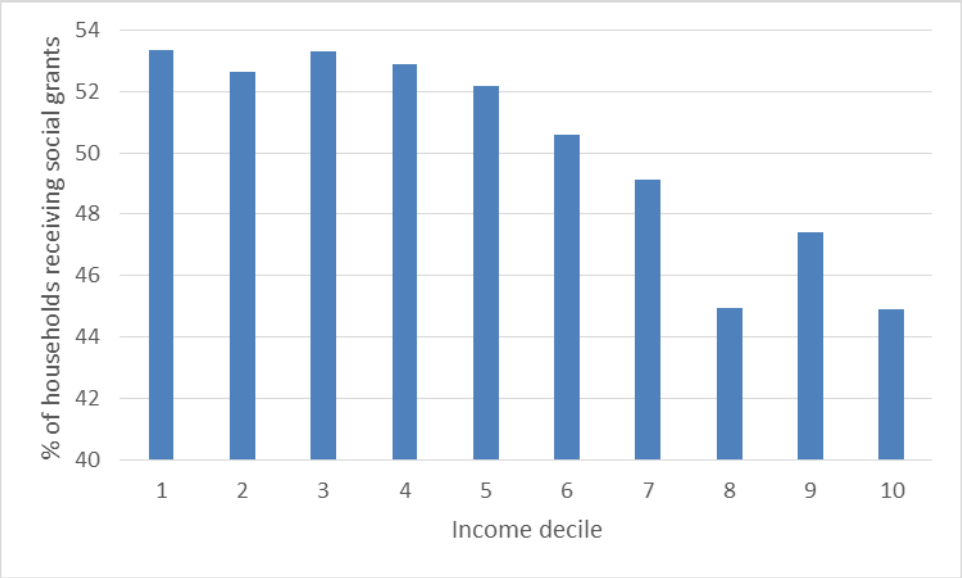
The Reg_c of standard rating fruit and dairy is calculated at 0.347 and the Reg_c of a one percent increase in VAT is calculated at 0.467. It is therefore evident that the standard rating of the least well targeted zero-rated foodstuffs provides revenue in a more regressive manner than a one percent increase in the VAT rate. It may however be possible to address this difference in the Reg_c with the use of the transfer system and specifically, an increase in social grants.

6.3.1.2 The South African social grant system

Currently a variety of social grants aimed at assisting the poor are paid by government to citizens in South Africa. These include old age pension grants, disability grants, child support grants, care dependency grants, foster care grants, grants-in-aid, war veteran's grants and other assistance grants. To show to whom the social grants are paid, I provide the percentage of social grants per household for every income decile in Figure 32.

[220] If Reg_c equals the Gini coefficient (0.633) the VAT will be proportional.

Figure 32: Percentage of households receiving social grants per income decile



It is evident from Figure 32 that the current social grant system can be argued to be relatively poorly targeted towards assisting the needy, as many members of richer households (who could be expected to be taken care of by other members in that household) are receiving social grants. Although relatively poorly targeted, it appears from Figure 32 that South Africa's social grant system does provide more monetary assistance to poorer households than richer households and could therefore, if increased, provide for a more progressive VAT.[221]

It should be noted that although the data used for the calculations in Figure 32 indicate that the system is relatively poorly targeted, there exists convincing evidence that the system "markedly reduces poverty" (Armstrong *et al.,* 2008:22, see also Leibbrandt *et.al*., 2010). Further, Leibbrandt *et.al*. (2010), Woolard and Leibbrandt (2011) and Van der Berg *et. al.* (2010) whose findings are based on different datasets to the dataset used for purposes of this study, report results that indicate the system is not as poorly targeted as the results in Figure 32 suggest.

6.3.1.3 Additional VAT revenue from and distribution of standard rating fruit and dairy with a partial grant

To determine the increase in social grants, the average amount of additional VAT paid by households receiving social grants, per social grant, was calculated.

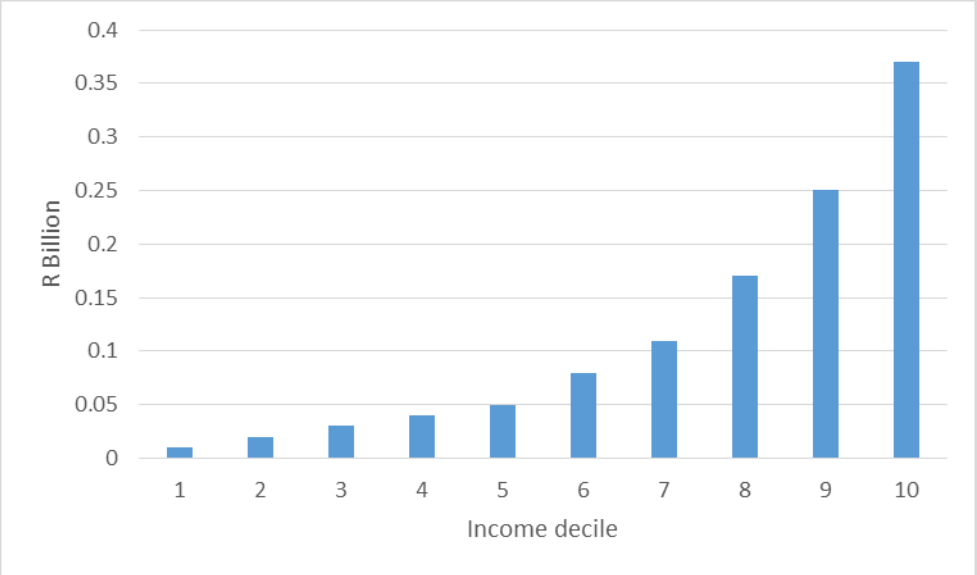
[221] It should be noted that for the remainder of the study I use the term VAT as inclusive of the transfer system (when applicable). This is obviously not the case. The progressivity of the VAT does not change, but rather the progressivity of the VAT together with the transfer system. For ease of reading, I do not however at each instance write "VAT together with the transfer system", but rather just VAT.

Households receiving more than one grant therefore received an increase upon every grant received. This calculation was done in an attempt to strike a balance between revenue objectives and distributional objectives of the change in policy.

From my sample, 9 585 households received a total of 12 511 social grants. The amount of additional VAT paid by these households by standard rating fruit and dairy was R963 854. Dividing this total by the amount of social grants received provides for an increase in social grants of R74.88 per social grant. This means that according to my estimations, an increase of R6.24 per month (approximately R7.80 in current terms) to social grants per household should on average alleviate the burden of standard rating fruit and dairy for households receiving social grants. After applying weights (provided by Statistics South Africa in the IES data set), the total amount of revenue allocated to an increase in social grants amounts to R401 million.

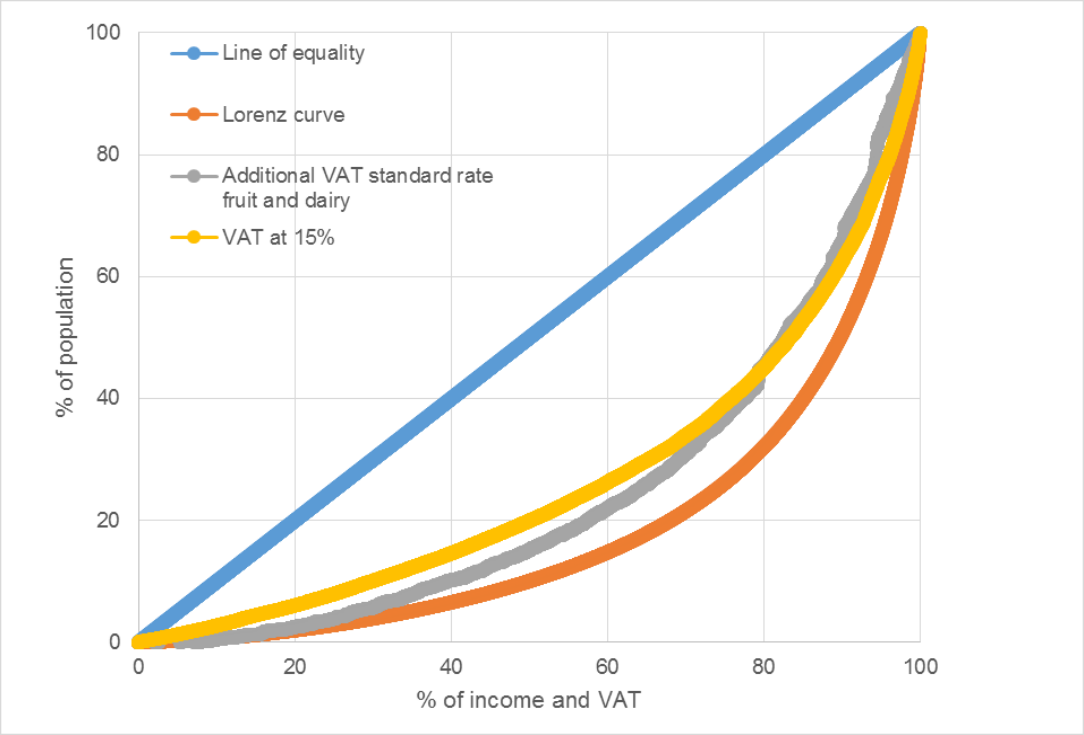
After increasing the total expenditure for each household that receives social grants, by the increase in social grants that are estimated to be expended by that household, the amount of VAT revenue increases to R86.22 billion. After deducting the revenue allocated to an increase in social grants, R1.23 billion of additional revenue remains (approximately R1.54 billion in current terms). Figure 33 provides the contribution of the additional VAT revenue per income decile, after deducting the increase in social grants for households receiving such grants from the additional revenue paid.

Figure 33: Additional VAT from standard rating fruit and dairy with a partial grant



It is evident from Figure 33 that increasing the social grants has decreased the even spread of contributions to additional revenue by households. The additional revenue can therefore be argued to be collected more equitably (when only considering income as a measure of ability to pay) than without the increase in social grants. Next, the Reg_c of this change in policy is calculated for comparison purposes with other changes in policy. This is illustrated in Figure 34.

Figure 34: Distribution of VAT for standard rating fruit and dairy with a partial grant and VAT at 15 percent.



It is evident from Figure 34 that standard rating fruit and dairy and increasing social grants as mentioned, will provide for additional revenue in a more progressive manner when considering households in approximately the bottom 80 percent of income than a one percent increase in the VAT rate. It is important to note that since the curve of the VAT currently levied and administered in South Africa would be identical to the “VAT at 15%” curve in Figure 34, this change in policy will provide for a more progressive tax for the bottom 80 percent of income households.

The change in policy will be more regressive than a one percent increase in the VAT rate for the top approximately 20 percent of income households. It further appears that the change in policy will be progressive (measured against income) for approximately the bottom 15 percent of income households.

The Reg_c for this change in policy is calculated at 0.509, compared to 0.467 for a one percent increase in the VAT rate. It is therefore evident that the manner in which additional revenue is raised for this change in policy can be preferred to an increase in the VAT rate. However it remains unclear which types of households will be impacted by this change in policy, meaning the equity of the change in policy when considering ability besides income.

6.3.1.4 Estimation of the impact of standard rating fruit and dairy with a partial increase in social grants

To determine the impact of this policy change (as done with an increase in the VAT rate), I refer to the same measure of impact based upon income (Pi), altered to include the effect of the increase in social grants (ISG):

$$Pi = \left(\frac{VATn - VATo - ISG}{I}\right) \times 100 \quad (60)$$

For the purpose of the estimation of the OLS regression of the impact of standard rating fruit and dairy (referred to as Pi_{fd}), the starting sample was kept unchanged from the estimation of $Pi15$ in the previous chapter. As the impact of the policy will likely be dependent upon households' consumption behaviour towards fruit and dairy, the majority of the independent variables are kept unchanged from the $Pi15$ estimation. Many of the same issues in the estimation of $Pi15$ (that have already been addressed) could be present in this estimation.

A potential argument can be made against the standard rating of fruit and dairy regarding the impact that such a change in policy could have upon the preference of households towards healthier foods. It could therefore be of interest to policy makers to know what the impact of the change in policy will have upon households with a preference towards healthier consumption decisions. As a proxy for these preferences, a variable is added to the estimation, called health consumption (HC).

For purposes of calculating this new variable, food expenditure by each household was divided into three categories (good, better and best nutritional value) based upon the Guiding Stars Nutritional Guidance Programme which was developed by a scientific advisory panel in the fields of nutrition and health from various institutions (Food.guidingstars.com, 2015). The amount expended upon each category was divided by the total amount of expenditure upon food and weighted with a weight of

one hundred, two hundred, or three hundred (based upon the nutritional categories and to get a percentage point). The total HC was reduced by 100 for all households, as a score of 100 would indicate that only category one foods were consumed. A higher total HC would therefore indicate that a household spends more upon healthier foods.

Another variable that could potentially be of significance is whether a household receives social grants, and if so, how many social grants does each household receive. To include this in my estimation a new variable SOG was included that indicates the number of social grants received by a household.

From the starting sample (estimation of $Pi15$ in the previous chapter), 499 additional outliers with studentized residuals greater or less than three were identified and removed from the data set[222]. As the descriptive statistics for this estimation (Pi_{fd}) would be very similar to that of the $Pi15$ estimation (only changing very slightly as a result of the additional outliers) for variables that are in both estimations, I do not repeat the descriptive statistics provided in Chapter 5.

Descriptive statistics are however provided for new and changed variables. New and changed variables include Pi_{fd}, I (income is changed with the full amount of social grants received), C (consumption is changed with the amount of additional expenditure per household) $PIFD$ (the price increase as a result of standard rating fruit, vegetables and legumes), HC and SOG.

Both Pi_{fd} and HC were transformed to their log10 forms for the same reasons as mentioned in Chapter 5. Since Pi_{fd} had a negative value for some households (additional social grants exceed additional VAT), a constant term was added to Pi_{fd} before transforming this variable to its log form. This is done to only provide for positive observations (since a negative number cannot be transformed by log). Adding this constant will not influence the variance of these terms and would therefore not influence the coefficients of the regression estimation. The descriptive statistics for these four variables are provided in Table 46.

[222] It should be noted that, as is evident by the scatterplot of the residuals provided in Table 45, upon the second run of the regression there remain studentized residuals greater and less than 3. The residuals generally represent households that earn a low income and also receive a number of social grants. The amount of additional VAT paid by these households therefore seems plausible, and in my opinion, not removing these households provides for a better estimation of the actual impact of the change in policy. The same applies to the remainder of regression estimations in this chapter.

Table 47: Descriptive statistics for new and adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_ifd	22733	.22	.97	.5566	.05349
LnI	22733	1.90	6.61	4.6710	.52091
LnC	22733	3.05	6.66	4.6038	.45545
PIFD	22733	.00	.12	.0099	.01076
LnHC	22733	-.28	2.30	2.0153	.18999
SOG	22733	0	2	.50	.692

After incorporating these variables the notation for estimation purposes is as follows:

$$LnP_{i_{fd}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIFD + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (61)$$

The results of this estimation follow in Table 48.

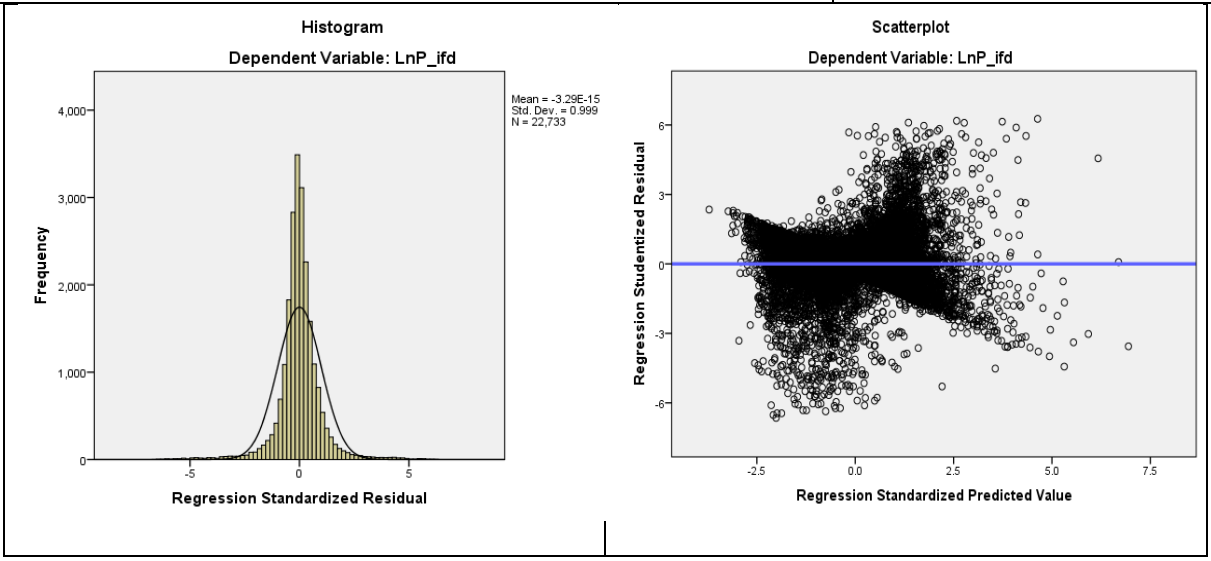
Table 48: Regression of the impact of standard rating fruit and dairy with a partial grant

Linear regression

Number of obs = 22733
F(31, 22701) = 249.31
Prob > F = 0.0000
R-squared = 0.4279
Root MSE = .04048

LnP_ifd	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	-.035293	.0014703	-24.00	0.000	-.0381749	-.032411
LnC	.0386726	.0011995	32.24	0.000	.0363216	.0410237
LnVD	-.0020627	.0005471	-3.77	0.000	-.003135	-.0009905
EDU	-.0002252	.0001038	-2.17	0.030	-.0004287	-.0000217
LnAGEA	.0035622	.0027615	1.29	0.197	-.0018504	.0089749
LnAGEC	.0002584	.0008599	0.30	0.764	-.0014271	.0019438
EMP	-.0020669	.0003789	-5.46	0.000	-.0028096	-.0013243
LnADULT	.0144759	.0013683	10.58	0.000	.0117938	.0171579
LnCHILD	.0043597	.0014693	2.97	0.003	.0014798	.0072396
PIFD	2.24975	.0432283	52.04	0.000	2.16502	2.33448
LnHC	.0023626	.001793	1.32	0.188	-.0011518	.0058769
SOG	-.0312385	.0004852	-64.39	0.000	-.0321894	-.0302875
FHD	.0015231	.0006067	2.51	0.012	.000334	.0027122
MHS	-.0004035	.0006627	-0.61	0.543	-.0017024	.0008954
SHS	.000284	.0007151	0.40	0.691	-.0011176	.0016855
CR	.0012172	.0009882	1.23	0.218	-.0007198	.0031541
IAR	0	(omitted)				
WHR	-.0141631	.0011677	-12.13	0.000	-.0164518	-.0118744
WC	.0015362	.0010512	1.46	0.144	-.0005242	.0035966
EC	.0031662	.0010321	3.07	0.002	.0011431	.0051893
NC	-.0012581	.0013321	-0.94	0.345	-.0038692	.0013529
FS	.0007194	.0010607	0.68	0.498	-.0013596	.0027985
KZN	-.002055	.0010544	-1.95	0.051	-.0041218	.0000118
NW	-.0041751	.0011772	-3.55	0.000	-.0064825	-.0018677
MP	.0014223	.0011651	1.22	0.222	-.0008613	.0037059
LP	.000139	.0011342	0.12	0.902	-.0020842	.0023621
UI	.001558	.0012284	1.27	0.205	-.0008499	.0039658
TA	-.0021488	.0008438	-2.55	0.011	-.0038027	-.000495
RF	.0001227	.0020447	0.06	0.952	-.003885	.0041304
WR	-.0014996	.000759	-1.98	0.048	-.0029872	-.0000119
SG	-.0012762	.0007557	-1.69	0.091	-.0027575	.0002051
AN	.0001255	.0007539	0.17	0.868	-.0013523	.0016032
_cons	.5364116	.0073012	73.47	0.000	.5221008	.5507224

Variable	VIF	1/VIF
LnCHILD	4.69	0.213137
LnAGEC	4.26	0.234666
LnI	3.19	0.313887
LnC	2.88	0.346777
WC	2.12	0.470881
LP	2.10	0.476506
TA	1.93	0.518607
EDU	1.91	0.524190
KZN	1.90	0.526725
LnVD	1.86	0.538785
EC	1.85	0.540384
CR	1.76	0.567277
NW	1.67	0.597707
MP	1.57	0.637241
MHS	1.55	0.645109
EMP	1.54	0.647635
WHR	1.54	0.649145
FS	1.50	0.668474
WR	1.46	0.686278
SG	1.46	0.686444
AN	1.44	0.695217
LnAGEA	1.41	0.710839
NC	1.38	0.723191
FHD	1.37	0.727799
LnADULT	1.37	0.728359
SHS	1.34	0.746005
UI	1.20	0.832878
PIFD	1.10	0.910394
RF	1.08	0.928260
SOG	1.08	0.930171
LnHC	1.07	0.936520
Mean VIF	1.82	



I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-

Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are fairly normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated. There appears to be heteroskedasticity in the residuals and as a result, the regression was estimated with robust standard errors using the Huber-White sandwich estimators.

From the coefficients of the model it is evident that this policy change is regressive when controlling for all other variables. For every one percent increase in income, the impact of the policy change will be .035 less (refer to coefficient of LnI). This is also evident from Figure 34, with the curve of this change in policy being predominantly to the left of the Lorenz curve. It should be noted that due to the difference in constant, this coefficient does not lend itself to comparison with other coefficients in other linear regression estimations in this study.

From the other coefficients with significance at the 5 percent level ($p<0.05$), it is evident that households with older adults and more adults and children (larger households) will be more affected by the change in policy. The impact of the policy will further be 0.031 percent less for every social grant that a household receives and also be less for households with higher valued dwellings. Additionally, compared to a household represented by the constant (black, male head, female dominant household living in an urban formal area in Gauteng), female head households and households in the Eastern Cape will be more affected by the change in policy. White households, households situated in North West and households living in traditional area settlement types will be impacted to a lesser extent than households represented by the constant.

The new variable, health consumption (HC) is not significant. This can be interpreted to mean that the impact of the policy will not differ significantly between households with healthy and less healthy consumption preferences.

To determine whether the policy change is progressive or regressive when measured against consumption (C), the same impact measurement against consumption (Pc) is calculated. This measurement is also altered to include the effect of the increase in social grants (ISG) and is written as:

$$Pc = (\frac{VATn - VATo - ISG}{C}) \times 100 \quad (62)$$

Again, both Pc and C were transformed to log10 variables for the purpose of this estimation. Outliers were also removed for this estimation. The coefficient for LnC is 0.013 (significance .000) with the constant at .529 for this estimation. This indicates that the change in policy is progressive when measured against consumption. For every one percent increase in consumption, the impact of the policy is estimated to be 0.013 percent greater.

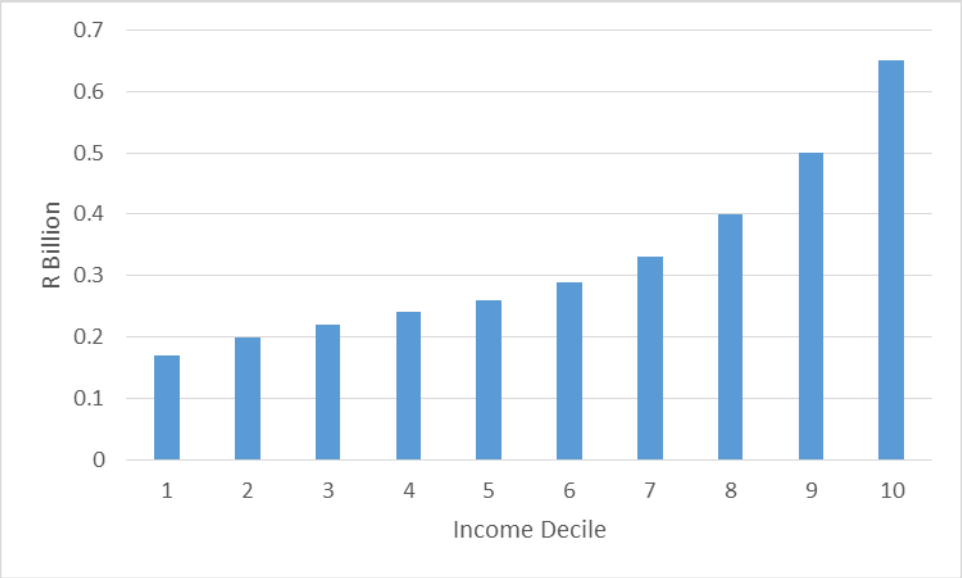
6.3.2 Standard rate fruit, dairy, vegetables and fish with a partial increase in social grants

In this sub-section I firstly consider the additional VAT revenue from and distribution of standard rating fruit, dairy, vegetables and fish without any increase in social grants. Next, I consider the additional VAT revenue from and distribution of standard rating fruit, dairy, vegetables and fish with a partial increase in social grants. Lastly, the impact of this last mentioned change in policy is estimated.

6.3.2.1 Additional VAT revenue from and distribution of standard rating fruit, dairy, vegetables and fish

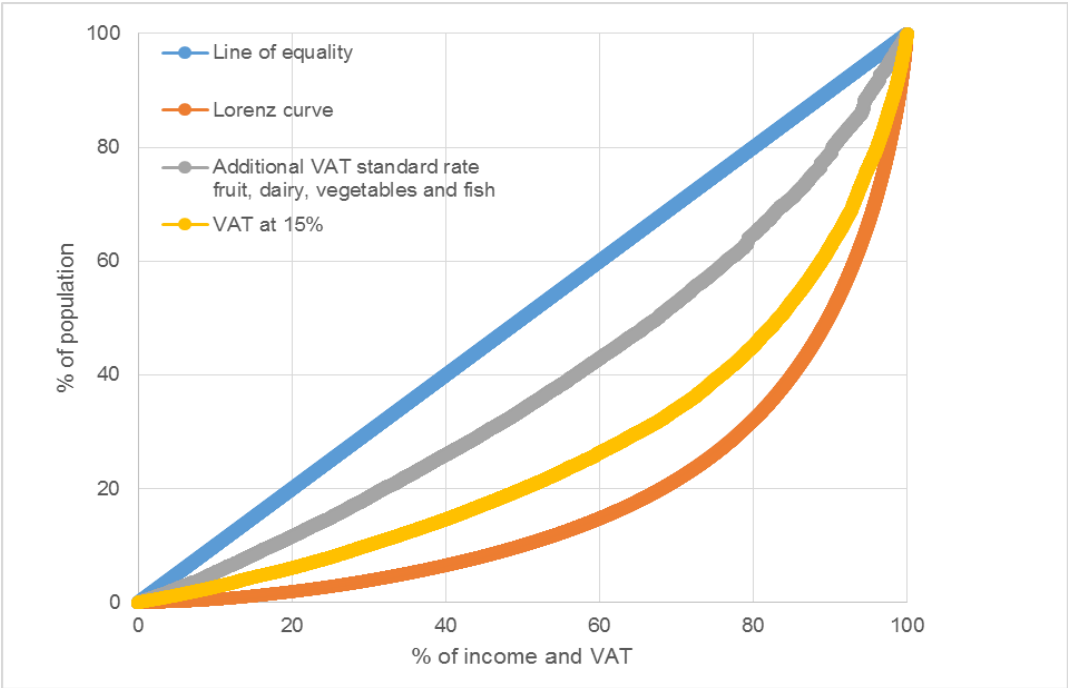
After applying the standard rate to currently zero-rated fruit, dairy, vegetables and fish (before increasing social grants) in SAVATMOD, and allowing for behavioural changes to the unique change in prices faced by each household, the total weighted VAT revenue from households increased to R87.84 billion (effective VAT rate at 7.40 percent). It is therefore estimated that standard rating fruit, dairy, vegetables and fish will result in a 0.28 percentage increase in the effective VAT rate for the average household. The increase in VAT revenue of R3.24 billion increases to R4.05 billion in current terms when inflated with the CPI. I next consider the increase in VAT revenue per income decile, provided in Figure 35.

Figure 35: Standard rate fruit, dairy, vegetables and fish without grant



It appears from Figure 35 that the burden of the VAT is more equally spread in the case of standard rating fruit, dairy, vegetables and fish than in the case of only standard rating fruit and dairy or an increase in the VAT rate. It can therefore be expected that this change in policy will be more regressive than the other changes in policies mentioned. To further investigate this suggestion, the Lorenz curve and VAT curves for this change in policy and for an increase in the VAT rate to 15 percent are provided in Figure 36.

Figure 36: Distribution of VAT for standard rating fruit, dairy, vegetables and fish and VAT at 15 percent.

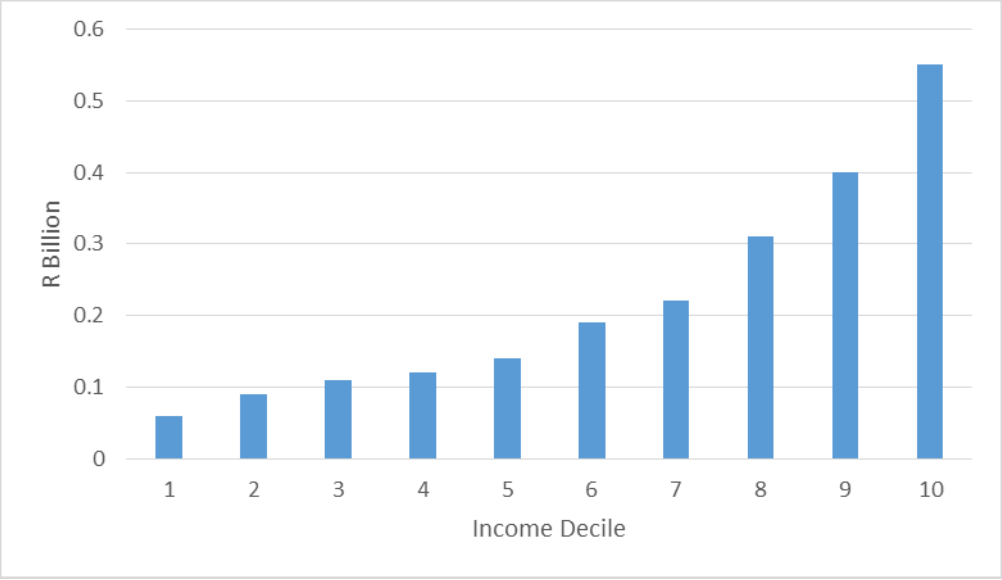


It is evident from Figure 36 that standard rating fruit, dairy, vegetables and fish will provide for additional revenue in a more regressive manner than a one percent increase in the VAT rate. The Reg_c for this change in policy is calculated at 0.234, which indicates that this change in policy is more regressive than only standard rating fruit and dairy ($Reg_c = 0.347$) or increasing the VAT rate by one percent ($Reg_c = 0.467$). It should however be kept in mind that a greater amount of additional revenue will be generated by this change in policy, compared to only standard rating fruit and dairy, which could be applied in increasing social grants.

6.3.2.2 Additional VAT revenue from and distribution of standard rating fruit, dairy, vegetables and fish with partial grant

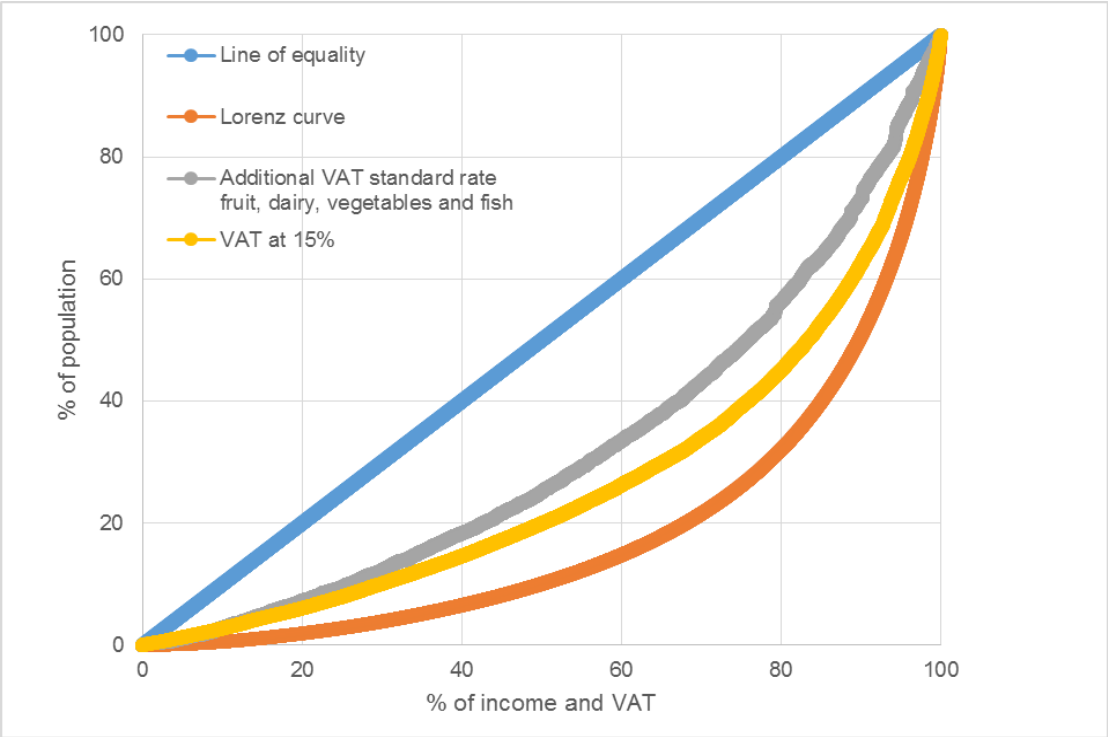
In my data set, households (9585) that received social grants (12 511) contributed R2 154 611 towards additional revenue, providing for an increase in social grants of R172.22 per social grant (the same calculation as the increase in Section 6.3.1.3). Total expenditure of households receiving social grants therefore increased in SAVATMOD with the amount of this increase in social grants that is estimated to be expended. The increase in social grants increased the total amount of revenue to R87.91 billion. After deducting the total amount of revenue contributed towards increasing social grants (R922 million), R2.39 billion of additional revenue remains (2.99 billion in current terms). Figure 37 provides the additional revenue paid per household after taking into account the increase in social grants.

Figure 37: Standard rate fruit, dairy, vegetables and fish with partial grant



From Figure 37 it appears that the burden of the additional VAT is less evenly spread than before the increase in social grants for this change in policy. It is yet to be determined whether the manner in which additional revenue is generated for this change in policy is less regressive than the previous policy changes. To do this I provide a Lorenz curve and VAT curves (see Figure 38).

Figure 38: Distribution of VAT for standard rating fruit, dairy, vegetables and fish with a partial grant and VAT at 15 percent.



From Figure 38 it is evident that the increase in social grant does not seem to be sufficient for providing revenue in a less regressive manner than a one percent increase in the VAT rate. This is confirmed by the Reg_c for this change in policy, calculated at 0.360, which is less than the Reg_c for an increase in the standard rate by one percent (0.467). The manner in which additional revenue is generated is also less preferred than only standard rating fruit and dairy (Reg_c= 0.509). It should however be kept in mind that a greater amount of additional revenue is generated and the VAT will be better aligned with the structure of a good VAT, when compared to the previous change in policy in this chapter. For these reasons the impact of this change in policy upon households is estimated.

6.3.2.3 Estimation of standard rating fruit, dairy, vegetables and fish with a partial increase in social grants

For the purpose of the estimation of the OLS regression of the impact of standard rating fruit, dairy, vegetables and fish (referred to as Pi_{fdvfi}), a similar approach was adopted to that of the previous regression estimation in this chapter. From the starting sample (sample for P_i15), 518 outliers with a studentized residual greater or less than three were removed from the data set. The only new or changed variables from the previous regression estimation in this chapter are Pi_{fdvfi}, I, C and $PIFDVFI$ (price increase from standard rating fruit, dairy, vegetables and fish). Pi_{fdvfi} was transformed to its log10 form using the same method as discussed for the previous regression estimation. The descriptive statistics for these four variables are provided in Table 49.

Table 49: Descriptive statistics of new or adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_ifdvfi	22714	.33	1.16	.7248	.07137
LnI	22714	1.90	6.61	4.6740	.51780
LnC	22714	3.06	6.66	4.6055	.45431
PIFDVFI	22714	.00	.12	.0211	.01519

By incorporating these variables, the model for estimation purposes is written as:

$$LnP_{i_{fdvfi}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIFDVFI + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (63)$$

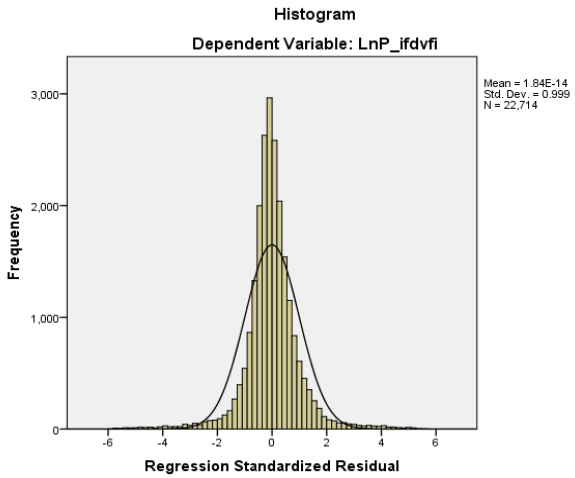
The results of the estimation are provided in Table 50.

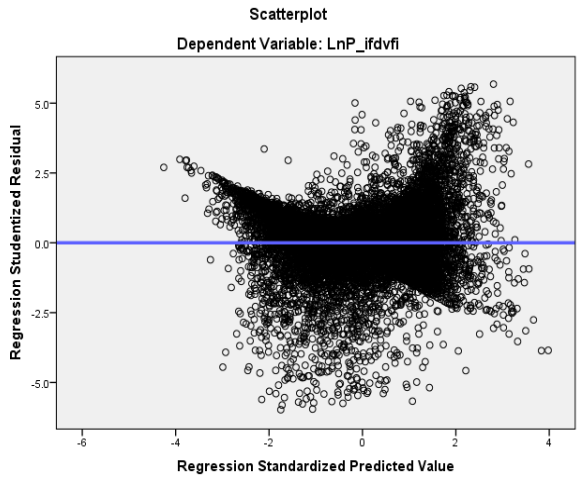
Table 50: Regression of standard rating fruit, dairy, vegetables and fish.

