The Impact of VAT Reforms on Poverty in Malawi

MASTER THESIS

May 2023

Chifundo Mchowa

Erasmus Mundus Joint Master's Degree in Global Development Policy (GLODEP)

Palacký University Olomouc

University of Clermont Auvergne

University of Pavia

Palacký University Olomouc
University of Clermont Auvergne
University of Pavia

MASTER THESIS

The Impact of VAT Reforms on Poverty in Malawi

Chifundo Mchowa

Supervisor: Professor Jean Francois Brun, University of Clermont Auvergne-CERDI
Co-Supervisor: Professor Fouzi Mourji, Laboratoire de Statistique Appliquée à L'analyse et La Recherche en Économie (LASAARE)

GLODEP 2023

Declaration

I, Chifundo Mchowa, declare that the Master Thesis titled "*The Impact of VAT Reforms on Poverty in Malawi"* submitted to GLODEP Consortium is the product of my independent research, conducted under the supervision of Professor Jean Francois Brun and Professor Fouzi Mourji. I have properly acknowledged and attributed all the materials and sources utilized in its preparation.

Date: 31 May 2023

UNIVERZITA PALACKÉHO V OLOMOUCI

Přírodovědecká fakulta

Akademický rok: 2022/2023

ZADÁNÍ DIPLOMOVÉ PRÁCE

(projektu, uměleckého díla, uměleckého výkonu)

Jméno a příjmení:	**Chifundo MCHOWA**
Osobní číslo:	**R210720**
Studijní program:	**N0588A330004 Global Development Policy**
Téma práce:	**The Impact of VAT Reforms on Poverty in Malawi**
Zadávající katedra:	**Katedra rozvojových a environmentálních studií**

Zásady pro vypracování

The study aims to investigate the impact of VAT reforms on poverty in Malawi by examining the impact on food consumption, determining whether current VAT exemptions benefit the poor, and determining the VAT's progressiveness using the Quadratic Almost Ideal Demand System (QUAIDS) model. The research will also estimate the price and income effects of VAT, as well as examine the Gini Coefficient, poverty headcount, and poverty gap, and finally model the impact of VAT reforms on different household strata. VAT is anticipated to have a negative impact on demand by eroding consumer purchasing power (Bettah, Ezzrari, & Mourji, 2022). As a result, consumption patterns will shift toward less nutritious foods or decrease in quantity. We still expect VAT to be progressive (Adoho & Gansey, 2019), but we do not know how much, and the research will reveal that. VAT exemptions may also have a negative impact on poor (rural) producers of exempted products, and we seek to investigate that as well. The Malawi Integrated Household Surveys will be used to assess the effects in 2010/2011 and 2019/2020.

Rozsah pracovní zprávy:	**as required**
Rozsah grafických prací:	**10 – 15 000 words**
Forma zpracování diplomové práce:	**tištěná/elektronická**
Jazyk zpracování:	**Angličtina**

Seznam doporučené literatury:

- Adoho, F. M., & Gansey, R. J. (2019, 6). Welfare Impact of Value-Added Tax Reform: The Case of The Democratic Republic of Congo. *The World Bank Group: Poverty & Equity Global Practice Working Paper 210*.
- Bettah, M., Ezzrari, A., & Mourji,M. (2022). Impact of VAT Reforms on Moroccan Household's Food Consumption: Microsimulation Analyses Through the QUAIDS Model (2001-2014). *Journal of Development and Economic Policies, Vol. 24, No. 2*, 5-43.
- Mwale, J. (2018, 10 17). *The Nation Online*. Retrieved from https://mwnation.com/malawi-shines-on-tax-reforms/
- Otomani, W. (2016, 5 30). *Malawi Revenue Authority*. Retrieved from Msonkho Online: https://www.mra.mw/news/malawi-embarks-on-vat-reforms#: :text=Malawi%20embarks%20on%20VAT%20reforms%20Malawi%20will%20introduce,a%20simple%2C%20efficient%2C%20transparent%20and%20fair%
- *The Times Group*. (2016, 10 11). Retrieved from Online News : https://times.mw/government-taxes-water-bread/

Vedoucí diplomové práce:	**Jean-Francois Brun** University of Clermont Auvergne

Datum zadání diplomové práce: **19. ledna 2023**
Termín odevzdání diplomové práce: **31. května 2023**

L.S.

doc. RNDr. Martin Kubala, Ph.D.
děkan

doc. Mgr. Zdeněk Opršal, Ph.D.
vedoucí katedry

V Olomouci dne 19. ledna 2023

Acknowledgments

I would like to express my heartfelt gratitude to my husband, family, and friends for their unwavering support and encouragement all-throughout my Master's journey. I am very grateful to the GLODEP Consortium for giving me this great opportunity to pursue this master's program through the EMJMD scholarship. Special thanks go to my supervisors, Professor Jean Francois Brun, and Professor Fouzi Mourji, for their unwavering guidance and support. I extend my sincere appreciation to the Professors from the three universities and my classmates for their invaluable support during the program. I would also like to acknowledge Professor Mounia Bettah and Doctor Abdeljaoud Ezzrari for their invaluable support and guidance.

Abstract

This study investigates the impact of Value-Added Tax (VAT) reforms on poverty in Malawi. Specifically, it examines the impact of VAT on food consumption, the effectiveness of current VAT exemptions in benefiting the poor, and the progressiveness of VAT using the Quadratic Almost Ideal Demand System (QUAIDS) model. The study estimates the price and income effects of VAT and analyses the Gini Coefficient. The research also simulates the impact of VAT reforms on different household strata. The results show that the non-poor benefit more from the fiscal expense, indicating that VAT is regressive in Malawi. Additionally, households in the first and second strata are more responsive to price changes in cereals and vegetables, while fats, meats, and cereals are the most responsive food products nationally. In terms of expenditure (income) elasticities, the study finds that milk, fats, and beverages are luxuries in Malawi while cereals, vegetables, meats, and fruits are necessities. The Malawi Integrated Household Surveys 2019/2020 (IHS5) is used as the primary data source. This study has significant implications for policymakers, as it provides evidence for the potential negative impact of VAT on poverty reduction in Malawi and the need for VAT reforms that prioritize the poor.

Keywords: VAT Reforms; QUAIDS Model; Demand Elasticity; Poverty; Food Consumption; Taxation

Table of Contents

List of Tables

List of Figures

List of Abbreviations

AIDS:	Almost Ideal Demand System
CAMA:	Consumers Association of Malawi
CRI:	Commitment to Reducing Inequality
DRC:	Democratic Republic of Congo
GDP:	Gross Domestic Product
HHID:	Household Identifier
IHS5:	Fifth Integrated Household Survey
IMF:	International Monetary Fund
JCE:	Junior Certificate of Education
LSMS:	Living Standards Measurement Study
MCCCI:	Malawi Confederation of Chambers of Commerce and Industries
MRA:	Malawi Revenue Authority
MSCE:	Malawi School Certificate of Education
NSO:	National Statistical Office
OECD:	The Organisation for Economic Co-operation and Development
PID:	Personal Identification Code
PSLC:	Primary School Leaving Certificate
QUAIDS:	Quadratic Almost Ideal Demand System
SADC:	Southern African Development Community
VAT:	Value Added Tax

Introduction

Tax systems are an essential tool for Governments in financing public expenditures and achieving social and economic objectives, such as wealth redistribution. In many countries, including Malawi, Value Added Tax (VAT) is a significant source of revenue (Bye, Strom, and Avitsland, 2011). VAT contributes 30 percent of the tax revenue in Malawi. Nonetheless, the VAT system in Malawi has been subject to frequent reforms, with the Ministry of Finance making amendments every year during budget presentations. (Banda, 2018). While the Malawian Government aims to ensure that the tax system is progressive rather than regressive, the VAT system in Malawi has several exemptions, particularly for food items. Fiscal experts, such as the World Bank and the International Monetary Fund (IMF), have pointed out that these exemptions are unnecessary and erode the tax base. (Banda, 2018). Despite these recommendations, the Government has been slow to change the VAT system, due in part to public outcry over potential impacts of VAT on consumer purchasing power. Some recent reforms to the VAT system in Malawi have sparked criticism from the public and the Consumers Association of Malawi (CAMA), particularly the introduction of VAT on tap water, bread, cooking oil, and milk. (The Times Group Newspaper (2016)). However, despite these challenges, Malawi was recognized by OXFAM as having one of the most progressive tax systems in 2018. Yet, poverty and inequality remain significant challenges in Malawi, with almost half of the population living in poverty and more than one-fifth living in extreme poverty. The Gini coefficient, calculated based on expenditure levels as a proxy for income, is relatively high at 0.385, indicating significant inequality.

Unlike in other countries, such as Morocco, where VAT rates differ for different products, the standard VAT rate in Malawi is 16.5 percent, and some products are exempted or zero-rated. Quarebarbes, Boccanfuso, and Savard (2016) conducted a study on the macro-micro impact analysis of VAT designs in Niger and their findings indicate that although a flat rate is more economically efficient, a higher statutory rate coupled with exemptions for staple foods has the highest potential for reducing poverty. The empirical question that still needs to be addressed for Malawi is whether VAT exemptions are truly unnecessary and which group benefits the most from them. Additionally, it is crucial to understand how poverty and inequality rates would be affected if the Government were to alter the current VAT system by eliminating exemptions for certain food items, either partially or entirely.