Linear regression

Number of obs	= 22714
F(31, 22682)	= 290.56
Prob > F	= 0.0000
R-squared	= 0.4552
Root MSE	= .05271

LnP_ifdvfi	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	-.0785983	.0019967	-39.36	0.000	-.082512	-.0746845
LnC	.0717418	.0016082	44.61	0.000	.0685896	.0748939
LnVD	-.0024037	.0007436	-3.23	0.001	-.0038613	-.0009461
EDU	-.0000846	.0001342	-0.63	0.528	-.0003478	.0001785
LnAGEA	.0081136	.0035877	2.26	0.024	.0010816	.0151457
LnAGEC	.0011363	.001139	1.00	0.318	-.0010963	.0033688
EMP	-.0014361	.0004936	-2.91	0.004	-.0024036	-.0004686
LnADULT	.0218307	.0017674	12.35	0.000	.0183665	.0252949
LnCHILD	.0072823	.001944	3.75	0.000	.0034719	.0110928
PIFDVFI	1.498003	.0321824	46.55	0.000	1.434923	1.561082
LnHC	.0070449	.0019784	3.56	0.000	.0031671	.0109226
SOG	-.0469204	.0006524	-71.92	0.000	-.0481992	-.0456417
FHD	.0003193	.0007962	0.40	0.688	-.0012413	.0018799
MHS	.0000881	.0008738	0.10	0.920	-.0016246	.0018009
SHS	.0008294	.0009284	0.89	0.372	-.0009903	.002649
CR	.0034777	.0012534	2.77	0.006	.001021	.0059344
IAR	0	(omitted)				
WHR	-.0084853	.0013836	-6.13	0.000	-.0111972	-.0057734
WC	.0004648	.0013436	0.35	0.729	-.0021686	.0030983
EC	.006792	.0013829	4.91	0.000	.0040813	.0095026
NC	.0002159	.0016584	0.13	0.896	-.0030347	.0034665
FS	-.002317	.0013296	-1.74	0.081	-.0049231	.0002892
KZN	.0007483	.0013955	0.54	0.592	-.0019869	.0034835
NW	-.0042969	.0015052	-2.85	0.004	-.0072472	-.0013467
MP	.0015511	.001575	0.98	0.325	-.001536	.0046382
LP	-.0020489	.0014987	-1.37	0.172	-.0049865	.0008886
UI	.0022453	.0016046	1.40	0.162	-.0008998	.0053904
TA	-.0006685	.0011059	-0.60	0.546	-.0028361	.0014992
RF	-.0043093	.0025035	-1.72	0.085	-.0092163	.0005977
WR	-.0008425	.0009781	-0.86	0.389	-.0027597	.0010746
SG	-.0007587	.0009744	-0.78	0.436	-.0026686	.0011511
AN	.0002342	.0009789	0.24	0.811	-.0016845	.002153
_cons	.7316308	.0089357	81.88	0.000	.7141162	.7491453





I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-

Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are approximately normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated (refer to previous regression estimation results). It is further apparent that the residuals do not have a constant variance and are therefore heteroskedastic. To address this problem the estimation was run with robust standard errors, as evident in the results.

From the coefficient for income from the estimation, it is evident that the policy change is regressive when controlling for all other variables. For every one percent increase in income, it is estimated that the impact of the policy will be 0.078 percent less.

From the other coefficients (with statistical significance at the 5 percent level) it is estimated that the impact of the policy will be greater for households with older adults and more adults and children. The impact of the policy will be less for households with higher valued dwellings, more members employed and households receiving social grants (-0.046 percent less impact per social grant received). Compared to a household indicated by the constant, coloured households and households situated in the Eastern Cape will be more affected by the change in policy. White households and households situated in the North West will be less affected by the change in policy (compared to a household represented by the constant).

The health consumption variable is statistically significant and indicates that for every one percent that a household has a preference towards healthier consumption, the impact of the policy will be 0.007 percent greater. The magnitude (economic significance) of this coefficient could serve as an indication that government need not be overly concerned with the impact that the change in policy has upon households with a preference towards healthier consumption decisions. Although statistically significant, the health consumption variable is not very economically significant.

To determine whether the policy change is progressive or regressive when measured against consumption, the same impact measurement against consumption (Pc) is calculated (refer to Notation 62). Again, outliers were removed and both Pc and C were transformed to log10 variables for the purpose of this

estimation. The results provide a constant of .647 and the coefficients of Lnc is 0.019 (significance .000), indicating that this change in policy will be slightly progressive when measured against consumption. For every one percent increase in consumption the impact of the change in policy is estimated to be 0.019 percent greater.

6.3.3 Standard rate all foodstuffs with a partial increase in social grants

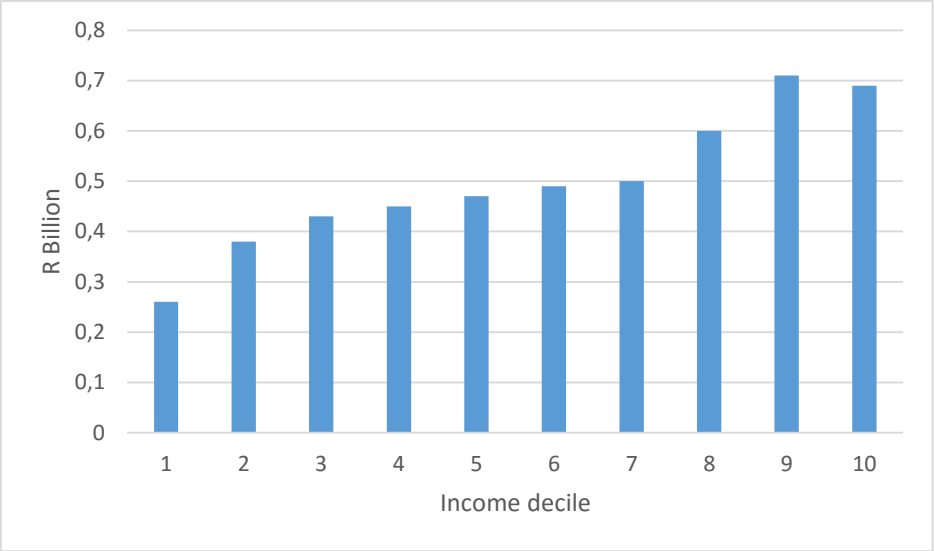
Firstly, in this sub-section I consider the additional VAT revenue from and distribution of standard rating all currently zero-rated foodstuffs without any increase in social grants. Secondly, I consider the additional VAT revenue from and distribution of standard rating all currently zero-rated foodstuffs with a partial increase in social grants. Lastly, the impact of this last mentioned change in policy is estimated.

6.3.3.1 Additional VAT revenue from and distribution of standard rating all currently zero-rated foodstuffs

After applying a standard rate to all foodstuffs (before increasing social grants) to SAVATMOD and allowing for behavioural changes to the unique change in prices faced by each household, the total weighted VAT revenue from households increased to R91.49 billion (effective VAT rate at 7.70 percent). It is therefore estimated that standard rating all currently zero-rated foodstuffs will result in a 0.58 percentage increase in the effective VAT rate for the average household. The increase in VAT revenue from households of R6.89 billion can be adjusted with use of the CPI and is estimated at R8.62 billion in current terms, R1.7 billion more than a one percent increase in the VAT rate.[223] I next consider the increase in VAT revenue per income decile, provided in Figure 39.

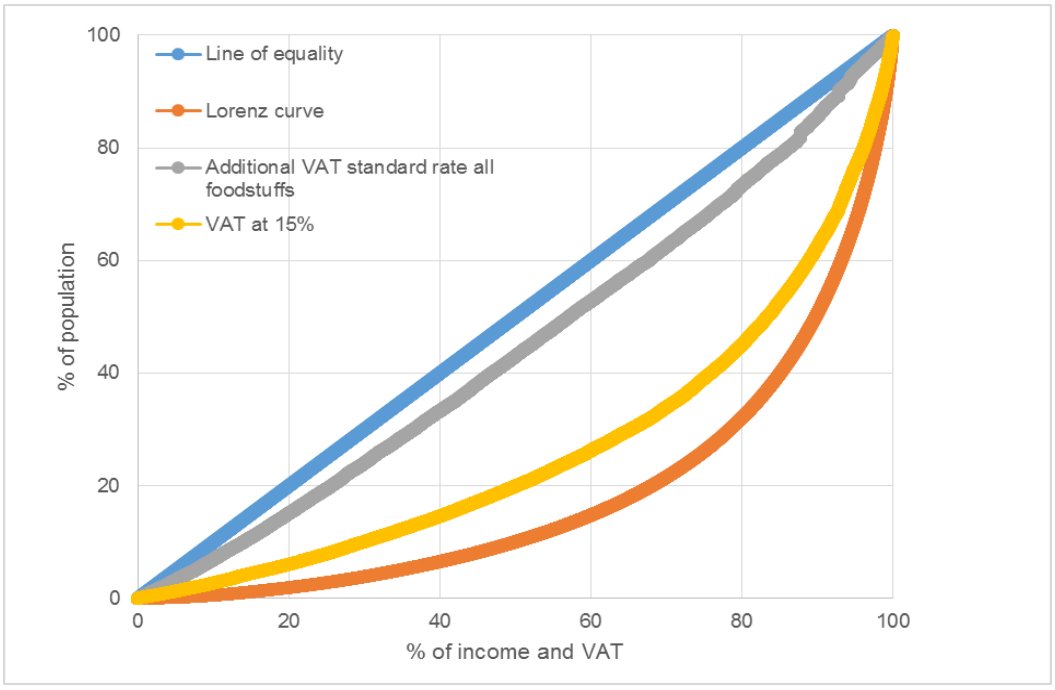
[223] Of course, the total VAT revenue as a result of a one percent increase in the VAT rate will be greater than for standard rating all basic foodstuffs.

Figure 39: Standard rate all foodstuffs without grant



It is evident from Figure 39 that the burden distribution of standard rating all foodstuffs will be more equally spread than the previous policy changes considered in this study. This change in policy would likely be more regressive than the previous policy changes considered. To further investigate this apparent regressivity, I provide a Lorenz curve and VAT curves in Figure 40.

Figure 40: Distribution of VAT for standard rating all foodstuffs and VAT at 15 percent.



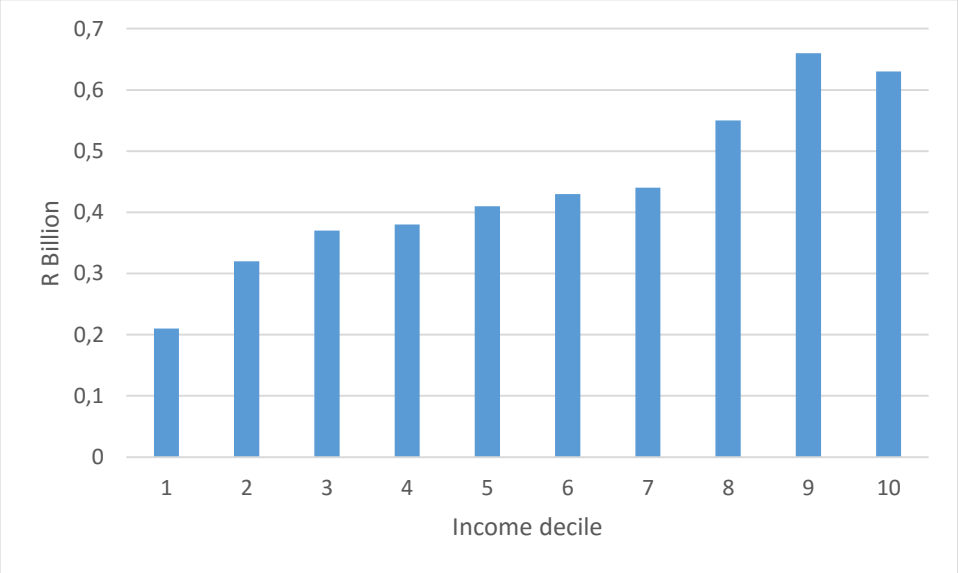
From Figure 40 it is evident that standard rating all foodstuffs will provide for additional revenue in a more regressive manner than a one percent increase in the

VAT rate. This is confirmed by the Reg_c for this change in policy, calculated at 0.108, compared to the Reg_c of a one percent increase in the VAT rate (0.467). This change in policy will also provide for additional revenue in a more regressive manner than only standard rating fruit and dairy (Reg_c = 0.347) or standard rating fruit, dairy, vegetables and fish (Reg_c = 0.234).

6.3.3.2 Additional VAT revenue from and distribution of standard rating all currently zero-rated foodstuffs with a partial grant

The households (9585) in my data set receiving social grants (12 511) contributed a total of R 5 129 288 towards additional revenue from the standard rating of all foodstuffs. The increase in social grants is therefore calculated as R409.97 per social grant. The weighted amount of revenue allocated to the increase of social grants is R2.19 billion. After increasing the total expenditure of households that receive social grants to the extent that these households are expected to expend additional income, the total amount of VAT revenue calculated by SAVATMOD increased to R91.65 billion. The remaining amount of revenue after the increase in social grants is R4.86 billion (R0.64 billion less from households than a standard rate increase of one percent). Adjusted with the CPI, the remaining amount of revenue from households is R6.075 billion. Figure 41 provides the amount of additional revenue per income decile after taking account of the increase in social grants.

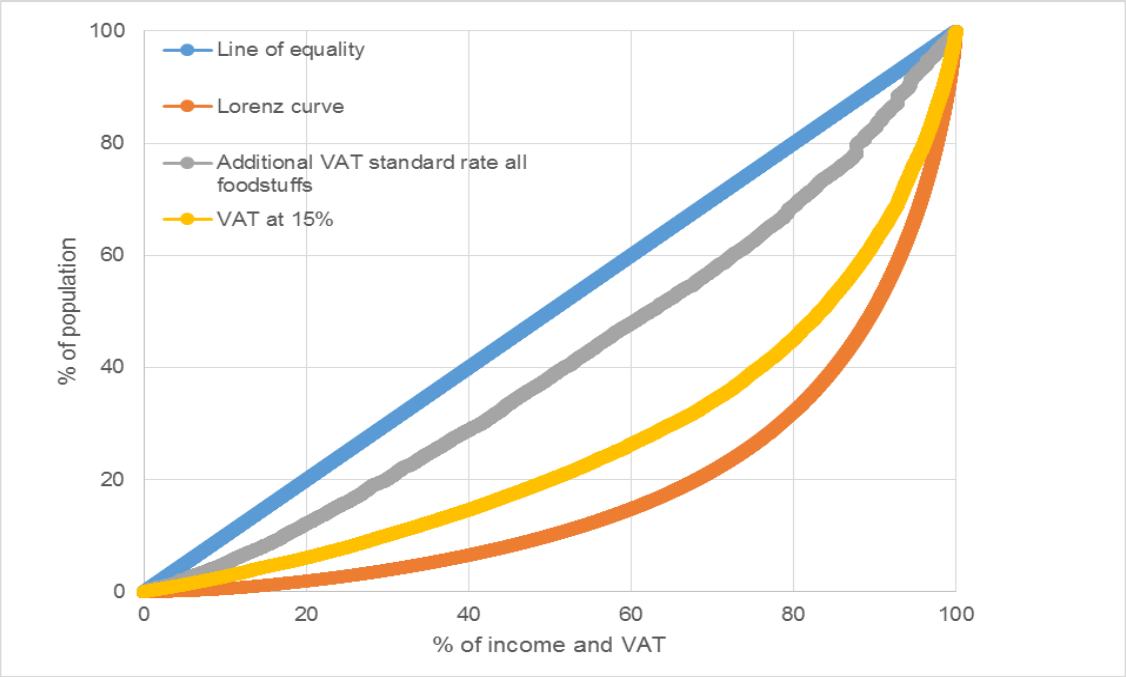
Figure 41: Standard rate all foodstuffs with partial grant



From Figure 41 it can be seen that although the burden distribution of the additional revenue is less evenly spread, the change in policy seems to remain regressive. To

further investigate this apparent regressivity, a Lorenz curve and VAT curves are provided in Figure 42.

Figure 42: Distribution of VAT for standard rating all foodstuffs and VAT at 15 percent.



It is evident from Figure 42 that although the change in policy appears to be slightly less regressive when increasing social grants, the change in policy remains more regressive than a one percent increase in the VAT rate. From the Reg_c for this change in policy, calculated at 0.179, it is evident that standard rating all currently zero-rated foodstuffs with an increase in social grants, will provide for revenue in a more regressive manner than any of the previous policy changes concerned (besides standard rating all foodstuffs without an increase in social grants).

It should however be kept in mind that this change in policy will best align the VAT with the structure of a good VAT, and will also provide more additional revenue than any change in policy previously considered in this chapter. For these reasons the impact of this change of policy is estimated.

6.3.3.3 Estimation of standard rating all foodstuffs with a partial increase in social grants

For the purpose of the estimation of the OLS regression of the impact of standard rating all foodstuffs (referred to as Pi_{af}), a similar approach was adopted to that of the previous regression estimations in this chapter. From the starting sample

(sample for P_i15), 536 outliers with a studentized residual greater or less than three were removed from the data set. New and changed variables from the previous regression estimations are Pi_{af}, I, C and $PIAF$(price increase all foodstuffs). Pi_{af} was transformed to its log10 form using the same method as discussed in Section 6.3.1.4. The descriptive statistics for these new and changed variables are provided in Table 51.

Table 51: Descriptive statistics of new and adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_iaf	22696	.56	1.51	1.0348	.07960
LnI	22696	2.57	6.61	4.6780	.51295
LnC	22696	3.08	6.66	4.6077	.45288
PIAF	22696	.00	.12	.0472	.02497

After incorporating these variables, the model for estimation purposes is written as:

$$LnP_{i_{af}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIAF + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (64)$$

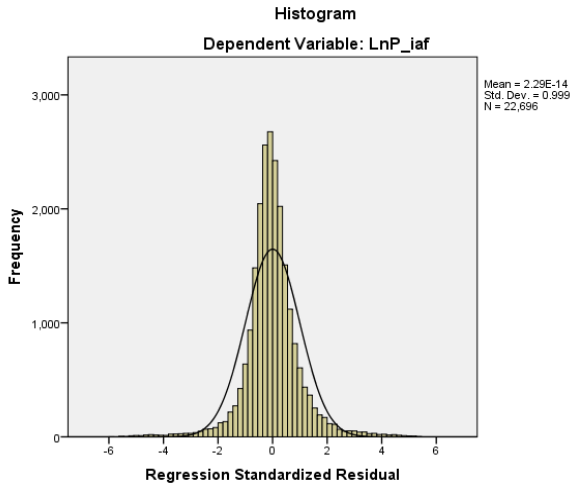
The results of this estimation are provided in Table 52.

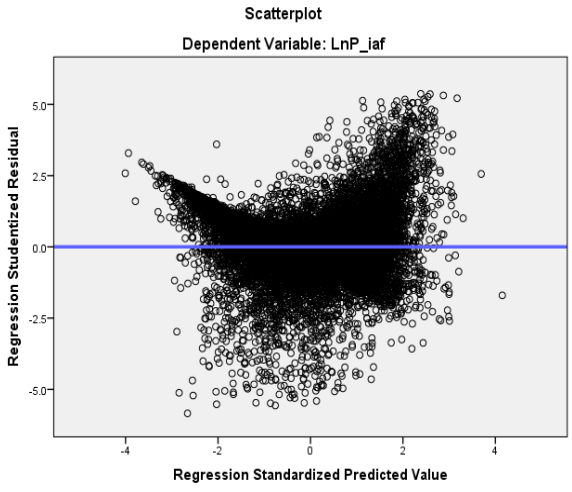
Table 52: Regression of standard rating all food with a partial grant

Linear regression

Number of obs	= 22696
F(31, 22664)	= 349.87
Prob > F	= 0.0000
R-squared	= 0.4963
Root MSE	= .05653

LnP_iaf	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	-.0955894	.0020139	-47.46	0.000	-.0995368	-.091642
LnC	.0899916	.0017205	52.31	0.000	.0866193	.0933639
LnVD	-.004047	.0007588	-5.33	0.000	-.0055343	-.0025596
EDU	-.0004205	.00015	-2.80	0.005	-.0007144	-.0001266
LnAGEA	.0026609	.0038658	0.69	0.491	-.0049163	.0102381
LnAGEC	.0015019	.0012659	1.19	0.235	-.0009794	.0039832
EMP	-.0019783	.0005265	-3.76	0.000	-.0030102	-.0009464
LnADULT	.0233368	.0019618	11.90	0.000	.0194915	.027182
LnCHILD	.0099449	.0021846	4.55	0.000	.005663	.0142269
PIAF	.902451	.0212247	42.52	0.000	.8608492	.9440528
LnHC	.0000665	.0022776	0.03	0.977	-.0043976	.0045307
SOG	-.0529519	.0007054	-75.07	0.000	-.0543345	-.0515693
FHD	-9.29e-06	.0008585	-0.01	0.991	-.0016919	.0016734
MHS	.0011001	.0009522	1.16	0.248	-.0007663	.0029665
SHS	.001966	.0009946	1.98	0.048	.0000165	.0039154
CR	.0024815	.0012239	2.03	0.043	.0000825	.0048805
IAR	0	(omitted)				
WHR	.0019495	.0014219	1.37	0.170	-.0008376	.0047366
WC	-.0014972	.0012915	-1.16	0.246	-.0040288	.0010343
EC	.0104326	.0014586	7.15	0.000	.0075736	.0132916
NC	-.000813	.0016812	-0.48	0.629	-.0041084	.0024823
FS	-.0078965	.0013582	-5.81	0.000	-.0105586	-.0052343
KZN	.0066388	.0015191	4.37	0.000	.0036613	.0096163
NW	-.0118025	.0015935	-7.41	0.000	-.0149258	-.0086792
MP	.0012749	.0016254	0.78	0.433	-.0019111	.0044608
LP	.0012556	.001619	0.78	0.438	-.0019177	.0044289
UI	.0008861	.0016407	0.54	0.589	-.0023298	.0041021
TA	.0085839	.001171	7.33	0.000	.0062887	.010879
RF	-.0035653	.0027371	-1.30	0.193	-.0089303	.0017997
WR	-.0010082	.0010397	-0.97	0.332	-.0030459	.0010296
SG	-.0013351	.0010453	-1.28	0.202	-.003384	.0007139
AN	.0003778	.0010563	0.36	0.721	-.0016925	.0024482
_cons	1.058336	.0094312	112.22	0.000	1.03985	1.076822





I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-

Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are approximately normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated (refer to the results of the estimation of standard rating fruit and dairy). The residuals appear however to be heteroskedastic and the estimation was therefore run with robust standard errors.

The log of the income coefficient of the estimation confirms the findings in Figure 42 that this change in policy is regressive. For every one percent increase in income, the impact of this change in policy is estimated to be .095 percent less.

From the other coefficients (with significance at the 5 percent level) it is estimated that the impact of the policy will be greater for households with more adults and children (larger households). It is further estimated that the impact of the policy will be less for households with higher valued dwellings, a higher average amount of years of education, more members employed and households receiving social grants (0.052 percent less impact per social grant received). Compared to the constant, the other coefficients indicate that the impact will be greater for split gender households, coloured households, households situated in the Eastern Cape and KwaZulu-Natal and households living in traditional area settlement types. Also compared to the constant, the impact will be less for households living in the Free State and North West.

The health consumption variable is not statistically significant, which indicates that the impact of the policy will not differ significantly between households which make healthy and households which make less healthy consumption decisions.

To determine whether the policy change is progressive or regressive when measured against consumption, the same impact measurement against consumption (Pc) is estimated. Again, outliers were identified and removed and both Pc and C were transformed to log10 variables for the purposes of this estimation. The coefficient for this estimation for LnC is 0.017 (0.000 significance) with the constant being 1.015, indicating that this change in policy is slightly progressive

when measured against consumption. For every one percent increase in consumption, the impact of the policy is estimated to increase by 0.017 percent.

In the next section I consider the policy changes under Argument 2 in Section 6.2.

6.4 Results of policy changes under Argument 2

In this section I present the results of the same VAT policy changes presented in the previous section, but with the entire amount of additional VAT obtained from standard rating a combination of foodstuffs, applied towards an increase in social grants. It should therefore be noted that from a revenue perspective, the South African fiscus should not be impacted (except perhaps as a result of a decrease in evasion) by these changes in policy, as the amount of revenue from these policies will be the same as under the VAT currently levied and administered (Rnil). The VAT will however be better aligned with the structure of a good VAT. This means it can be expected that the economy, neutrality, and efficiency of the VAT will increase and the complexity will decrease. Furthermore, evasion under the VAT may decrease.

The policy changes considered are standard rating fruit and dairy with a full increase in social grants, standard rating fruit, dairy, vegetables and fish with a full increase in social grants and standard rating all currently zero-rated foodstuffs with a full increase in social grants.

6.4.1 Standard rate fruit and dairy with full increase in social grants

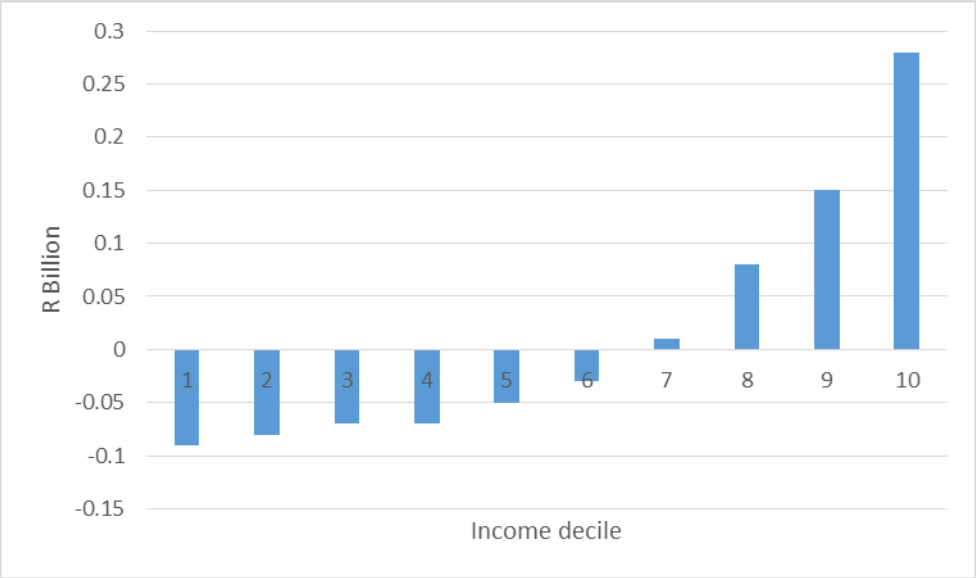
In considering whether the standard rating of fruit and dairy with the full amount of additional revenue being paid towards an increase in social grants should be preferred to the current zero rate policy, in this sub-section I first consider the additional VAT revenue paid or ‘received’ from and distribution of standard rating fruit and dairy with a full increase in social grants. This is followed by an estimation of the impact that the change in policy will have upon households.

6.4.1.1 Additional VAT revenue paid or ‘received’ from and distribution of standard rating fruit and dairy with full grant

If the aim of standard rating fruit and dairy is to address distributional objectives (as is the current zero rating of basic foodstuffs), the amount of the increase in social

grants will rise from R74.88 to R241.58 per social grant.[224] This amount can be deducted from the additional VAT paid by each household (after increasing household expenditure by the amount of social grant expended) to provide the additional amount of VAT paid or 'received' due to the change in policy (refer to Figure 43).

Figure 43: Standard rate fruit and dairy with full grant



From Figure 43 it appears that, if the objective of government is to improve upon the distributional consequences of the VAT, standard rating fruit and dairy by allocating all the additional revenue towards an increase in social grants seems to be working well. Under the current policy of zero rating fruit and dairy products, all households pay Rnil in VAT (upon these supplies), meaning that the current policy is proportional. By means of a change in policy (standard rate fruit and dairy products with full grant) the average household in Deciles 1 to 6 will be in a better financial position than under the VAT currently levied and administered. The average household in Deciles 7 to 10 (richer household) will be in a worse financial position than under the VAT currently levied and administered.

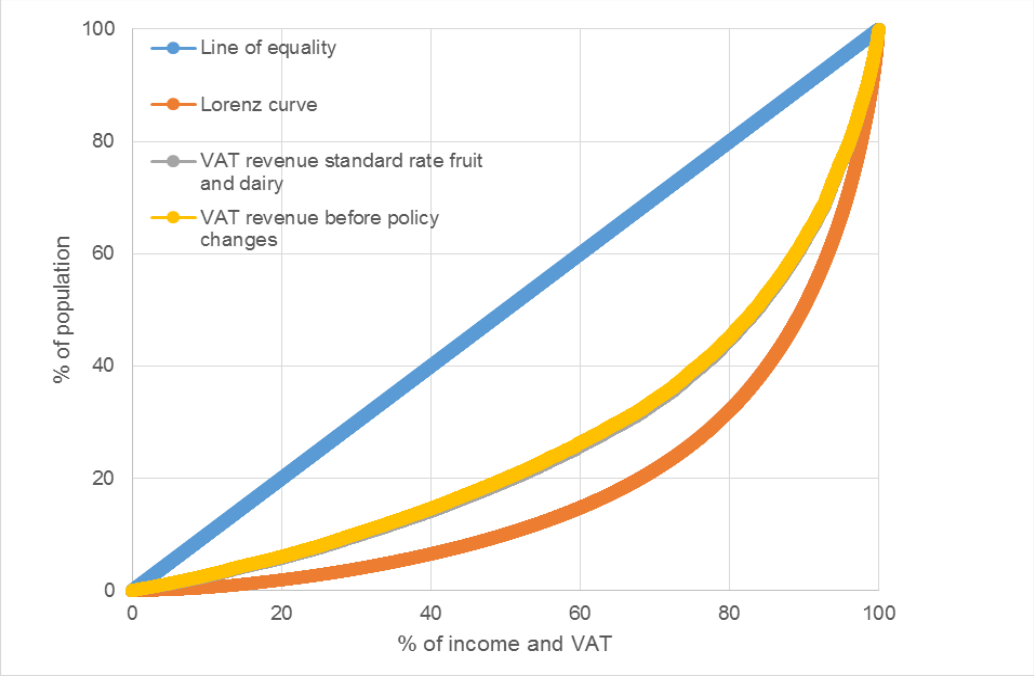
This result should however be interpreted with caution. Even though such a policy change seems to be more effective via the social grant system in alleviating the additional tax burden, not all poor households are included in the social grant

[224] This is calculated by taking the total additional VAT revenue from standard rating fruit and dairy and dividing this amount by the amount of social grants.

system. The impact of the policy upon households not included in the social grant system may be largely regressive.

To determine the Reg_c for this change in policy, and whether this change in policy could be preferred to the current policy of zero rating fruit and dairy, I draw a Lorenz curve and VAT curves for the total VAT revenue for this change in policy and total VAT revenue before any change in policy. It should be noted that a VAT curve of the additional VAT for the change in policy cannot be drawn, since the total amount of additional revenue is near to Rnil.[225] Figure 44 presents the results for this change in policy.

Figure 44: Distribution of VAT for standard rating fruit and dairy and VAT before a change in policy



It is evident from Figure 44 that this change in policy will cause the VAT to be slightly less regressive than the VAT currently levied and administered (the curve for the change in policy is slightly to the right of the curve for revenue before any change in policy). This is confirmed by the Reg_c for this change in policy, calculated at 0.474, compared to the Reg_c of 0.467 for the VAT currently levied and administered. Moreover, if only the additional VAT from this change in policy could be visually

[225] Although an attempt is made to distribute all revenue towards increasing social grants, the expenditure due to an increase in social grants provides for some additional revenue that is not distributed.

provided in Figure 44, this VAT curve would be slightly to the right of the Lorenz curve. [226] The change in policy will therefore be slightly progressive.

Similar to the regression estimations provided in the previous section, I next consider which households will be impacted by this change in policy.

6.4.1.2 Estimation of standard rating fruit and dairy with a full increase in social grants

For the purpose of the estimation of the OLS regression of the impact of standard rating fruit and dairy with all the additional revenue contributing to increasing social grants (referred to as Pi_{fdfg}), a similar approach was adopted to the previous regression estimations in this chapter. From the starting sample (sample for P_i15), 384 outliers with a studentized residual greater or less than three were removed from the data set. New and changed variables from the previous regression estimations are Pi_{fdfg}, I and C (the price increase variable will be the same as in the case of the estimation of Pi_{fd}). Pi_{fdfg} was transformed to its log10 form using the same method as discussed in Section 6.3.1.4. The descriptive statistics for these new and changed variables are provided in Table 53.

Table 53: Descriptive statistics of new and adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_ifdfg	22848	.64	1.24	.9925	.04435
LnI	22848	1.90	6.61	4.6696	.52177
LnC	22848	3.07	6.66	4.6043	.45417

After incorporating these new and adjusted variables the notation for the model is as follows:

[226] This is true as the current zero rating of fruit and dairy is proportional and therefore follows the Lorenz curve.

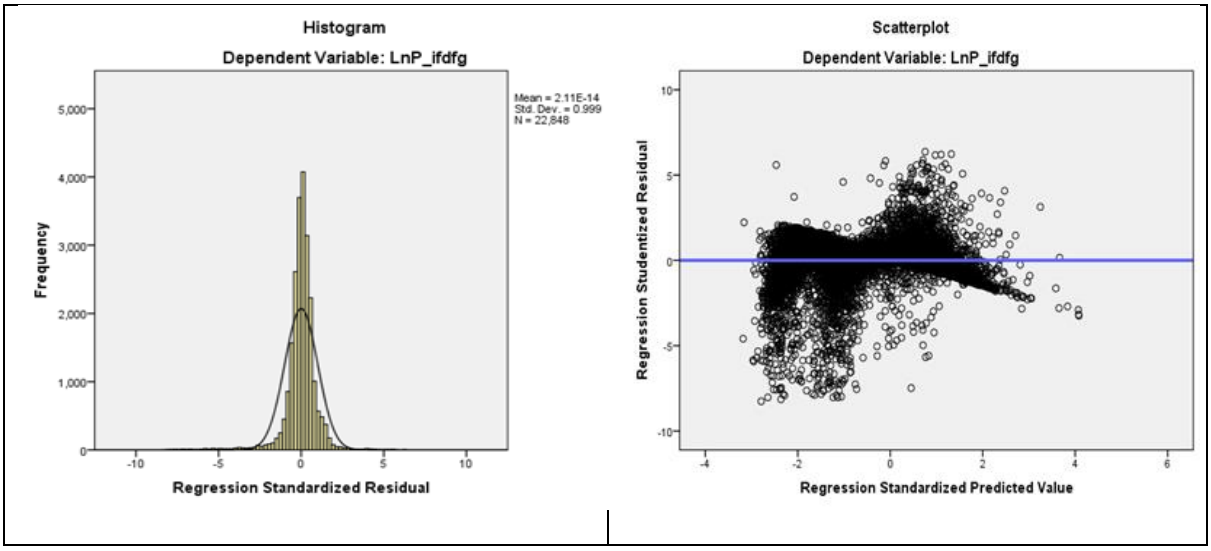
$$LnP_{i_{fdfg}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIFD + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (65)$$

The results of this estimation follow in Table 54.

Table 54: Regression of standard rating fruit and dairy with full grant

Linear regression — Number of obs = 22848; F(31, 22816) = 261.58; Prob > F = 0.0000; R-squared = 0.4336; Root MSE = .0334

LnP_ifdfg	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	.0040937	.0012773	3.20	0.001	.0015901	.0065974
LnC	.0161089	.0009568	16.84	0.000	.0142334	.0179843
LnVD	-.0013338	.0004567	-2.92	0.003	-.002229	-.0004386
EDU	-.0001141	.0000891	-1.28	0.200	-.0002887	.0000605
LnAGEA	.0048293	.0023025	2.10	0.036	.0003163	.0093424
LnAGEC	-.0009601	.0007204	-1.33	0.183	-.0023721	.0004519
EMP	-.0012577	.0003215	-3.91	0.000	-.0018879	-.0006275
LnADULT	.0102589	.0011094	9.25	0.000	.0080845	.0124333
LnCHILD	.0031577	.0012043	2.62	0.009	.0007972	.0055182
PIFD	.9227231	.0276473	33.37	0.000	.8685325	.9769137
LnHC	.0014159	.0015216	0.93	0.352	-.0015666	.0043984
SOG	-.0371216	.0004622	-80.32	0.000	-.0380275	-.0362157
FHD	.0007788	.0004969	1.57	0.117	-.0001951	.0017527
MHS	-.0002777	.0005453	-0.51	0.611	-.0013466	.0007912
SHS	.0003102	.000581	0.53	0.593	-.0008286	.001449
CR	-.0008019	.0008106	-0.99	0.323	-.0023908	.000787
IAR	0	(omitted)				
WHR	-.0117421	.0008791	-13.36	0.000	-.0134651	-.0100191
WC	-.0013347	.000825	-1.62	0.106	-.0029518	.0002824
EC	.0025055	.000846	2.96	0.003	.0008472	.0041638
NC	-.000204	.0011356	-0.18	0.857	-.0024298	.0020218
FS	.0006963	.000834	0.83	0.404	-.0009383	.0023309
KZN	-.0009939	.000914	-1.09	0.277	-.0027854	.0007977
NW	-.0013659	.0009806	-1.39	0.164	-.0032881	.0005562
MP	.0022188	.0009621	2.31	0.021	.0003331	.0041045
LP	.0019834	.0009591	2.07	0.039	.0001035	.0038633
UI	.0007987	.0010391	0.77	0.442	-.001238	.0028354
TA	-.0027117	.000707	-3.84	0.000	-.0040974	-.0013261
RF	-.0002881	.0014813	-0.19	0.846	-.0031915	.0026153
WR	-.0006901	.0006196	-1.11	0.265	-.0019046	.0005243
SG	-.0001318	.0006091	-0.22	0.829	-.0013257	.0010621
AN	.0003349	.0006207	0.54	0.589	-.0008816	.0015514
_cons	.9043786	.0062551	144.58	0.000	.8921182	.916639



I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are approximately normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated (refer to the results of the estimation of standard rating fruit and dairy with a partial grant). The residual appears however to be heteroskedastic and the estimation was therefore run with robust standard errors.

From the coefficient of income it is estimated, as also suggested by the VAT curves in Figure 44, that the change in policy is slightly progressive when measured against income. For every one percent increase in income the impact of the policy will be 0.004 percent greater.

From the other coefficients with significance at the 5 percent level, it is estimated that the impact of the policy will be greater for households with older adults, more adults and more children. The impact of the policy is estimated to be less for households with higher valued dwellings, more members employed and households receiving social grants (the impact of the policy is estimated to be 0.037 percent less per social grant received). Compared to a household represented by the constant, the impact of the policy is estimated to be greater for households situated in the Eastern Cape, Mpumalanga and Limpopo. The impact of the policy is estimated to be less for white households and households located in traditional area settlement types.

The health consumption variable is not statistically significant, indicating that the impact of the policy will not differ significantly between households who have a greater and lesser preference towards healthier consumption. To determine whether the policy change is progressive or regressive when measured against consumption, the same impact measurement against consumption (Pc) is estimated (refer to Notation 62). Again, outliers were identified and removed and the impact variable was transformed to its log10 form for purposes of this estimation. The coefficient for this estimation for LnC is 0.028 (0.000 significance) with the constant being .909, indicating that this change in policy is also progressive when measured against consumption. For every one percent increase in consumption, the impact of the policy is estimated to increase by 0.028 percent.

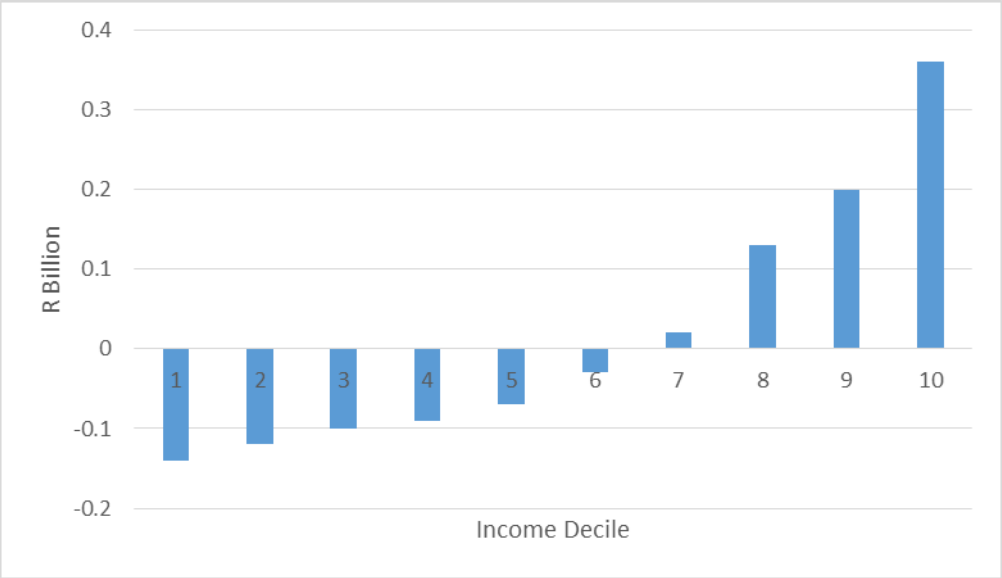
6.4.2 Standard rate fruit, dairy, vegetables and fish with full increase in social grants

In this sub-section I first consider the additional VAT revenue paid or 'received' from and the distribution of standard rating fruit, dairy, vegetables and fish, with all additional revenue contributing to an increase in social grants. This is followed by the impact estimation for this change in policy.