The main objective of this master's thesis is to analyse the impact of VAT reforms on poverty in Malawi. Specifically, the study will:

1. Examine the impact of VAT reforms on food consumption in Malawi by examining the implications of the VAT liability of some basic products that are currently exempted
2. Examine the extent to which the poor benefit from lower rates and exemptions in comparison to other social classes
3. Determine how progressive the VAT is, consider welfare loss and how it affects purchasing power
4. Examine the Gini coefficient
5. Estimate the price and income effects of changes in VAT rates on consumption expenditure
6. Simulate the impact of VAT reforms on the different household strata

Significance and Contribution to Knowledge:

According to Deaton (1987), knowledge on price responses is required for any intelligent analysis of tax or subsidy reform which is a topic of central importance for policy in developing countries. The findings obtained from the analysis of expenditure and price elasticities can provide valuable insights into the impact of price and income changes on overall welfare. Policymakers can utilize this information to make informed decisions and utilize price adjustments to stabilize the well-being of households. (Naz, Ahmad, & Arif, 2018). According to Dal, Rivera, Opazo, and Madrigal (2022), measuring price elasticities is crucial for several reasons. Firstly, it provides insights into the responsiveness of food demand to changes in prices, enabling a better understanding of how consumers react to price fluctuations. Additionally, it helps in anticipating shifts in the quantities of food demanded due to fiscal policy changes. Furthermore, measuring price elasticities enables the assessment of potential substitution and complementary effects between different food groups, as well as potential nutritional implications of fiscal policies. In addition, to the best of our knowledge, no study has looked at the impact of VAT reforms on poverty in Malawi.

Presentation of the Work:

This paper is structured into three chapters, each containing different sections. In the first chapter, we provide a comprehensive literature review related to tax policy. We begin by discussing the theoretical framework and the theory of taxation, including an exploration of Value Added Tax (VAT). We then dive into empirical studies on VAT reforms that have been

conducted, examining their findings and implications. Lastly, we provide an overview of the VAT policy in Malawi, discussing its structure and the political argumentation surrounding it, as well as highlighting critical reforms that have been implemented in recent years.

Moving on to the second chapter, our focus is to address objectives 1, 2, 3, and 4. In this chapter, we present the data and analyse the benefits of the VAT policy. The first section provides a description of the data used and its source. We explain how the food groups have been composed and the methodology behind constructing the dataset for our study. In the second section, we look into the lessons derived from the descriptive statistics, shedding light on key insights gained from analysing the data. The third section examines the structure of household consumption in Malawi, while the fourth section investigates the poverty situation in the country. We measure inequalities in different types of expenditures, analyse the fiscal expenses, and explore how they are distributed among the population.

Moving on to the last chapter (chapter 3), we address objectives 5 and 6. Here, we explain the modelling method employed, which is the Quadratic Almost Ideal Demand System (QUAIDS) model. We elaborate on the computation of the expenditure (income) and price elasticities and provide an interpretation of these elasticities. Finally, in the last section, we simulate the potential impact of introducing VAT on the food groups that are currently exempt, offering insights into the potential outcomes and implications of such a reform. Overall, this paper provides a comprehensive analysis of tax policy, with a specific focus on VAT, empirical studies on VAT reforms, and an in-depth examination of Malawi's VAT policy. Through our analysis, we aim to shed light on the benefits, challenges, and potential impacts of VAT policy in Malawi, contributing to the ongoing discourse on tax policy and its implications for economic welfare and social development

Chapter 1: Literature Review Related to Tax Policy

Section 1: Theoretical Framework (Theory of Taxation Globally and VAT in General)

Tax systems play a crucial role in financing public expenditures and achieving various social and economic objectives. The Organisation for Economic Co-operation and Development (OECD) identifies several principles of tax policy, including neutrality, efficiency, certainty, simplicity, effectiveness, fairness, and flexibility. According to Bye, Strom, and Avitsland (2011), many countries rely heavily on indirect taxes, particularly the value added tax (VAT), as a significant source of their tax revenue. However, according to Inchauste and Rubil (2017),

it is important to note that indirect taxes have regressive effects and tend to exacerbate inequality.

Value Added Tax (VAT) is a type of tax that is based on the value that a producer adds to raw materials or purchases before selling the final product or service (Lait, 1988). Quarebarbes, Boccanfuso, and Savard (2016) argue that VAT, while theoretically efficient for generating public revenue, lacks equity in its performance. VAT diminishes the purchasing power of individuals as it is applied to consumer goods. Due to limited savings capacity, poor households bear a larger portion of their total income as tax burden compared to non-poor households. VAT was first introduced in France in 1948 and has since been implemented in numerous countries around the world (Cnossen, 2019). In Africa, many nations have modelled their VAT legislation after that of the European Union or New Zealand. Malawi, for instance, has modelled its VAT legislation after that of the United Kingdom (Giha, Toma, and Akaichi, 2020). VAT legislation in Malawi, as well as in other countries, is intended to ensure that tax revenues are generated efficiently and equitably. By implementing VAT, Governments can collect revenue from a broad range of economic activities, including imports, manufacturing, distribution, and retail sales. Overall, tax policies and systems can have a significant impact on economic behaviour and living standards (OECD). By implementing tax systems that are fair, efficient, and effective, Governments can generate the revenue needed to finance public expenditures while also addressing social and economic concerns.

Value Added Tax (VAT) rates are not standardized across countries and can vary greatly, with some countries employing a single rate while others have multiple rates (Lait, 1988). However, according to Lait (1988) implementing a single-rate VAT may not be cost-effective as the administrative costs remain the same regardless of the rate chosen. Therefore, setting a low VAT rate may not necessarily result in an efficient use of resources. Additionally, lower VAT rates may not necessarily benefit the end consumer, as traders will adjust their prices based on market demand regardless of the tax rate on individual items. On the other hand, multiple VAT rates have their drawbacks. According to Tait (1988), such rates distort both consumer and producer choices. Differential rates may also not be an effective tool for favouring specific households, and lower VAT rates can erode the tax base. Rate differentiation can also result in significant reductions in welfare gains. Bye, Strom, & Avitsland (2011) argues that a VAT system with varying tax rates can lead to decreased efficiency, increased opportunities for rent-seeking and tax evasion, and elevated administrative expenses. Bye, Strom, & Avitsland (2011)

says that implementing a uniform VAT system is better as it can lead to positive outcomes in terms of household welfare distribution. If the current scenario involves a VAT on most goods but only a few services, introducing a uniform VAT rate on all goods and services can enhance welfare distribution as the consumption of services increases with income. Research conducted in Bangladesh by Hossan (1994) provides empirical evidence indicating that the implementation of a uniform value-added tax on all commodities has regressive effects. However, the literature on optimal commodity taxation from earlier times, specifically the works of Ramsey (1927), suggests that nonuniform commodity taxation is preferable. This is because the Ramsey rule recommends that taxes should be applied differently based on the demand elasticities of the products, which can lead to efficient tax revenue. Toth, Cupak, and Rizov (2020) suggest that due to variations in price elasticities across different commodities, employing a differentiated tax scheme that aligns with demand characteristics could be a more effective and efficient approach compared to applying a uniform tax rate. This approach considers social goals more effectively. On the other hand, when it comes to distributional concerns, Atkinson, and Stiglitz (1972) recommend using a combination of a nonlinear income tax and a uniform commodity tax. According to Saez (2002), it may be more optimal to impose higher taxes on luxury goods that are less sensitive (inelastic) to price changes and tend to be purchased more by high-income groups, within a less restrictive model framework. The actual implementation of tax policies is however largely influenced by administrative capability and political requirements. (Bird and Gendron, 2007). Nevertheless, according to Bird and Gendron (2007), experts advise on using a single VAT rate on all goods and services and a zero rate on exports.

Bye, Strom, and Avitsland (2011) note that exemptions and zero rating are important aspects of the Value Added Tax (VAT) system. While VAT is applied to most goods and services, some goods and services are exempt or zero-rated. When a good or service is VAT exempt, the trader pays VAT on their inputs without being able to claim any credit for the tax paid. This means that they cannot impose a VAT on their exempt sales, and therefore, cannot claim input tax liability as a credit against their tax liability on sales. (Lait 1988). In contrast, when a good or service is zero-rated, the trader is fully compensated for any VAT they pay on inputs and is genuinely exempt from VAT. This means that they can deduct the entire VAT liability on inputs from their zero VAT liability on sales, generating a repayment of tax from the Government. Lait (1988) explains that exemptions and zero rating can be justified in three ways: improving progressivity, merit, and administrative convenience. Some goods and services, such as basic

food items, healthcare, and education, may be exempt or zero-rated to improve progressivity and make the tax system fairer for lower-income individuals. But exemptions and zero rating may also be granted for reasons of merit, such as to encourage the use of environmentally friendly products. Finally, exemptions and zero rating may be granted for administrative convenience, such as when it is difficult to tax certain goods and services, like banking, finance, insurance, and legal services. In such cases, the administrative costs of including these goods and services in the VAT system may outweigh the benefits of taxing them.