6.4.2.1 Additional VAT revenue paid or 'received' from and distribution of standard rating fruit, dairy, vegetables and fish with full grant

The full amount of additional VAT revenue as a result of standard rating fruit, dairy, vegetables and fish, provides for an increase in social grants from R172.21 to R508.07 per social grant. The additional amount of VAT paid or 'received' as a result of standard rating fruit, dairy, vegetables and fish with a full increase in social grants is provided in Figure 45.

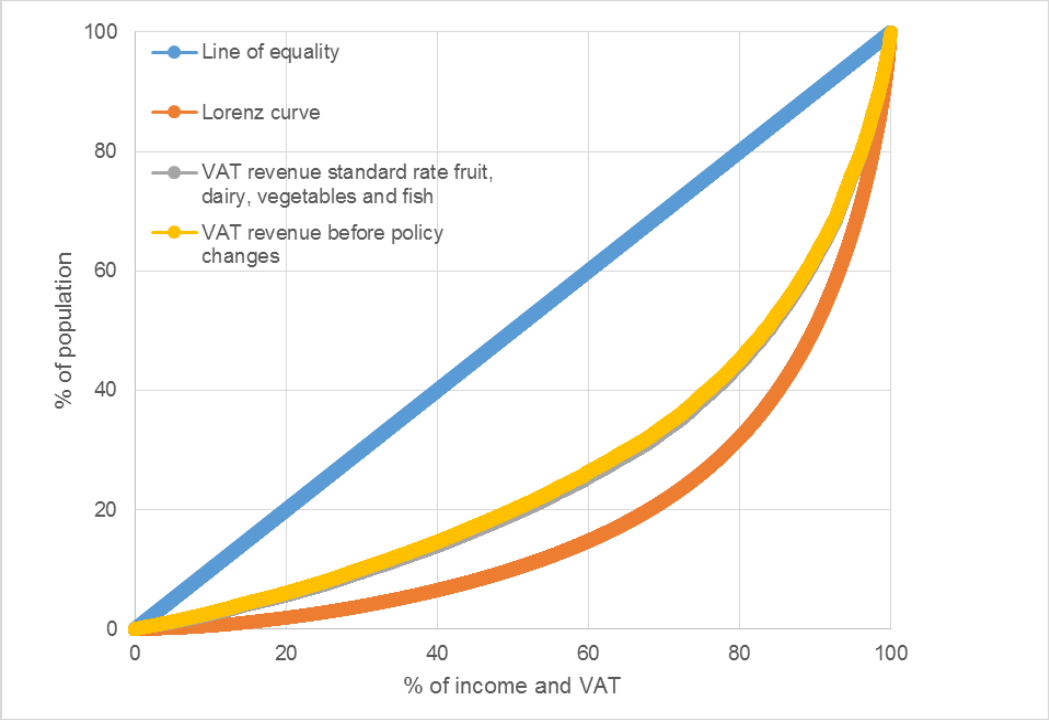
Figure 45: Standard rate fruit, dairy, vegetables and fish with full grant



From Figure 45 it is evident that standard rating fruit, dairy, vegetables and fish with the full amount of additional revenue allocated towards an increase in social grants will result in the average household in Deciles 1 to 6 being in a better financial position than under the VAT currently levied and administered. Households in Deciles 7 to 10 will be in a worse financial position than under the VAT currently levied and administered. These results again need to be interpreted with caution for the same reason as provided in the previous section.

To determine whether the VAT with this change in policy can be preferred to the VAT currently levied and administered, I provide Lorenz and VAT curves in Figure 46. Similarly to the previous section the VAT curves are for the total VAT revenue with this change in policy taken into account and the total VAT revenue before a change in policy.

Figure 46: Distribution of VAT for standard rating fruit, dairy, vegetable and fish and VAT before a change in policy



From Figure 46 it is evident that this change in policy causes the VAT to be less regressive than the VAT currently levied and administered. This is confirmed by the Reg_c for this change in policy, calculated at 0.478 (compared to 0.467). This policy change is also more progressive than the previous change in policy considered in this section (0.478 compared to 0.474). Again, if only the additional VAT paid or 'received' were illustrated, this curve would be to the right of the Lorenz curve.[227]

I next provide an estimation of the types of households that will be impacted by this change in policy.

6.4.2.2 Estimation of standard rating fruit, dairy, vegetables and fish with a full increase in social grants

For the purpose of the estimation of the OLS regression of the impact of standard rating fruit, dairy, vegetables and fish with all the additional revenue contributing to increasing social grants (referred to as $Pi_{fdvfifg}$), I apply a similar approach to the previous regression estimations in this chapter. From the starting sample (sample for

[227] This is true since under the VAT currently levied and administered, the VAT paid by households upon these supplies is Rnil. Therefore reducing the regressivity of the VAT with this change in policy must have a progressive effect in the burden distribution.

P_i15), 183 outliers were identified[228] and removed from the data set. $Pi_{fdvfifg}$, I and C (the price increase variable will be the same as in the case of the estimation of Pi_{fdvfi}) are new or changed variables from the previous regression estimations. $Pi_{fdvfifg}$ was transformed to its log10 form using the same method as discussed in Section 6.3.1.4. The descriptive statistics for these new or changed variables are provided in Table 55.

Table 55: Descriptive statistics of new and adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_ifdvfifg	23049	1.01	1.49	1.2965	.02696
LnI	23049	1.90	6.61	4.6606	.52891
LnC	23049	3.07	6.66	4.6005	.45511

After incorporating these variables the model for estimation purposes is written:

$$LnP_{i_{fdvfifg}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIFDVFI + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (66)$$

The results of this estimation follow in Table 56.

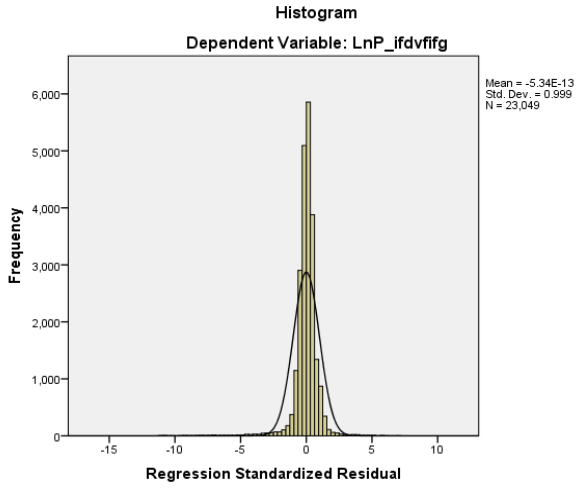
[228] Some studentized residuals less than minus three were not removed due to these residuals representing households with a low income that received social grants, and the impact measurement for these households is therefore likely not a true outlier.

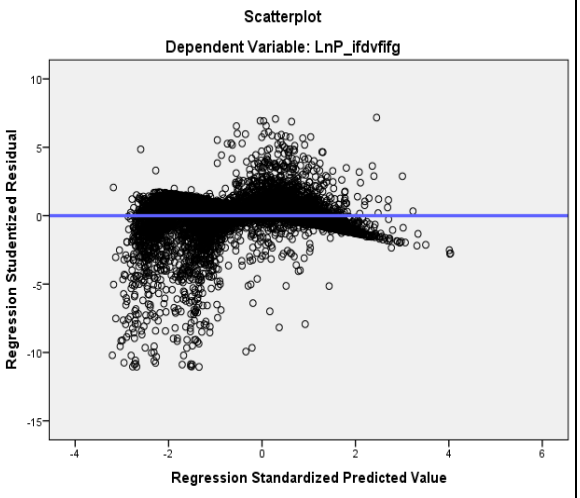
Table 56: Regression of standard rating fruit, dairy, vegetables and fish with full grant

Linear regression

Number of obs	= 23049
F(31, 23017)	= 201.27
Prob > F	= 0.0000
R-squared	= 0.3694
Root MSE	= .02142

LnP_ifdvfifg	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	.0068295	.0009431	7.24	0.000	.0049809	.008678
LnC	.0074491	.0006214	11.99	0.000	.0062311	.0086672
LnVD	-.0012754	.0002979	-4.28	0.000	-.0018593	-.0006915
EDU	-.0001807	.000057	-3.17	0.002	-.0002925	-.000069
LnAGEA	.0040953	.0015147	2.70	0.007	.0011265	.0070641
LnAGEC	-.0006059	.0004482	-1.35	0.176	-.0014845	.0002727
EMP	-.0011082	.0002055	-5.39	0.000	-.001511	-.0007054
LnADULT	.004922	.0006979	7.05	0.000	.003554	.0062899
LnCHILD	.0028895	.0007639	3.78	0.000	.0013922	.0043868
PIFD	.4951007	.0164584	30.08	0.000	.462841	.5273603
LnHC	.001557	.0010455	1.49	0.136	-.0004923	.0036063
SOG	-.0202869	.000295	-68.76	0.000	-.0208652	-.0197086
FHD	.0010659	.0003214	3.32	0.001	.000436	.0016958
MHS	-.0003705	.0003496	-1.06	0.289	-.0010558	.0003149
SHS	.00057	.0003461	1.65	0.100	-.0001085	.0012484
CR	-.0007639	.0004816	-1.59	0.113	-.0017079	.0001802
IAR	0	(omitted)				
WHR	-.0073335	.0005439	-13.48	0.000	-.0083996	-.0062674
WC	-.0004525	.0005176	-0.87	0.382	-.001467	.000562
EC	.0014584	.0005229	2.79	0.005	.0004335	.0024834
NC	-.0003734	.000721	-0.52	0.605	-.0017865	.0010397
FS	.0006901	.0005148	1.34	0.180	-.0003189	.0016991
KZN	-.0000545	.0005793	-0.09	0.925	-.0011899	.001081
NW	-.0007833	.000634	-1.24	0.217	-.0020259	.0004594
MP	.0011463	.0006247	1.83	0.067	-.0000783	.0023708
LP	.0006399	.0006114	1.05	0.295	-.0005584	.0018382
UI	.0005408	.000651	0.83	0.406	-.0007351	.0018168
TA	-.0014138	.0004535	-3.12	0.002	-.0023027	-.0005248
RF	.001318	.0008635	1.53	0.127	-.0003745	.0030105
WR	-.0001523	.0003868	-0.39	0.694	-.0009105	.0006058
SG	.0000334	.0003966	0.08	0.933	-.000744	.0008109
AN	.0003241	.0003993	0.81	0.417	-.0004585	.0011066
_cons	1.233354	.0041635	296.23	0.000	1.225193	1.241514





I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are approximately normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated (refer to the results of the estimation of standard rating fruit and dairy with a partial grant). The residuals appear to be heteroskedastic and the estimation was therefore run with robust standard errors.

From the coefficient of income it is estimated that this change in policy will be slightly progressive. For every one percent increase in income the impact of the change in policy is estimated to be 0.007 percent greater. This result is also evident with reference to Figure 46.

From the other coefficients with significance at the 5 percent level, it is estimated that the impact of the policy will be greater for households with older adults, more adults and more children. The impact of the policy will be less for households with higher valued dwellings, a higher average amount of years of education, households with more members employed and households receiving social grants (0.02 percent less impact per social grant).

Compared to households represented by the constant, the impact of the change in policy will be greater for households with female household heads and households situated in the Eastern Cape. Also compared to the constant, the impact of the change in policy will be less for white households and households living in traditional area settlement types. The health consumption variable is again not statistically significant.

Once again, the coefficient of LnC is provided by means of a similar regression estimation of the impact of the change in policy upon consumption (P_c) (refer to Notation 62) to estimate whether the change in policy will be regressive or progressive when measured against consumption. The coefficient of LnC for this estimation is 0.44 (significance .000) with the constant 0.842. This indicates that the change in policy is progressive when measured against consumption. For every one

percent increase in consumption the impact of the policy is estimated to be 0.44 percent greater.

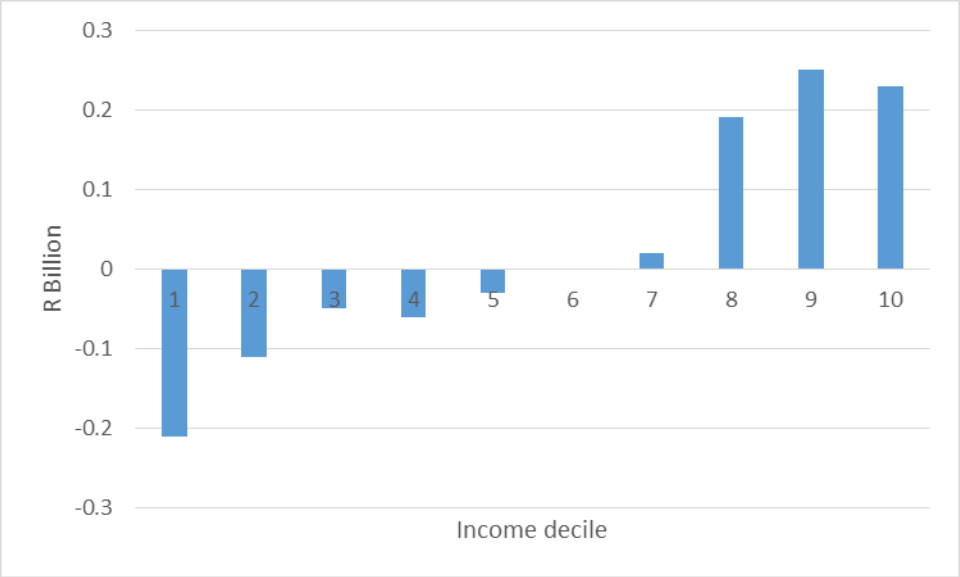
6.4.3 Standard rate all foodstuffs with a full increase in social grants

In this sub-section I first consider the additional VAT revenue paid or 'received' from and the distribution of standard rating all foodstuffs, with all additional revenue contributing to an increase in social grants. Following this, I provide the impact that the considered change in policy will have upon households.

6.4.3.1 Additional VAT revenue paid or 'received' from and distribution of standard rating all foodstuffs with a full grant

The additional VAT paid and 'received' in the case where all the additional VAT from standard rating currently zero-rated food contributes towards increasing social grants (an increase from R409.97 to R1 096.73 per grant) is provided in Figure 47.

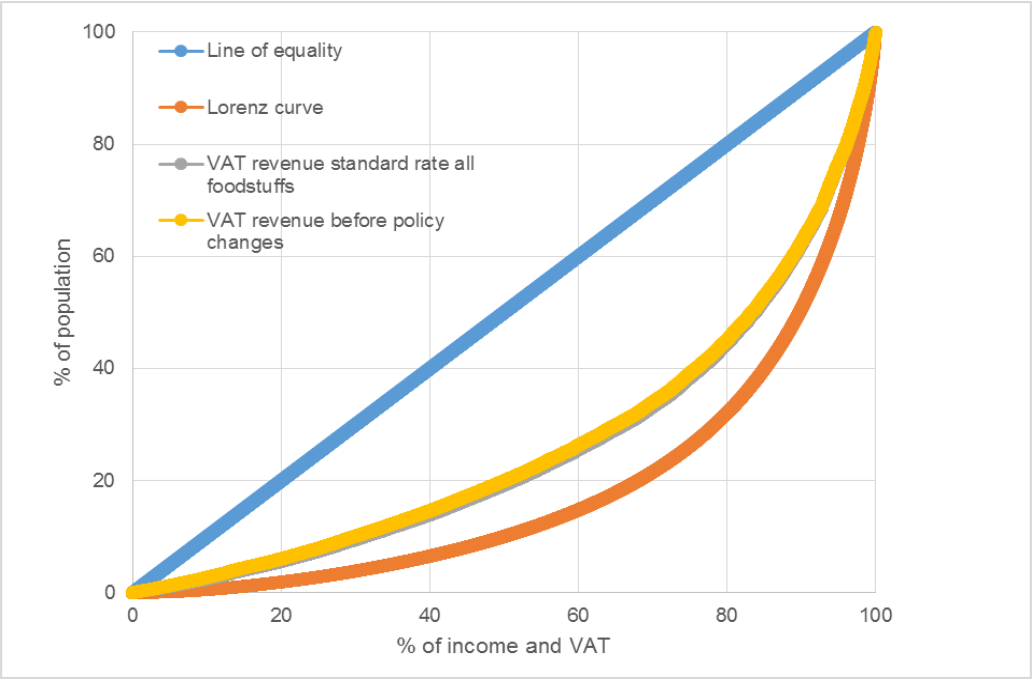
Figure 47: Standard rate all foodstuffs with full grant



From Figure 47 it is evident that the average household in Deciles 1 to 5 will be in a better financial position than under the VAT currently levied and administered. The average household in Decile 6 will be in the same financial position than under the VAT currently levied and administered. The average households in Deciles 7 to 10 will be in a worse financial position than under the VAT currently levied and administered. Again, this result needs to be interpreted with caution.

To determine whether this change in policy is progressive or regressive, I refer to the Reg_c calculated from the VAT curves provided in Figure 48.

Figure 48: Distribution of VAT for standard rating all foodstuffs and VAT before a change in policy



It is evident from Figure 48 that standard rating all foods and increasing social grants by the full amount of additional revenue will provide for a less regressive VAT than the VAT currently levied and administered. This is confirmed by the Reg_c for this change in policy calculated at 0.478 (compared to 0.467). This change in policy will also provide for a VAT that is as regressive as only standard rating fruit, dairy, vegetables and fish with all additional revenue contributing to an increase in social grants (Reg_c = 0.478).

I next consider which households will be impacted by this change in policy with reference to the regression estimation of the impact measurement.

6.4.3.2 Estimation of standard rating all foodstuffs with a full increase in social grants

A similar approach is applied for the OLS regression of the impact of standard rating all foodstuffs with all the additional revenue contributing to increasing social grants (referred to as Pi_{affg}) to that of the previous regression estimation in this section. From the starting sample (sample for P_i15), 194 outliers were identified and removed from the data set. Pi_{affg}, I and C (the price increase variable will be the same as in the case of the estimation of Pi_{af}) are new or changed variables from the previous regression estimations and Pi_{affg} was transformed to its log10 form using the same

method as discussed in Section 6.3.1.4. The descriptive statistics for these new or changed variables are provided in Table 57.

Table 57: Descriptive statistics of new and adjusted variables

	N	Minimum	Maximum	Mean	Std. Deviation
LnP_iaffg	23038	.82	1.84	1.5508	.06238
LnI	23038	2.57	6.61	4.6698	.51813
LnC	23038	3.10	6.66	4.6060	.45145

After incorporating these variables the notation for the model is as follows:

$$LnP_{i_{affg}} = c + LnI + LnC + LnVD + EDU + LnAGEA + LnAGEC + EMP + LnADULT + LnCHILD + PIAF + LnHC + SOG + FHD + MHS + SHS + CR + IAR + WHR + WC + EC + NC + FS + KZN + NW + MP + LP + UI + TA + RF + WR + SG + AN + \varepsilon \quad (67)$$

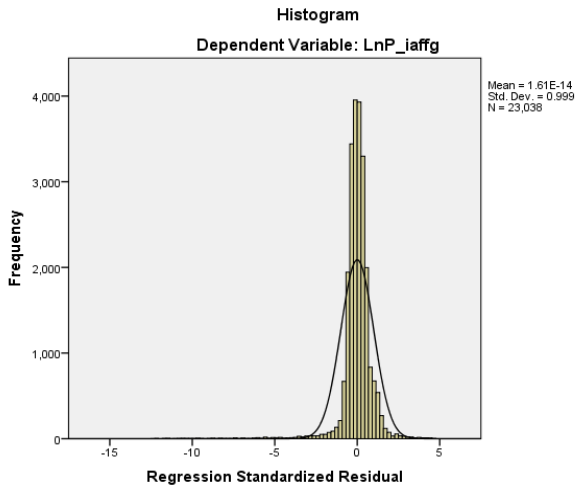
The results of this estimation follow in Table 58.

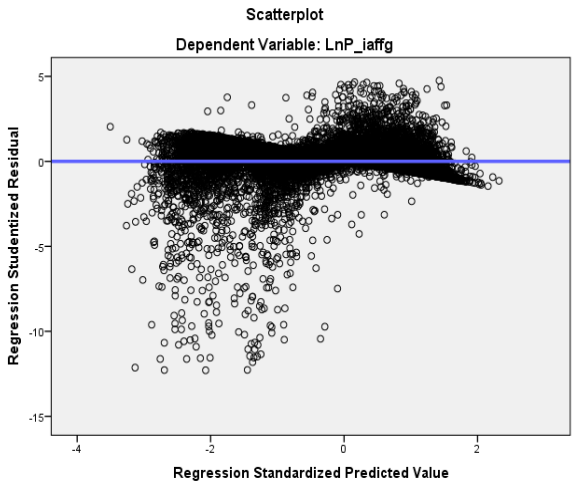
Table 58: Regression of standard rating all foodstuffs with full grant

Linear regression

Number of obs	= 23038
F(31, 23006)	= 207.70
Prob > F	= 0.0000
R-squared	= 0.3477
Root MSE	= .05041

LnP_iaffg	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
LnI	.0059816	.0021491	2.78	0.005	.0017693	.0101939
LnC	.0262197	.001429	18.35	0.000	.0234187	.0290207
LnVD	-.0026873	.0007395	-3.63	0.000	-.0041368	-.0012378
EDU	-.000556	.0001353	-4.11	0.000	-.0008213	-.0002908
LnAGEA	.0114791	.0037391	3.07	0.002	.0041502	.018808
LnAGEC	-.0003414	.0010799	-0.32	0.752	-.0024581	.0017754
EMP	-.0025773	.0004775	-5.40	0.000	-.0035133	-.0016413
LnADULT	.0128847	.001627	7.92	0.000	.0096957	.0160737
LnCHILD	.0074149	.0018097	4.10	0.000	.0038678	.010962
PIAF	.3009104	.0178831	16.83	0.000	.2658583	.3359624
LnHC	.0016185	.0025239	0.64	0.521	-.0033285	.0065656
SOG	-.0499883	.000723	-69.14	0.000	-.0514054	-.0485712
FHD	.0026416	.000741	3.57	0.000	.0011892	.004094
MHS	-.0004593	.0007828	-0.59	0.557	-.0019936	.0010751
SHS	.001124	.0008162	1.38	0.168	-.0004758	.0027237
CR	-.0027988	.0010698	-2.62	0.009	-.0048957	-.0007018
IAR	0	(omitted)				
WHR	-.0107035	.0012047	-8.88	0.000	-.0130649	-.0083422
WC	-.0012364	.0011723	-1.05	0.292	-.0035342	.0010615
EC	.0060734	.0012641	4.80	0.000	.0035958	.0085511
NC	.0006601	.001527	0.43	0.666	-.0023329	.0036532
FS	-.0000502	.0011879	-0.04	0.966	-.0023786	.0022783
KZN	.0038227	.0014182	2.70	0.007	.001043	.0066025
NW	-.0036891	.0015936	-2.32	0.021	-.0068126	-.0005656
MP	.0015124	.0015226	0.99	0.321	-.001472	.0044968
LP	.0006039	.0015438	0.39	0.696	-.002422	.0036298
UI	.0012513	.0015875	0.79	0.431	-.0018604	.004363
TA	.0005653	.0010702	0.53	0.597	-.0015323	.0026629
RF	.0031802	.0020721	1.53	0.125	-.0008812	.0072416
WR	-.0007598	.0009257	-0.82	0.412	-.0025742	.0010545
SG	-.0007188	.0009337	-0.77	0.441	-.002549	.0011115
AN	.0005597	.0009007	0.62	0.534	-.0012057	.002325
_cons	1.40572	.0100249	140.22	0.000	1.386071	1.42537





I-Income, C-Consumption, VD-Value of dwelling, EDU-Years of education, AGEA-Age of adults, AGEC-Age of children, EMP-Number of members employed, ADULT-Number of adults, CHILD-

Number of children, PI-Price increase, HC-Health Consumption, SOG-Number of social grants, FHD-Female household head, MHS-Male dominant household, SHS-Split household, CR-Coloured, WHR-White, WC-Western Cape, EC-Eastern Cape, NC-Northern Cape, FS-Free State, KZN-KwaZulu-Natal, NW-North West, MP-Mpumalanga, LP-Limpopo, UI-Urban Informal, TA-Traditional area, RF-Rural Formal, WR-Winter, SG-Spring and AN-Autumn

It is apparent that the residuals are approximately normally distributed, although clustered around the mean. The residuals have a mean of zero and are uncorrelated (refer to the results of the estimation of standard rating fruit and dairy with a partial grant). The residuals appear however to be heteroskedastic and the estimation was therefore run with robust standard errors.

From the coefficient of LnI it is estimated that for every one percent increase in income the impact of the policy will be 0.006 percent greater, meaning that the change in policy is slightly progressive. This is similar to the results presented in Figure 48.

From the other significant coefficients (at the 5 percent level) it is estimated that the impact of the policy will be greater for households with older adults, more adults and more children. The impact of the policy will be less for households with a higher average amount of years of education, households with more members employed and households receiving social grants (0.049 percent less per social grant received).

In comparison to a household represented by the constant, the impact of the change in policy will be greater for households with a female head and households situated in the Eastern Cape and KwaZulu-Natal. Also compared to a household represented by the constant, the impact of the change in policy will be less for coloured households, white households and households situated in North West.

The regression estimation of the impact of the policy change measured against consumption (P_c) (refer to Notation 62) was also estimated in a similar manner to the previous regression estimation in this section. The coefficient for LnC for this estimation is 0.041 (significance .000) with the constant 1.465.

6.5 Conclusion

All the policy changes considered in this chapter better align the South African VAT with the structure of a good VAT. The main results presented in this chapter are summarised in Table 59.

Table 59: Summary of the main results of Chapter 6

Changes in revenue	**Standard rate fruit and dairy with partial grant**	**Standard rate fruit, dairy, vegetables and fish with partial grant**	**Standard rate all foodstuffs with partial grant**	**Standard rate fruit and dairy with full grant**	**Standard rate fruit, dairy, vegetables and fish with full grant**	**Standard rate all foodstuffs with full grant**
Additional VAT revenue from households	R1.54 billion	R2.99 billion	R6.075 billion	R0	R0	R0
Regressive or progressive						
Regressive coefficient[229] (rate increase = 0.467)	0.509	0.360	0.179	0.474	0.478	0.478
Regressive or progressive against income	Slightly regressive	Slightly regressive	Regressive	Slightly progressive	Slightly progressive	Slightly progressive
Regressive or progressive against consumption	Slightly progressive	Slightly progressive	Slightly progressive	Slightly progressive	Progressive	Progressive
Statistical significantly greater impact on households						
Households with older adults	√	√		√	√	√
Households with more adults	√	√	√	√	√	√
Households with more children	√	√	√	√	√	√
Households with female heads	√				√	√
Households situated in the Western Cape	√					
Households situated in the Eastern Cape		√	√	√	√	√
Households situated in KwaZulu-Natal			√			√
Households situated in Mpumalanga				√		
Households situated in the Limpopo				√		
Split gender households			√			

[229] A higher rate can be interpreted to mean that a change in policy is less regressive or alternatively more progressive.

Coloured households		√	√			
Households who prefer healthier consumption		√				
Statistical significantly lesser impact on households						
Households receiving social grants	√	√	√	√	√	√
Households with higher valued dwellings	√	√	√	√	√	
White households	√	√		√	√	√
Coloured households						√
Households situated in North West	√	√	√			√
Households situated in Free State			√			
Households living in traditional area settlement types	√			√	√	
Households with higher level of education			√		√	√
Households with more members employed		√	√	√	√	√

The results presented in Table 59 and other results in this Chapter should be informative to policy makers considering either additional revenue from the VAT, or whether and when the burden distribution of the VAT should rather be targeted by means of the social grant system. Furthermore, the type of household that will be impacted to a greater or lesser extent as a result of a policy change is also provided. This result provides for a more informative understanding of the equity of the policy changes considered. A combined summary of all the results from this study are provided in the conclusion chapter.

For other institutions, such as the OECD and the academic community, the results may also be informative. From the results in this section it appears that targeted relief from the burden distribution of the VAT by means of the tax transfer system, would not in all instances provide for a much more progressive VAT. If government were to pay all additional revenue from standard rating a selection of basic foodstuffs, then even under a fairly poorly targeted transfer system (such as the South African transfer system), the burden distribution of the VAT will be better addressed by the transfer system than a zero rate. If government does not have to fully compensate for the revenue loss, but for only a portion (which is likely to occur in many countries), by means of increased direct tax transfers, the zero rating may be preferred for foodstuffs that are not very poorly targeted with the zero rate.

This preference is of course only towards addressing the burden distribution of the VAT, meaning the canon of equity, and this canon may and perhaps should not be very important for other (developed) countries when only considering their VAT. If the entire tax and transfer system is progressive, then standard rating basic foodstuffs with or without targeted relief by means of the transfer system is likely to provide many benefits. This is as a result of a VAT being better aligned with the structure of a good VAT.

This study is concluded in the following chapter.

CHAPTER 7:
CONCLUSION

In providing a quantitative measurement of policy options to inform VAT reform in South Africa, the primary research objectives of this study were firstly to establish the structure of a good VAT. Secondly, to consider how the South African VAT is aligned with the established structure of a good VAT and from this analysis, provide well-motivated and theory based possible policy changes that take into account identified challenges faced by South Africa (refer to Section 1.1). Thirdly, to develop a structural model, incorporating consumption behavioural changes, that can be used to provide empirical evidence upon the impact of these policy changes upon consumers (households) and lastly, to apply the policy changes to the structural model, analyse and describe the results and provide policy recommendations based upon the results.

In this final chapter a summary of findings related to the research objectives is provided first. Not all results from this study are repeated here.[230] The summary of findings is followed by policy recommendations based upon the results of this study. Hereafter, I discuss the contribution of the study followed by the areas of future research related to the research in this study. The chapter and study conclude with some final remarks.

7.1 Summary of findings

Based upon the underlying form of a good tax and studies by experts in the field, the structure of a good VAT can be summarised as follows: The structure of a good VAT should be mainly aimed towards revenue by taxing at a single non-zero rate the largest possible base of goods and services consumed and generally not taxing production. This VAT should be an invoice credit method VAT that generally uses the accrual or invoice basis of accounting. The term “possible” can be taken to mean that the destination principle should be applied, an appropriately high threshold should be set and inevitable exemptions, namely non-supplies, residential immovable property, financial services, only basic education and health in the PNC Sector, and in some instances farming in developing countries, should be included.

[230] For instance, the price elasticities provided in Chapter 4 are a contribution made in this study, but not repeated here.

The South African VAT, although mostly aligned with the structure of a good VAT, does not tax the largest possible base of goods and services consumed. In an attempt to address the burden distribution of the tax, the supply of certain basic foodstuffs is excluded from the base of the tax. Although improving the equity of the South African VAT (within a highly progressive tax and transfer system), the zero rating of basic foodstuffs results in lowering the economy, neutrality and efficiency of the VAT. Furthermore, it also contributes to the complexity of the VAT and opportunities for evasion of VAT liability.

South Africa requires additional tax revenues if it is to meet future fiscal objectives and also face many challenges of which income inequality is one of the most pressing. In obtaining additional revenue, the level of income inequality provides political and economic tax revenue challenges. It therefore appears important that if additional tax revenue is to be collected from the VAT, it should be done in the most equitable manner possible.

To this end, a number of policy changes were considered. These policy changes can be classified as having one or more of the following objectives: (1) additional revenue, (2) additional revenue and a more equitable burden distributional, or (3) a more equitable burden distribution. Besides these objectives, some policy changes considered also better align the VAT with the structure of a good VAT. The policy changes considered and their objectives are provided in Table 60.

Table 60: Policy changes considered and their objectives

Policy change considered	Revenue	Burden distribution	Align with good VAT
Increase the standard VAT rate to 15 percent.	√		
Increase the standard VAT rate to 16 percent.	√		
Apply the standard rate to fruit and dairy.	√		√
Apply the standard rate to fruit and dairy with a proportion of the additional revenue allocated towards increasing social grants.	√	√	√
Apply the standard rate to fruit, dairy, fish and vegetables.	√		√
Apply the standard rate to fruit, dairy, fish and vegetables with a proportion of the additional revenue allocated towards increasing social grants.	√	√	√
Apply the standard rate to all currently zero-rated foodstuffs.	√		√
Apply the standard rate to all currently zero-rated foodstuffs with a proportion of the additional revenue allocated towards increasing social grants.	√	√	√
Apply the standard rate to fruit and dairy with all additional revenue allocated towards an increase in social grants.		√	√
Apply the standard rate to fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.		√	√
Apply the standard rate to all currently zero-rated foodstuffs with all additional revenue allocated towards an increase in social grants.		√	√

In providing empirical evidence upon the extent that the policy changes listed in Table 60 meet their aimed objectives, specifically the objective of additional revenue and a more equitable burden distributional[231] a structural model was developed (refer to Chapter 4), referred to as SAVATMOD.

This model contains expenditure data from the Income and Expenditure Survey of Households of South Africa for 24 752 households. Unique demand equations were estimated for each household with the use of two quadratic almost ideal demand system estimations (a complete consumer demand system and a nutritional goods demand system). This allows households to follow a two-stage budgeting process in response to a change in prices and expenditure (an increase in social grants for

[231] In Chapter 3 I discuss how the standard rating of zero-rated foodstuffs would better align with the structure of a good VAT.

those households that receive social grants) as a result of the changes in policy listed in Table 60.

From SAVATMOD, I was able to estimate the amount of additional VAT revenue payable per household for each expenditure item (there are 200 of these after grouping certain items), the VAT payable per household, as well as the VAT payable by all households as a result of the policy change. This result allowed for some further analysis upon the burden distribution of the additional VAT revenue by, amongst other results, calculating a regressive coefficient[232] (Reg_c) of the additional VAT for every change in policy (besides the last three listed in Table 60) (refer to Chapter 6).

Since no additional VAT is obtained from the last three changes in policy in Table 60, the Reg_c is not calculated based upon the additional VAT revenue, but rather the total VAT revenue. A summary of the additional VAT revenue in current terms from all households (weighted) and the Reg_c of the additional VAT revenue for the applicable changes in policy are provided in Table 61. The Reg_c of the total VAT revenue after the last three changes in policy (as listed in Table 60), together with the Reg_c of the VAT before any change in policy are provided in Table 62.

[232] As described in Chapter 6, the regressive coefficient indicates the extent that VAT revenue is obtained in a regressive manner. A regressive coefficient less than the Gini coefficient (0.633) indicates that revenue is obtained in a regressive manner, a regressive coefficient equal to the Gini coefficient indicates that revenue is obtained in a proportional manner and a regressive coefficient greater than the Gini coefficient indicates that revenue is obtained in a progressive manner. The distance between the Gini coefficient and the regressive coefficient indicates the extent that the revenue is obtained in a regressive or progressive manner.

Table 61: Total additional revenue from households (weighted) and Reg_c of the additional revenue of a change in policy

Policy change considered	Additional VAT revenue (R Billion)	Reg_c of additional revenue
Increase the standard VAT rate to 15 percent.[233]	6.92	0.467
Increase the standard VAT rate to 16 percent.	14.4	0.467
Apply the standard rate to fruit and dairy.	2	0.347
Apply the standard rate to fruit and dairy with a proportion of the additional revenue allocated towards increasing social grants.	1.23	0.509
Apply the standard rate to fruit, dairy, fish and vegetables.	4.05	0.234
Apply the standard rate to fruit, dairy, fish and vegetables with a proportion of the additional revenue allocated towards increasing social grants.	2.99	0.360
Apply the standard rate to all currently zero-rated foodstuffs.	8.62	0.108
Apply the standard rate to all currently zero-rated foodstuffs with a proportion of the additional revenue allocated towards increasing social grants.	6.08	0.179

Table 62: Reg_c of the total revenue before a change in policy and after a change in policy

Policy change considered	Reg_c of total revenue
VAT currently levied and administered.	0.467
Apply the standard rate to fruit and dairy with all additional revenue allocated towards an increase in social grants.	0.474
Apply the standard rate to fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.	0.478
Apply the standard rate to all currently zero-rated foodstuffs with all additional revenue allocated towards an increase in social grants.	0.478

From Table 61 it can be seen that, although applying the standard rate to fruit and dairy or fruit, dairy, fish and vegetables or all foodstuffs without increasing social grants will better align the VAT with the structure of a good VAT, additional revenue from these policy changes is provided in a more regressive manner than a rate increase. From the reports of previous tax committees of South Africa, discussed in Chapter 6, it appears that there is little motivation to describe the effect of these policy changes in depth to policy makers. This is potentially due to low levels of political support for these policy changes. Furthermore, when considering the current

[233] In the case of an increase in the standard rate to 15 percent and an increase in the standard rate to 16 percent, the additional VAT revenue from households can be multiplied with 2.21 to approximate the total additional VAT revenue.

level of income inequality, standard rating basic foodstuffs without some additional financial assistance towards the poor is not likely to be recommended. These policy changes are therefore not described by way of an impact regression estimation (refer below).

The impact[234] of the remaining policy changes in Table 61 and Table 62 upon households was considered by way of ordinary least square regression estimation. This was done by taking into account variables that the literature suggests influence consumer behaviour (refer to Chapter 5). The purpose of these estimations was to provide additional information in respect of the equity of a policy change (when considering that ability to pay is not only dependent upon income). A summary of selected statistically significant results at the 5 percent level of the impact upon households for each remaining change in policy is provided in Table 63 (refer to Chapters 5 and 6 for all the results). A plus sign indicates that as the variable considered increases, the impact of the policy increases. A negative sign indicates that as the variable considered increases, the impact of the policy decreases.

[234] This is a measure of the additional VAT revenue paid or 'received' per household after deducting the amount of increased social grants received (where applicable), divided by the income of that household.

Table 63: Impact of policy upon households (selected variables)

Policy change considered	EDU	EMP	AGEA	AGEC	ADULT	CHILD
Increase the standard VAT rate to 15 percent.	-	-	+	-	+	+
Increase the standard VAT rate to 16 percent.	-	-	+	-	+	+
Apply the standard rate to fruit and dairy with a proportion of the additional revenue allocated towards increasing social grants.	-	-			+	+
Apply the standard rate to fruit, dairy, fish and vegetables with a proportion of the additional revenue allocated towards increasing social grants.		-			+	+
Apply the standard rate to all currently zero-rated foodstuffs with a proportion of the additional revenue allocated towards increasing social grants.	-	-			+	+
Apply the standard rate to fruit and dairy with all additional revenue allocated towards an increase in social grants.		-	+		+	+
Apply the standard rate to fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.	-	-	+		+	+
Apply the standard rate to all currently zero-rated foodstuffs with all additional revenue allocated towards an increase in social grants.	-	-	+		+	+

EDU = average number of years of education of adults, EMP = members older than 15 employed, AGEA= Average age of adults, AGEC= average age of children, ADULT = number of adults, CHILD = number of children.

7.1.1 Summary of findings for policy changes listed in Table 61

In obtaining additional revenue from the VAT, it is evident from Table 61 that South Africa has a number of options that I considered. The first is a rate increase to either 15 percent or 16 percent. Although this change in policy will not necessarily better align the South African VAT with the structure of a good VAT, additional revenue will be provided in the second least regressive manner of all policy changes considered. It should further be noted that the total additional revenue from a one percent increase in the standard rate is approximated at R15.29 billion. For a two percent increase, the total additional revenue is approximated at R31.82 billion and for a three percent increase, it is approximated at R45.87 billion.