Section 2: Empirical Studies on VAT Reforms

Previous research on this topic has been conducted in various countries, including Morocco. For instance, Bettah, Ezzrari, and Mourji (2022) examined the impact of VAT reforms on Moroccan household's food consumption between 2001 and 2014. Their study focused on the impact of Value Added Tax (VAT) reforms on the food consumption of Moroccan households. They employed a microsimulation approach and the Quadratic Almost Ideal Demand System (QUAIDS) model to estimate the impact of VAT on various food groups while considering household income levels and expenditure patterns.

Bettah, Ezzrari, and Mourji (2022) discovered that the 2006 VAT reform had a regressive effect on Moroccan households, especially those with low incomes. The reform caused a decrease in the consumption of food items such as meat, fish, and dairy products, while the consumption of basic food items such as cereals, vegetables, and fruits increased. The authors also found that the 2014 VAT reform had a similar effect on household consumption patterns. The study highlights the need to consider the distributional effects of VAT reforms on households, especially those with lower incomes. Policymakers should recognize the potential negative impact of VAT reforms on food consumption when developing fiscal policies.

Adoho & Gansey (2019) conducted a research on the welfare impact of value added tax reform: The case of the Democratic Republic of Congo. The study aimed to evaluate the potential welfare impacts of Value Added Tax (VAT) reform in the Democratic Republic of Congo (DRC). Using a microsimulation model, the study estimated the welfare impacts of VAT reform by examining the effects of changes to VAT rates and exemptions. The findings of the study indicated that VAT reform could have substantial welfare impacts in the DRC, especially for low-income households. The study recommended that reducing VAT rates on essential goods and services, such as food and healthcare, and eliminating exemptions on luxury items such as

high-end vehicles and jewellery, could lead to a significant increase in welfare for the poorest households. The paper suggested that policymakers should take into consideration the potential impacts of VAT reform on low-income households and make informed decisions on how to best implement such policies, given the challenging political climate in the DRC. Further research and analysis are needed to better understand the potential impacts of VAT reform in the country and to inform future policy decisions.

VAT has been and continues to be under reform in Malawi almost every year through tax amendments created by the Ministry of Finance during the production of annual budget statements for the Government. Malawi's noteworthy and critical VAT reforms include the implementation of VAT on milk in 2016 and the exemption of cooking oil from VAT in 2017. Giha, Toma, and Akaichi (2020) say that, On October 1, 2016, the Malawi Revenue Authority declared that domestic pasteurized milk would be taxed at the standard rate of 16.5 percent, after previously being exempt from VAT. This was the third attempt by the Government of Malawi to impose VAT on milk. The tax was initially announced in July 2016, but due to complaints, it was not implemented until November of the same year. The introduction of VAT was not only on milk but on almost all previously untaxed products. According to Giha, Toma and Akaichi (2020). The VAT increased the retail price of milk by 90 Malawi Kwachas per litre, which led to decreased demand during a period of low seasonal demand. Processors also reduced the farmers' price by 9 percent to minimize the impact of the price increase on the retail level. However, the measure faced strong opposition and was eliminated in May 2017.

While Giha, Toma and Akaichi (2020), look at how consumption taxes may impact fairness and consumers welfare, their study only analyses the incidence of Value Added Tax on the domestic dairy supply chain, by answering the question of whether consumers bear all the tax burden of the taxes levied on goods or whether the burden is also shared by the firms. The study found out that the introduction of VAT on pasteurized milk led to increasing in prices with the prices fully reflecting the VAT change which is basically the 16.5 percent rate. The price changes affected the stock accumulation by processors since the quantity demanded decreased. However, the introduction of VAT will not significantly affect the per capita consumption of milk at the country level as consumption will only decrease by 0.2 percent, but in poor urban areas consumption is expected to decrease by 3 percent. The study finds that most of the VAT revenue was paid by the industry hence the effect is on both the processors and the farmers.

Mussa (2014) conducted a study in Malawi using the second integrated household survey (IHS2) to examine the relationship between household expenditure components and poverty and inequality. The study found that both within-component and between-component inequality have positive elasticities with respect to poverty, indicating that increased inequality leads to increased poverty. The study also found that inequalities in expenditure on food and health have similar positive elasticities with respect to the poverty gap and poverty indices. These results support the Value Added Tax (VAT) exemptions and zero rating for some food, health, and education-related goods and services, and suggest that expanding the coverage of these policies would help reduce poverty. These findings were consistent across rural and urban areas and did not depend on the choice of the poverty line.

Section 3: Overview of VAT Policy in Malawi

1.1: The Structure of VAT and the Political Argumentation

In Malawi, VAT was introduced on 1st April 1970 and the rates at the inception were 5 percent to 35 percent instead of applying a single positive rate as is the case now. At its inception, VAT which was called Surtax, was part of the Customs and Excise tariffs order, where registered manufacturers were allowed to import taxable goods or services without paying import and domestic surtax. Surtax was levied when the final product was manufactured and sold. This system was called the suspension or ring system. (Malawi Revenue Authority, VAT Induction Course). The ring or suspension system had disadvantages in that Surtax was lost as goods changed hands and also there were delays in collecting tax hence the Malawi Government changed from the system and introduced the Surtax Credit System on 1st May 1989. In the new system, Surtax is paid when goods are imported or bought locally. Some of the advantages of the Surtax Credit system are that it improves Government cash flow since the tax is paid upfront and the system is self-policing. Previously the rate was at 20 percent then 17.5 percent. The Surtax Act was passed by Parliament in 2001 and in 2005 Surtax was renamed to Value Added Tax (VAT) following the passing of the VAT Act of 2005. VAT Credit System is therefore the mechanism under which a registered trader deducts the VAT paid in his raw materials from the VAT charged to his customers. (Malawi College of Accountancy, 2013). Malawi's standard VAT rate is 16.5 percent, while other goods and services are zero rated supplies where VAT is charged at zero percent and others are exempt supplies. (Value Added Tax Act, 2005). Banda (2018) notes that when compared to neighboring countries in the Southern African Development Community (SADC) region, the Value-Added Tax (VAT) rate in Malawi is

relatively high. A comparison table shows that Malawi's VAT rate is ranked in the top four position in terms of the highest rates among its SADC neighbors.

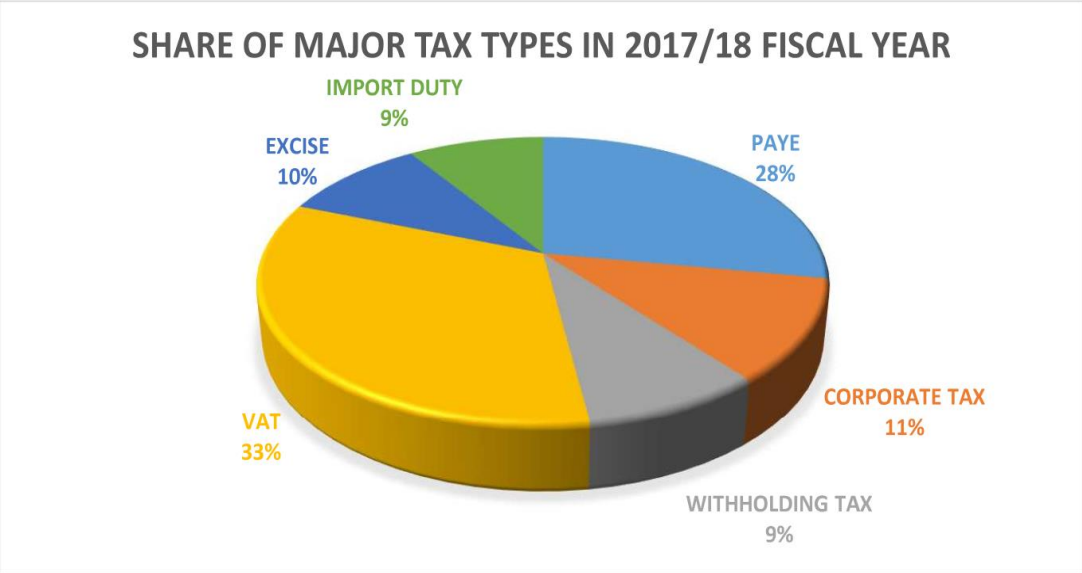
Table 1: VAT Rates for Selected Economies in Southern Africa

	Uganda	Tanzania	Mozambique	Malawi	Kenya	Zambia	DRC	Zimbabwe	South Africa	Botswana	Angola
VAT rate	18%	18%	17%	16.5%	16%	16%	16%	15%	14%	12%	10%

Source: Banda (2018)-VAT Incidence in Malawi: An Empirical Estimation and Analysis

According to Banda (2018), in Malawi, the Value-Added Tax (VAT) has been the largest contributor to tax revenue for the past decade, accounting for an average annual share of 30 percent of total tax revenues. Despite being the main source of Government revenue, the expansion of the VAT has been slower compared to personal income tax. The share of personal income tax in total tax revenue has increased, from around 24 percent in 2011 to 29 percent in 2015 and 26.8 percent in 2017. Meanwhile, the share of company tax has been declining in recent years. Figure 1 depicts the shares of major tax types in the 2017/18 fiscal year