A standard rate increase will however have a greater impact upon households with less education, fewer members employed, older adults, younger children, and

households with more individuals. Households with these characteristics are likely to have a lower ability to afford the increased VAT than other households.

The second option considered is to bring a selection of basic foodstuffs into the base of the tax and increase social grants by a proportion of the additional revenue. The major advantage of this approach is that it would better align the South African VAT with the structure of a good VAT (again, meaning an increase in the economy, neutrality, efficiency and a decrease in the complexity and evasion of the VAT). It should also be kept in mind that the greater the selection of basic foodstuffs included in the tax base, the better the South African VAT will be aligned with the structure of a good VAT.

The first change in policy considered under this second option is standard rating fruit and dairy with a portion of the additional revenue allocated towards an increase in social grants. This change in policy will provide revenue in a more progressive manner than a rate increase and will result in a less regressive VAT than currently administered. Moreover, the change in policy will be progressive (meaning that these households are estimated to be better off than under the VAT currently levied and administered) for approximately the bottom 15 percent of income households (refer to Figure 34 in Chapter 6). This change in policy also has the potential benefit over the increase in the VAT rate of not negatively impacting upon households with older adults and younger children, given that households with these characteristics can likely less afford the increase in VAT.

It is further important to note that in the case that government fails to increase social grants after this change in policy, the additional revenue obtained will not be obtained in a much more regressive manner than a one percent increase in the VAT rate. Therefore, if the South African Government has as its objective an increase in revenue, together with improving upon the economy, neutrality, efficiency and equity of the VAT and decreasing complexity and evasion under the VAT, this change in policy offers promising results.

A negative aspect of this change in policy however, is that only standard rating fruit and not vegetables may provide a compliance and administrative challenge, since it may in some instances prove difficult to differentiate between items belonging to these commodity groups. If the standard rating is extended to include vegetables

and fish (which only include canned pilchards) with a portion of the additional revenue allocated towards an increase in social grants, this would most likely be a more efficient policy change.

Although standard rating fruit, dairy, vegetables and fish (with a portion of additional revenue allocated towards an increase in social grants) will provide for more additional revenue than only standard rating fruit and dairy (with a portion of the additional revenue allocated towards an increase in social grants), this additional revenue is provided in a more regressive manner. The additional revenue is also provided in a more regressive manner than an increase in the standard rate. This change in policy will however not have a greater negative impact upon households with less education, older adults and younger children (that a standard rate increase will have), who likely have lower ability to pay the increase in VAT payable.

In the case where all foodstuffs that are currently zero-rated are standard-rated with a proportion of the additional revenue allocated towards increasing social grants, the VAT will be even better aligned with the structure of a good VAT (compared to the previous policy changes discussed). The VAT will be more economical, efficient (without a need to distinguish between zero-rated and standard rated foodstuffs), neutral, more difficult to evade and less complex. The amount of revenue collected from households by standard rating all foodstuffs (with a proportional increase in social grants) is estimated to be close to the revenue collected from households for a one percent increase in the VAT rate. Moreover, households with older adults and younger children, that are likely to have less ability to pay, will not be more severely affected by the change in policy.

This said, additional revenue is obtained in a strongly regressive manner. The additional revenue allocated towards an increase in social grants does not make a great difference to the regressive coefficient for this change in policy. Although this change in policy holds many benefits by better aligning the VAT with the structure of a good VAT, it appears that the manner in which additional revenue is collected will be inequitable. It should however be constantly kept in mind that the South African tax and transfer system is highly progressive.

7.1.2 Summary of findings for policy changes listed in Table 62

The three policy changes without the objective of increasing revenue, but rather addressing the burden distribution of the VAT and better aligning the VAT with the structure of a good VAT, all provide for a more progressive VAT than the VAT currently administered (refer to Table 62).

There is not much difference between the types of households that will be affected by the change in policy, with the only difference being the years of education variable not being significant when only standard rating fruit and dairy, and with all additional revenue allocated towards an increase in social grants. The main differentiating factors between these three policy changes are therefore the burden distribution after the change in policy, the burden distribution of additional revenue that will be obtained in the case where government fails to sufficiently increase social grants and importantly, the increased alignment of the VAT with the structure of a good VAT.

For standard rating fruit and dairy with all additional revenue allocated towards an increase in social grants, the VAT will be slightly more regressive than the other two policy changes in Table 62 (and less regressive than the VAT currently levied and administered). The burden distribution in the case of government failing to increase social grants will however be the least regressive. As discussed in Section 7.1.1, even a partial grant will provide revenue in a more progressive manner than an increase in the VAT rate.

The VAT will however, when only standard rating fruit and dairy, be least well aligned (compared to the other two policies in Table 62) with the structure of a good VAT. This means that the economy, neutrality, efficiency and complexity benefits will be the least (although an improvement over the VAT currently levied and administered).

If the standard rate is extended to include vegetables and fish (with all additional revenue allocated towards increasing social grants), the VAT becomes even less regressive than standard rating fruit and dairy, with all the additional VAT allocated towards an increase in social grants. This said, the VAT will be even more regressive if government fails to sufficiently increase social grants than in the case when only standard rating fruit and dairy. If government does not allocate all additional revenue towards an increase in social grants, additional revenue from standard rating fruit,

dairy, vegetables and fish could be provided in a more regressive manner than a one percent increase in the VAT rate.

The VAT will however, when standard rating fruit, dairy, vegetables and fish be better aligned with the structure of a good VAT, than only standard rating fruit and dairy. This means that the economy, neutrality, efficiency and complexity benefits of the VAT can be expected to be greater than when only standard rating fruit and dairy.

In the case where all currently zero-rated foodstuffs are standard rated with all additional revenue allocated towards an increase in social grants, the VAT will best align with the structure of a good VAT. The VAT will likely be more economic, neutral, efficient and less complex than in the case of the other two policy changes in Table 62. Evasion could also decrease most with this change in policy. The VAT will also be more progressive than the VAT currently levied and administered.

It should however be noted that extending the zero rate to include all basic foodstuffs will only provide for a VAT that is as regressive as only standard rating fruit, dairy, fish and vegetables, with all additional revenue allocated towards an increase in social grants. A larger increase in social grants is therefore required to only provide a VAT that is as regressive as in the case of a smaller increase in social grants required when standard rating fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.

Together with this, the manner in which additional revenue will be generated if government fails to sufficiently increase social grants, is estimated to be strongly regressive and more regressive than only standard rating fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.

It should be mentioned that if the South African Government were able to improve the targeting of their social grant system, its impact upon the burden distribution of the VAT could provide for a much less regressive VAT (for the policy changes that include the use of this system). When considering the percentage of social grants for households in each income decile, it can be argued that the social grant system is not ideally targeted (as was shown in Section 6.3.1.2.). It may potentially be that the individuals who receive social grants do not earn a great amount of income, but it

can be argued that the extended family system of an individual should also be considered (or better considered) when awarding social grants.[235]

7.2 Policy recommendations

For the purposes of this study an empirically relevant method was used in obtaining and describing the results of the considered policy changes (Banks *et al*., 1997). It also does not critically depend upon the homogeneity of households and, although rational preference assumptions are made for the purpose of estimating household consumer demand behaviour, the incorporation of individual household demand equations provide for heterogeneity. Based upon the research results, the policy changes and the recommendations that follow are all implementable. Therefore, with reference to the view of Diamond and Saez (2011) regarding when results can be used towards policy recommendations (refer to Section 2.1.1.1), in this section I provide policy recommendations.[236]

The policy recommendations are ordered from most recommended to least recommended in Table 64.[237] A discussion of this order follows after Table 64.

[235] The point here is that it makes little sense that an individual that is part of a high income earning household (e.g. income Decile 10) is receiving a social grant. Surely there are more needy individuals who are currently not receiving social grants.
[236] It should be kept in mind that the policy recommendations are only based upon the results of this study. The method used only provides for a partial picture of reality. The limitations that apply to this study also apply to these policy recommendations.
[237] It is important to note that these policy recommendations are not ordered according to priority, in other words which policy change should be made first. The order is rather based upon the benefits and costs/risks relating to each change in policy. If the policy recommendations were ordered according to priority, it may well be that an increase in the standard VAT rate to either 15 percent or 16 percent would have the highest priority. This is based upon the amount of additional revenue obtained from a rate increase, the current and estimated budget deficit, together with the objectives of the National Development Plan for 2030 (refer to Section 5.1).

Table 64: Ordered policy recommendations

Order	Policy recommendation
1	Apply the standard rate to fruit and dairy with all additional revenue allocated towards an increase in social grants.
2	Apply the standard rate to fruit and dairy with a proportion of the additional revenue allocated towards increasing social grants.
3	Apply the standard rate to fruit, dairy, fish and vegetables with all additional revenue allocated towards an increase in social grants.
4	Increase the standard VAT rate to 15 percent.
5	Increase the standard VAT rate to 16 percent.
6	Apply the standard rate to fruit, dairy, fish and vegetables with a proportion of the additional revenue allocated towards increasing social grants.
7	Apply the standard rate to all currently zero-rated foodstuffs with all additional revenue allocated towards an increase in social grants.
8	Apply the standard rate to all currently zero-rated foodstuffs with a proportion of the additional revenue allocated towards increasing social grants.

The key question for policy change Number 1 in Table 64 is whether the current zero rating of fruit and dairy should be preferred to standard rating fruit and dairy with all additional revenue (from this change in policy) allocated towards an increase in social grants? It should be noted that both these policies will provide for nil (or very near to nil) net revenue.[238] Therefore, from only a revenue point of view, the zero rating of fruit and dairy is equivalent to the standard rating of fruit and dairy with all additional revenue allocated towards an increase in social grants. Standard rating fruit and dairy will however better align the VAT with the structure of a good VAT. The VAT will be more economic, neutral and efficient and also less complex and prone to evasion. If government successfully allocates all additional revenue from standard rating fruit and dairy towards increasing social grants, the VAT will be less regressive than the VAT currently levied and administered.

As the objective of the current zero rate upon fruit and dairy is to address equity concerns regarding the VAT, standard rating these goods with all additional revenue allocated towards an increase in social grants should be preferred towards this objective, and is therefore recommended. A risk associated with this change in policy arises if government were not to increase social grants with all additional revenue

[238] For the standard rating of fruit and dairy with all additional revenue allocated towards an increase in social grants, R2 billion additional revenue is raised and the entire R2 billion is allocated towards an increase in social grants, providing for Rnil net revenue. The same applies for all policy changes where all additional revenue from the change in policy is allocated towards an increase in social grants.

from the change in policy Number 2 in Table 64. This provides for an approximation of the resulting change in policy.

For policy change Number 2 in Table 64 the first question is whether the current zero rating of fruit and dairy should be preferred to standard rating fruit and dairy with only a portion of the additional revenue (from standard rating fruit and dairy) allocated towards an increase in social grants? It should be noted that contrary to policy change Number 1 in Table 64, additional revenue will be obtained from policy change Number 2 in Table 64 (R1.23 billion).[239] The second question is therefore whether this additional revenue is obtained in a manner that is preferred to an increase in the VAT rate?

Similar to policy change Number 1 in Table 64, standard rating fruit and dairy will better align the VAT with the structure of a good VAT. If government were only to partially increase social grants, the VAT would remain less regressive than the VAT currently levied and administered. The additional revenue will also be obtained in a less regressive manner than a standard VAT rate increase (refer to Table 61 in this chapter). This change in policy (Number 2 in Table 64) will also be progressive for the bottom 15 percent of income earning households, meaning that these households will be in an improved financial position compared to their current position (refer to Figure 34 in Chapter 6).

In summary, for policy change Number 2 in Table 64 the VAT will be more economic, efficient, neutral and less complex and prone to evasion. Furthermore, the VAT will be more equitable than the VAT currently levied and administered. In other words, the standard rating of fruit and dairy with a portion of additional revenue allocated towards an increase in social grants should be preferred to zero rating fruit and dairy. Additional revenue will also be obtained in a less regressive manner than an increase in the VAT rate. Policy change Number 2 in Table 64 is therefore also recommended.

[239] This amount (R1.23 billion) represents the amount of additional revenue raised by standard rating fruit and dairy (R2 billion), less the amount of this additional revenue allocated towards an increase in social grants (R0.77 billion). The same calculation applies to other policy changes that allocate a portion of additional revenue towards social grants. The calculation of the portion of additional revenue going towards an increase in social grants (e.g. R0.77 billion) is discussed in Section 6.3.1.

It is further recommended that the standard rating of basic foodstuffs be extended to also include vegetables and fish, together with an increase in social grants by the full amount of additional revenue from this change in policy (Number 3 in Table 64). The key question for this change in policy is whether the zero rating of fruit, dairy, vegetables and fish should be preferred to standard rating these goods, with all additional revenue allocated towards an increase in social grants? Similar to policy change Number 1 in Table 64, it should be kept in mind that both these policy options provide for nil (or near nil) net revenue.

However, if the standard rate is applied to fruit and not to vegetables, it may result in additional efficiency costs.[240] If government were to standard rate fruit, dairy, vegetables and fish with all additional revenue allocated towards an increase in social grants, the VAT would be further aligned with the structure of a good VAT (compared to only standard rating fruit and dairy). This means that the VAT can be expected to be more economic, efficient, neutral and less complex and prone to evasion. In addition, the VAT will be less regressive than the VAT currently levied and administered, meaning that policy change Number 3 in Table 64 better addresses the equity concerns of the VAT than the current zero rating of fruit, dairy, vegetables and fish. A risk associated with this change in policy arises if government were not to increase social grants with all additional revenue as a result of this change in policy. Policy change Number 6 in Table 64 provides for an approximation of the resulting change in policy.

In the case where government only partially increases social grants (Number 6 in Table 64), R2.99 billion additional revenue will be obtained from this change in policy. This revenue will however be obtained in a more regressive manner than an increase in the VAT rate. The VAT will therefore be less equitable due to this change in policy.

It should however be considered that the revenue would not be obtained in a much more regressive manner than an increase in the VAT rate (Reg_c of 0.360 compared to 0.467). Moreover, the combined tax and transfer system is highly progressive

[240] As previously mentioned in this chapter, this is due to the potential compliance and administrative costs of differentiating between fruit and vegetables, since these goods are in some instances very similar. Although not previously mentioned, there may also be economic costs that arise if farmers were to change from farming vegetables to farming fruit, due to the different VAT treatment of these two goods.

(refer to Section 3.4). Policy change Number 6 in Table 64 will also, similarly to policy change Number 3 in Table 64, better align the VAT with the structure of a good VAT. It can therefore be expected that the VAT will be more economic, neutral and efficient and less complex and prone to evasion. Policy change Number 6 in Table 64 is therefore recommended, but to a lesser extent than policy change Number 3 in Table 64.

When considering the government's National Development Plan and the revenue requirements towards achieving the objectives of this plan (refer to Section 5.1), it is recommended, together with the previously discussed policy changes in Table 64, to increase the standard VAT rate to either 15 percent or 16 percent (Numbers 4 and 5 in Table 64).[241]

As discussed in the background to this study (Section 1.1), the narrow personal income tax base and disincentives associated with increasing corporate income tax rates provide a challenge towards additional revenue from these taxes. Increasing the VAT rate may therefore be necessary towards obtaining revenue to achieve the objectives of the National Development Plan. A one percent increase in the VAT rate is estimated to provide R15.29 billion in additional revenue per year. A two percent increase is estimated to provide R31.82 billion in additional revenue per year.

The additional revenue from an increase in the standard VAT rate will however be raised in an arguably inequitable manner. Furthermore, the additional VAT will be raised in a more regressive manner than policy change Number 2 in Table 64. The benefits associated with better aligning the VAT with the structure of a good VAT (as is the case for all other policy changes) are therefore not achieved if only the rate is increased. As discussed in Section 3.4, the South African VAT is regressive when measured against income or consumption and households with less income or consumption will contribute proportionally more towards additional revenue. In addition, households with characteristics that likely indicate a lower ability to pay (refer to Section 7.1) will be impacted to a greater extent by this increase, than households with less of these characteristics. When considering the level of income

[241] Whether an increase to 15 percent or 16 percent is recommended will depend upon the revenue requirements of the National Development Plan. There are currently no clear indications of the yearly amount of additional revenue that will be required. When considering the expected budget deficit (refer to Section 5.1), it may well be required that the VAT rate be increased to 16 percent. It should be noted though that the full macroeconomic impact of such an increase in the VAT rate has not been investigated in this study.

inequality, additional tax revenues obtained in a more regressive manner may therefore not be recommended.

The counter argument is that the combined tax and transfer system is highly progressive. The equity of the VAT should ideally not be viewed in isolation, but rather the equity of the entire tax and transfer system should be considered (refer to Section 2.2.3.6). Of the three South African taxes that make the largest contribution to revenue,[242] the VAT is the only tax that also taxes (at least from a legal perspective) the informal sector. When viewed in isolation, the transfer system is also highly progressive. This transfer system, together with the objectives of the National Development Plan, could therefore likely see that the additional revenue from a rate increase provides for improved benefits to poorer households. For these reasons an increase in the standard VAT rate is recommended and should be a priority when considering the required additional revenue for the South African fiscus (refer to Section 5.1).

Standard rating all foodstuffs with all additional revenue allocated towards an increase in social grants (Number 7 in Table 64) is recommended to a lesser extent than the previously discussed policy changes. The benefit associated with this change in policy is that it will better align the VAT with the structure of a good VAT. Therefore, if all currently zero-rated foodstuffs were standard-rated, the VAT would be more economic, efficient, neutral and less complex and prone to evasion. If government contributed all additional revenue towards an increase in social grants, the VAT would be less regressive than the VAT currently levied and administered.

The VAT will however when standard rating all foodstuffs with all additional revenue allocated towards an increase in social grants (Number 7 in Table 64), be as regressive as policy change Number 3 in Table 64. Therefore, extending the standard rate of basic foodstuffs to also include breads, grains, oil and legumes (in addition to fruit, dairy, vegetables and fish) with all additional revenue being contributed to an increase in social grants, requires a larger amount of social grants to compensate for the increase in regressivity, but does not provide any equity benefit for this increase in social grants.[243] A comparison of the results of policy

[242] These are the personal income tax, the corporate income tax and the VAT.
[243] The argument here is that for both policy change Number 3 and Number 7 in Table 64, all additional revenue from a change in policy is contributed towards social grants (refer to the results in

change Number 7 and Number 3 in Table 64 (refer to Table 61 in this chapter), shows that from an equity and revenue perspective, the zero rating of breads, grains, oil and legumes is equivalent to the standard rating of breads, grains, oil and legumes, with all additional revenue allocated towards an increase in social grants.

There is also a potential cost that arises if government does not allocate all additional revenue from standard rating these goods towards increasing social grants. This potential cost is approximated by policy change Number 8 in Table 64.

In the case where all foodstuffs are standard-rated, but government only partially increases social grants (Number 8 in Table 64), additional revenue of R6.08 billion will be raised, but in a highly regressive manner (refer to Section 6.3.3). Additional revenue will also be raised in a more regressive manner than would be the case when there is only an increase in the VAT rate (Reg_c of 0.179 compared to 0.467) or any of the other policy changes in Table 64. When considering the current level of income inequality in South Africa, additional revenue in such a regressive manner provides a challenge. It will also likely not be politically acceptable to obtain additional revenue in such a regressive manner.

It may therefore be that the potential cost associated with collecting revenue in such a regressive manner may exceed the benefits associated with better aligning the VAT with the structure of a good VAT. It should be made clear that this is likely only the case for standard rating breads, grains, oil and legumes and not the other zero-rated basic foodstuffs. Zero rating breads, grains, oil and legumes could therefore perhaps be preferred to standard rating these foodstuffs with the additional revenue allocated towards an increase in social grants (Number 7 and 8 in Table 64).

The recommended policy changes in this section can be summarised as follows: Fruit, dairy, vegetables and fish should be standard-rated and as much as possible of the additional revenue collected (R4.05 billion) allocated towards increasing social grants.[244] In addition, the standard rate should be increased to provide for additional

---

Chapter 6). For policy change Number 3, the total revenue allocated to social grants is R4.05 billion. For policy change Number 7, the total revenue allocated to social grants is R8.62 billion. Despite social grants being increased by more than double the amount, policy change Number 7 does not provide for a more equitable VAT. The difference between these two changes in policy is the addition of standard rating bread, grains, oil and legumes.

[244] It should be noted that policy change Number 3 in Table 64 is recommended here, but it is taken into account that it may not be possible and is perhaps unlikely that all additional revenue from standard rating fruit, dairy, vegetables and fish will be allocated towards an increase in social grants.

revenue to contribute towards achieving the objectives of the National Development Plan.[245] Furthermore, the current zero rate on breads, grains, oil and legumes should be retained.[246]

If South Africa were to adopt these recommended policy changes, it would provide for a VAT that is more economic, neutral, efficient, equitable and less complex and prone to evasion. The VAT would contribute a large amount of additional revenue that could contribute towards achieving the objectives of the National Development Plan. The risk and potential costs associated with not allocating all additional revenue from standard rating the selection of recommended basic foodstuffs to social grants would be minimised.

7.3 Summary of the contributions of the study

This study makes a number of contributions. The structure of a good VAT which is based upon the underlying form of taxation and studies by experts in the field is outlined in Chapter 2. This structure could be useful for countries beside South Africa in determining potential improvements to their VAT structures and understanding why the improvements would be beneficial. Empirical results for some countries are also included indicating that the adjustment of VAT policies could be made less burdensome.

In Chapter 3 the extent that the South African VAT is aligned with a good VAT is outlined. From this I also show and discuss where the South African VAT does not align with the structure of a good VAT. This should provide for an understanding of the structure of the South African VAT. It is further shown that the South African VAT is regressive when measured against both income and consumption. I further investigate which type of zero ratings and exemptions are contributing to the regressivity of the VAT, when measured against consumption. This has not been done before in a South African context and provides a unique understanding of these zero ratings and exemptions.

It should further be noted that in recommending policy change Number 3, policy change Number 1 and 2 are also recommended and policy change Number 6 is included (in the case where all additional revenue is not successfully allocated towards increasing social grants).

[245] Policy change Number 4 or 5 in Table 64 (depending upon the revenue requirements of the South African fiscus) is recommended here.

[246] It is recommended here that policy changes Number 7 and 8 in Table 64 should not be implemented.

In Chapter 4 I provide the estimation results for two consumer demand systems. This is the first study of its kind for South Africa that allows for a two-stage budgeting process by estimating a complete demand system and a food demand system. Furthermore, the study provides results upon South African consumer demand based upon actual prices. The number of statistically significant results exceeds that in previous studies that incorporate similar demand system structures for a food demand system. The model developed, SAVATMOD, can also be used to estimate future VAT policy changes for South Africa.

The main results of this study are found in Chapters 5 and 6. Although similar studies have been conducted regarding a change in the VAT rate, no study could be found that empirically considers the policy changes in Chapter 6 for any country's VAT with a similar methodology. These results should inform South African policy makers and could also be insightful for other institutions and the academic community. For South Africa, these results allowed for insights and policy recommendations into how the South African VAT can be better aligned with the structure of a good VAT and additional revenue can be obtained that may be required towards South Africa's long terms objectives.

7.4 Future research

The study highlights a number of areas of future research. Firstly, South Africa could benefit from an empirical estimation of the optimal threshold. Such an estimation will require data upon the compliance and administrative costs of VAT in South Africa. Although some data regarding administrative costs can be obtained from publications and possibly data received from SARS, there appears to be no current data upon the compliance costs of the South African VAT. The level of the voluntary threshold is also of interest, especially the treatment of vendors with taxable supplies below the voluntary threshold.

Secondly, for the purposes of this study, it was assumed that the economic incidence of the VAT falls upon the consumer in the case of standard-rated supplies, and upon the vendor in the case of exempt supplies. As previously mentioned, this is unlikely to be the case. It may therefore prove useful to determine the price elasticities of supply that could, combined with the estimated price elasticities of demand provided in this study, provide an indication of the economic incidence of

VAT in South Africa. Other methods in determining the shift of VAT incidence, perhaps by means of an experimental approach, could provide useful results (especially when compared to the archival results). This work could also be combined with VAT base estimations from input-output matrices in order to address economic impacts in sectors that make exempt supplies.

Thirdly, SAVATMOD (the structural model used in this study) could be improved upon by incorporating labour elasticities and long term variables of consumer demand. Currently, the model is limited to the purpose it served for this study, but as no such model for South Africa exists (besides SAVATMOD), further work may provide for a well-functioning, long term behavioural model.

Fourthly, from the literature it seems as if researchers in the field of optimal taxation theory have given little thought to consumption taxes. There are therefore many opportunities for further research when considering the optimal theory of the VAT.

Lastly, a study that provides in-depth consideration of the South African social grant system could be greatly beneficial in increasing the targeting of this system. This study could, for example, consider the requirements of receiving social grants, which individuals (from what type of households) are receiving social grants and whether the objectives of this system are met by the current processes in awarding social grants.

ANNEXURE 1: PRICES USED IN ESTIMATING A COMPLETE DEMAND SYSTEM

Western Cape

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	34.29	195.94	1919.52	1575.26	62.17	858.40	207.02	674.99
Sep-10	34.31	199.62	1924.50	1565.36	62.45	851.83	208.53	671.51
Oct-10	33.87	194.88	1924.53	1565.96	62.24	855.18	210.06	671.45
Nov-10	33.91	198.77	1924.60	1559.75	62.52	856.44	209.96	671.63
Dec-10	33.76	199.94	1951.25	1566.16	62.59	853.96	210.36	669.97
Jan-11	33.89	198.96	1951.01	1569.19	62.52	858.13	209.88	672.27
Feb-11	34.26	198.26	1951.39	1578.32	64.95	857.84	210.26	707.63
Mar-11	35.53	197.86	1984.06	1582.56	65.15	866.21	214.35	708.85
Apr-11	35.56	194.46	1984.10	1590.19	65.22	876.16	214.61	709.33
May-11	35.37	211.39	1984.38	1600.63	65.50	891.12	215.34	710.15
Jun-11	35.46	206.21	2013.12	1607.99	65.57	902.36	216.36	710.85
Jul-11	35.38	204.11	2062.28	1623.94	66.06	907.94	217.24	715.38
Aug-11	35.77	213.46	2116.10	1657.20	66.48	917.15	218.51	719.82

Eastern Cape

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	31.72	153.07	1028.35	1644.63	29.99	676.26	127.48	518.32
Sep-10	31.98	154.83	1045.33	1619.53	30.02	669.77	127.75	518.36
Oct-10	32.23	153.88	1045.25	1634.87	30.02	673.20	128.07	518.41
Nov-10	32.26	156.41	1045.26	1633.40	30.09	675.59	128.12	518.36
Dec-10	31.91	160.17	1049.80	1646.26	30.12	675.65	128.04	518.41
Jan-11	32.25	168.56	1050.34	1636.59	30.15	680.76	128.40	519.10
Feb-11	32.13	159.48	1050.65	1598.39	31.36	682.84	128.37	545.74
Mar-11	33.30	156.06	1076.93	1608.48	31.49	693.39	131.12	546.17
Apr-11	33.33	164.17	1077.47	1641.44	31.59	705.40	131.74	546.29
May-11	33.35	168.35	1078.08	1683.07	31.59	706.08	132.64	546.63
Jun-11	33.43	160.78	1086.75	1691.67	31.49	708.23	133.36	546.67
Jul-11	33.50	166.82	1096.59	1680.49	31.52	700.86	133.89	549.40
Aug-11	33.85	153.81	1097.87	1715.25	31.52	703.53	133.57	549.43

Northern Cape

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	32.58	141.35	980.47	1514.84	40.11	873.03	125.35	597.32
Sep-10	32.63	151.72	988.40	1458.92	40.11	833.86	125.65	597.49
Oct-10	33.10	137.77	988.37	1516.33	40.24	836.08	125.51	597.67
Nov-10	32.82	145.54	988.75	1542.96	40.20	837.96	125.98	597.65
Dec-10	32.59	127.98	995.23	1533.30	40.20	830.38	125.67	597.06
Jan-11	33.31	137.78	995.65	1608.07	40.20	834.19	126.46	599.05
Feb-11	33.27	134.86	996.17	1594.87	41.97	838.72	126.39	625.88
Mar-11	33.92	141.82	1016.62	1552.88	42.10	844.63	127.63	626.47
Apr-11	34.34	145.37	1017.25	1597.76	42.15	854.79	128.35	626.91
May-11	33.56	136.24	1017.14	1667.68	42.01	855.37	128.68	627.07
Jun-11	34.14	151.87	1028.02	1698.06	42.10	850.20	128.54	627.05
Jul-11	34.46	149.36	1042.95	1684.52	42.10	843.64	128.79	626.96
Aug-11	34.84	145.49	1047.97	1697.74	42.10	844.90	129.58	626.86

Free State

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	31.15	148.81	733.09	1507.46	23.23	640.09	154.65	479.63
Sep-10	31.37	139.37	756.45	1548.94	23.28	635.52	154.94	479.64
Oct-10	31.48	144.38	756.46	1518.73	23.34	639.16	154.95	479.81
Nov-10	31.48	144.92	756.46	1557.62	23.44	638.07	155.58	479.78
Dec-10	31.26	149.01	761.38	1567.88	23.47	640.01	155.52	479.71
Jan-11	31.79	147.18	761.92	1573.16	23.49	644.95	155.79	482.01
Feb-11	31.44	149.22	762.42	1590.54	24.37	648.30	156.35	508.18
Mar-11	32.67	150.38	772.16	1570.44	24.45	654.39	157.75	508.48
Apr-11	33.02	152.22	772.53	1563.95	24.45	668.58	160.43	508.60
May-11	33.10	150.92	772.51	1564.26	24.48	670.87	162.05	508.83
Jun-11	33.37	155.01	778.11	1577.96	24.45	666.29	161.83	508.65
Jul-11	33.47	153.81	788.57	1581.00	24.45	661.67	162.79	512.96
Aug-11	33.79	149.51	788.97	1545.23	24.50	664.37	162.77	512.97

KwaZulu-Natal

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	32.99	143.40	1066.58	1838.11	28.97	927.95	157.25	747.19
Sep-10	32.88	140.65	1065.83	1870.92	28.97	921.81	157.88	747.18
Oct-10	32.78	140.93	1065.75	1867.94	28.90	928.41	159.02	747.16
Nov-10	32.86	139.03	1065.98	1873.93	29.00	927.33	158.46	747.26
Dec-10	32.90	142.01	1071.50	1911.59	29.03	928.65	158.13	747.18
Jan-11	33.23	147.27	1071.70	1889.76	29.06	932.90	157.44	749.77
Feb-11	33.38	147.67	1071.70	1901.33	30.35	939.27	157.70	785.93
Mar-11	34.21	149.95	1082.99	1917.53	30.42	952.86	159.92	786.11
Apr-11	34.29	148.57	1083.14	1945.32	30.45	965.56	160.55	786.17
May-11	34.29	156.06	1083.30	1944.16	30.51	969.50	161.31	786.46
Jun-11	34.49	157.80	1093.37	1945.17	30.42	966.18	160.62	786.46
Jul-11	34.73	155.42	1111.02	1955.12	30.48	959.00	161.37	789.75
Aug-11	34.68	164.54	1111.90	1998.80	30.45	962.54	161.16	789.84

North West

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	33.66	144.63	1563.82	1925.86	49.25	954.05	200.17	681.82
Sep-10	33.61	143.92	1585.73	1907.77	49.31	946.62	200.44	678.19
Oct-10	34.00	146.04	1585.73	1986.76	49.31	951.08	201.66	678.38
Nov-10	34.14	144.59	1585.83	1934.94	49.42	948.36	202.28	678.52
Dec-10	33.83	149.68	1596.76	1934.40	49.42	948.15	202.38	678.42
Jan-11	34.54	147.71	1596.94	2008.92	49.47	953.73	203.06	676.01
Feb-11	34.70	149.60	1596.98	1941.94	51.73	958.45	202.29	701.53
Mar-11	35.48	147.49	1605.35	1989.75	51.84	969.52	205.46	703.39
Apr-11	35.28	151.68	1605.56	1906.73	51.84	982.76	205.64	703.42
May-11	34.93	146.11	1605.73	1963.15	51.90	987.42	206.68	703.72
Jun-11	35.12	143.91	1633.18	1981.71	51.73	984.30	206.88	703.66
Jul-11	35.72	150.15	1649.98	1975.11	51.90	976.97	206.48	707.83
Aug-11	35.41	149.95	1650.09	2001.06	51.90	979.38	206.29	707.86

Gauteng

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	32.64	174.63	1563.82	2015.66	49.25	954.05	196.42	681.82
Sep-10	32.64	178.63	1585.73	2076.99	49.31	946.62	196.75	678.19
Oct-10	32.56	179.59	1585.73	2045.72	49.31	951.08	196.87	678.38
Nov-10	32.55	177.26	1585.83	2071.34	49.42	948.36	197.84	678.52
Dec-10	32.54	180.32	1596.76	2058.47	49.42	948.15	197.93	678.42
Jan-11	32.90	177.52	1596.94	2065.89	49.47	953.73	198.74	676.01
Feb-11	33.01	181.55	1596.98	2107.92	51.73	958.45	198.12	701.53
Mar-11	34.19	187.38	1605.35	2106.70	51.84	969.52	200.76	703.39
Apr-11	34.43	183.09	1605.56	2115.45	51.84	982.76	200.84	703.42
May-11	34.65	186.94	1605.73	2137.04	51.90	987.42	202.18	703.72
Jun-11	34.80	188.68	1633.18	2140.88	51.73	984.30	202.37	703.66
Jul-11	34.74	192.09	1649.98	2140.60	51.90	976.97	201.65	707.83
Aug-11	34.68	190.75	1650.09	2158.59	51.90	979.38	201.23	707.86

Mpumalanga

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	32.77	159.21	876.00	1673.83	34.43	717.42	143.04	579.00
Sep-10	32.74	160.19	884.49	1709.57	34.47	714.10	143.00	579.15
Oct-10	32.85	163.87	884.53	1710.98	34.43	720.19	142.71	579.31
Nov-10	32.56	163.54	884.43	1730.64	34.47	723.41	143.09	579.26
Dec-10	32.37	168.38	889.99	1728.41	34.43	724.22	142.77	579.35
Jan-11	32.86	163.35	889.43	1757.82	34.51	728.38	144.82	582.76
Feb-11	32.97	163.18	889.38	1738.40	36.04	730.86	143.94	615.32
Mar-11	34.19	159.38	901.43	1743.27	36.04	742.08	144.61	615.46
Apr-11	34.05	162.98	902.41	1718.42	36.04	755.65	145.78	615.65
May-11	34.31	161.93	902.31	1761.63	36.08	759.31	146.42	615.81
Jun-11	34.11	167.50	916.47	1757.25	36.04	758.08	146.45	615.82
Jul-11	34.57	163.68	930.59	1823.05	36.04	749.16	145.86	620.00
Aug-11	34.10	166.98	930.64	1829.58	36.04	751.39	146.34	620.22

Limpopo

Date	Nutritional goods	Clothing and footwear	Housing and utilities	Household contents and equipment	Health	Transport and Communication	Recreation	Other goods and services
Aug-10	32.15	161.74	690.34	1470.95	31.29	658.47	134.60	367.40
Sep-10	32.00	147.27	702.15	1480.97	31.05	652.58	133.76	367.30
Oct-10	32.41	142.47	702.50	1577.85	31.15	657.17	133.97	366.94
Nov-10	32.26	142.02	702.55	1575.37	30.77	660.30	134.02	366.84
Dec-10	32.52	148.56	704.74	1584.96	30.67	662.60	134.72	366.82
Jan-11	33.38	159.14	705.81	1592.33	30.68	666.86	134.89	367.09
Feb-11	32.46	163.14	705.83	1559.83	31.65	674.59	134.80	388.42
Mar-11	33.50	164.15	713.66	1574.08	31.66	686.61	135.67	388.96
Apr-11	34.07	162.78	713.70	1563.13	31.51	699.05	135.86	388.83
May-11	34.40	165.86	713.23	1584.67	31.66	700.84	136.01	388.97
Jun-11	34.51	148.24	722.26	1539.43	31.69	698.81	136.58	388.91
Jul-11	34.45	161.38	724.15	1598.33	31.69	692.97	136.35	389.61
Aug-11	34.65	164.27	726.11	1565.42	31.47	696.39	137.13	389.72

ANNEXURE 2: PRICES USED IN ESTIMATING THE NUTRITIONAL GOODS DEMAND SYSTEM

Western Cape

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.83	48.07	13.61	16.12	14.16
Sep-10	12.58	47.75	13.34	16.45	14.06
Oct-10	13.07	49.02	13.61	16.10	13.89
Nov-10	13.10	49.37	13.52	16.10	14.15
Dec-10	13.00	49.79	12.97	15.19	14.08
Jan-11	13.16	50.25	13.34	15.73	14.43
Feb-11	13.11	51.93	13.55	15.09	14.99
Mar-11	13.18	52.57	13.74	15.96	15.19
Apr-11	13.32	52.57	13.55	16.04	15.13
May-11	13.81	51.01	14.03	16.01	15.37
Jun-11	13.79	51.29	13.93	16.19	15.44
Jul-11	13.66	52.01	14.06	15.69	15.48
Aug-11	13.64	53.80	14.10	16.70	15.36

Eastern Cape

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.00	45.82	14.14	16.04	14.17
Sep-10	12.03	46.12	14.37	16.36	14.17
Oct-10	12.17	46.43	14.27	16.20	14.15
Nov-10	12.46	46.85	14.04	15.65	14.18
Dec-10	12.36	46.79	13.79	16.24	14.03
Jan-11	12.42	48.06	14.07	16.29	14.48
Feb-11	12.33	48.05	14.19	15.27	14.98
Mar-11	12.47	48.81	14.37	15.10	15.27
Apr-11	12.43	48.56	14.10	14.98	15.40
May-11	13.13	48.43	14.22	15.29	15.12
Jun-11	13.05	48.81	14.15	15.60	15.20
Jul-11	13.15	49.05	14.17	15.62	15.34
Aug-11	13.17	49.45	14.42	16.07	15.25

Northern Cape

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	11.80	44.70	14.49	15.87	13.11
Sep-10	12.43	44.34	14.18	15.90	13.27
Oct-10	12.52	43.98	14.21	15.82	13.58
Nov-10	12.48	44.70	14.00	15.71	13.69
Dec-10	12.05	44.58	13.19	15.55	13.57
Jan-11	12.76	47.35	13.89	15.70	13.90
Feb-11	12.28	47.24	14.02	15.60	14.37
Mar-11	10.52	48.13	14.21	15.35	14.28
Apr-11	12.77	47.48	14.32	15.34	14.56
May-11	9.05	46.93	14.48	13.72	14.41
Jun-11	13.16	46.54	14.70	13.81	14.49
Jul-11	13.48	47.05	14.94	15.29	14.73
Aug-11	13.45	47.45	14.81	15.98	14.90

Free State

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.97	44.19	14.47	15.95	13.50
Sep-10	13.32	44.36	14.33	16.28	13.54
Oct-10	13.41	44.97	14.11	16.59	13.74
Nov-10	13.56	44.97	13.70	15.61	13.98
Dec-10	13.43	44.46	13.58	15.65	13.64
Jan-11	13.68	45.88	14.26	16.72	14.37
Feb-11	13.49	45.17	13.82	15.67	14.62
Mar-11	13.65	47.57	14.05	14.31	15.03
Apr-11	13.71	47.68	14.20	16.11	15.09
May-11	13.98	47.01	14.26	16.04	15.07
Jun-11	14.03	48.89	14.46	15.07	15.07
Jul-11	14.44	49.49	14.51	16.81	15.29
Aug-11	13.89	51.04	14.49	17.09	15.17

KwaZulu-Natal

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.93	44.60	14.39	16.49	13.97
Sep-10	12.97	44.21	14.29	16.41	13.86
Oct-10	13.21	44.17	14.45	16.18	13.90
Nov-10	13.55	44.10	14.33	16.17	13.99
Dec-10	13.48	44.46	14.17	15.42	13.98
Jan-11	13.68	45.72	14.19	15.49	14.36
Feb-11	13.75	45.77	14.20	15.50	14.60
Mar-11	13.85	46.34	14.43	15.24	14.91
Apr-11	13.99	46.20	14.51	15.50	15.05
May-11	14.13	46.43	14.47	15.88	15.22
Jun-11	14.27	46.73	14.77	16.13	15.27
Jul-11	14.42	47.18	14.88	15.69	15.30
Aug-11	14.36	47.70	14.91	16.38	15.49

North West

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.76	46.77	14.31	17.02	13.45
Sep-10	12.90	46.82	14.38	17.30	13.71
Oct-10	12.96	48.49	14.22	17.25	13.79
Nov-10	13.13	48.72	13.92	16.97	13.83
Dec-10	12.93	47.32	13.97	16.18	13.89
Jan-11	13.02	49.24	14.05	16.14	13.97
Feb-11	13.01	49.85	14.01	16.39	14.68
Mar-11	13.01	50.38	14.22	16.17	14.69
Apr-11	12.96	49.40	14.27	16.22	14.97
May-11	13.35	47.31	14.40	16.75	15.19
Jun-11	13.48	50.33	14.57	16.65	14.69
Jul-11	13.67	50.20	14.71	17.04	14.69
Aug-11	13.60	50.07	14.80	17.54	15.03

Gauteng

Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	13.70	46.72	14.83	17.40	13.91
Sep-10	13.64	46.51	14.50	17.37	13.89
Oct-10	13.65	46.39	14.31	18.02	13.79
Nov-10	13.92	46.44	14.13	16.99	14.00
Dec-10	14.07	46.67	13.96	16.67	13.81
Jan-11	14.07	47.87	14.26	17.03	14.52
Feb-11	13.91	48.32	14.37	16.89	14.75
Mar-11	13.96	48.70	14.74	16.86	15.11
Apr-11	13.91	49.68	14.42	16.53	15.09
May-11	14.57	49.80	14.59	18.09	15.29
Jun-11	14.64	50.77	14.80	17.14	15.36
Jul-11	14.65	49.94	14.82	17.22	15.29
Aug-11	14.56	49.31	14.93	17.40	15.30

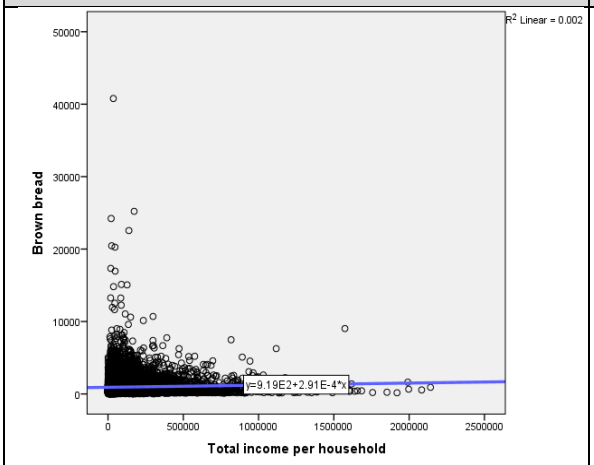
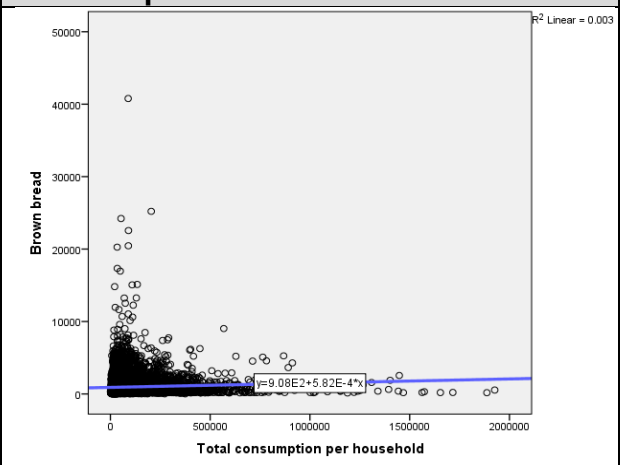
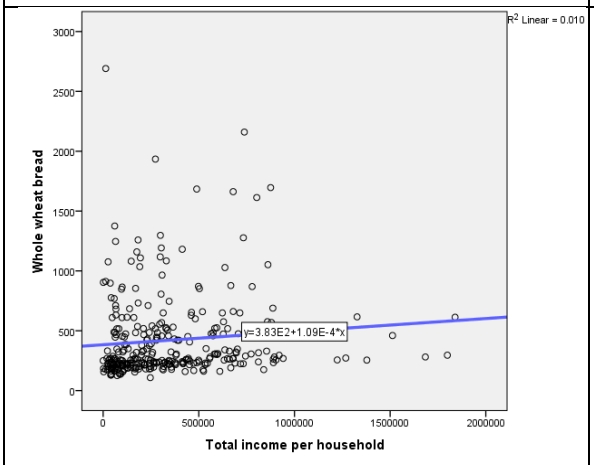
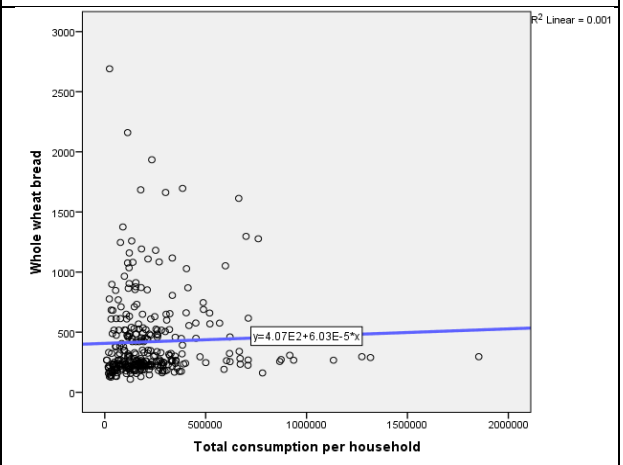
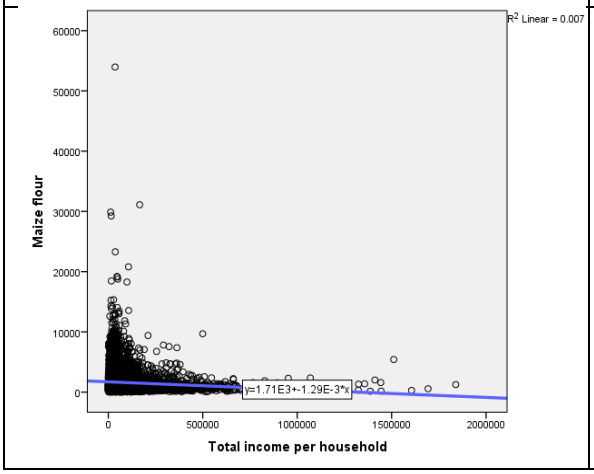
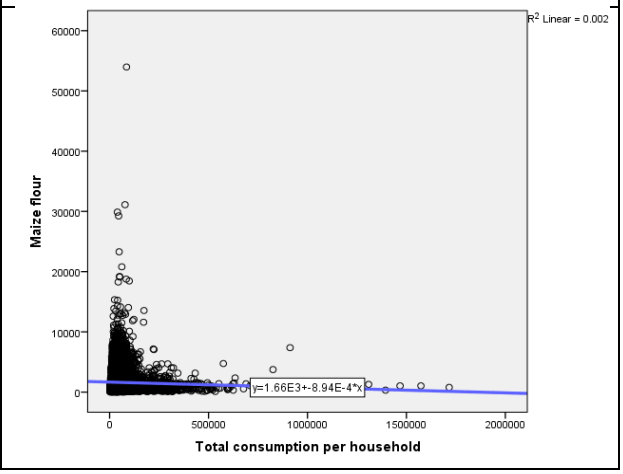
Mpumalanga

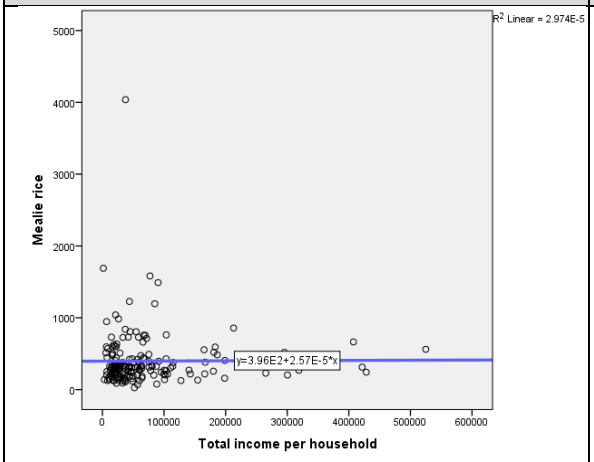
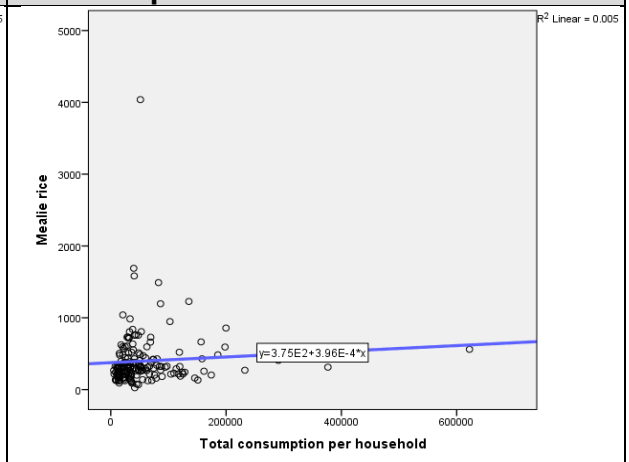
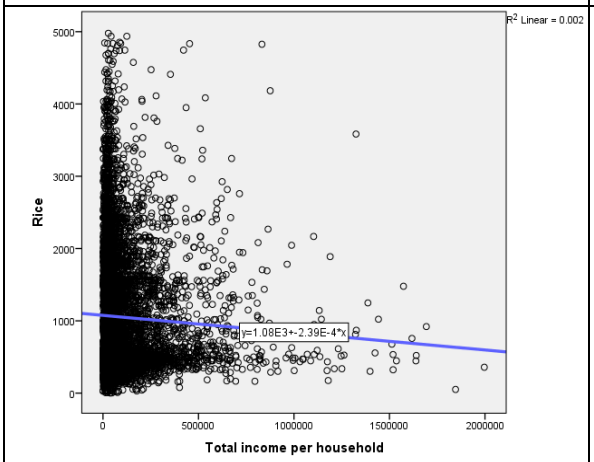
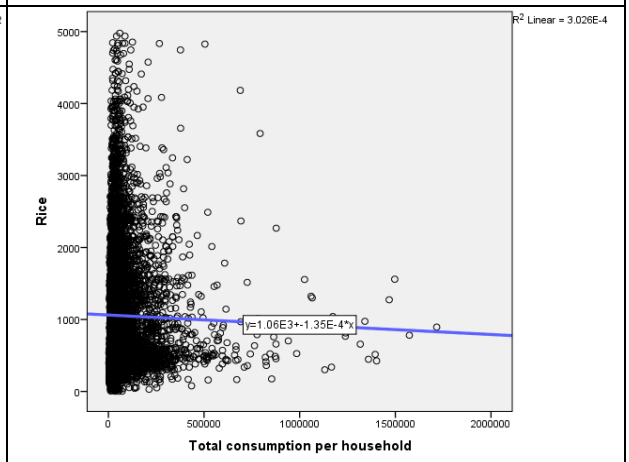
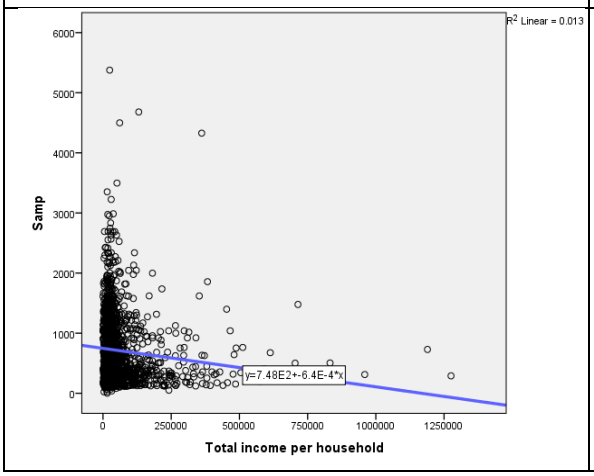
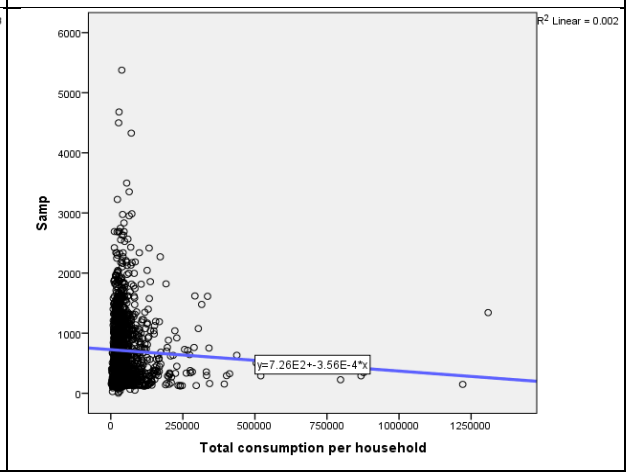
Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.19	47.78	15.09	17.70	14.21
Sep-10	12.55	47.49	14.85	17.05	14.34
Oct-10	12.82	47.68	14.68	17.10	14.25
Nov-10	12.96	46.32	14.32	16.56	14.31
Dec-10	12.94	46.31	14.18	15.89	14.05
Jan-11	12.84	48.21	14.62	16.43	14.74
Feb-11	12.79	48.62	14.45	16.23	15.13
Mar-11	12.69	49.83	14.58	16.35	15.52
Apr-11	12.82	49.98	14.48	16.37	15.43
May-11	13.30	50.01	15.00	16.67	15.64
Jun-11	13.24	50.03	15.01	16.75	15.71
Jul-11	13.40	51.62	15.29	17.10	15.64
Aug-11	13.10	50.65	15.35	17.21	15.79

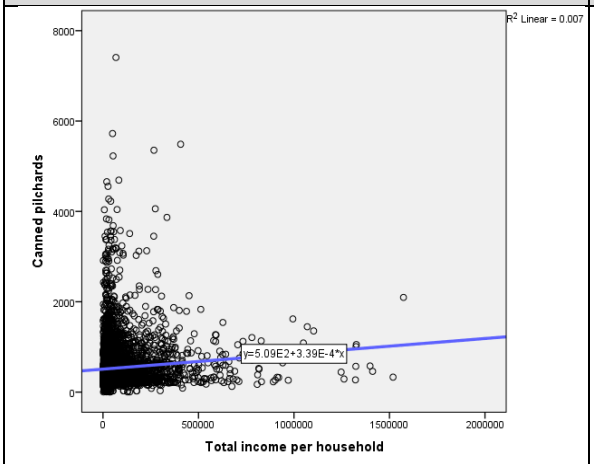
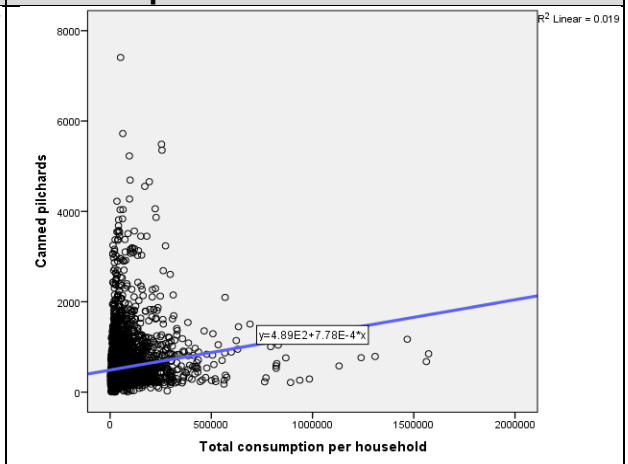
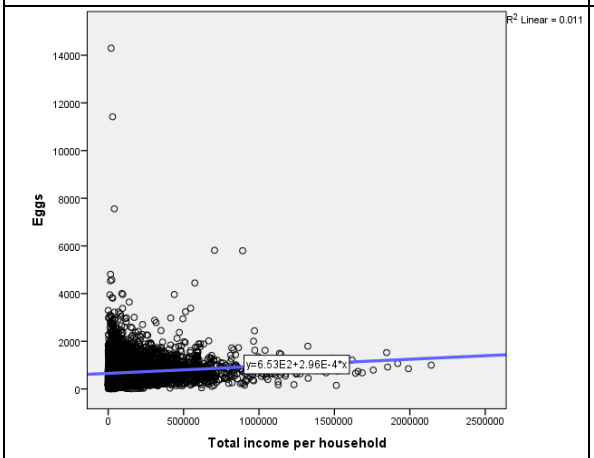
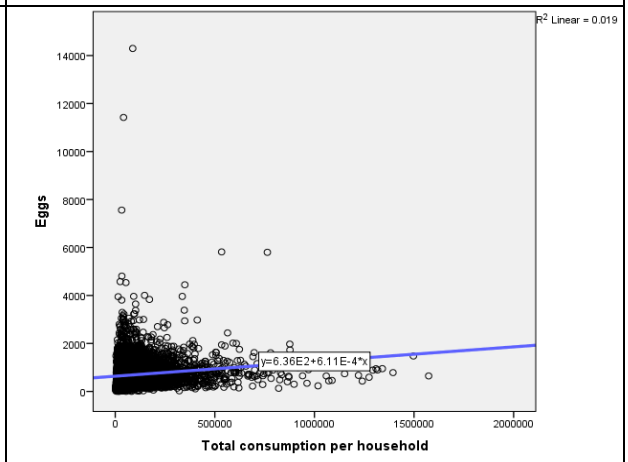
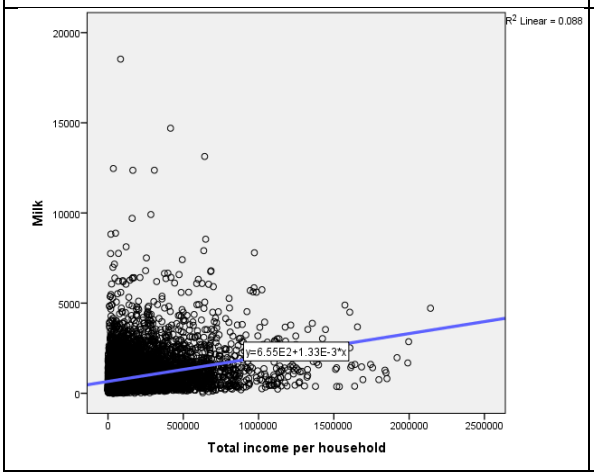
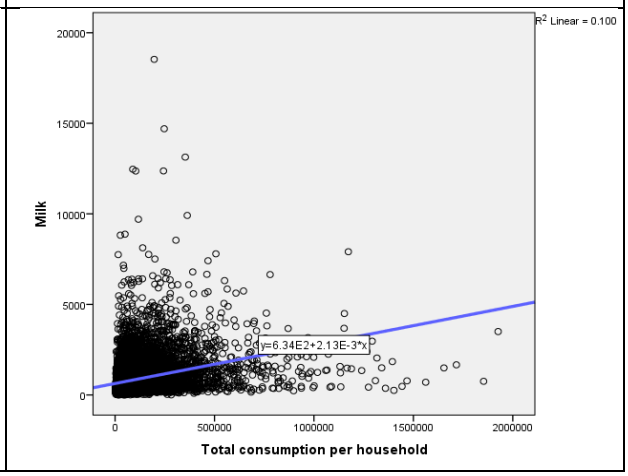
Limpopo

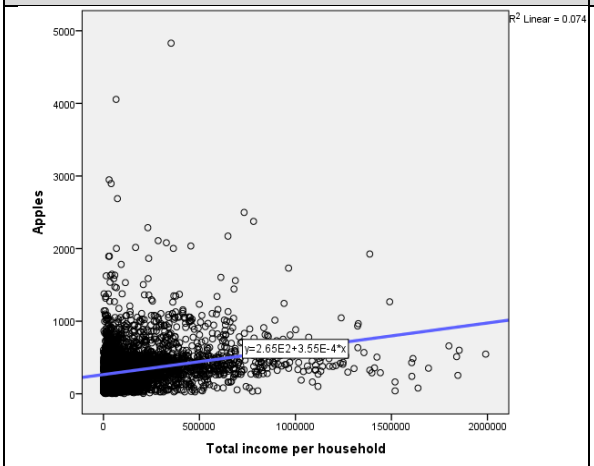
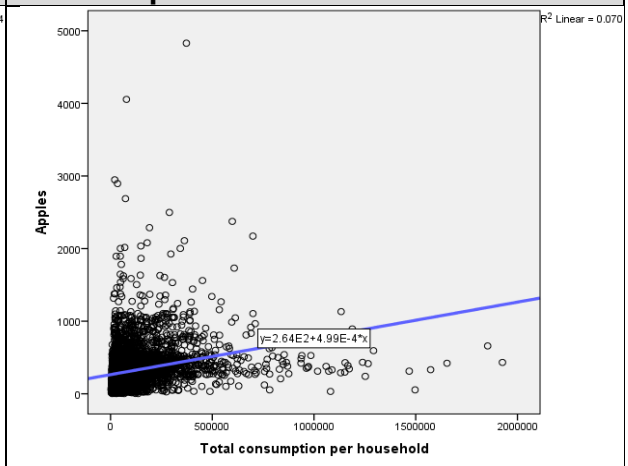
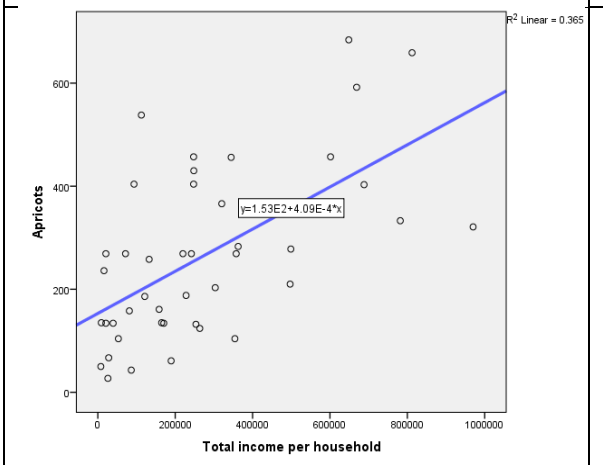
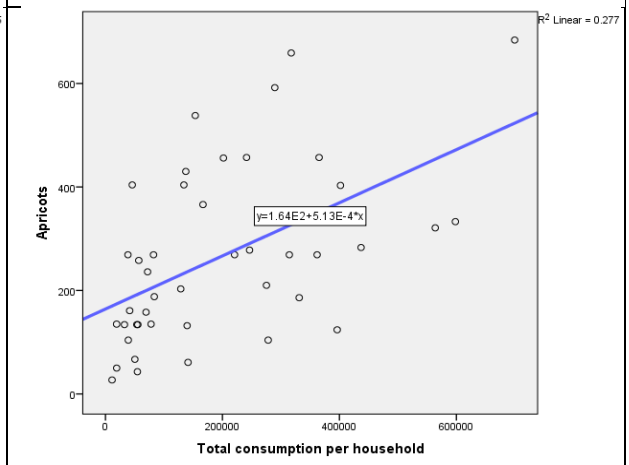
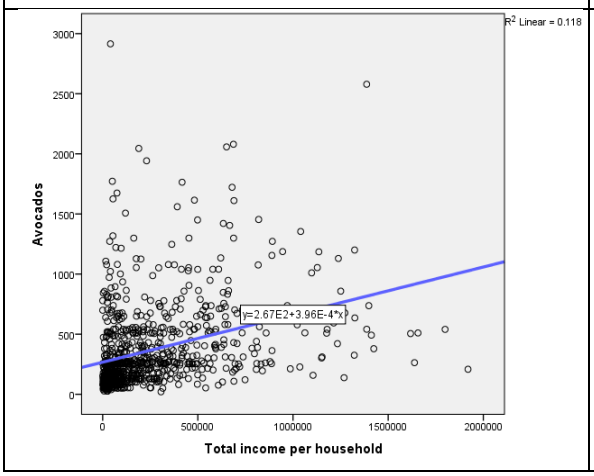
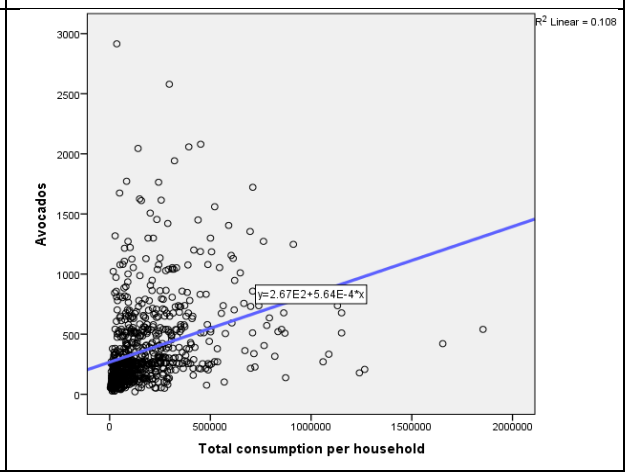
Date	Grains, bread and cereals	Meat and fish	Dairy	Fruit and vegetables	Other nutritional goods
Aug-10	12.50	45.31	14.81	14.48	13.46
Sep-10	12.63	44.84	14.52	14.59	13.48
Oct-10	13.16	45.47	14.29	16.87	13.50
Nov-10	13.09	45.98	14.06	15.07	13.63
Dec-10	13.28	48.37	13.89	14.67	13.43
Jan-11	13.38	51.40	14.34	15.48	14.30
Feb-11	12.86	48.54	13.98	15.03	14.34
Mar-11	13.01	49.41	14.21	13.27	14.53
Apr-11	13.46	48.91	14.55	15.47	14.57
May-11	13.61	50.17	14.67	15.97	14.89
Jun-11	13.63	50.69	14.76	15.60	14.71
Jul-11	13.69	51.00	15.15	15.33	15.14
Aug-11	13.19	52.08	15.20	16.41	15.07

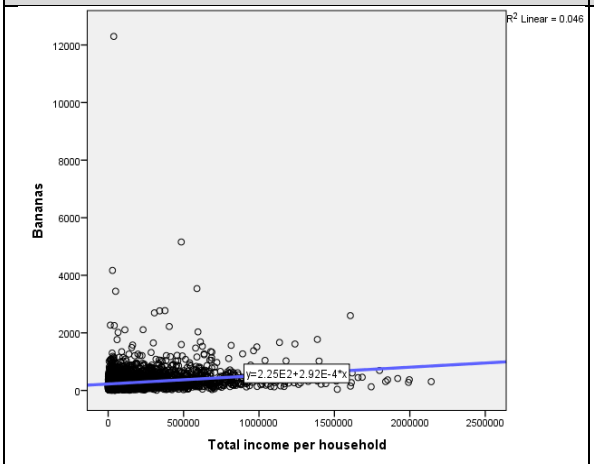
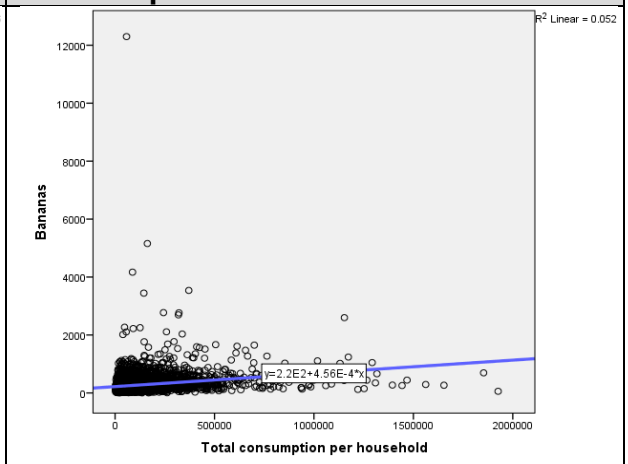
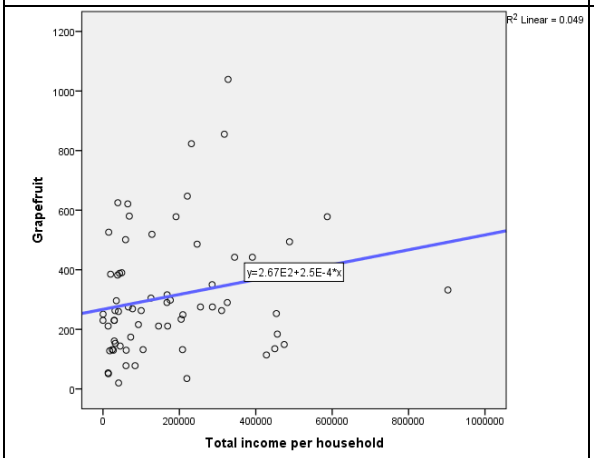
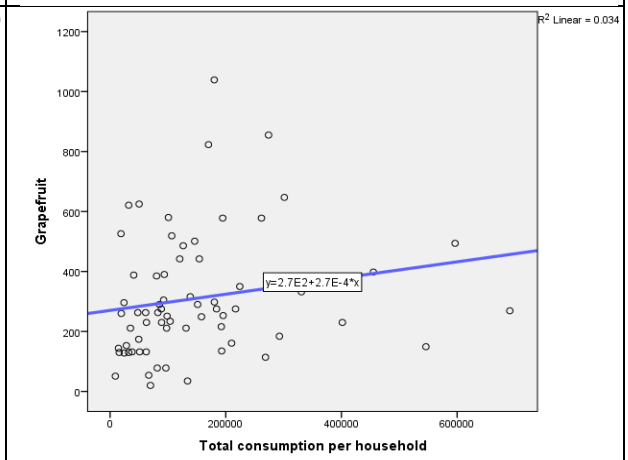
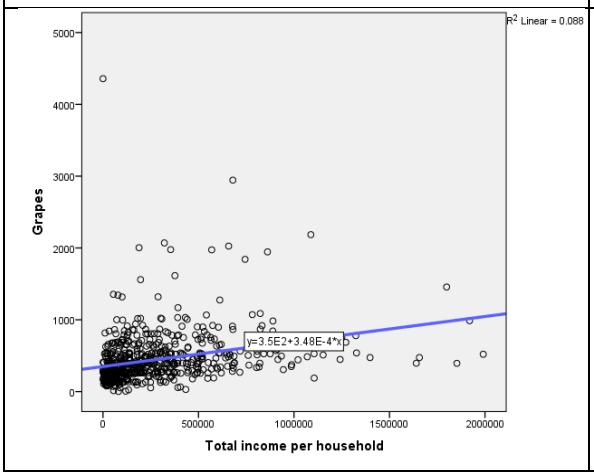
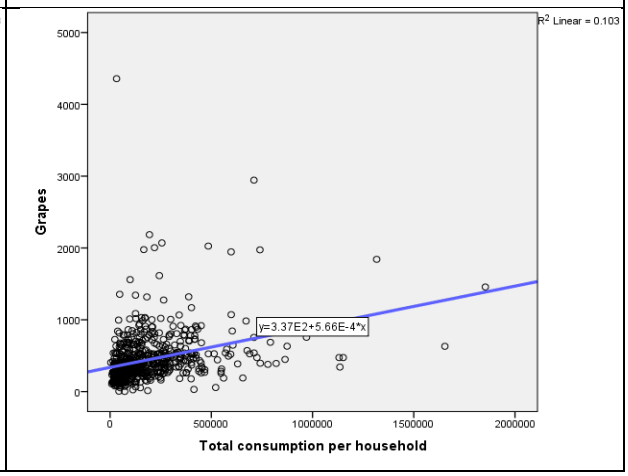
ANNEXURE 3: RELATIONSHIP BETWEEN HOUSEHOLD EXPENDITURE UPON INDIVIDUAL ZERO-RATED FOODSTUFFS AND INCOME AS WELL AS CONSUMPTION.

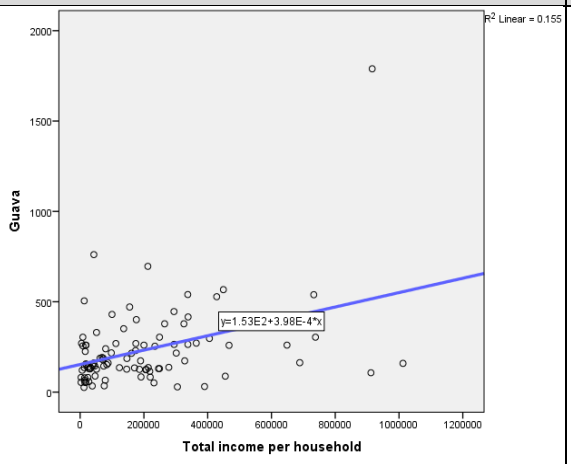
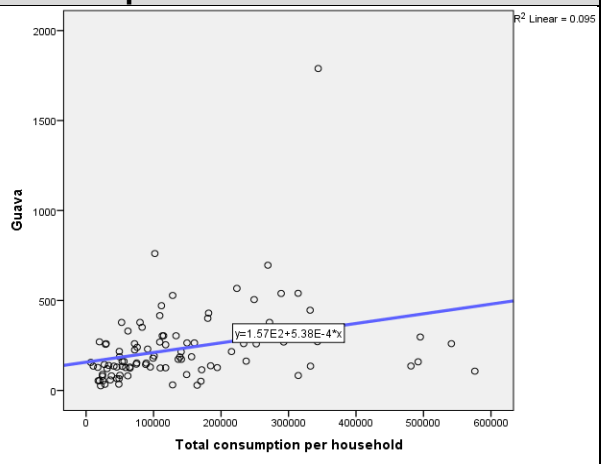
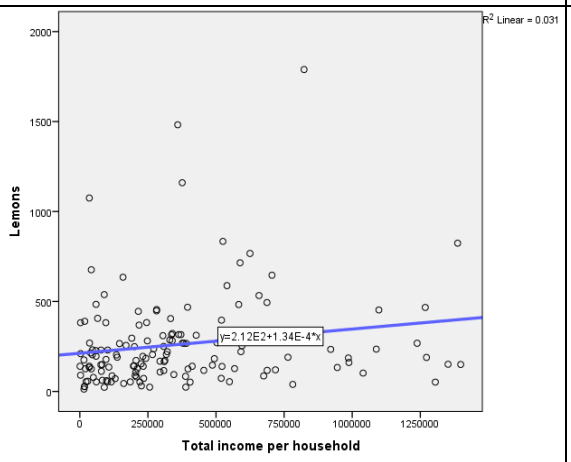
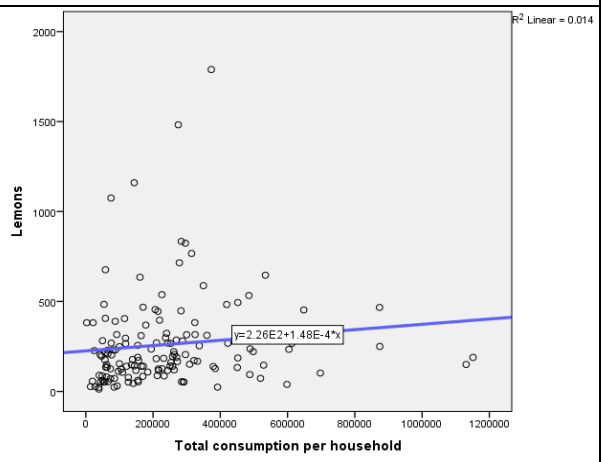
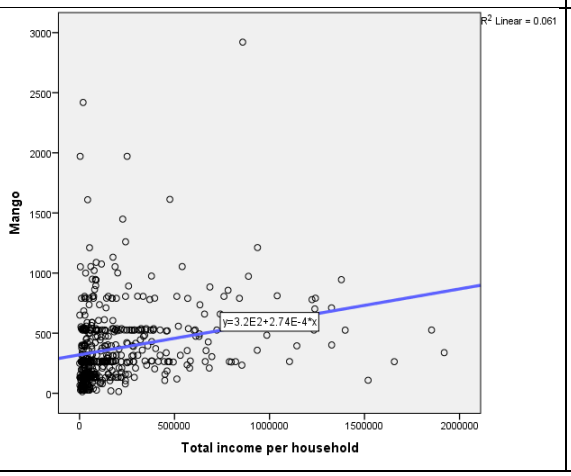
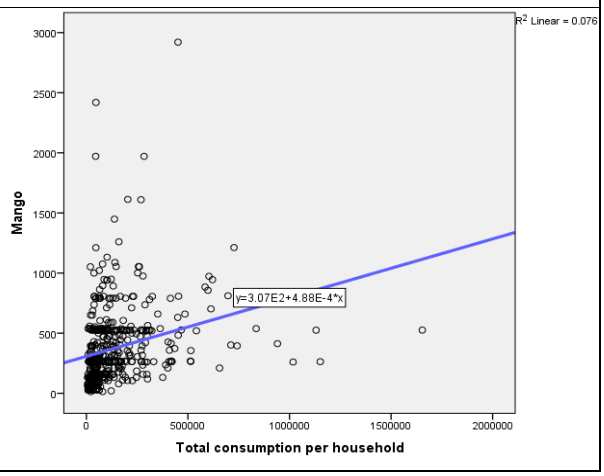
Income	Consumption
	
	
	