Figure 1: Share of Revenue Contribution of Major Tax Types



Source: Banda (2018)-VAT Incidence in Malawi: An Empirical Estimation and Analysis

1.2: Some Major Critical Reforms of VAT in Malawi

According to Banda (2018), the Value Added Tax (VAT) system in Malawi has undergone frequent changes, with amendments being made almost every fiscal year. These changes are aimed at broadening the tax base, addressing issues of inequality, and enhancing the efficiency of the VAT system. One of the significant changes made to Malawi's VAT system was the implementation of a standard 16.5 percent VAT rate on previously zero-rated or exempted goods in 2016. This move was motivated by the Government's desire to create a productive, stable, and efficient revenue source. According to the Minister of Finance, VAT in Malawi had numerous exemptions and zero ratings, causing it to fail to be a productive, stable, and efficient source of Government revenue (Otomani, 2016). According to the Times Group Newspaper article by Sangala (2016) on August 16, 2016, Malawi began charging a standard VAT rate on tap water, ordinary bread, newspapers, periodicals, magazines, journals, laundry soap, and milk among other products. However, it was met with criticism from organizations such as the Malawi Confederation of Chambers of Commerce and Industries (MCCCI) and the Consumers Association of Malawi (CAMA), who argued that the VAT reforms would increase the cost of essential goods for consumers. Despite these concerns, Malawi's tax system was recognized as one of the top ten progressive tax systems in the world by the OXFAM and Development Finance International Commitment to Reducing Inequality (CRI) index in 2018. The index examined three major tax sources: personal income tax, corporate income tax, and value-added tax (Mwale, 2018). According to Mwale (2018), the Government also announced plans to shift its tax base from labor and investment taxation to consumption in the medium term as it works to broaden the tax base. However, organizations such as CAMA have raised concerns about the potential negative impacts of these reforms on the demand for essential goods, but empirical evidence to support these claims is lacking. Banda (2018) states that despite frequent amendments to the Value Added Tax (VAT) system in Malawi, fiscal experts such as the IMF and World Bank have repeatedly pointed out that the system is plagued with numerous and unnecessary exemptions and zero ratings. These exemptions and zero ratings ultimately undermine revenue collections by eroding the tax base. However, the Government has been reluctant to make adjustments to the VAT system due to public outcry, particularly when goods and services that are considered basic necessities and are currently exempt or zero-rated are proposed to be subjected to taxation.

Chapter 2: Presentation of Data and Analysis of the Benefits of VAT Policy

Section 1: Data Description and Source

The study draws data from the Fifth Malawi Integrated Household Survey (IHS5) conducted in 2019/2020 as part of the Living Standards Measurement Study (LSMS), which is the World Bank's primary household survey program carried out in collaboration with the Malawian Government through the National Statistical Office (NSO). The IHS encompasses a broad range of units of analysis, including households, individuals' consumption expenditure commodities/items, communities, and agricultural households, with comprehensive coverage of household, agriculture, fishery, and community-related topics. The IHS 5 had a high response rate of 93 percent from 12,288 households across 768 enumeration areas that were selected for the study. The IHS5 is stratified into the rural and urban, with urban strata comprising Lilongwe City, Blantyre City, Mzuzu City, and Municipality of Zomba while the rest of the 27 districts are considered rural.

1.1: Composition of Food Groups

Using the data from the Malawi Integrated Household Survey (IHS5) module HH_MOD_G1, eight food groups have been identified by grouping similar food item codes. These food groups are:

1. Cereals: This group includes all staple foods and other cereals that are commonly consumed.
2. Vegetables: This group comprises all types of vegetables that are consumed, including leafy greens, root vegetables, and legumes.
3. Meats: This group includes all types of animal products such as meats, fish, and other seafoods.
4. Fruits: This group comprises all types of fruits that are commonly consumed, such as bananas, oranges, and apples.
5. Milk: This group includes all types of dairy products, such as milk, cheese, and yogurt.
6. Fats: This group comprises all types of fats, sugars, and oils that are commonly consumed.
7. Other food items: This group includes spices, food bought from vendors, as well as candy, sweets, and chocolates.
8. Beverages: This group includes all types of non-alcoholic and alcoholic drinks that are commonly consumed.

These food groups provide a useful framework for understanding the different types of foods that people in Malawi consume. By categorizing food items into these groups, it becomes easier to analyze consumption patterns. The table below gives full details of the list of items that are included in each food group.

Table 2: Detailed Composition of the Food Groups

Cereals	**Vegetables**	**Meat**	**Fruits**
-Maize flour, Maize grain, Finger millet, Sorghum, Pearl millet, Wheat flour, Bread, Buns, Scones, Biscuits, Macaroni, Pasta, Spaghetti, Breakfast, Infant feeding cereals, Irish Potatoes, Sweet Potatoes, Plantains, Cooking bananas, Cocoyam, Beans, Pigeon peas, Groundnuts, Soyabean, Ground beans, Cowpeas, Macadamia nuts	-Onion, Cabbage, Rape, Pumpkin leaves, Chinese cabbage, Green leafy vegetables, Tomato, Cucumber, Pumpkin, Okra, Tinned vegetables, Mushrooms	-Eggs, Beef, Goat, Pork, Mutton, Chicken, Guinea fowl, Doves, Rabbit, Mice, Fish, Termites, Other insects	-Mango, Banana, Orange, Pineapples, Papaya, Guava, Avocado, Wild fruits, Apples
Milk	**Fats**	**Other Foods**	**Beverages**
-Fresh milk, Powdered milk, Margarine, Butter, Soured milk, Yoghurt, Cheese, Infant feeding formula,	-Cooking oil, Sugar	-Salt, Spices, Tomato sauce, Hot sauce, Jam, Sweets, Candy, Chocolates, Baking soda, Bicarbonate soda, Yeast, Honey, Streat foods	-Tea, Coffee, Cocoa, Milo, Squash, Freezes, Soft drinks (Fanta, Coca cola, Sprite), Bottled water, Bottled/canned beer, Wine, Locally brewed liquor, Thobwa (Local sweet beer)

Source: Own construction based on NSO IHS5 data

1.2: Building of the Dataset for the Study

To create the database for this study, we merged six modules from the IHS5. These modules include:

1. hh_mod_a_filt: This module contains household-level data such as the unique household identifier (case_id), survey solutions unique HH identifier (HHID), unique enumeration area code (ea_id), region, district, and rural/urban status. Additionally, this module includes information on household size.
2. HH_MOD_B: This module contains individual-level data including case_id, HHID, personal identification code (PID), sex, relationship to the household head, age, marital status and date of birth.
3. HH_MOD_C: This module contains individual-level data on socioeconomic variables like education level
4. HH_MOD_E: This module contains individual-level data on the employment status of the individuals in the households.
5. HH_MOD_G1: This module includes information on food consumption in the past 7 days, including the amount of food consumed from own production, purchased food, and the amount spent on purchases, as well as the amount of food received as gifts.
6. Ihs5_consumption_aggregate: This module contains aggregate consumption data for food and other goods, as well as information on total real and nominal annual consumption per household, poverty line, food poverty line, poverty gap, and a binary variable indicating poor and non-poor status.

By merging these six modules, we create a comprehensive database that includes information on household characteristics, individual characteristics, food consumption, and consumption patterns. This will provide a valuable resource for further analysis and research in the field.

In the first module, HH_MOD_G1, the data on food consumption and purchases were presented in various units such as heaps, basins, pails, plates, packets, and kilograms. To standardize the data, we converted all the units to kilograms using the food conversion factor as provided in the ihs_foodconversion_factor_2020. The data was then grouped into eight categories of food items, including cereals, vegetables, meats, fruits, milk, fats, other food items, and beverages. To analyze the data further, we generated variables on the expenditure of each food item, the quantities consumed in the past 7 days, and the quantities purchased in the past 7 days. The expenditure variable summed up the total amount spent on food items purchased per group per

household, while the quantity variable summed up the quantities of food items consumed in each group over a period of 7 days by each household. The purchased variable summed up the quantities of food items purchased but consumed over the same period by each household. We then used a collapse function to rearrange the data at the household level for all eight food groups. To calculate the unit prices of each food item, we divided the expenditure variable by the purchases variable.

In the HH_MOD_B dataset, we conducted checks for missing values and duplicates. Fortunately, we found no missing values, but duplicates were present. Thus, we dropped the duplicates to ensure a clean dataset. Next, we merged the HH_MOD_B dataset with all the other datasets to create a complete dataset for our analysis. However, since not all of the food consumed was purchased, only food items that were purchased had prices. Therefore, we calculated the average prices for each food group in every district and used them to replace the prices for all food quantities. This way, each food item consumed had an average price for our analysis.