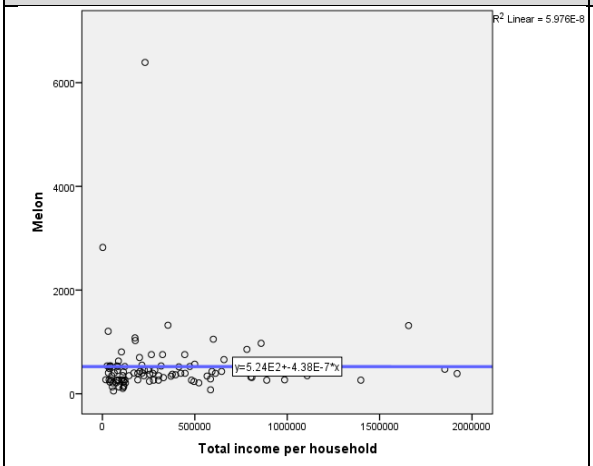
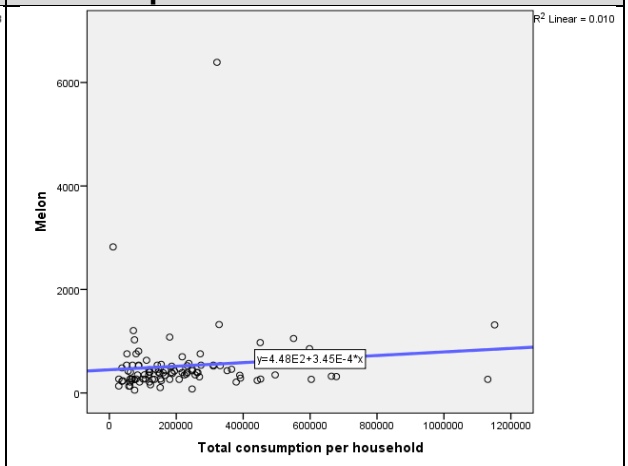
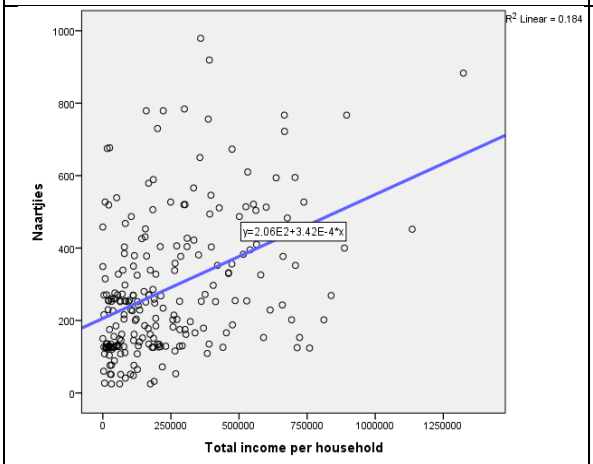
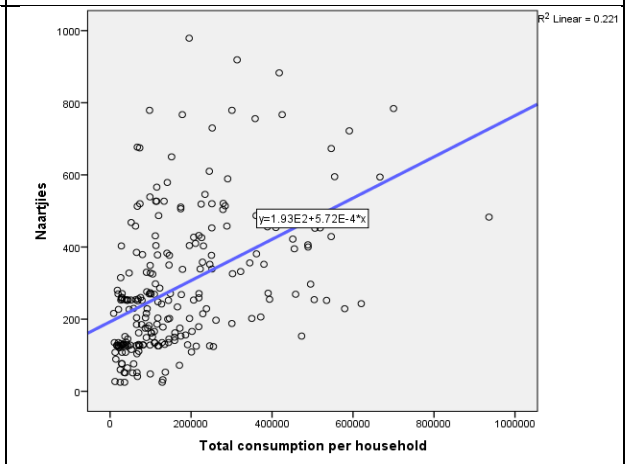
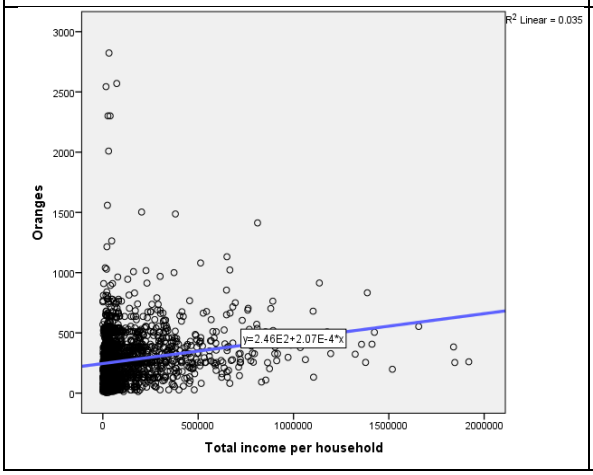
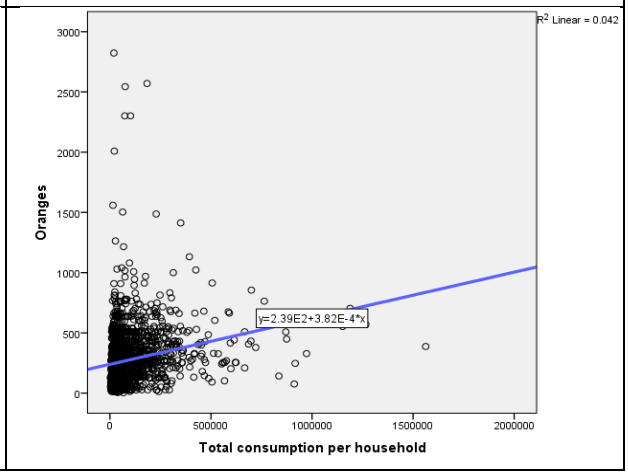
Income	Consumption
	
	
	

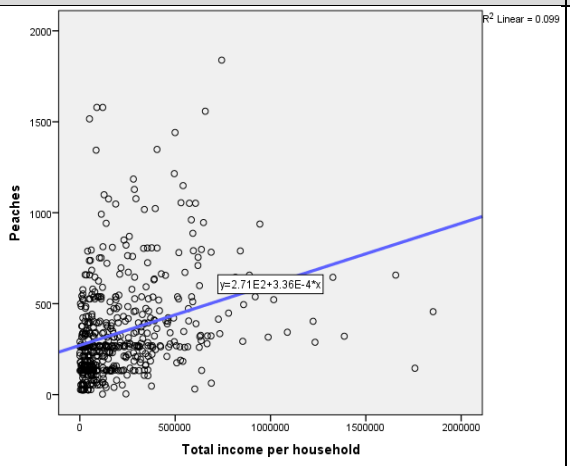
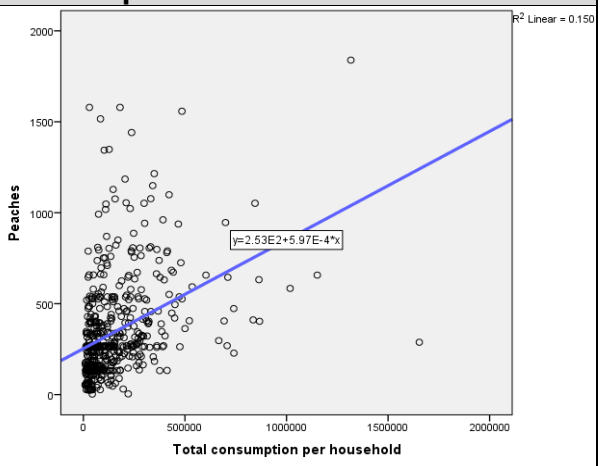
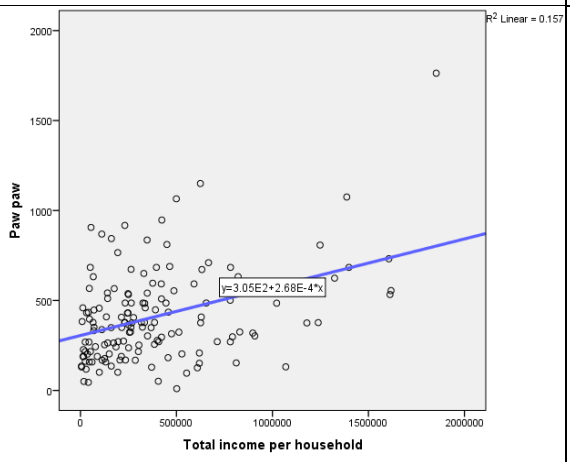
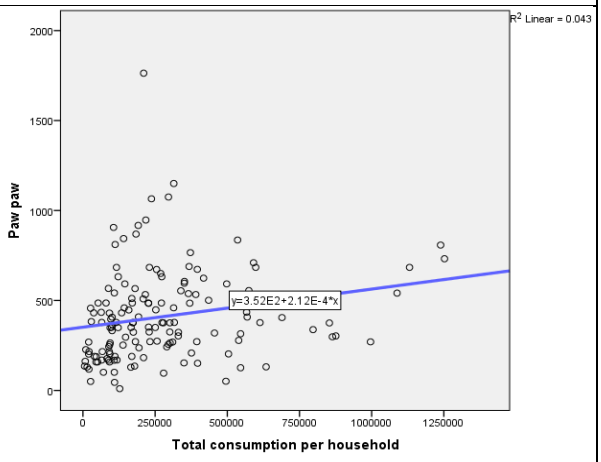
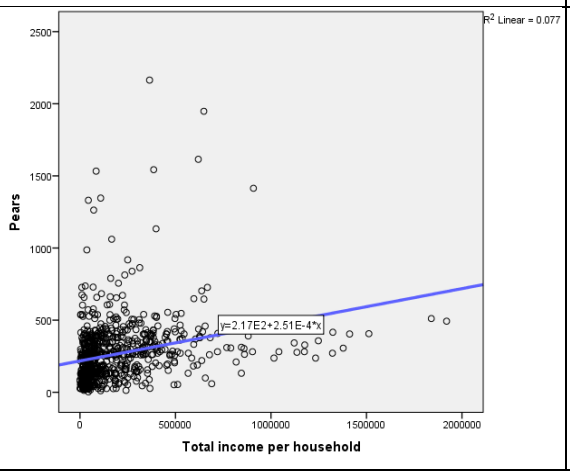
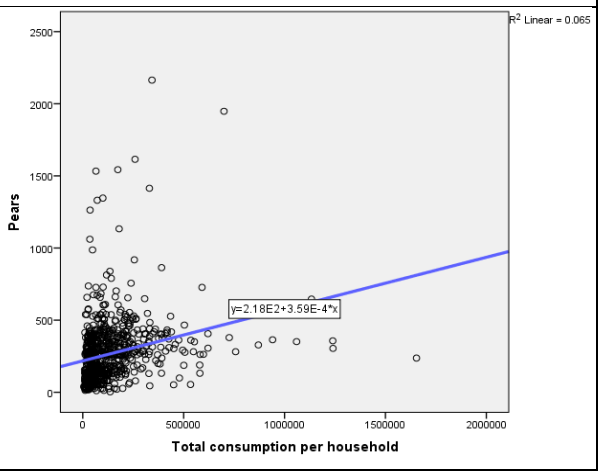
Income	Consumption
	
	
	

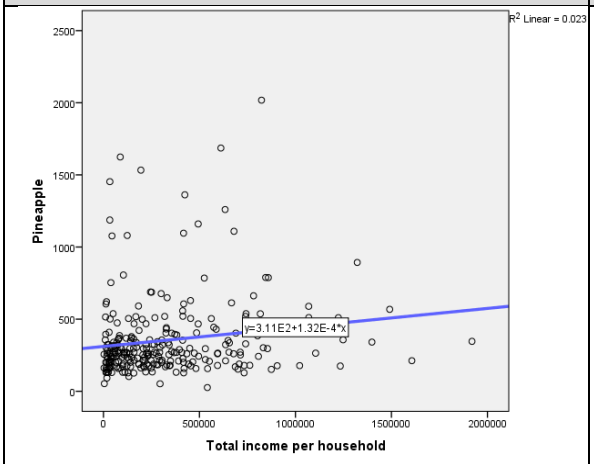
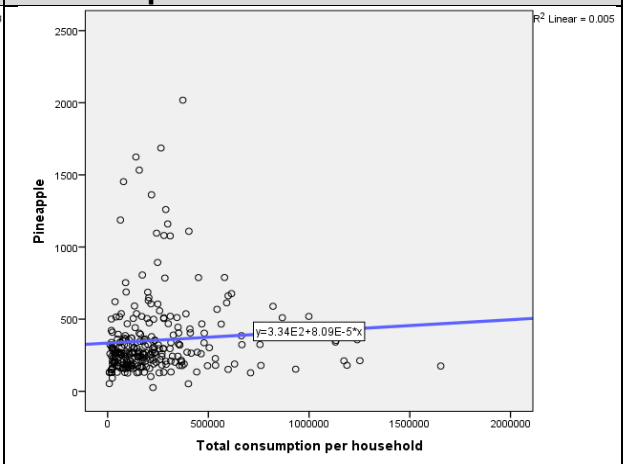
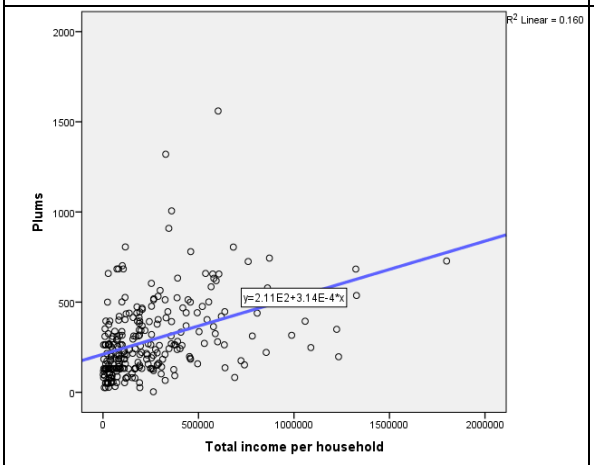
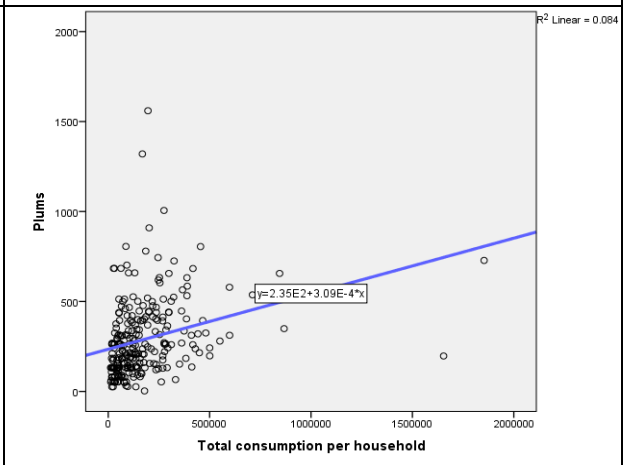
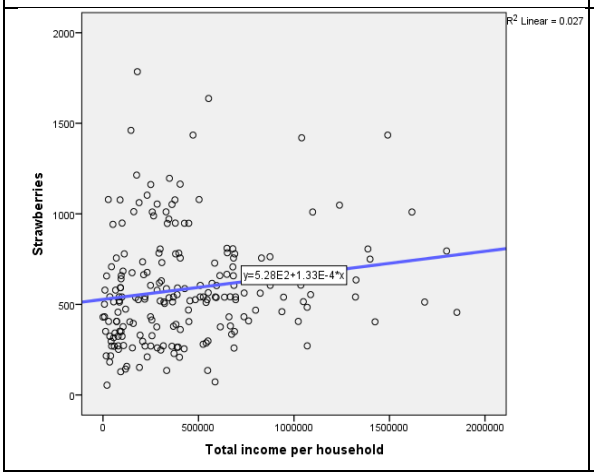
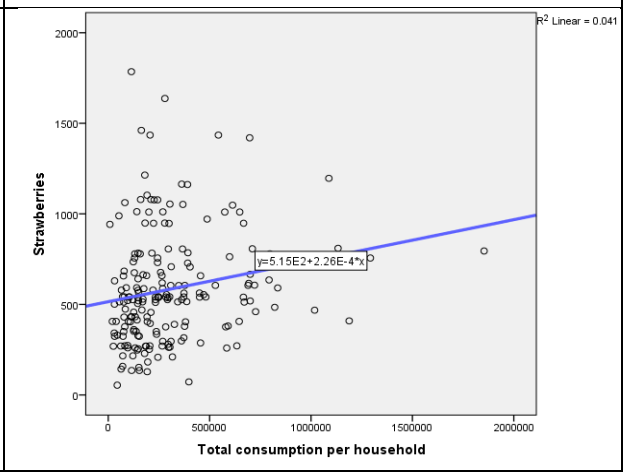
Income	Consumption
	
	
	

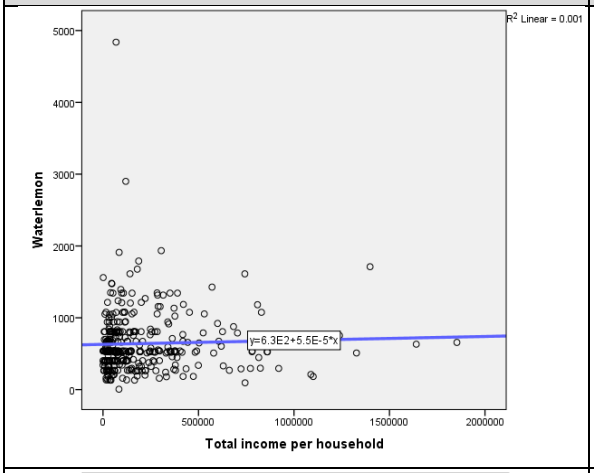
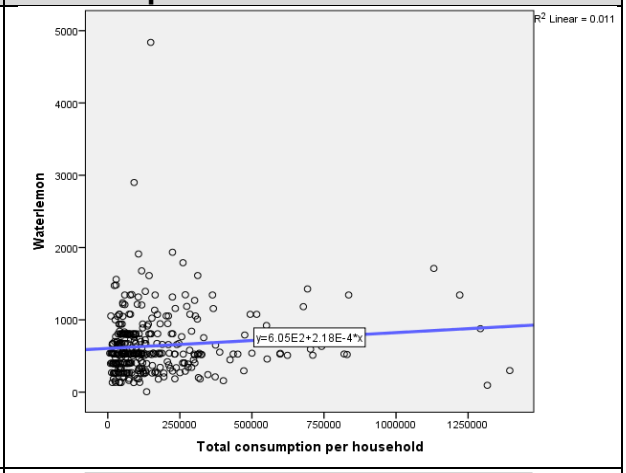
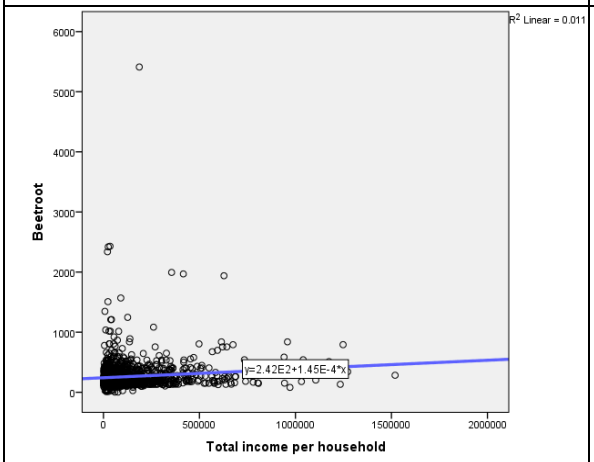
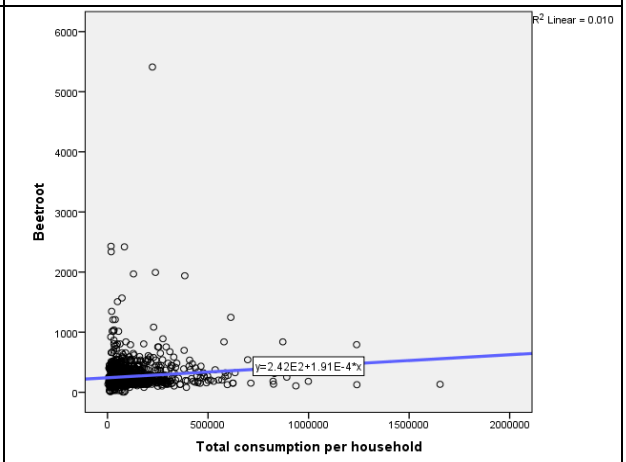
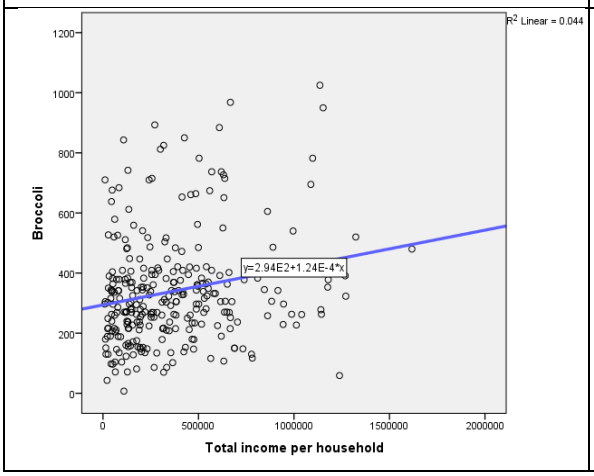
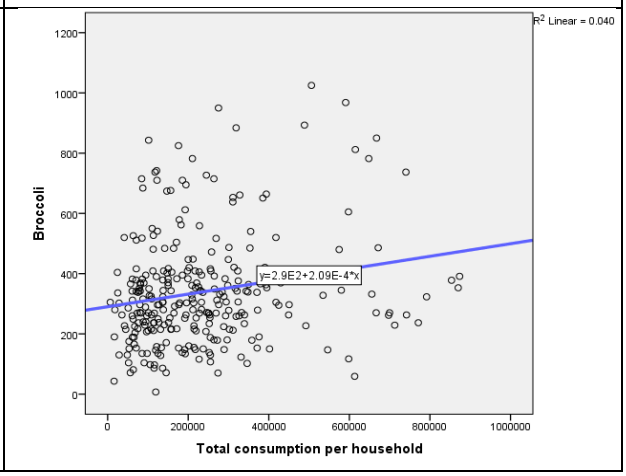
Income	Consumption
	
	
	

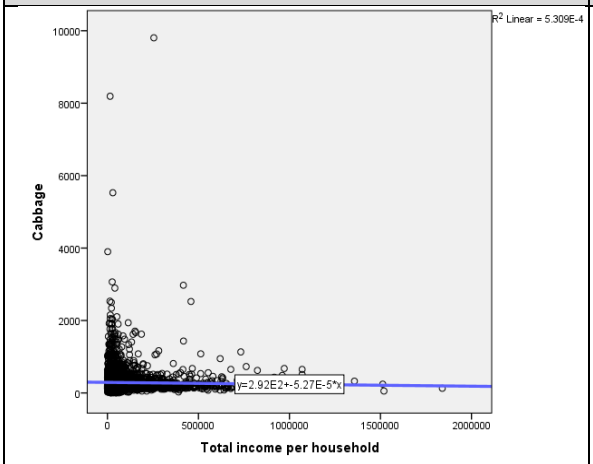
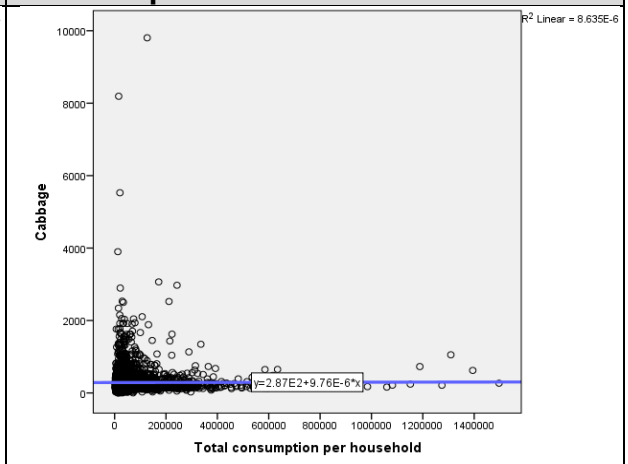
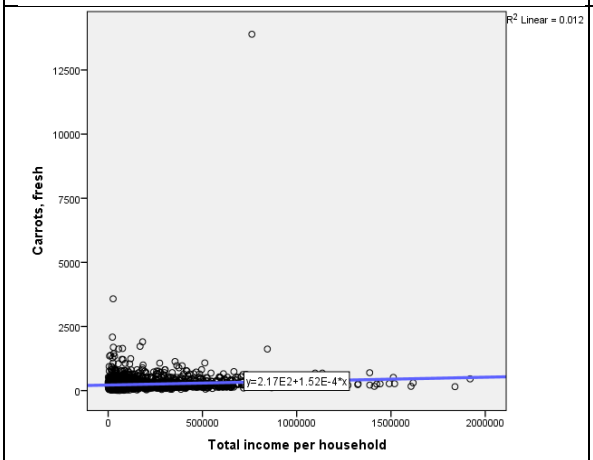
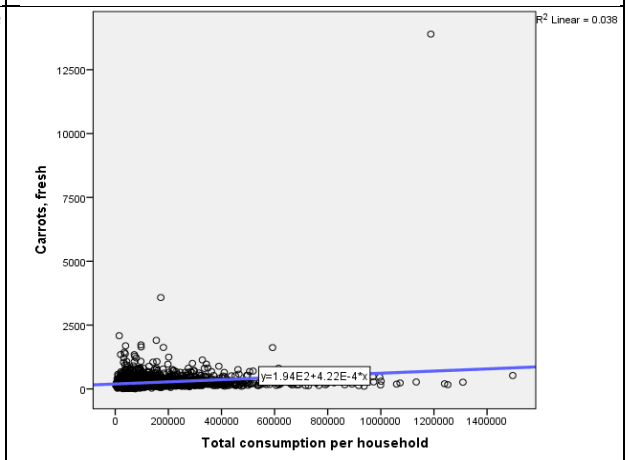
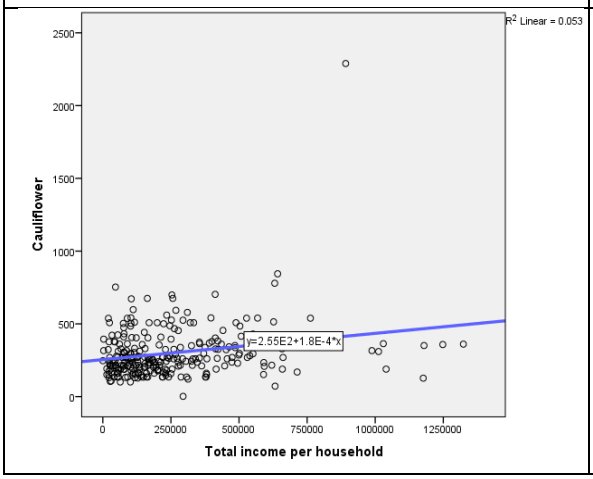
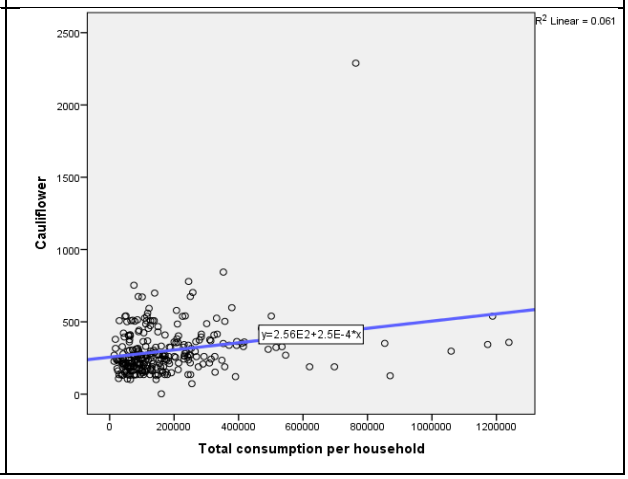
Income	Consumption
	
	
	

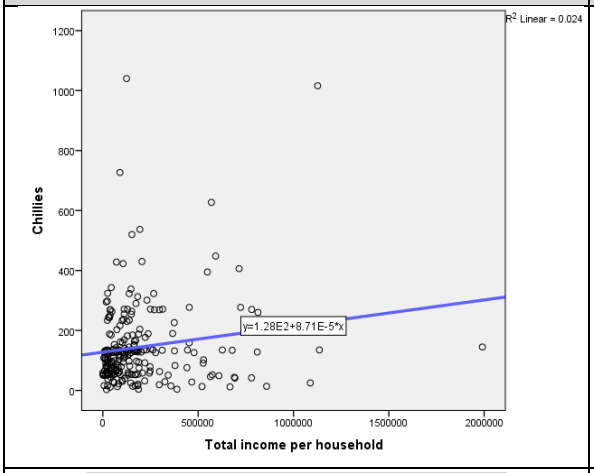
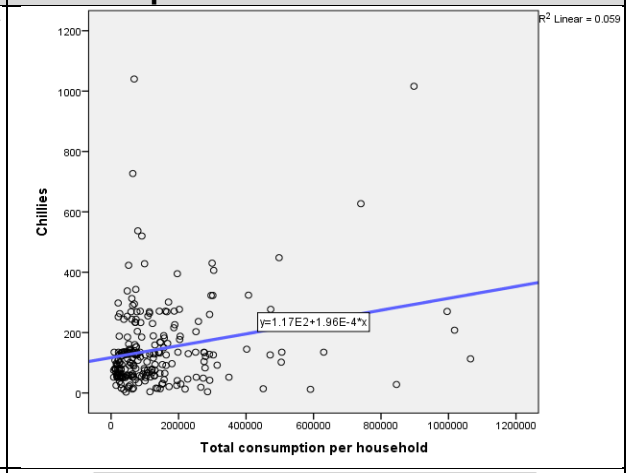
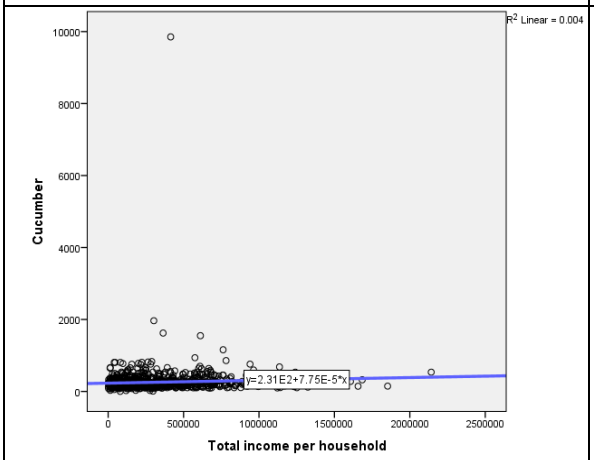
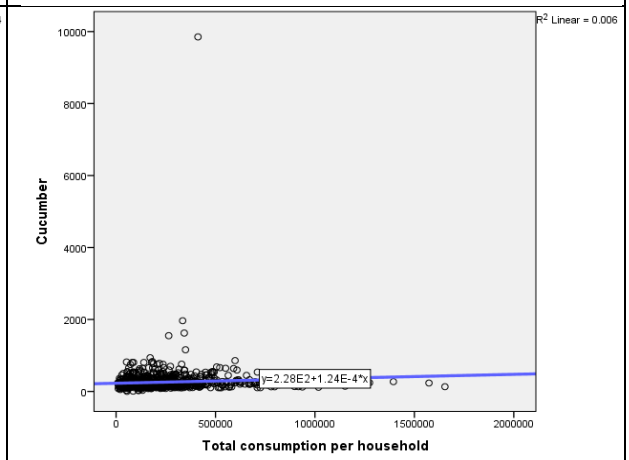
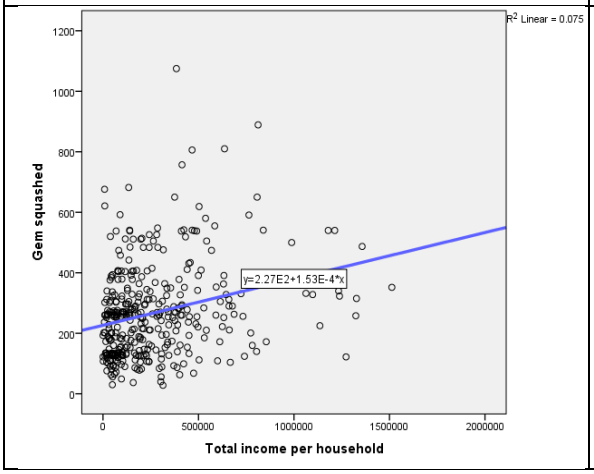
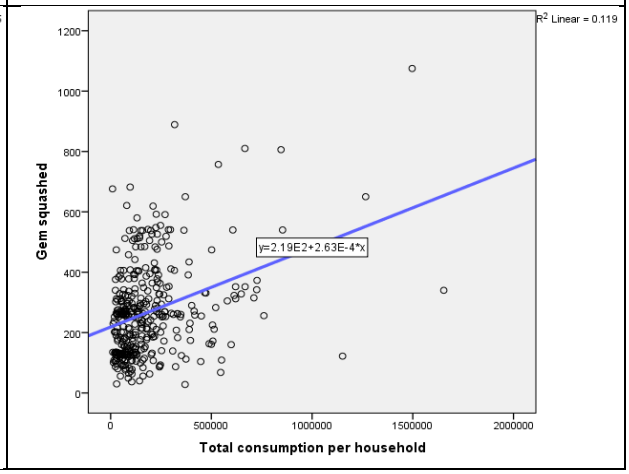
Income	Consumption
	
	
	

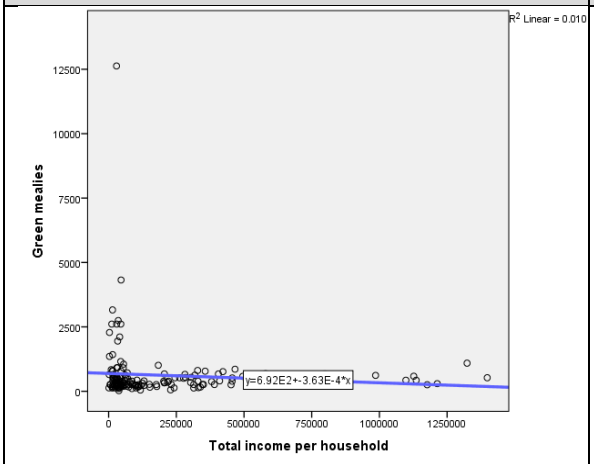
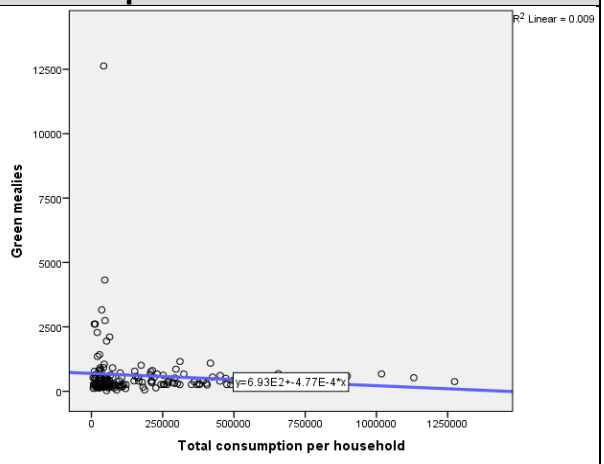
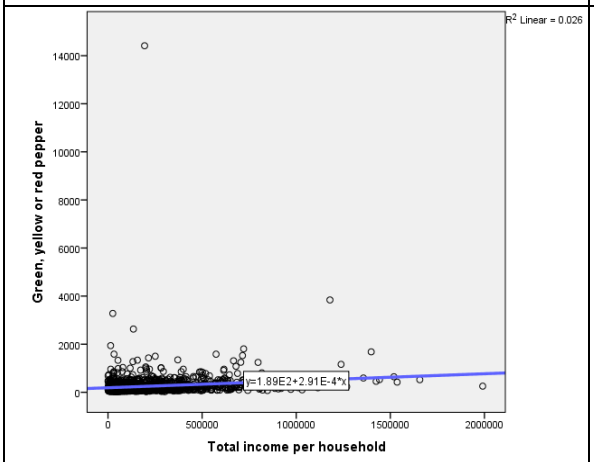
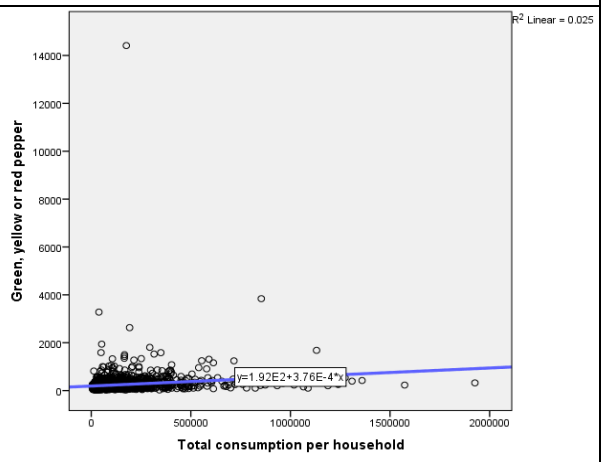
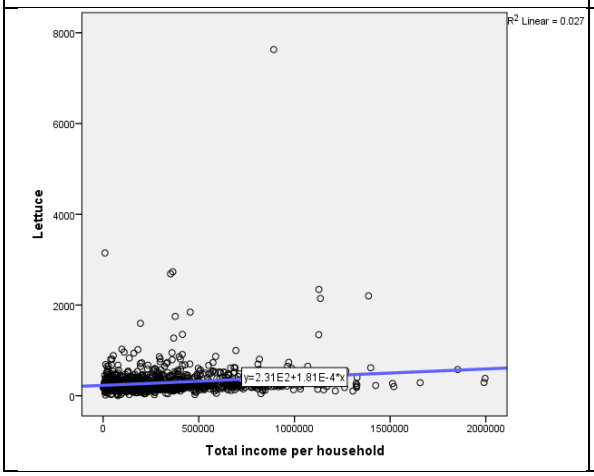
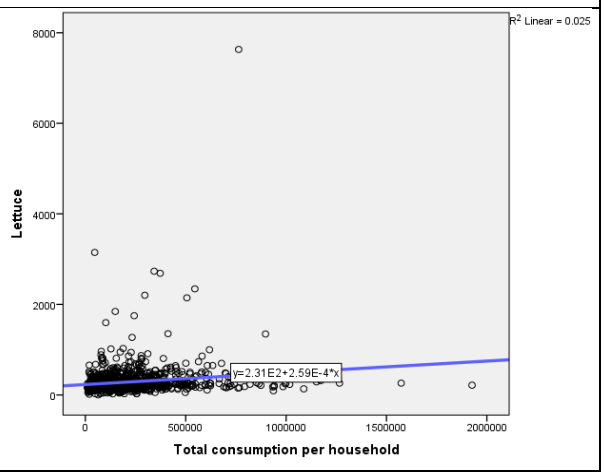
Income	Consumption
	
	
	

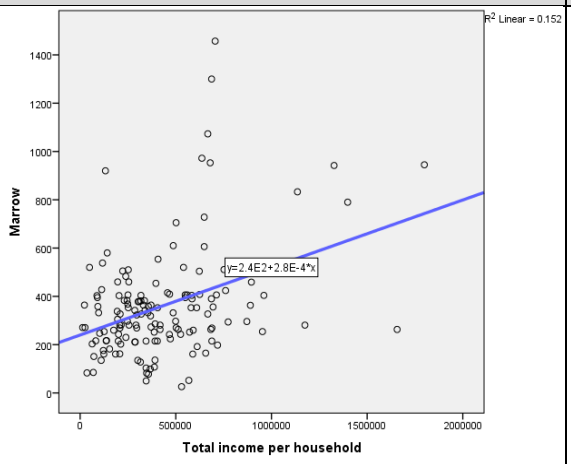
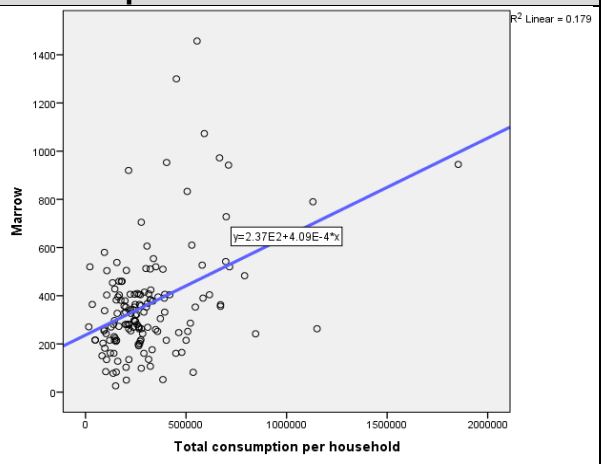
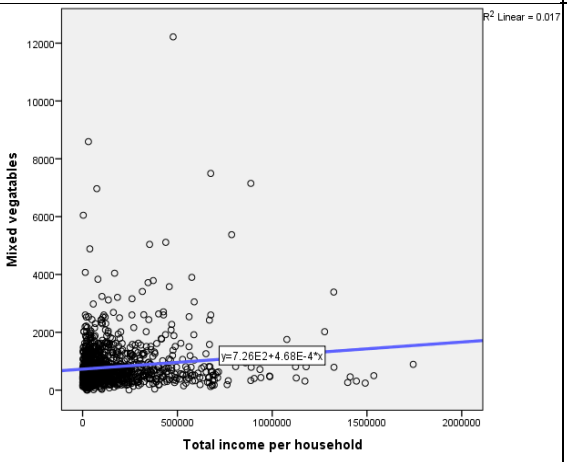
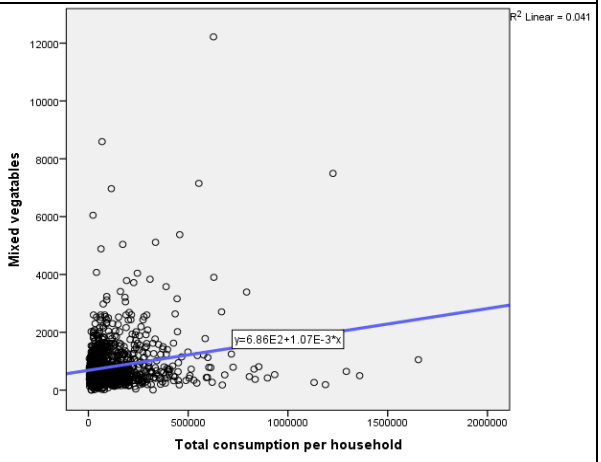
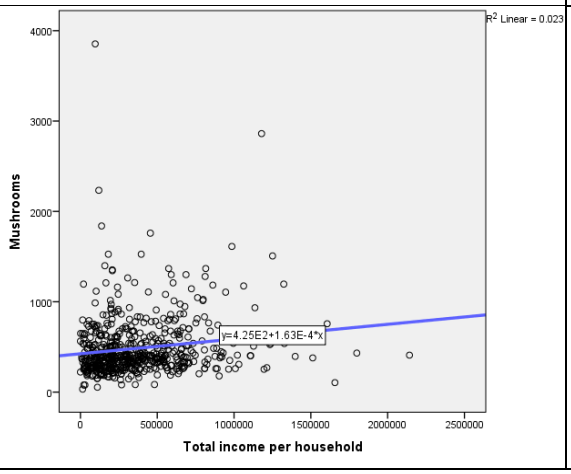
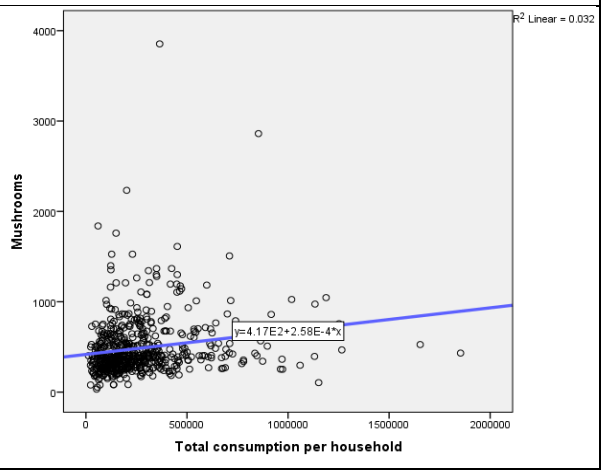
Income	Consumption
	