Section 2: Univariate Analysis/Lessons from Descriptive Statistics

2.1: Demographic Variables

Table 3: Descriptive Statistics of Demographic Variables

Variable	Category	Freq.	Percent
Marital Status	Monogamous Married	7250	64.11
	Polygamous Married	637	5.63
	Separated	665	5.88
	Divorced	986	8.72
	Widow or Widower	1395	12.34
	Never Married	375	3.32
Sex	Male	7880	69.69
	Female	3428	30.31
Reside	Rural	9238	18.31
	Urban	2070	81.69

Source: Own construction based on NSO IHS5 Data

Table 4: Summary Statistics of the Age of the Respondents (Household Head)

Variable	Obs	Mean	Std. Dev.	Min	Max
Age Years	11308	43.22	16.102	15	100

Source: Own construction based on NSO IHS5 Data

Table 5: Descriptive Statistics of the Household Size

Variable	Obs	Mean	Std. Dev.	Min	Max
Household Size	11308	4.409	2.092	1	22

Source: Own construction based on NSO IHS5 Data

Based on the data analysis, we find that the majority of the respondents (household heads), 69.69 percent of them are males with a smaller proportion (30.31 percent) being females. The age range of the household heads is quite wide, from 15 years to 100 years, with a mean age of 43.22 years, indicating a relatively youthful age distribution. The average household size is 4.41 members per household, with a maximum of 22 members per household and a minimum of 1 member per household. In terms of location, the vast majority of the population (81.69 percent) lives in rural areas, while only 18.3 percent reside in urban areas. It is also noteworthy that the largest proportion of households are married (69.74 percent).

2.2: Socioeconomic Variables

Table 6: Descriptive Statistics of the Education Level Variable

Highest Educational Qualification acquired	IHS5 2019 Rural Residence		
	URBAN	RURAL	Total
NONE	1184	7841	9025
	(13.12)	(86.88)	(100.0)
PSLC	251	687	938
	(26.76)	(73.24)	(100.0)
JCE	215	361	576
	(37.33)	(62.67)	(100.0)
MSCE/GCSE	280	284	564
	(49.65)	(50.35)	(100.0)
A-LEVEL	25	11	36

	(69.44)	(30.56)	(100.0)
DIPLOMA	72	38	110
	(65.45)	(34.55)	(100.0)
DEGREE	34	14	48
	(70.83)	(29.17)	(100.0)
MASTERS	9	2	11
	(81.82)	(18.18)	(100.0)
Total	2070	9238	11308
	18.31	81.69	100.00

Source: Own construction based on NSO IHS5 Data

Note: In parenthesis percentage

The distribution of socio-economic variables is noticeably different between rural and urban areas. Specifically, the data shows that the majority of respondents who have attained some level of education reside in urban areas. Out of all respondents, 81.82 percent of the respondents who have attained a master's degree live in urban areas, respondents with a bachelor's degree 70.83 percent of them live in the urban, followed by 65.45 percent of those with a diploma also living in the urban. For the lower levels of education, 69.44 percent of those with A-Level live in the urban followed by 49.69 percent of those with MSCE, while 37.33 percent of those with JCE and 26.76 percent of those with PSLC live in the urban. Only a small proportion of respondents, 13.13 percent who have no level of education live in urban areas.

Table 7: Descriptive Statistics of the Employment Status Variable

Economic activity did spend most time in the last 12 months	IHS5 2019 Rural Residence		
	URBAN	RURAL	Total
WAGE EMPLOYMENT EXCLUDING GANYU	358 (50.49)	351 (49.51)	709 (100.00)
HOUSEHOLD BUSINESS (NONAG)	340 (38.86)	535 (61.14)	875 (100.00)
UNPAID HOUSEHOLD LABOR (AGRIC)	240 (5.22)	4362 (94.78)	4602 (100.00)
UNPAID APPRENTICESHIP	8	11	19

	(42.11)	(57.89)	(100.00)
GANYU (CASUAL LABOUR)	223	1073	1296
	(17.21)	(82.79)	(100.00)
Total	1169	6332	7501
	(15.58)	(84.42)	(100.0)

Source: Own construction based on NSO IHS5 Data

Note: In parenthesis percentage

The data reveals a clear disparity in the distribution of occupation status between rural and urban areas. In rural areas, a large majority of people work as casual laborers (82.79 percent), whereas only 17.21 percent work in this capacity in urban areas. Similarly, unpaid household agricultural work is much more prevalent in rural areas, with 94.78 percent of respondents working in this capacity compared to only 5.22 percent in urban areas. In contrast, the distribution between those working for a wage employment is relatively balanced, with 50.49 percent in urban areas and 49.51 percent in rural areas.

Ansah, Marfo, and Donkoh (2020) emphasize the importance of taking into account socio-economic and demographic variables when analysing food purchasing behaviour, as individuals' purchasing behaviour is influenced by their socio-economic characteristics. They argue that policies that assume a "one size fits all" approach can negatively affect vulnerable populations, particularly those who are economically disadvantaged. Therefore, understanding the demand elasticities of different socio-economic groups is crucial for informed food policy decisions and the development of targeted tax policies that mitigate the impact of price increases on vulnerable populations.

Section 3: Structures of Household Consumption in Malawi

Mussa (2014) found that household expenditure in Malawi can be categorized into four distinct groups, which include spending on food, health, education, and non-food/non-human capital items. These categories are mutually exclusive and exhaustive, meaning that they cover all possible types of household expenditure in Malawi. Further analysis of the Malawi Integrated Household Survey Data (IHS5), data reveal that these categories can be disaggregated into 12 expenditure items, including food and beverages, alcohol and tobacco, clothing and footwear, house and utilities, furnishings, health, transport, communication, recreation, education, hotels, and miscellaneous goods. Of these expenditure items, food and beverages are found to be the

most significant, accounting for 55 percent of the annual household expenditure. House and utilities follow closely behind, representing 19 percent of the total expenditure. In contrast, education and health expenditures are found to be relatively low, comprising only 4 percent and 2 percent of the total expenditure, respectively. Notably, food and beverages are largely exempt and zero-rated products, meaning that the Government may be missing out on potential revenue by not taxing this category. Mussa (2014) highlights the importance of understanding household expenditure patterns in Malawi and the potential implications of untaxed goods. By gaining insight into how households allocate their resources, policymakers can make more informed decisions regarding taxation and revenue generation. Table 8 below shows the breakdown of the real annual expenditure in Malawi.

Table 8: Breakdown of Real Annual Expenditure in Malawi

Category	**Annual Household Expense (In Billion Malawi Kwacha)**	**Percentage**
Food and Beverages	30.13661	55%
Alcohol and Tobacco	0.420631	1%
Clothing and Footwear	1.25823	2%
House and Utilities	10.52082	19%
Furnishings	2.106893	4%
Health	0.826227	2%
Transport	3.473137	6%
Communication	1.478191	3%
Recreation	0.375957	1%
Education	2.279763	4%
Hotels	0.495559	1%
Miscellaneous Goods	1.388125	3%
Total (Real Annual Expenditure)	54.76015	100%

Source: Own construction based on NSO IHS5 Data

Further analysis of the data reveals the distribution of household expenditure on food and beverages, house and utilities, transport, and education across different quantiles. The findings show that households in the fifth quantile have higher expenditures across all categories. Specifically, they spend 34 percent of their household expenditure on food and beverages, 36 percent on housing and utilities, 64 percent on transport, and 61 percent on education. In contrast, households in the first quantile have lower expenditures across all categories, spending only 10 percent on food and beverages, 11 percent on housing and utilities, 2 percent on

transport, and 5 percent on education. This highlights the significant disparities in household expenditure patterns in Malawi, with households in the higher quantiles allocating more resources towards necessities such as food, housing, and education. These findings may have important implications for policymakers and stakeholders working to address poverty and promote equitable development in Malawi.

Table 9: Household Consumption per Strata

Quantile	Food and Beverages	Percent	House and Utilities	Percent	Transport	Percent	Education	Percent
1	2.988143	10%	1.172419	11%	0.074719	2%	0.120013	5%
2	4.460699	15%	1.52779	15%	0.192103	6%	0.17948	8%
3	5.575343	19%	1.852789	18%	0.372957	11%	0.231542	10%
4	6.895797	23%	2.197968	21%	0.614377	18%	0.362573	16%
5	10.21663	34%	3.769855	36%	2.218981	64%	1.386155	61%
Total	**30.136612**	**100%**	**10.520821**	**100%**	**3.473137**	**100%**	**2.279763**	**100%**

Source: Own construction based on NSO IHS5 Data

Section 4: Analysis of the Fiscal Expense in Malawi

4.1: Poverty Status in Malawi: Proportion of People Living in Poverty in Malawi

According to the World Bank (2007), poverty can be best measured by comparing an individual's consumption-related expenditures with a cost-of-basic-needs threshold, which determines whether or not they are considered poor. However, measuring income in developing economies is challenging due to several factors. Firstly, many individuals do not have a regular income, making it difficult to assess their current income at any given point in time. Secondly, income from agricultural activities may be challenging to quantify, especially if households do not maintain formal records of their revenues and expenditures. Lastly, households may intentionally under-report earnings from informal activities, making income measurement even more challenging. In Malawi, where agriculture accounts for about 40 percent of GDP and there is a large informal sector, income measurement is deemed unsuitable for assessing poverty. (World Bank, 2007). Instead, household welfare is measured based on total consumption and expenditures, including implicit expenditures on home-produced food items. The most used poverty and inequality measures rely on income or consumption-expenditure data collected from a sample survey of households. (World Bank, 2007). Based on the reasons highlighted

above, Mussa (2014) emphasizes that household consumption expenditure is a more reliable welfare indicator in Malawi for two primary reasons. Firstly, income in agricultural economies, such as Malawi, tends to be irregular, with farming households receiving a large amount of cash income only during certain times of the year. In contrast, consumption expenditure provides a more stable measure of welfare over time. It represents the actual welfare realized by households, whereas income is more of a measure of potential welfare. Secondly, a significant proportion of household income in Malawi comes from self-employment businesses or subsistence-oriented agricultural activities, making it challenging to assign income values to the proceeds from these enterprises. Furthermore, as noted by Mussa (2014), household consumption expenditure serves as a better welfare indicator and allows for a closer examination of the impact of fiscal policy on poverty reduction. For instance, if it is discovered that the marginal effect of within-component inequality for a particular expenditure item is positive, this may suggest that increasing taxes or removing exemptions on that item would lead to an increase in within-component inequality, resulting in a rise in overall poverty. In such a scenario, an effective poverty-reducing fiscal policy would involve reducing taxes or providing exemptions for that particular item.

To evaluate the proportion of people living under the poverty line, we use the poverty line provided in the IHS5 data. According to the Malawi Poverty Report 2020, the Malawi Poverty line is generated by calculating the per capita consumption which is used to rank the population from lowest to the highest level of consumption. An appropriate poverty threshold (poverty line) is then generated which is used to classify individuals as poor or non-poor. Ravillion (1998) defines the poverty line as the monetary cost to a given person, of a reference level or welfare, at a given place and time. According to the Malawi Poverty Report 2020, the total poverty line is made up of food and non-food consumption. Where the food poverty line is the cost of a basket of food that is required to provide necessary energy per person per day and the non-food poverty line is the cost of basic non-food needs. In calculating the proportion of people living in poverty we, therefore, use the variable ‘poor’ in the dataset which is a dummy variable that takes the form of ‘poor’ or ‘non-poor’. The results show that 47 percent of the population in Malawi lives under the poverty line by using the total poverty line (food and non-food) measure.

Table 10: Proportion of People Living under the Poverty Line in Malawi

Dummy for poor households below the national poverty line	Freq.	Percent	Cum.
Non-poor	26106	52.98	52.98
Poor	23170	47.02	100.00
Total	49276	100.00	

Source: Own construction based on NSO IHS5 Data

We examine the proportion of ultra-poor households in Malawi based on the definition provided by the Malawi Poverty Report (2020). According to the report, the ultra-poor are households whose consumption per capita of food and non-food items is lower than the minimum food consumption level. Based on a sample of 49,276 households, our analysis indicates that 8,850 households in Malawi fall into this category, representing approximately 22 percent of the total sample.

Table 11: Proportion of People who are Ultra-Poor in Malawi

	Dummy for ultra-poor households below national food poverty line		
Dummy for poor households below national poverty line	Non-ultra-poor	Ultra-poor	Total
Non-poor	26106	0	26106
Poor	14320	8850	23170
Total	40426	8850	49276

Source: Own construction based on NSO IHS5 Data

Our analysis aims to examine the distribution of poverty across urban and rural areas by calculating the proportion of households classified as poor. Out of the 8,608 households in urban areas, 1,496 (17.36 percent) are living below the poverty line. In contrast, out of the 40,668 households in rural areas, 21,674 (53.39 percent) are classified as poor. These findings highlight the significant disparity in poverty rates between urban and rural areas in our sample. While poverty remains a significant issue in both areas, the prevalence of poverty in rural areas is more than three times higher than that in urban areas. This can be attributed to factors such

as limited access to basic services, poor infrastructure, limited employment opportunities, and exposure to natural disasters and climate change.

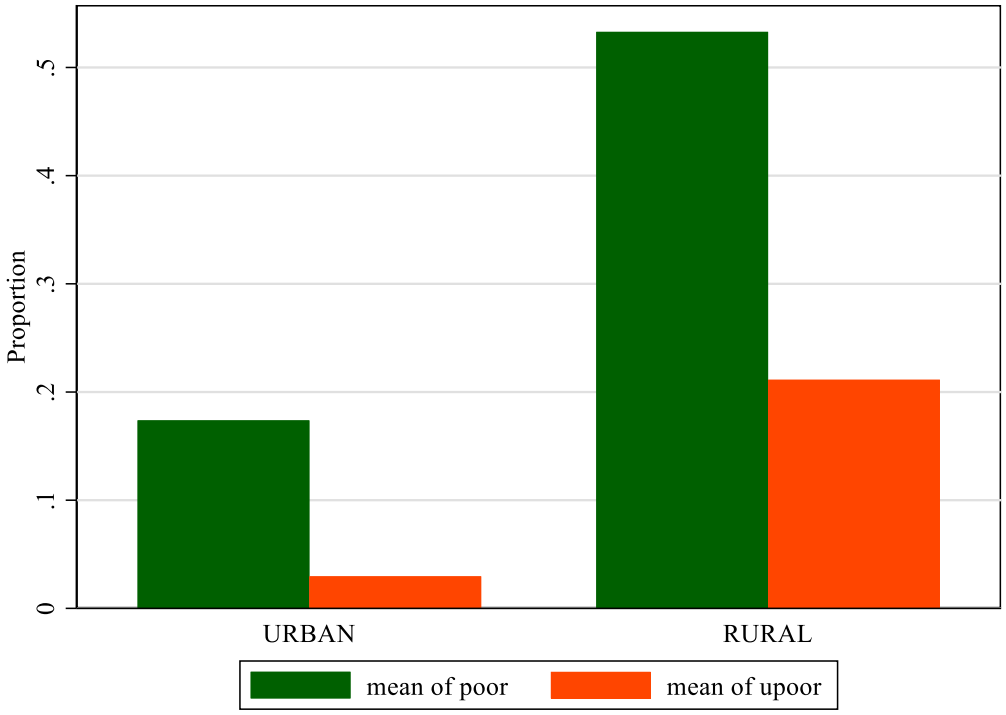
Table 12: Proportion of People Living in Poverty by Area of Residence

Dummy for poor households below national poverty line	IHS5 2019 Rural Residence		
	URBAN	RURAL	Total
Non-poor	7112	18994	26106
Poor	1496	21674	23170
Total	8608	40668	49276

Source: Own construction based on NSO IHS5 Data

Figure 2 provides a visual depiction illustrating the distribution of poverty levels between rural and urban areas.

Figure 2: Proportion of People Living in Poverty by Area of Reside (Urban/Rural)



Source: own Construction based on NSO IHS5 Data

Our analysis examines the distribution of poverty by region and calculates the proportion of households classified as poor in each region. Out of the 9,475 households in the northern region, 2,786 (29.39 percent) are classified as poor. In the central region, out of 17,570 households, 9,527 (54.26 percent) are classified as poor. Finally, in the southern region, out of 22,231 households, 10,857 (48.89 percent) are classified as poor. These findings demonstrate that poverty rates vary significantly by region, with the central region having the highest proportion of poor households, followed by the southern region and then the northern region. These differences may reflect variations in factors such as access to economic opportunities, education, health, and other essential services.

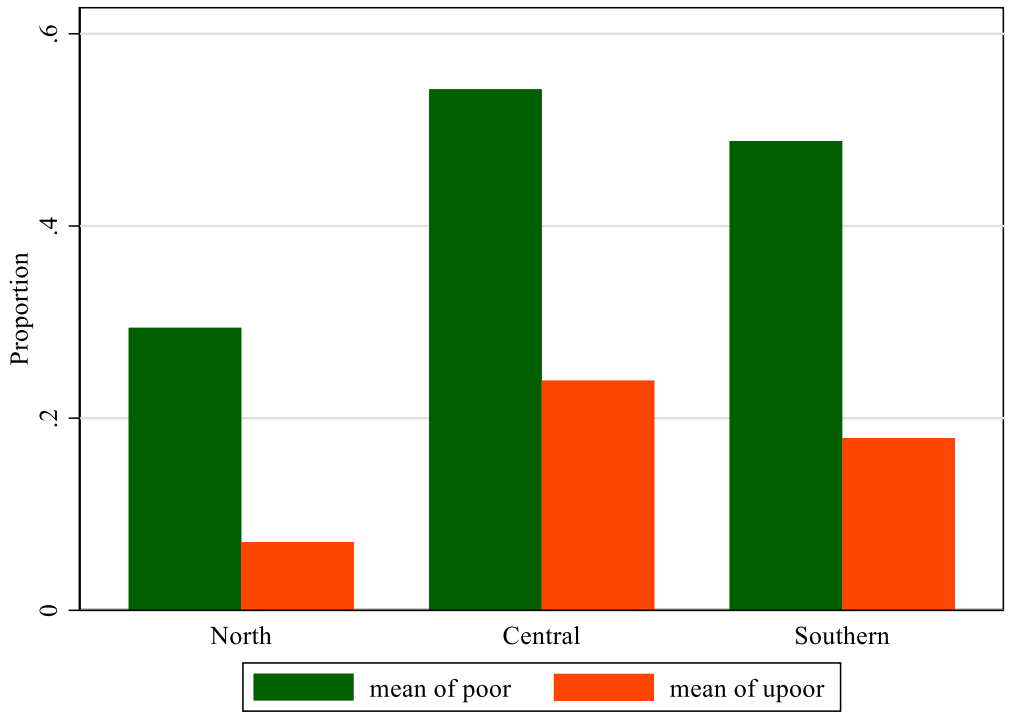
Table 13: Proportion of People Living in Poverty by Region

Dummy for poor households below the national poverty line	IHS5 2019 Region location			
	North	Central	Southern	Total
Non-poor	6689	8043	11374	26106
Poor	2786	9527	10857	23170
Total	9475	17570	22231	49276

Source: Own construction based on NSO IHS5 Data

Figure 3 illustrates the distribution of poverty between South, Central and Northern regions, providing a graphical representation of this disparity.