	
	

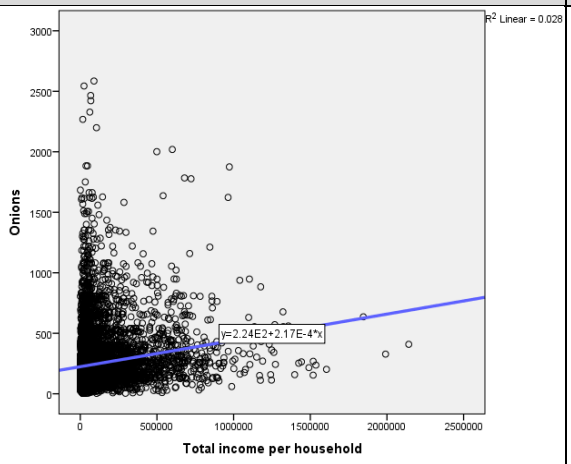
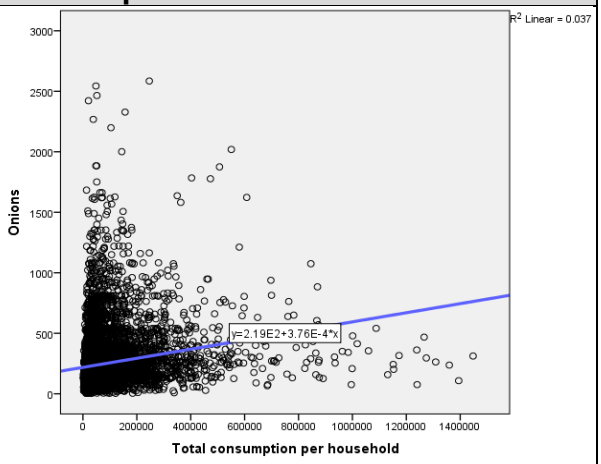
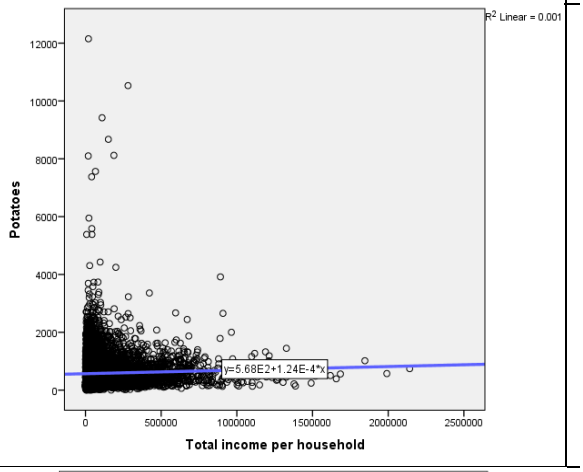
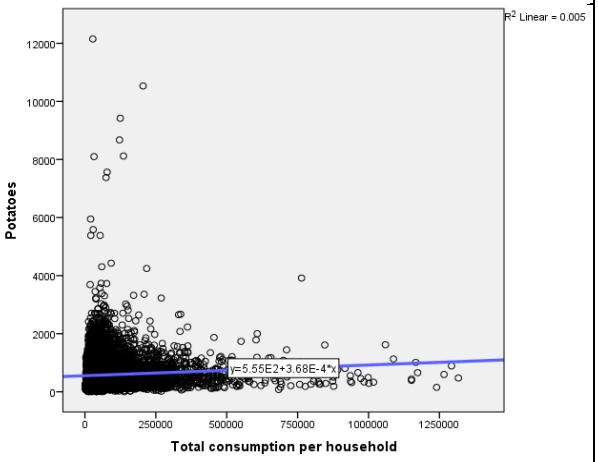
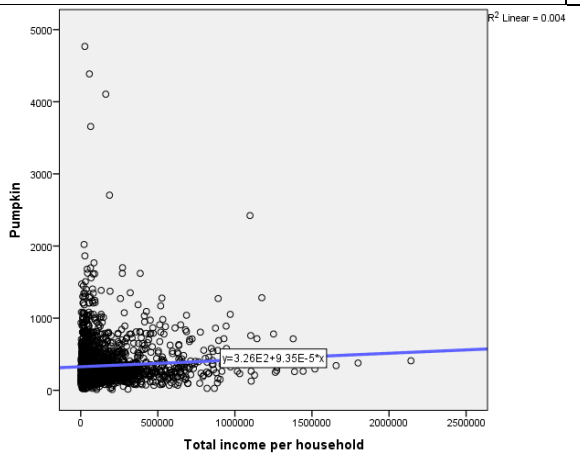
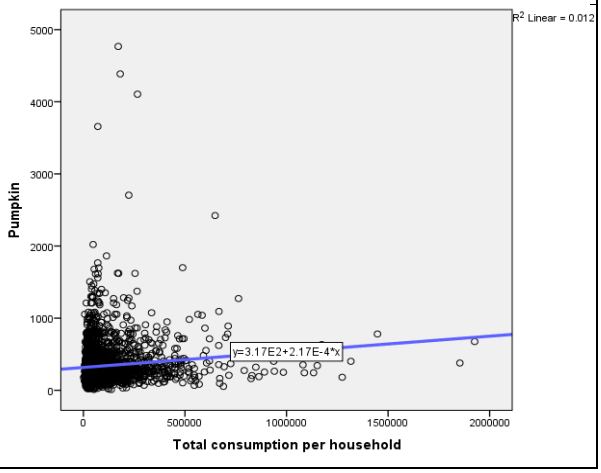
Income	Consumption
	
	
	

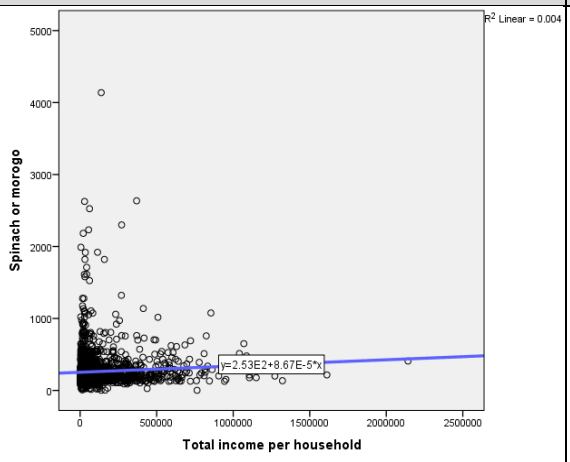
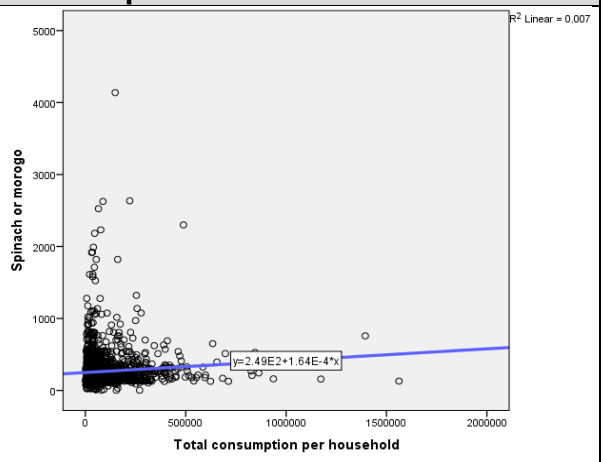
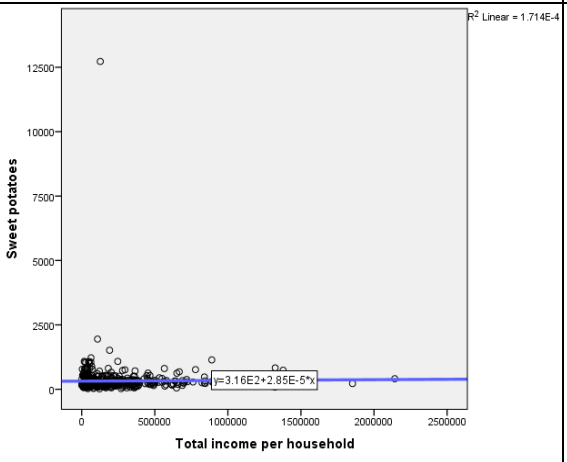
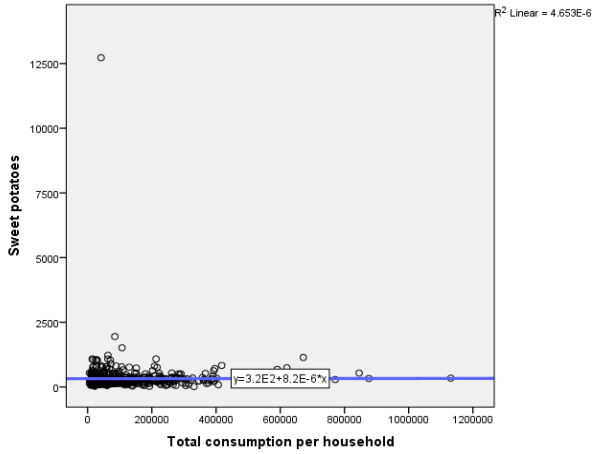
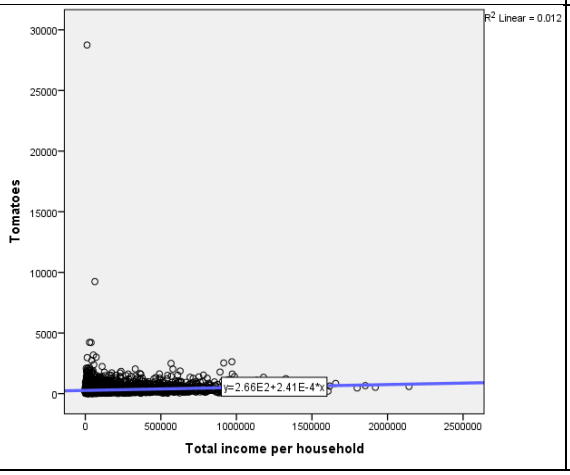
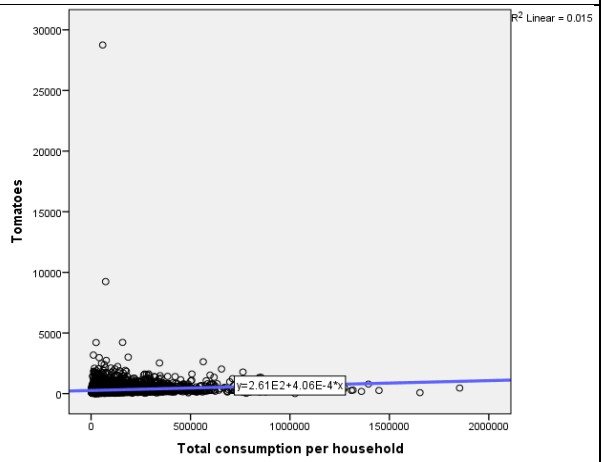
Income	Consumption
	
	
	

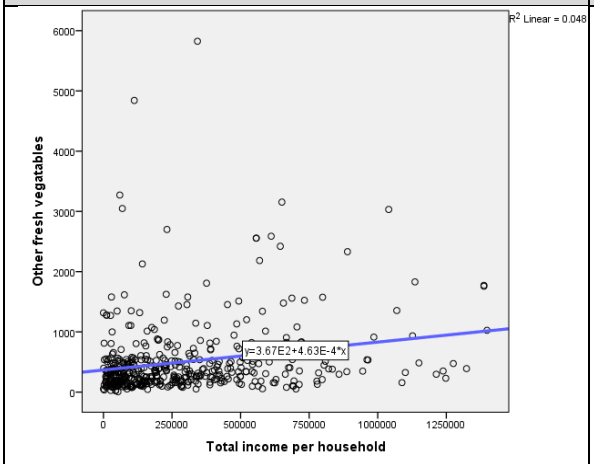
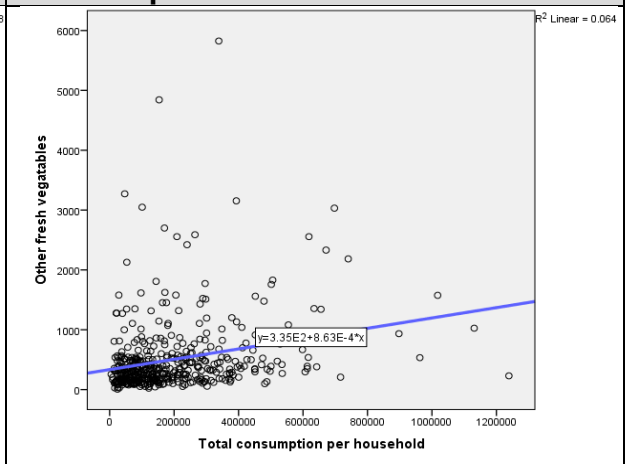
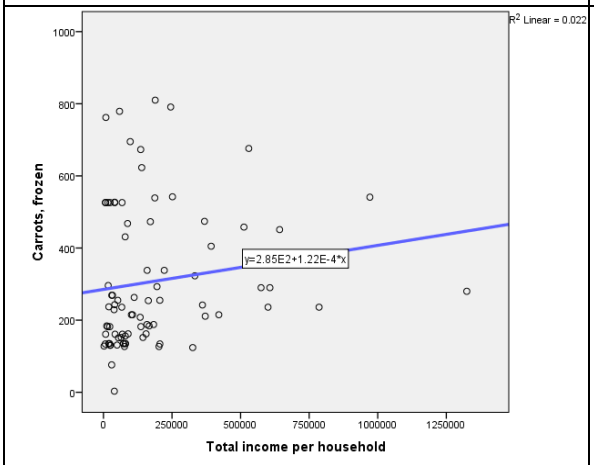
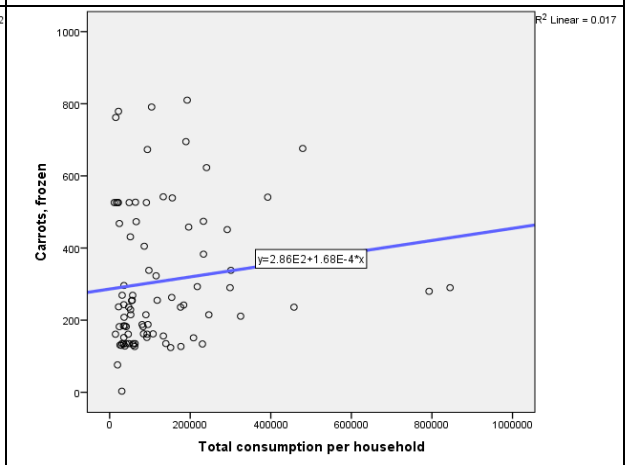
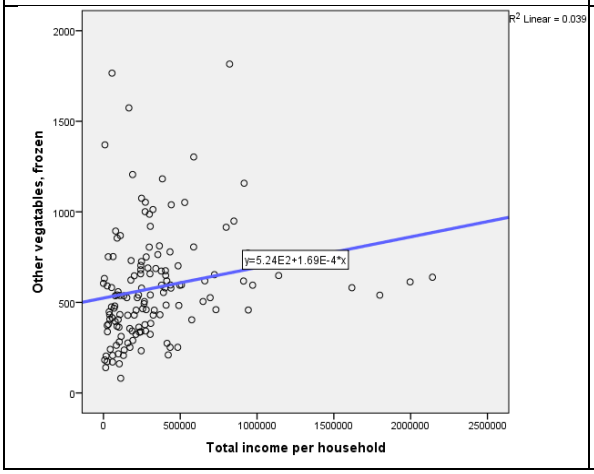
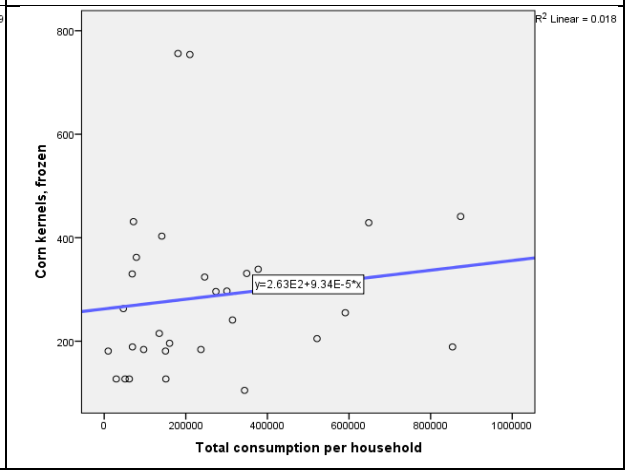
Income	Consumption
	
	
	

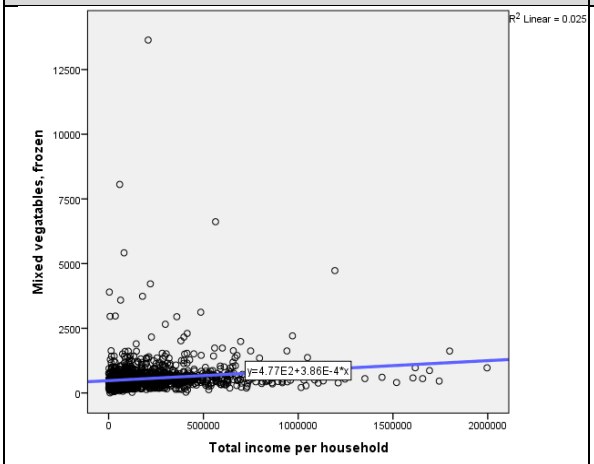
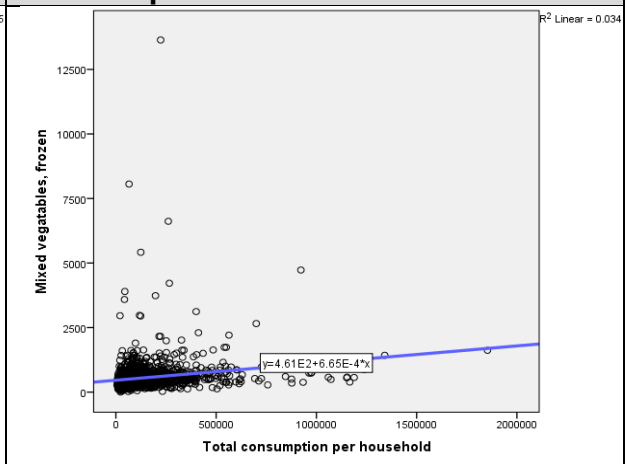
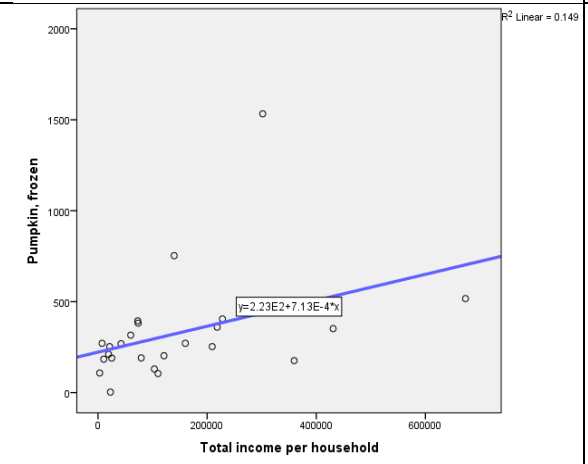
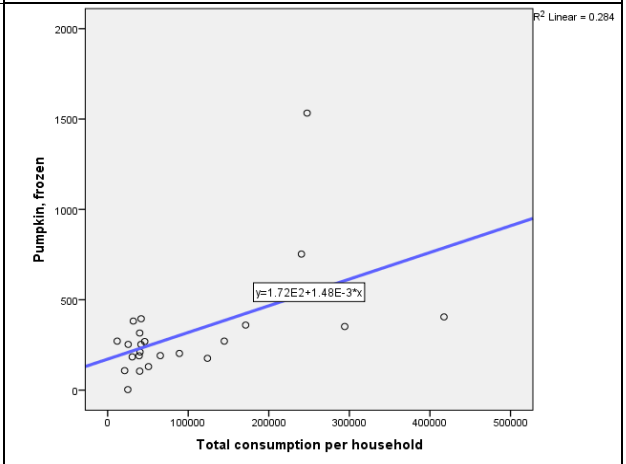
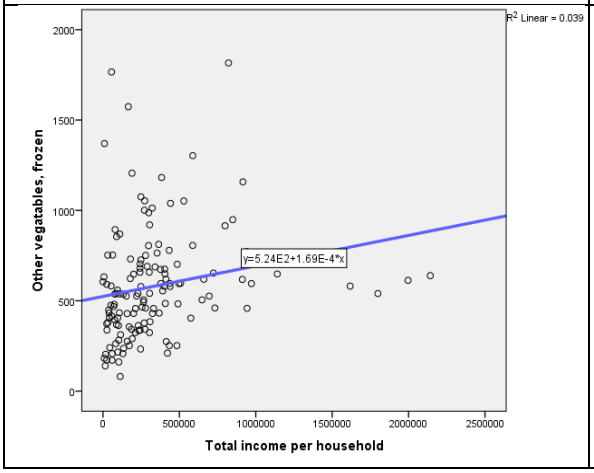
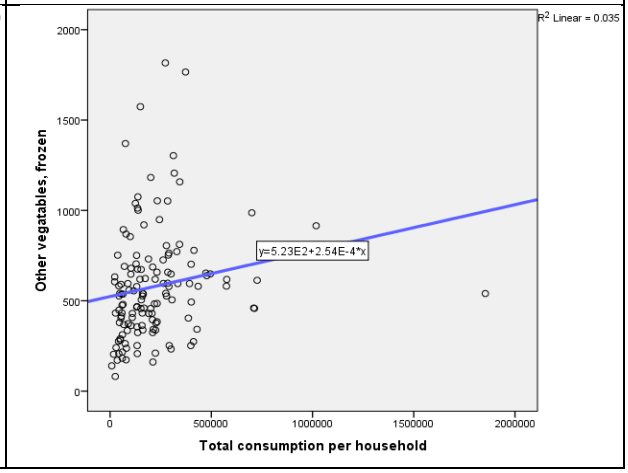
Income	Consumption
	
	
	

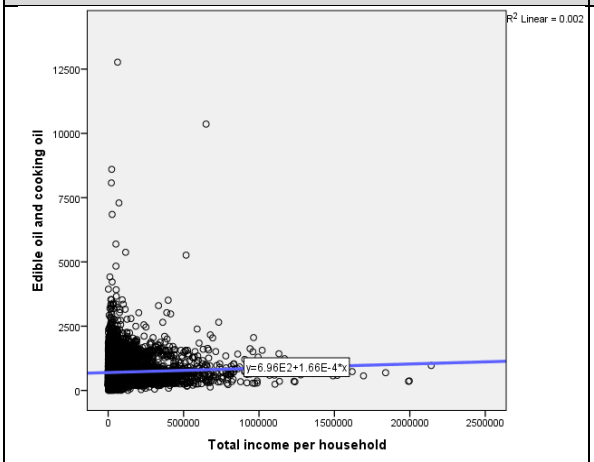
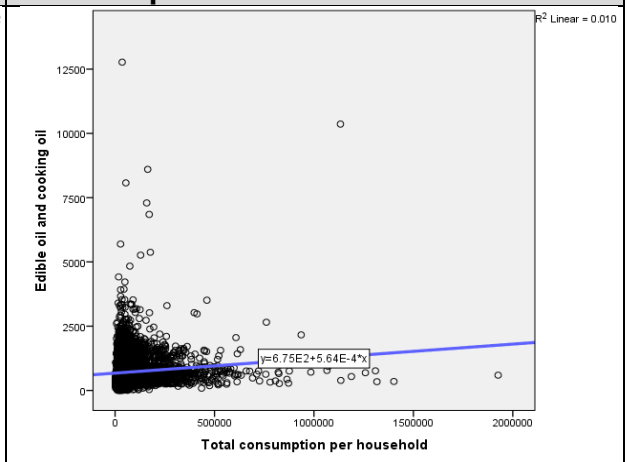
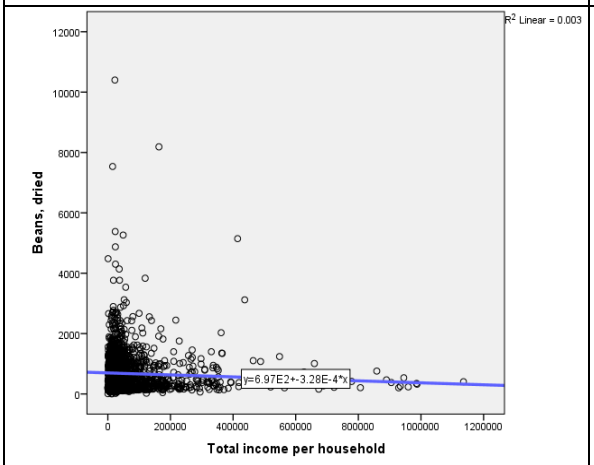
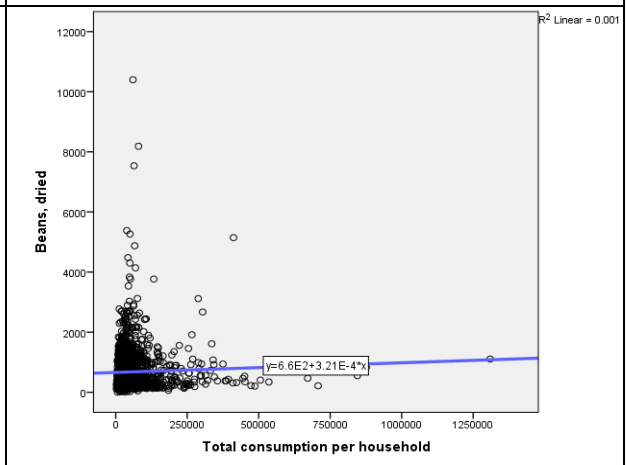
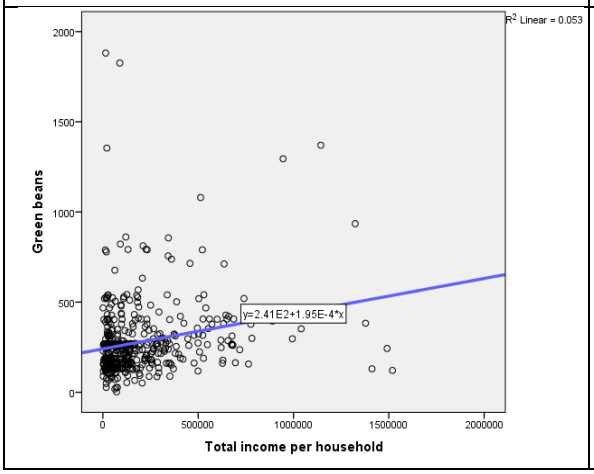
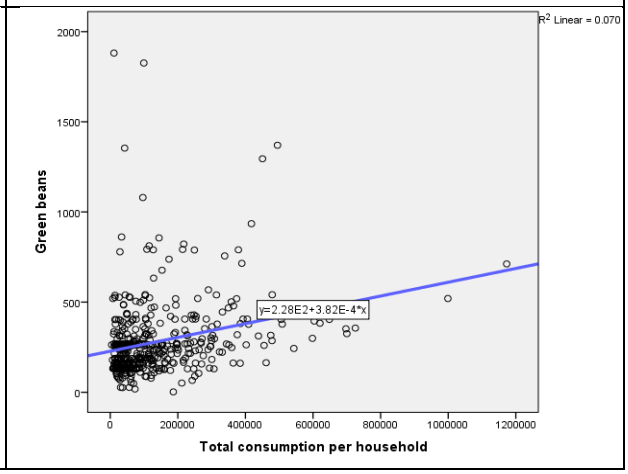
Income	Consumption
	
	
	

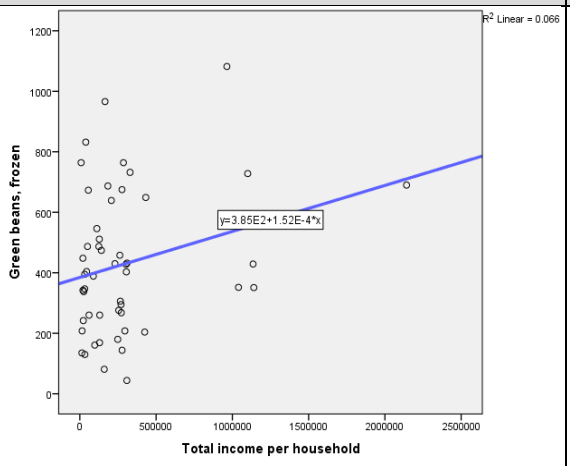
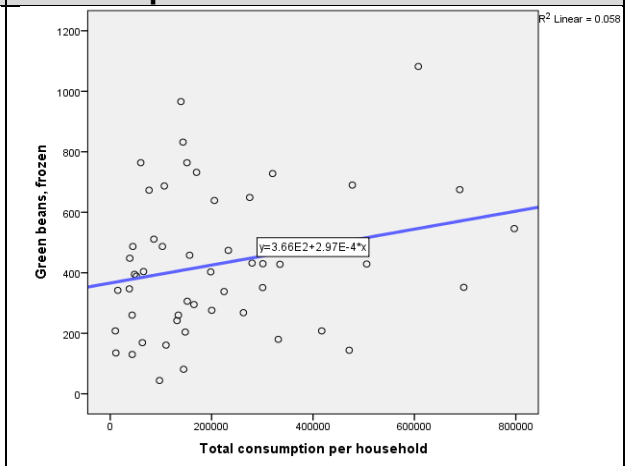
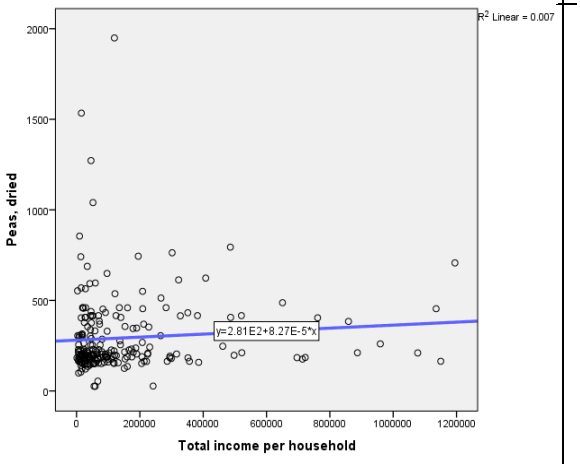
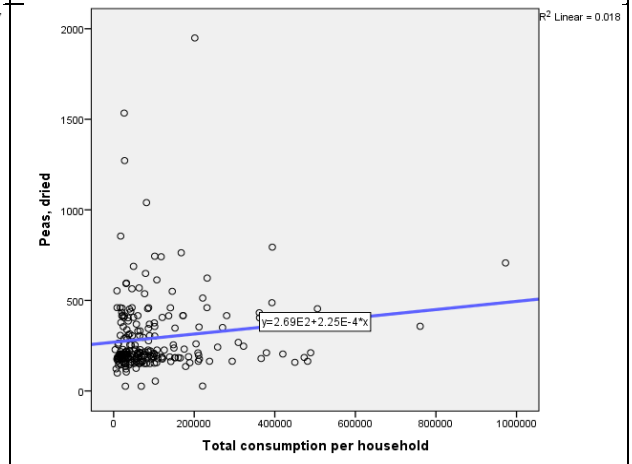
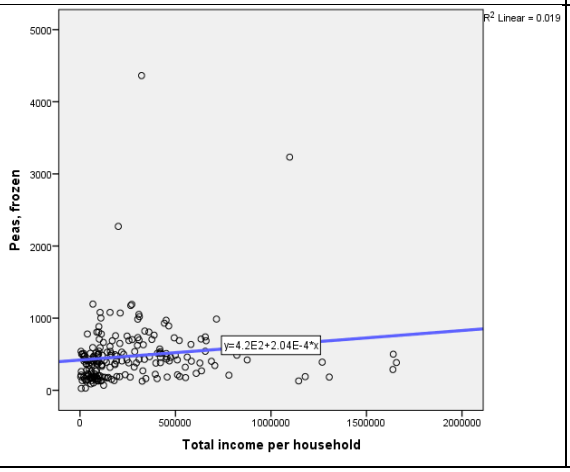
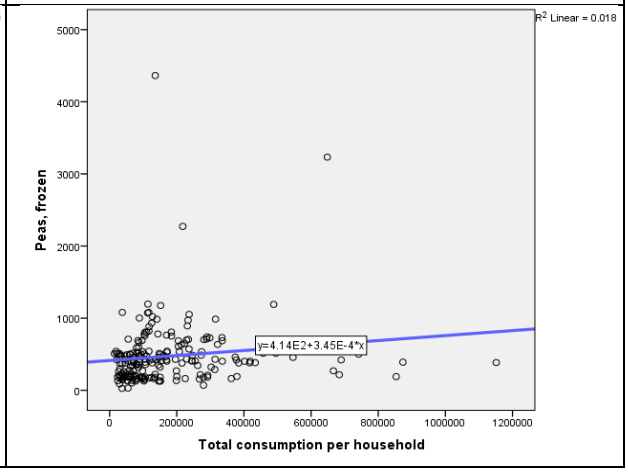
Income	Consumption
	
	
	

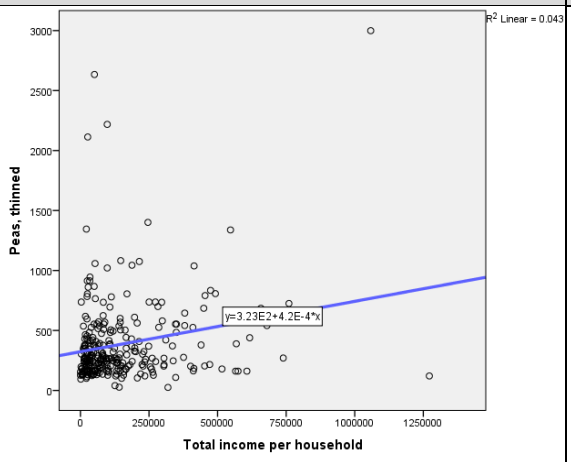
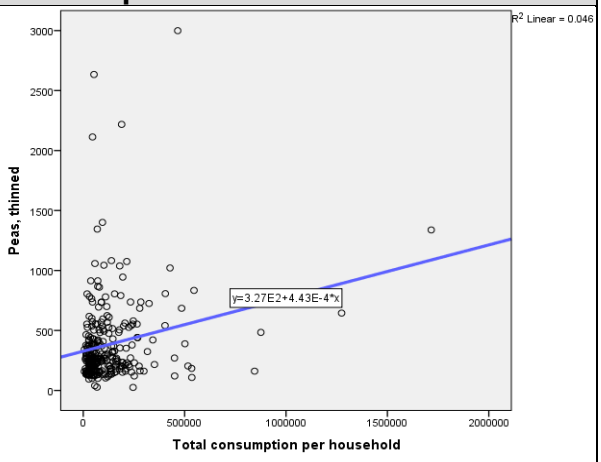
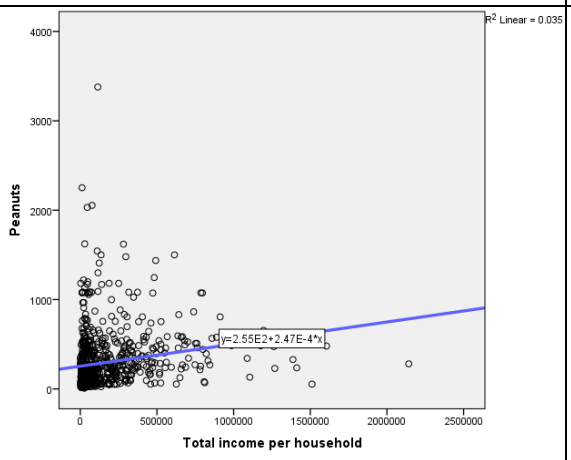
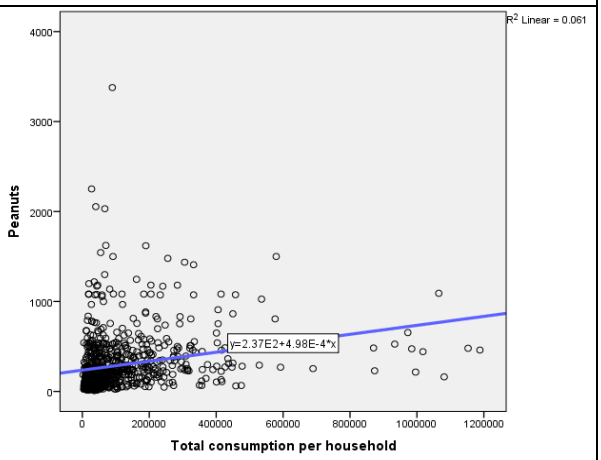
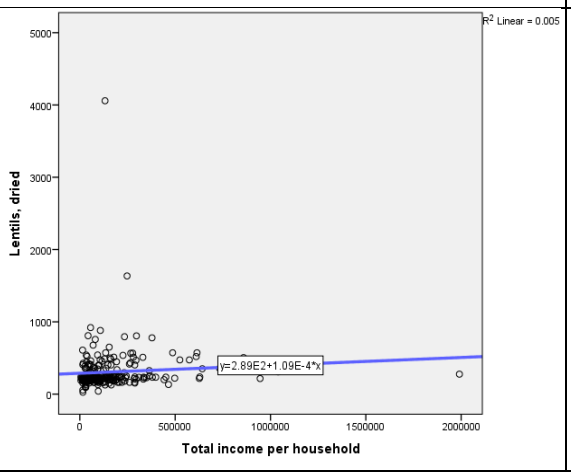
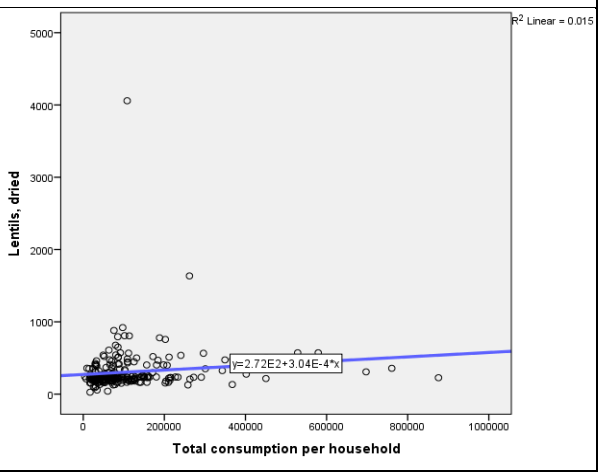
Income	Consumption
	
	
	

Income	Consumption
	
	
	

Income	Consumption
	
	
	

Income	Consumption
	
	
	

Income	Consumption
	
	
	

Income	Consumption
	
	
	

LIST OF REFERENCES

A NEW TAX SYSTEM (GOODS AND SERVICES TAX) ACT 1999.