Figure 3: Poverty Status by Region in Malawi



Source: Own construction based on NSO IHS5 Data

4.2: Measurement of Inequality in Malawi: The Gini Coefficient

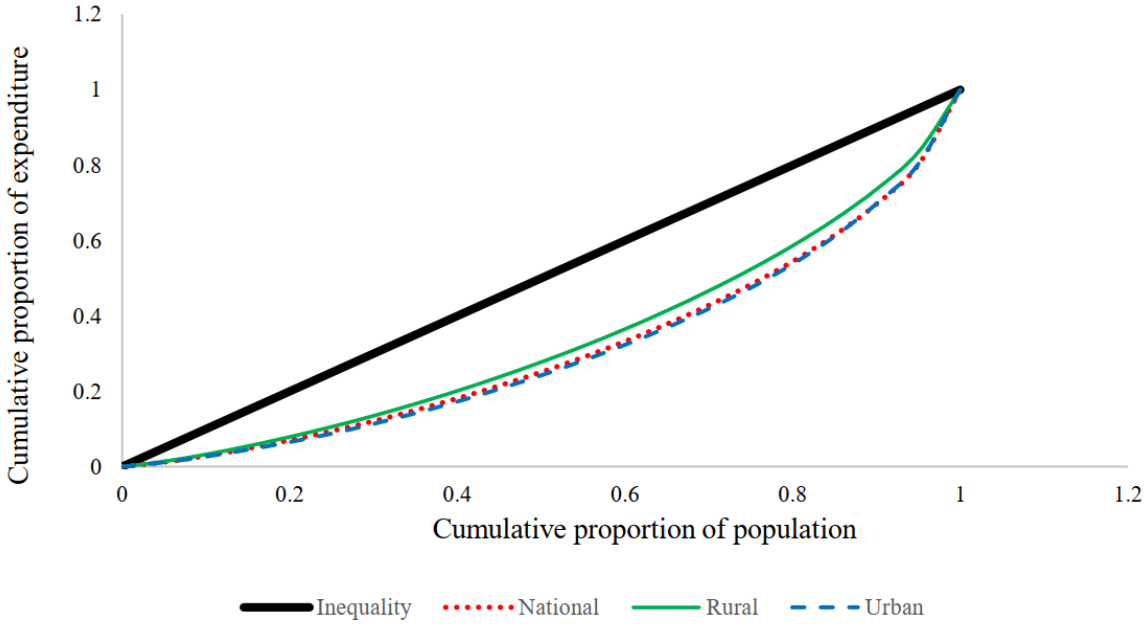
We calculated the global Gini using the per capita expenditure as a proxy of income and we found that the Gini coefficient is 0.385. This is in line with the Gini coefficient from the Malawi Poverty Report 2020, which found that the national inequality is 0.379. However, according to Malawi Poverty Report 2020, the level of poverty has declined from 0.423 which was found in the previous survey IHS4 (2016/2017). We also calculated the Gini coefficient in Education, Transport and Health and we found that inequality in health is at 0.645 while that in transport is 0.715 and in education is 0.781. The Gini coefficient is a measure of income inequality, ranging from 0 to 1, with 0 representing perfect equality (everyone has the same income) and 1 representing perfect inequality (one person has all the income).(Todaro, M. P., & Smith, S. C. 2015). A Gini coefficient of 0.385 suggests that there is a relatively high level of income inequality in the population being measured. In other words, there is a significant gap between the high earners and the low earners, with the wealthy holding a disproportionate amount of the total income. (Malawi Povert Report, 2020). According to Mussa (2014), poverty and inequality in Malawi have remained high despite policies aimed at reducing poverty like the Malawi Poverty Reduction Strategy and Malawi Growth and Development Strategy just to

mention a few. The Gini coefficient for 1998 and 2005 was 0.39 suggesting that inequality remained high and unchanged. (Mussa, 2014).

4.3: The Lorenz Curves

The Lorenz curve is a visual representation of the distribution of income or consumption per capita among a given population. According to the Malawi Poverty Report 2020, the line from the bottom left corner to the top right corner represents perfect equality, where each percentage of the population receives an equal share of total consumption. The red dashed line shows the actual distribution of consumption at the national level, indicating the degree of inequality in the population. The solid green curved line is closer to the diagonal line than the blue dashed line, indicating that the degree of inequality is higher for the urban population compared to the rural population. Therefore, the green line represents a more equal distribution of consumption than the blue line. This information is shown in the Figure below

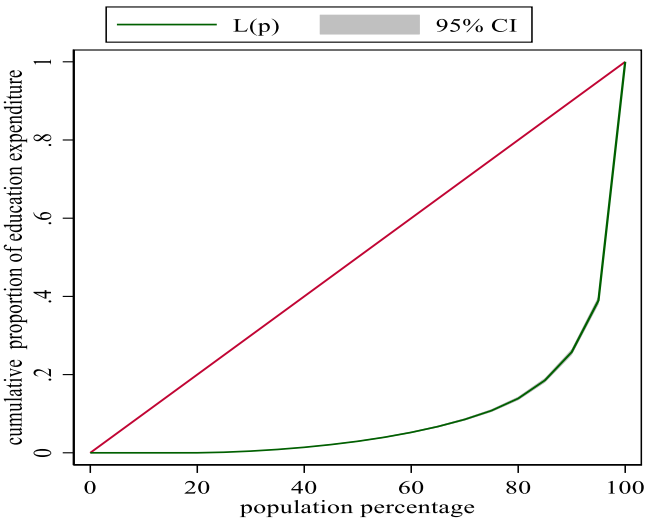
Figure 4: Lorenz Curve: Rural and Urban Consumption by Population, Malawi 2020



Source: Malawi Poverty Report 2020

Figure 5 below depicts the Lorenz curve for education in Malawi at the national level, revealing the presence of significant inequalities within the education system.

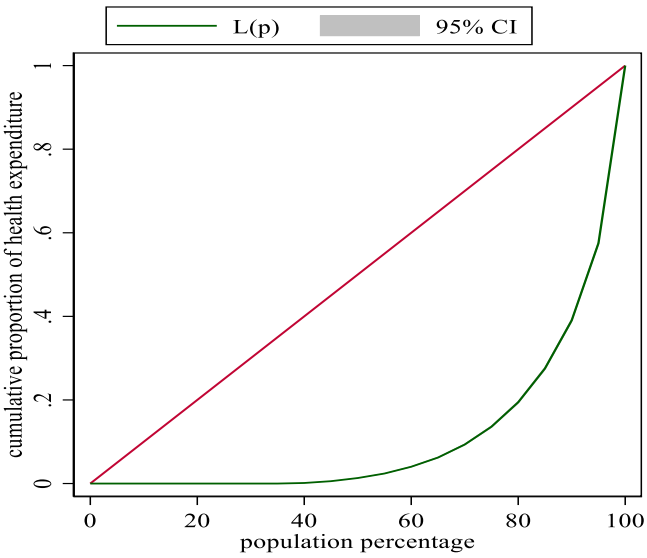
Figure 5: The Lorenz Curve in Education at National Level



Source: Authors computation using the IHS5 data

The Lorenz curve in Figure 6 below illustrates the degree of inequality in health at the national level in Malawi. The curve indicates that the level of inequality in health within the country is high.

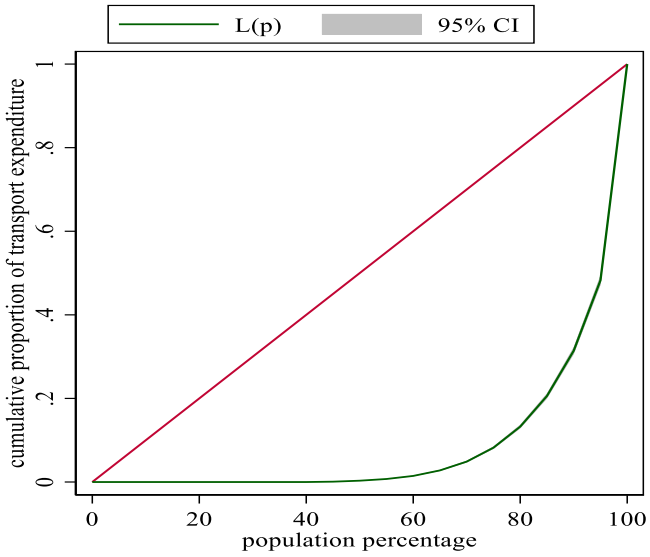
Figure 6: The Lorenz Curve in Health at National Level



Source: Authors computation using the IHS5 data

The Lorenz curve depicted in Figure 7 below illustrates the extent of transport inequalities in Malawi at the national level, revealing a significant level of disparity.