ADAMS, C. 1993. *For good and evil: the impact of taxes on the course of civilization*. London: Madison.

ADAMS, T.S. 1921. Fundamental Problems of Federal Income Taxation. *The Quarterly Journal of Economics*, 35:4, 527-556.

AFRICAN ECONOMIC OUTLOOK. 2010. Available: https://sustainabledevelopment.un.org/content/documents/AEO2010_part1_p76.pdf [Accessed 2015-06-12].

AFRICAN ECONOMIC OUTLOOK. 2015. Available: http://www.africaneconomicoutlook.org/en/theme/public-resource-mobilisation-and-aid/challenges-for-african-policy-makers/structural-cross-cutting-issues/ [Accessed 2015-06-12].

AGBOLA, F. W. 2003. Estimation of food demand patterns in South Africa based on a survey of households. *Journal of Agricultural and Applied Economics*, 35:03, 663-670.

ALDERMAN, H. and DEL NINNO, C. 1999. Poverty issues for zero rating VAT in South Africa. *Journal of African Economies*, 8:2, 182-208.

ALM, J.R., MARTINEZ-VAZQUEZ, J., SCHNEIDER, F. 2004. 'Sizing' the Problem of the Hard-to-Tax, in Alm, J.R., Martinez-Vazquez, J. and Wallace, S. (eds.), *Taxing the Hard-to-Tax: Lessons from Theory and Practice.* Amsterdam: Elsevier.

ANDERSON, J.E. 2011. *Public Finance*. Mason: South-Western Cengage Learning.

ARMSTRONG, P., LEKEZWA, B. AND SIEBRITS, K. 2008. Poverty in South Africa: A profile based on recent household surveys. Stellenbosch Economic Working Papers: 04/08. Available: http://core.ac.uk/download/pdf/6358757.pdf [Accessed 2015-11-25]

ATKINSON, A.B. 1977. Optimal Taxation and the Direct versus Indirect Tax Controversy. *Canadian Journal of Economics*, 10:4, 590-606.

ATKINSON, A.B. and STIGLITZ. J. E. 1976. The design of tax structure: direct versus indirect taxation. *Journal of Public Economics*, 6:1, 55-75.

AGHA, A. and HAUGHTON, J. 1996. Designing VAT systems: Some efficiency considerations. *Review of Economics and Statistics*, 78:2, 303–308.

BANKS, J., BLUNDELL, R. and LEWBEL, A. 1997. Quadratic Engel curves and consumer demand. *Review of Economics and Statistics*, 79:4, 527-539.

BARBONE, L., BELKINDAS, M., BETTENDORF, L., BIRD, R.M., BONCHOSMOLOVSKIY, M. and SMART, M. 2013. Study to quantify and analyse the VAT Gap in the EU-27 Member States. Available: http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/vat-gap.pdf [Accessed 2014-08-07].

BARNETT, W.A. and SECK, O., 2008. Rotterdam model versus almost ideal demand system: Will the best specification please stand up? *Journal of Applied Econometrics,* 23: 699–728.

BASTABLE, C.F. 1917. *Public Finance*. London: Macmillan and Co., Limited.

BASTOW, S., DUNLEAVY, P. and TINKLER, J. 2014. *The Impact of the Social Sciences: How Academics and their Research Make a Difference.* London: SAGE Publications.

BESLEY, T. and JEWITT, I. 1990. Optimal uniform taxation and the structure of consumer preferences, in Myles, G. D. (ed.), *Measurement and Modelling in Economics.* Amsterdam: Elsevier Science Publishers.

BIRD, R.M. 1991. The taxation of personal wealth in international perspective. *Canadian Public Policy – Analyse de Politiques*, 17:3, 322–334.

BIRD, R.M. 2005. Redistribution via taxation: The limited role of the personal income tax in developing countries. *UCLA Law Review*, 52: 1627-1695.

BIRD, R.M. and GENDRON P.-P. 2006. Is VAT the best way to impose a general consumption tax in developing countries? *Bulletin for International Taxation*, 60: 287-320.

BIRD, R.M. and GENDRON, P.-P. 2007. *The VAT in developing and transitional countries*. United Kingdom: Cambridge University Press.

BIZNEWS. 2015. Budget 2015: Using the VAT system to decrease the budget deficit. Available: http://www.biznews.com/budget/2015/02/25/budget-2015-using-the-vat-system-to-decrease-the-budget-deficit/ [Accessed 2015-03-10].

BLANKSON, S. 2007. *A brief history of Taxation*. Amazon Kindle Edition.

BOPAPE, L. and MYERS, R. 2007. Analysis of Household Demand for Food in South Africa: Model Selection, Expenditure Endogeneity, and the Influence of Socio-Demographic Effects. Paper presented at the African econometrics society annual conference, Cape Town, South Africa, July.

BUDGET SPEECH. 2015. Available: http://www.treasury.gov.za/documents/national%20budget/2015/speech/speech.pdf [Accessed 2015-08-01].

BURG, D.F. 2004. *An Encyclopedia of Tax Rebels, Revolts, and Riots from Antiquity to the Present*. New York and London: Routledge.

BUSINESS DAY. 2014. Available: http://www.bdlive.co.za/business/2014/05/28/vat-burden-on-the-poor-bothers-governments?service=print [Accessed 2015-02-05].

CANADIAN EXCISE TAX ACT (R.S.C., 1985, C.E-15).

CASALE, D.M. 2012. Indirect taxation and gender equity: Evidence from South Africa*. Feminist Economics*, 18: 25-54.

CASPERSEN, E. and METCALF, G.E. 1994. Is a Value Added Tax regressive? Annual versus lifetime incidence measures*. National Tax Journal*, 47: 731-746.

CHAND, S.N. 2008. *Public Finance, Volume 1***.** Delhi: Atlantic Publisher and Distributors.

CHRISTENSEN, L.R., JORGENSON, D.W. and LAU, L.J. 1975. *Transcendental logarithmic utility functions*. The American Economic Review, 367-383.

CNOSSEN, S. 1989. The Value Added Tax: Key to a better tax mix*. Australian Tax Forum*, 6: 265-281.

CNOSSEN, S. 1990. Taxing Value Added: The OECD Experience. *International VAT Monitor,* 5: 2-16.

CNOSSEN, S. 1992. Key questions in considering a Value Added Tax for central and eastern European countries. *International Monetary Fund Staff Papers*, 39: 211-255.

CNOSSEN, S. 1993. Issues in adopting and designing a value added tax, in Sandford, C. (ed.), *Key Issues in tax reform*. UK: Fiscal publications.

CNOSSEN, S. 1994. *Administrative and Compliance Costs of the VAT: A Review of the Evidence*. Research Centre for Economic European Union. Available: http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/traders/vat_community/vat_in_ec_annexi.pdf [Accessed 2015-02-11].

CNOSSEN, S. 1996. VAT treatment of immovable property, in Thuronyi, V. (ed.), *Tax law design and drafting,* Washington: International Monetary Fund.

CNOSSEN, S. 1998. *Value-Added Taxes in central and eastern Europe: A survey and evaluation.* Paris: European Commission and OECD.

CNOSSEN, S. 2003. Is the VAT's Sixth Directive Becoming an Anachronism? *European Taxation*, 43, 434–42.

CNOSSEN, S. 2009. A VAT primer for lawyers, economists and accountants. *Tax Notes*, 124, 687-698.

CNOSSEN, S. 2013. A proposal to improve the VAT treatment of housing in the European Union, in de la Feria, R. (ed.), *VAT exemptions: Consequences and design alternatives.* Alphen aan den Rijn, NL: Wolters Kluwer.

CNOSSEN, S. 2015. Mobilizing VAT revenues in African countries. *International Tax and Public Finance*, 22:1.

CNOSSEN, S. and GENDRON, P.-P. 2012. *VATs in Africa: Work-in-progress*. Unpublished draft.

COLOMBO, G. 2010. Linking CGE and microsimulation models: a comparison of different approaches. *International Journal of Microsimulation*, 3, 72-91.

COUNCIL DIRECTIVE 2006/112/EC. Available: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:347:0001:0118:en:PDF [Accessed 2014-02-15].

CRAWFORD, I., KEEN, M. and SMITH, S. 2010. Value-Added Tax and Excises, in Adam, S., Besley, T., Blundell, R., Bond, S., Chote, R., Gammie, M., Johnson, P., Myles G. and Poterba J. (eds.), *Dimensions of Tax Design – the Mirrlees Review.* Oxford: Oxford University Press.

DAVIS TAX COMMITTEE. 2014. Addressing base erosion and profit shifting in South Africa. Davis Tax Committee Interim Report. Available: http://www.taxcom.org.za/docs/New_Folder/1%20DTC%20BEPS%20Interim%20Report%20-%20The%20Introductory%20Report.pdf [Accessed 2015-06-20].

DAVIS TAX COMMITTEE. 2015. The Tax System and Inclusive Growth in South Africa: A Discussion document. First Interim Report on Macro Analysis for the Minister of Finance. Available: http://www.taxcom.org.za/docs/20150605%20DTC%20Macro%20Analysis%20Framework%20First%20Interim%20Report%20(Full)%20%20for%20public%20comment.pdf [Accessed 2015-07-20].

DEATON, A. and MUELLBAUER, J. 1980A. An almost ideal demand system. *The American economic review*, 312-326.

DEATON, A. and MUELLBAUER, J. 1980B. *Economics and Consumer Behaviour*, Cambridge: Cambridge University Press.

DEATON, A. and STERN, N. 1986. Optimally uniform commodity taxes, taste differences and lump-sum grants. *Economics Letters*, 20:3, 263-266.

DECOSTER, A., LOUGHREY, J., O'DONOGHUE, C. and VERWERFT, D. 2010. How regressive are indirect taxes? A microsimulation analysis for five European countries. *Journal of Policy Analysis and Management*, 29:2, 326-350.

DECOSTER, A. and VERBINA, I. 2003. Who pays indirect taxes in Russia? WIDER Discussion Papers//World Institute for Development Economics.

DE LA FERIA, R. 2009. The EU VAT treatment of public sector bodies: Slowly moving in the wrong direction. *Intertax*, 37, 148-165.

DE LA FERIA, R. and KREVER, R. 2012. *Ending VAT exemptions: Towards a post-modern VAT*. Oxford: Oxford University Centre for Business Taxation.

DELOITTE. 2015. Global indirect tax rates. Available: http://www2.deloitte.com/global/en/pages/tax/solutions/global-indirect-tax-rates.html [Accessed 2015-01-14].

DIAMOND, P. A. and MIRRLEES, J. A. 1971. Optimal taxation and public production I: Production efficiency. *The American Economic Review*, 61:1, 8-27.

DIAMOND, P.A. and SAEZ, E. 2011. The case for a progressive tax: From basic research to policy recommendations. *Journal of Economic Perspectives*, 25:4, 165-190.

CEMAC DIRECTIVE NO. 1/99/CEMAC-028-CM-03. Available: http://www.droit-afrique.com/images/textes/Afrique_centre/CEMAC%20-%20Directive%20TVA.pdf [Accessed 2014-02-20].

UEMOA DIRECTIVE NO. 02/98/CM/UEMOA. Available: http://www.droit-afrique.com/images/textes/Afrique_Ouest/UEMOA%20-%20Directive%20TVA.pdf [Accessed 2014-02-20].

DUE, J.F. and MIKESELL, J. 1994. *State Sales Tax Administration*. Washington: Urban Institute.

DUNE, J.P. and EDKINS, B. 2008. The Demand for Food in South Africa. *South African Journal of Economics*, 76:1, 104-117.

DUVERNE, D. 1990. Coordinate audits of income tax and VAT. Paper presented at Conference on Administrative Aspects of a Value-Added Tax, Washington, United States Of America, October.

EBRILL, L., KEEN, M., BODIN, J.-P. and SUMMERS, V. 2001. *The modern VAT.* Washington: International Monetary Fund.

ECONOMICS, COPENHAGEN AND OTHERS. 2011. *VAT in the Public Sector and Exemptions in the Public Interest. Directorate General Taxation and Customs Union*. European Commission.

EFA GLOBAL MONITORING REPORT. 2010. Reaching the marginalized. Available: http://unesdoc.unesco.org/images/0018/001866/186606E.pdf [Accessed 2015-08-01].

ELECTORAL COMMISSION OF SOUTH AFRICA. 2015. Available: http://www.elections.org.za/content/Voters-Roll/Registration-statistics/ [Accessed 2015-06-25].

EUROPEAN COMMISSION. 2015. VAT rates applied in the member states of the European Union. Available: http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf [Accessed 2015-01-14].

EUROPEAN PARLIAMENT. 2014. Tax revenue mobilisation in developing countries: issues and challenges. Available: http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/433849/EXPO-DEVE_ET%282014%29433849_EN.pdf. [Accessed 2015-04-15].

EY. 2014. Cross-country Review of Taxes on Wealth and Transfers of Wealth. Available: http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/2014_eu_wealth_tax_project_finale_report.pdf [Accessed 2015-05-20].

FARNHAM, B. 1990. Political Cognition and Decision-Making. *Political Psychology*, 11:1, 83-111.

FELDSTEIN, M.S. 2014. Raising Revenue by Limiting Tax Expenditures. NBER Working Paper No. 20672. Available: http://www.nber.org/papers/w20672 [Accessed 2015-12-12]

FINANCIAL MAIL. 2015. Available: http://www.financialmail.co.za/coverstory/2015/03/12/tax-regime-revolt-in-the-air [Accessed 2015-04-20].

FJELDSTAD, O.-H. and RAKNER, L. 2003. *Taxation and tax reforms in developing countries: Illustrations from sub-Saharan Africa.* Chr. Michelsen Institute Reports. Available: http://www.cmi.no/publications/file/1551-taxation-and-tax-reforms-in-developing-countries.pdf [Accessed 2015-05-25].

FOURIE, F. and OWEN, A. 1993. Value-added tax and regressivity in South Africa. *South African Journal of Economics*, 61:4, 281-300.

FOX, W.F. 2002. History and Economic Impact. Available: http://cber.bus.utk.edu/staff/mnmecon338/foxipt.pdf [Accessed 2015-04-18].

FRANZSEN COMMISSION. 1968. *Taxation in South Africa.* First Report of the Commission of Enquiry into the Fiscal and Monetary Policy of South Africa. Pretoria: Government Printers.

FRECKNALL-HUGHES, J. 2015. *The theory, principles and management of Taxation*, New York and London: Routledge.

FURAIJI, F., ŁATUSZYŃSKA, M. and WAWRZYNIAK, A. 2012. An Empirical Study of the Factors influencing Consumer Behaviour in the Electric Appliances Market. *Contemporary Economics*, 6:3, 76-86.

GENDRON, P.-P. 2008. VAT Treatment of Financial Services: Assessment and Policy Proposal for Developing Countries. *Bulletin for International Taxation*, 62:11, 494-507.

GENDRON, P.-P. 2010. How should the United States treat government entities, non-profit organisations and other tax-exempt bodies under a VAT? *Tax Law Review*, 63, 477-508.

GO, D. S., KEARNEY, M., ROBINSON, S. and THIERFELDER, K. 2005. *An analysis of South Africa's value added tax*. Washington: World Bank.

GOODS AND SERVICES ACT 1985 (Public Act 1985/141 of New Zealand).

GOVERNMENT FINANCE STATISTICS. Available: http://elibrary-data.imf.org/FindDataReports.aspx?d=33061&e=170809 [Accessed 2015-01-10].

GRAEBER, D. 2011. Consumption. *Current Anthropology*, 52:4, 489-511.

GRANDCOLAS, C. 2005. The Occasional Failure in VAT Implementation: Lessons for the Pacific*. Asia-Pacific Tax Bulletin*, 10:1, 6-13.

GRANDCOLAS, C. 2008. Administrative aspects of VAT, in Krever, R. (ed.), *VAT in Africa*. Pretoria: Pretoria University Law Press.

GRINBERG, I. 2009. Where credit is due: Advantages of the credit-invoice method for a partial replacement VAT. *Tax Law Review*, 63, 309–350.

GROVES, H.M 1948. Neutrality in Taxation. *National Tax Journal*, 1:1, 18-24.

HANLON, J. 1986. *Beggar Your Neighbours: Apartheid Power in Southern Africa*. Indiana: Indiana University Press.

HICKS, J.R. 1936. Keynes' theory of employment. *The Economic Journal*, 46, 238-253.

HYMAN, D. 2010. *Public Finance*. Mason: South-Western Cengage Learning.

INLAND REVENUE DEPARTMENT (IRD). 2007. You and GST on Your Real Estate Transactions. Available: http://www.conveyit.co.nz/yk-files/4ada037815a1d6869b0ceac6d7786467/You%20and%20GST%20On%20Your%20Real%20Estate%20Transactions.pdf [Accessed 2015-01-28].

INTERNATIONAL FINANCIAL STATISTICS. Available: http://elibrary-data.imf.org/finddatareports.aspx?d=33061&e=169393. [Accessed 2015-04-25].

INTERNATIONAL TAX DIALOGUE. 2009. Key issues and debates in VAT, SME taxation and the tax treatment of the financial sector. Available: http://www.oecd.org/tax/tax-global/ITD-publication-decade-sharing-experiences.pdf [Accessed 2014-09-05].

JAMES, K. 2011. Exploring the Origins and Global Rise of VAT. *Tax Analyst,* 2011, 15-22. Available: http://www.taxanalysts.com/www/freefiles.nsf/Files/JAMES-2.pdf/$file/JAMES-2.pdf [Accessed 29/04/15].

JANSKY, P. 2013. Consumer Demand System Estimation and Value Added Tax. IFS Working Papers.

JENKINS, G.P., JENKINS, H.P. and KUO, C.Y. 2006. Is the value added tax naturally progressive? Queen's Economics Department Working Paper No. 1059.

JONES, R. 1914. *The nature and first principle of taxation*. London: Orchard House.

JOINT STANDING COMMITTEE OF FINANCE. 1996. Final Draft Report. Available: http://www.treasury.gov.za/publications/other/katz/3.pdf [Accessed 2015-03-25].

KATZ COMMISSION. 1994. The Commission of Inquiry into Certain Aspects of the Tax Structure of South Africa. Third Interim Report. Available: http://www.polity.org.za/polity/govdocs/commissions/katztoc.html [Accessed 2015-08-19].

KEARNEY, M. 2004. *Restructuring value-added tax in South Africa, A computable general equilibrium analysis*. Unpublished PhD thesis, University of Pretoria, Pretoria, South Africa.

KEEN, M. 2006. VAT attacks! Second best perspectives on the value added tax. Paper presented to International Institute of Public Finance, Cyprus, August.

KEEN, M. 2007. VAT attacks! *International Tax and Public Finance*, 14:4, 365-381.

KEEN, M. 2013. The anatomy of the VAT. *National Tax Journal*, 66, 423-446

KEEN, M. and HELLERSTEIN, W. 2009. Interjurisdictional Issues in the Design of a VAT. Revised paper presented at the American Tax Policy Institute Conference on Structuring a Federal VAT: Design and Coordination Issues, Washington D.C., February.

KEEN, M. and LOCKWOOD, B. 2006. Is the VAT a money machine? *National Tax Journal*, 59, 905–928.

KEEN, M. and MINTZ, J. 2004. The optimal threshold for a value-added tax. *Journal of Public Economics*, 88, 559–576.

KELLER, W. J. and VAN DRIEL, J. 1985. Differential consumer demand systems. *European Economic Review*, 27:3, 375-390.

KESSLER, D. and PESTIEAU, P. 1991. The Taxation of Wealth in the EEC: Facts and Trends. *Canadian Public Policy – Analyse de Politiques*, 17:3, 309–321.

KREVER, R. 2008. *VAT in Africa*. Pretoria: Pretoria University Law Press.

LAMB, M., LYMER, A., FREEDMAN, J. and JAMES, S. 2004. *Taxation: An Interdisciplinary Approach to Research*. Oxford: Oxford University Press.

LANG, M., MELZ, P. and KRISTOFFERSSON, E. 2009. *Value Added Tax and Direct Taxation*. Amsterdam: IBFD.

LEIBBRANDT, M., WOOLARD, I., FINN, A. AND ARGENT, J. 2010. Trends in South African Income Distribution and Poverty since the Fall of Apartheid. OECD Social, Employment and Migration Working Papers, No. 101. Available: http://www.irinnews.org/pdf/saincome.pdf [Acessed 2015-11-30].

LEWBEL, A. 1996. Aggregation without Separability: A Generalized Composite Commodity Theorem. *American Economic Review,* 86:3, 524-542.

LEWBEL, A. and KRISHNA, P. 2009. Tricks with Hicks: The EASI Demand System. *American Economic Review*, 99:3, 827-863.

LEVHARI, D. and SHESHINSKI, E. 1972. Lifetime excess burden of a tax. *Journal of Political Economy*, 80:1, 139-147.

LEVIN, J. 2009. Differentiated product demand systems. Available: http://web.stanford.edu/~jdlevin/Econ%20257/Demand%20Estimation%20Slides%20A.pdf [Accessed 2014-06-13].

LIPTON, D. 2013. South Africa: Facing the Challenges of the Global Economy. Available: https://www.imf.org/external/np/speeches/2013/050813.htm [Accessed 2015-05-28].

LORA, E. 2007. *The state of state reform in Latin America*. California: Stanford Economics and Finance.

LUOGA, F.D.A.M. 2002. Taxpayers' rights in the context of democratic governance: Tanzania. *IDS Bulletin*, 33:3, 1-14.

MACKENZIE, G.A. 1991. Estimating the Base of the Value-Added Tax (VAT) in Developing Countries: The Problem of Exemptions. IMF Working Paper.

MARGO COMMISSION. 1987. Report of the Commission of Inquiry into the Tax Structure of the Republic of South Africa. Pretoria: Government Printers.

MAS-COLELL, A., WHINSTON, M. D. and GREEN. J. R. 1995. *Microeconomic Theory*. New York: Oxford University Press.

METCALF, G.E. 1995. Value-added taxation: A tax whose time has come? *The Journal of Economic Perspectives*, 9, 121-140.

METCALF, G.E. and FULLERTON, D. 2002. The distribution of tax burdens: an introduction. NBER Working Paper No. 8978.

MIRRLEES, J.A. 1971. An Exploration into the Theory of Optimal Income Taxation. *Review of Economic Studies*, 38, 175-208.

MIRRLEES, J.A. 2010. *Dimensions of tax design: the Mirrlees review.* Oxford: Oxford University Press.

MONEYWEB. 2014. Available: http://today.moneyweb.co.za/article?id=727379#.VbzoNPmqqko [Accessed 2015-02-26].

MONEYWEB. 2015. Available: http://www.moneyweb.co.za/mymoney/moneyweb-tax/how-sa-could-collect-more-tax-revenue/ [Accessed 2015-06-05].

MUIR, R.S. 1993. The goods and services tax: Reflections on the New Zealand experience, six years on. *Revenue Law Journal*, 3:2, 100-114.

MUNOZ, S. and CHO, S.S.-W. 2003. Social Impact of a Tax Reform: The Case of Ethiopia. IMF Working Paper.

MY ETYMOLOGY. 2015. Available: http://www.myetymology.com/latin/consumptio.html [Accessed 2015-07-05].

NATIONAL BOARD OF REVENUE (NBR). 2015. What is the VAT rate in Bangladesh? Available: http://www.nbr.gov.bd/faq_page.php?lan=engandid=2 [Accessed 2015-01-15].

NATIONAL DEVELOPMENT PLAN FOR 2030. Available: http://www.gov.za/sites/www.gov.za/files/Executive%20Summary-NDP%202030%20-%20Our%20future%20-%20make%20it%20work.pdf [Accessed 2014-03-20].

NATIONAL TREASURY, 2014. Budget review 2014. Available: http://www.treasury.gov.za/documents/national%20budget/2014/review/FullReview.pdf [Accessed 2015-06-15].

NATIONAL TREASURY, 2015. Medium Term Budget Policy Statement. Available: http://www.treasury.gov.za/documents/mtbps/2015/mtbps/speech.pdf [Accessed 2015-12-13].

OBERHOLZER, R. 2005. A survey of the perceptions of previously disadvantaged South Africans on taxation. *Critical Perspectives on Accounting*, 16, 249–275.

OECD. 2006. International VAT/GST guidelines. Available: http://www.oecd.org/tax/consumption/36177871.pdf [Accessed 2014-07-02].

OECD. 2009. Is informal normal? Available: http://www.materialien.org/planet/oecdinformellersektor.pdf [Accessed 2015-06-12]

OECD. 2010. Choosing a Broad Base – Low Rate Approach to Taxation. Available: http://www.oecd.org/ctp/tax-policy/46605624.pdf [Accessed 2015-12-13].

OECD. 2012. Consumption Tax Trends. Available: http://www.oecd-ilibrary.org/taxation/consumption-tax-trends-2012_ctt-2012-en [Accessed 2014-07-02].

OECD. 2013. Action Plan on Base Erosion and Profit Shifting. Available: http://www.oecd.org/ctp/BEPSActionPlan.pdf [Accessed 2015-08-01].

OECD. 2014. Governments endorse new OECD Guidelines on applying VAT across borders. Available: http://www.oecd.org/newsroom/governments-endorse-new-oecd-guidelines-on-applying-vat-across-borders.htm [Accessed 2014-09-03].

OXFORD DICTIONARY. 2015. Available: http://www.oxforddictionaries.com/ [Accessed 2015-08-01].

PIKKETY, T. 2015. Putting Distribution Back at the Center of Economics: Reflections on Capital in the Twenty-First Century. *Journal of Economic Perspectives,* 29:1, 67-88.

PIRSIG, R.M. 1999. *Zen and the art of motorcycle maintenance*. Croydon: CPI Bookmarque.

PIXLEY, F. W. 1900. *Accountancy - Constructive and Recording Accountancy*. London: Forgotten Books.

PODDAR, S. 2009. Treatment of Housing under VAT for the US. Revision paper presented at the American Tax Policy Institute Conference, Structuring a Federal VAT: Design and Coordination Issues, Washington, DC.

POI, B.P. 2012. Easy demand-system estimation with quaids. *Stata Journal*, 12:3, 433-446.

POTERBA, J.M. 1989. Life time incidence and the distributional burden of excise. National Bureau of Economic Research Working Paper No. 2833.

POTERBA, J. 1999. Public Finance and Public Choice. *National Tax Journal*, 51:2, 391-396.

PWC. 2014. Overview of VAT in Africa. Available: http://www.pwc.co.za/en_ZA/za/assets/pdf/overview-of-vat-in-africa-2014.pdf [Accessed 2015-06-12].

RAMSEY, F.P. 1927. A Contribution to the Theory of Taxation. *The Economic Journal*, 37:145, 47-61.

RAY, R. 1983. Measuring the costs of children: An alternative approach. *Journal of Public Economics*, 22, 89–102.

REFAQAT, S. 2003. Social incidence of the General Sales Tax in Pakistan. IMF Working Paper WP/03/216.

RUDNICK, R.S. and GORDON, R.K. 1996. Taxation of Wealth, in Thuronyi, V. (ed.), *Tax Law Design and Drafting.* Washington: International Monetary Fund.

SABINE, B.E.V. 1966. *A History of Income Tax*. New York and London: Routledge.

SAHN, D. and YOUNGER, S.D. 1998. Fiscal Incidence in Africa: Microeconomic Evidence. AERC Working papers.

SALTER, L. and HEARN, A. 1996. *Outside the lines: Issues in interdisciplinary research*. Montreal: McGill-Queen's University Press

SAY, J.B. 1803. *A Treatise on Political Economy*. The online library of liberty. Available: http://lf-oll.s3.amazonaws.com/titles/274/Say_0518_EBk_v6.0.pdf [Accessed 03/07/2015].

SCHENK, A. and OLDMAN, O. 2007. *Value added tax: a comparative approach*. Cambridge: Cambridge University Press.

SCHUPPAN, T. 2009. E-Government in developing countries: Experiences from sub-Saharan Africa. *Government Information Quarterly*, 26:118–127.

SELIGMAN, E.R.A. 1914. *The income tax: a study of the history, theory, and practice of income taxation at home and abroad*. New York: Macmillan.

SELVANATHAN, S. and SELVANATHAN, E.A. 2004. Empirical regularities in South African consumption patterns. *Applied Economics*, 36:20, 2327-2333.

SHABAN, R. 2012. Theories of clinical judgment and decision-making: A review of the theoretical literature. *Australasian Journal of Paramedicine*, 3:1, Article 8.

SHEVLIN, T. 1999. Research in Taxation. *Accounting Horizons*, 13:4, 427–441.

SHOME, P. 1988. On the Elasticity of Developing Country Tax System. *Economic and Political Weekly,* 23:34, 1750-1754.

SHONKWILER, J.S. and YEN, S.T. 1999. Two-step estimation of a censored system of equations. *American Journal of Agricultural Economics*, 81:4, 972-982.

SHOUP, C.S. 1990. Choosing among types of VATs, in Gillis, M., Shoup, C.,Sicat, G.P. (eds.), *Value added taxation in developing countries,* Washington: World Bank.

SINGH, K. 2014. Worldwide VAT, GST and sales tax guide. Available: http://www.ey.com/GL/en/Services/Tax/Worldwide-VAT-GST-Sales-Tax-Guide---Country-list. [Accessed 2014-09-03].

SMART, M. and BIRD, R. 2009. The economic incidence of replacing a retail sales tax with a value-added tax: Evidence from Canadian experience. *Canadian Public Policy*, 35:1, 85-97.

SMITH, A. 1776. *An Inquiry into the Nature and Causes of the Wealth of Nations*. MetaLibri. Available: http://www.ibiblio.org/ml/libri/s/SmithA_WealthNations_p.pdf [Accessed 2015-04-27].

SOUTH AFRICAN NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY. 2012 Available: http://www.hsrc.ac.za/en/research-outputs/view/6493 [Accessed 2015-05-03].

STÁVKOVÁ, J., STEJSKAL, L. and TOUFAROVÁ, Z. 2008. Factors influencing consumer behaviour. *Zemedelska Ekonomika-Praha*, 54:6, 276.

STONE, R. 1954. Linear expenditure systems and demand analysis: an application to the pattern of British demand. *The Economic Journal*, 511-527.

STROTZ, R.H. 1957. The empirical implications of a utility tree. *Econometrica: Journal of the Econometric Society*, 269-280.

STATISTICS SOUTH AFRICA. 2012. Income and Expenditure of Households 2010/2011, Statistical release P0100. Available: http://www.statssa.gov.za/Publications2/P0100/P01002011.pdf [Accessed 2014-01-05].

STATISTICS SOUTH AFRICA. 2013. The South African CPI Sources and Methods Manual (version 2). Available: http://www.statssa.gov.za/CPI/documents/The%20South%20African%20CPI%20sources%20and%20methods%20-%2026Feb13.pdf [Accessed 2014-06-03].

STATISTICS SOUTH AFRICA. 2014. Statistical release P0441. Available: http://beta2.statssa.gov.za/publications/P0441/P04413rdQuarter2014.pdf [Accessed 2015-02-02].

STEINER, R. and SOTO C. 1999. *IVA: productividad, evasi´ on y progresividad*. Fedesarrollo: Bogot´ a.

STEYN, T. 2012. *A Conceptual Framework for Evaluating the Tax Burden of Individual Taxpayers in South Africa.* Unpublished PhD thesis, University of Pretoria, Pretoria, South Africa.

SUMMERS, L.H. 1987. Introduction, in Summers. L.H. (ed.), *Tax Policy and the Economy*, *Vol. 1.* Cambridge: MIT Press.

SUNLEY, E.M. and SUMMERS, V.P. 1995. An Analysis of Value-Added Taxes in Russia and Other Countries of the Former Soviet Union. International Monetary Fund Working Paper No. 95/1.

SURVEY ON THE GLOBAL AGENDA. 2014. Available: http://www3.weforum.org/docs/WEF_GAC_GlobalAgendaOutlook_2014.pdf [Accessed 2015-05-14].

SY, A. 2014 Is Africa at a Historical Crossroads to Convergence? Growth, Convergence and Income Distribution: The Road from the Brisbane G-20 Summit. Available: http://www.brookings.edu/~/media/Research/Files/Interactives/2014/thinktank20/chapters/tt20%20africa%20convergence%20sy.pdf [Accessed 2015-05-28].

TAIT, A.A. 1988. *Value Added Tax: International Practice and Problems*. Washington: International Monetary Fund.

TAIT, A.A. 1991. Value-added tax: Administrative and policy issues. Occasional paper 88. Washington: International Monetary Fund.

TALJAARD, P. R., ALEMU, Z. G. AND VAN SCHALKWYK, H.D. 2004. The demand for meat in South Africa: an almost ideal estimation. *Agrekon*, 43:4, 430-443.

TAX STATISTICS. 2010. Available: http://www.treasury.gov.za/publications/tax%20statistics/2010/2010%20Tax%20Statistics.pdf [Accessed 2014-06-14].

TAX STATISTICS. 2011. Available: http://www.treasury.gov.za/publications/tax%20statistics/2011/2011%20Tax%20Statistics.pdf [Accessed 2014-06-14].

TAX STATISTICS. 2012. Available: http://www.treasury.gov.za/publications/tax%20statistics/2012/2012%20Tax%20Statistics.pdf [Accessed 2014-06-14].

TAX STATISTICS. 2013. Available: http://www.treasury.gov.za/publications/tax%20statistics/2013/TStats%202013%20WEB.pdf [Accessed 2014-06-14].

TAX STATISTICS. 2014. Available: http://www.sars.gov.za/AllDocs/Documents/Tax%20Stats/Tax%20Stats%202014/TStats%202014%20WEB.pdf [Accessed 2015-01-28].

THE NATIONAL PLANNING COMMISSION'S DIAGNOSTICS REPORT. 2011. Available: http://pmg-assets.s3-website-eu-west-1.amazonaws.com/docs/110913npcdiagnostic2011_0.pdf [Accessed 2015-04-20].

THEIL, H. 1965. *The information approach to demand analysis*. Econometrica: Journal of the Econometric Society, 67-87.

TORGLER, B. 2007. *Tax Compliance and Tax Morale: A Theoretical and Empirical Analysis*. United Kingdom: Edward Elgar.

TRADING ECONOMICS. 2015. South African government budget. Available: http://www.tradingeconomics.com/south-africa/government-budget [Accessed 2015-05-02].

TRENTMAN, F. 2012. *The Oxford Handbook of the History of Consumption*. Oxford: Oxford University Press.

TURID, A. and JORGEN, A. 2004. *Combining CGE and microsimulation models: Effects on equality of VAT reforms*. Statistics Norway, Research Department, Discussion Papers No. 392.

TURNIER, W.J. 1984. Designing an Efficient Value Added Tax. *Tax Law Review*, 39, 435-472.

UNITED NATIONS. 2014. Economic development in Africa. Available: http://unctad.org/en/PublicationsLibrary/aldcafrica2014_en.pdf [Accessed 2015-05-28].

U.S. Bureau of Economic Analysis (BEA), 2007. An Introduction to the National Income and Product Accounts. Available: http://www.bea.gov/scb/pdf/national/nipa/methpap/mpi1_0907.pdf [Accessed 2015-07-03].

VALUE-ADDED TAX ACT 1991 (Act 89 of1991 of the Republic of South Africa).

VAN DER BERG, S. and SIEBRITS, K. 2012. *Social assistance reform during a period of fiscal stress*. Stellenbosch Economic Working Paper 17/10.

VAN DER BERG, S., SIEBRITS, K. AND LEKEZWA, B. 2010. Efficiency and equity effects of social grants in South Africa. Stellenbosch Economic Working Papers: 15/10. Stellenbosch University. Available: www.ekon.sun.ac.za/wpapers/2010/wp152010/wp-15-2010.pdf [Accessed 2015-11-30]

VAN SCHALKWYK, H.P., VAN SCHALKWYK, H.D., ALEMU, Z.G., TALJAARD, P.R. and OBI, A. 2005. The primary demand for oilseeds in South Africa: an Error Correction Linear Approximated Almost Ideal Demand System. *South African Journal of Economic and Management Sciences*, 8:1, 117-127.

VARIAN, H.R. 2010. *Intermediate Microeconomics: A Modern Approach*. New York: W.W. Norton and Company.

VATCOM. 1991. Report of the Value-Added Tax Committee. Pretoria: Government Printers.

WAGNER, A. 1883. *Public Finance*. Available: http://hum.ttu.ee/failid/oppematerjalid/AHintro/wagner.pdf [Accessed 2015-07-13].

WALKER, F.A. 1892. *Political Economy.* London: Macmillan. Available: http://oll.libertyfund.org/titles/157 [Accessed 2015-07-13].

WARREN, N. 2008. A Review of Studies on the Distributional Impact of Consumption Taxes in OECD Countries. OECD Social, Employment and Migration Working Papers No. 64.

WOOLARD. I, LEIBBRANDT, M. 2011. The Evolution and Impact of Unconditional Cash Transfers in South Africa. A Southern Africa Labour and Development Research Unit Working Paper Number 51. Cape Town: SALDRU, University of Cape Town.

WORKING, H. 1943. Statistical laws of family expenditure. *Journal of the American Statistical Association*, 38:221, 43-56.

WORLD BANK. 2014. South Africa Economic Update: Fiscal Policy and Redistribution in an Unequal Society. Available: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/10/30/000470435_20141030130616/Rendered/PDF/921670WP0P131400SAEU60for0web01029b.pdf [Accessed 2015-02-03].

WORLD BANK. 2015. Available: http://data.worldbank.org/indicator/SI.POV.GINI?order=wbapi_data_value_2010+wbapi_data_value+wbapi_data_value-firstandsort=asc [Accessed 2015-05-14].

WORLD ECONOMIC FORUM. 2015. Available: http://reports.weforum.org/outlook-global-agenda-2015/top-10-trends-of-2015/1-deepening-income-inequality/ [Accessed 2015-05-14].

WORLD SOCIAL SCIENCE REPORT. 2010. Available: http://unesdoc.unesco.org/images/0018/001883/188333e.pdf [Accessed 03/07/2015].

WORLWIDE GOVERNANCE INDICATORS. 2014. Available: http://info.worldbank.org/governance/wgi/index.aspx#home [Accessed 2015-03-20].

YOUNGER, S.D., SAHN, D. and DOROSH, P.A. 1999. Tax Incidence in Madagascar: An analysis using household data. *World Bank Economic Review*, 13:2, 303-331.

ZAPATA, J. G. and ARIZA, N. 2005. Eficiencia y equidad de la polıtica tributaria y su relaci´ onconelgastop´ ublicoenla Comunidad Andina–elcasode Colombia. Bogot´a, July.