Figure 7: The Lorenz Curve in Transport at National Level



Source: Authors computation using the IHS5 data

4.4: The Fiscal Expenditure in Malawi

We have conducted an analysis of the Value Added Tax (VAT) revenue for each of the eight food groups and estimated the total amount of tax revenue that the Government would collect in a year if VAT is charged on these products. This amount represents the fiscal expense. In addition, we have examined the distribution of this fiscal expense between the poor and non-poor segments of the population, both in terms of absolute values and percentages. Furthermore, we have also calculated the fiscal expense as a percentage of the annual per capita expenditure. This analysis sheds light on the impact of VAT on the different income groups and provides insights into the overall economic policies of the Government.

4.5: Distribution of the Fiscal Expense among the Population

From the analysis, we find that the total fiscal expense in 2019/2020 is approximately 9.3 billion Malawi Kwacha, and of this amount, 6.7 billion Malawi Kwacha representing 72 percent of the total fiscal expense is given to the non-poor. While 2.6 billion Malawi Kwacha, representing 28 percent of the fiscal expense is given to the poor. However, from the data, using the total poverty line which takes into account both the food and non-food poverty line, 53 percent of

the population is non-poor while 47 percent of the population is poor which means that, 53 percent of the population is taking up 72 percent of the fiscal expense while 47 percent of the population is taking up 28 percent of the fiscal expense.

Table 14: Distribution of the Fiscal Expense by Poverty Status

Category	**Fiscal Expense (Billion Malawi Kwacha)**	**Percentage**
Non-poor	6.735336	72%
Poor	2.655113	28%
Total Fiscal Expense	**9.390449**	**100%**

Source: own Construction based on NSO IHS5 Data

We extended the analysis and divided the households into 5 strata, and we found that the households in the first quantile which is the ultra-poor, earn 9 percent of the fiscal expense, while the second quantile and third quantile which are also poor but not ultra-poor, earn 14 percent and 17 percent, respectively. The fourth and fifth quantile is made up of the non-poor and they earn 22 percent and 38 percent, respectively of the fiscal expense.

Table 15: Distribution of the Fiscal Expense by Household Strata

Quantile	**Fiscal Expense (In Billion Malawi Kwacha)**	**Percentage**
1	0.8633703	9%
2	1.317228	14%
3	1.551908	17%
4	2.087995	22%
5	3.569949	38%
Total Fiscal Expense	**9.390449**	**100%**

Source: Own construction based on NSO IHS5 Data

Chapter 3: Modelisation of the Impact of VAT Reform: Effects of Price Variations

Section 1: Quadratic Almost Ideal Demand System Model

The study employs the Quadratic Almost Ideal Demand System (QUAIDS) model developed by Banks, Blundell, and Lewbel (1997) as an econometric tool to analyze consumer demand for 8 food groups. This model is known for its flexibility in capturing non-linearities in

preferences and substitution effects between different products. Building on the Almost Ideal Demand System (AIDS) model introduced by Deaton and Muellbauer (1980), the QUAIDS model incorporates quadratic terms that allow for more realistic modelling of consumer preferences. By considering the demand for a particular good or service as a function of its own price, the prices of other goods and services, and income, the model estimates the coefficients of the demand function based on observed data on consumer behavior, such as purchases and prices. The QUAIDS model is a statistical model that uses multiple variables to predict the relationship between the amount of money spent on different food groups and their corresponding prices, as well as the prices of other goods and services. This is done by taking the logarithm of the expenditure share and prices for each food group and analyzing how they relate to one another. (Bettah, Ezzrari & Mourji, 2022).

The QUAIDS Model can be specified as:

$$W_i = \alpha_i + \sum_{j=1}^{k} \gamma_{ij} \, lnp_j + \beta_i \ln\left\{\frac{m}{a(P)}\right\} + \frac{\lambda_i}{b(P)}\left[\ln\left\{\frac{m}{a(P)}\right\}\right]^2$$

Where:

W_i = is the budgetary share of food group (i) in food expenditure

P_i= price of good i

m = total food expenditure

$\alpha_i,\ \beta_i,\ \gamma,\ \lambda$ are parameters to be estimated

The parameters estimated in the Almost Ideal Demand System (AIDS) model include alpha, beta, and gamma. Alpha represents the expenditure estimates or budget shares, which reflect the proportion of total household expenditure allocated to each good or service. It is important to note that alpha values must sum up to 1, as they represent the entire budget allocation. Beta, on the other hand, represents the response of the expenditure shares to increases in supplementary income, such as changes in household income, transfers, or subsidies while gamma represents the price effect, or the responsiveness of the quantity demanded of a good or service to changes in its price, holding all other factors constant. A negative gamma value indicates that an increase in price will lead to a decrease in the quantity demanded, while a positive value indicates that an increase in price will lead to an increase in the quantity demanded.

The parameters in the model can be estimated using econometric techniques, such as maximum likelihood estimation. The estimated parameters can then be used to calculate the price and income elasticities of demand for each good, which can provide useful information for policy analysis and forecasting.

To meet the conditions for maximizing utility, the adding-up homogeneity and Slutsky symmetry restrictions are adhered to in the following manner:

$$\sum_{i=1}^{k} \alpha_i = 1, \sum_{i=1}^{k} \beta_i = 0, \sum_{j=1}^{k} \gamma_{ij} = 0, \sum_{i=1}^{k} \lambda_i = 0, \gamma_{ij} = \gamma_{ji}, \sum_{j=1}^{k} \eta_{rj} = 0$$

The adding up homogeneity and Slutsky symmetry restrictions are automatically imposed by the QUAIDS command in Stata. By default, the last expenditure share equation is left out to prevent a singular error covariance matrix from being generated. It is important to note that the exclusion of a specific expenditure share equation does not affect the resulting parameters. Ansah, Marfo, and Donkoh (2020)

1.1: Computation of Elasticities

The coefficients of the model provide information on the own-price elasticities and cross-price elasticities of demand for each good or service. These coefficients are used to calculate the expenditure (income) elasticities of demand, which indicate how responsive demand is to changes in expenditure (income) as well as the price elasticities of demand, which indicate how responsive demand is to changes in price. (Bettah, Ezzrari, & Mourji, 2022). Two kinds of price elasticities are generally computed, first is the Hicksian (compensated) price elasticity and the second is the Marshallian (uncompensated) price elasticity. Henningsen (2017) explains that the Marshallian price elasticities demonstrate the correlation between variations in the quantity demanded and changes in the consumer price, assuming that the total expenditure remains constant. In other words, if there is a one percent increase in the price of a product, the price elasticity calculates the percentage by which the quantity demanded will decrease. On the other hand, the Hicksian price elasticities measure the relationship between the quantity demanded and the consumer price, while assuming that the utility level remains constant. This means that if there is a one percent increase in the price of a product, the Hicksian elasticity computes the percentage by which the demanded quantity will decrease while holding the consumer's

satisfaction constant. If the QUAIDS model shows that certain basic goods (such as food, housing, or education) have a high own-price elasticity of demand, this could suggest that changes in VAT rates or prices of these goods could have a significant impact on the poverty level of households in Malawi.

According to Poi (2012), the formulae for uncompensated price elasticity of good i with respect to changes in the price of good j is:

$$\epsilon_{ij} = -\delta_{ij} + \frac{1}{\omega_i}(\gamma_{ij} - \left[\beta_i + \eta_i' Z + \frac{2\lambda_i}{b(P)C(P,Z)} \ln\left\{\frac{m}{\overline{m}_0(Z)a(P)}\right\}\right] * \left(\alpha_j + \sum_l \gamma_{ij}\, lnp_l\right) - \frac{(\beta_j + \eta_j' Z)\lambda_i}{b(P)C(P,Z)}\left[\ln\left\{\frac{m}{\overline{m}_0(Z)a(P)}\right\}\right]^2)$$

The expenditure (income) elasticity for good i is:

$$\mu_i = 1 + \frac{1}{\omega_i}\left[\beta_i + \eta_i' z + \frac{2\lambda_i}{b(P)C(P,Z)} \ln\left\{\frac{m}{\overline{m}_0\, a(P)}\right\}\right]$$

Compensated price elasticities are obtained from the Slutsky equation:

$$\epsilon_{ij}^C = \epsilon_{ij} + \mu_i \omega_j$$

1.2: QUAIDS Estimation

The goal of this study is to investigate the impact of VAT reform on poverty in Malawi by looking at the impact on food consumption. To do this, compensated and uncompensated price elasticities of the different groups are obtained from the Quadratic Almost Ideal Demand System (QUAIDS) model. We assume that the VAT increase is fully reflected in the price of the products/food group (Bettah, Ezzrari, & Mourji 2022). To estimate the QUAIDS model, we use the command quaids which was developed by Poi (2012). According to Poi (2012), the quaids command obviates the need for any programming by the user and it fits both the standard Deaton and Muellebauer's (1980) Almost Ideal Demand System model (AIDS) and also the Banks, Blundell, and Lewbels (1997) Quadratic Almost Ideal Demand System model (QUAIDS). In the quaids command, demographic variables can also be incorporated and there are post-estimation commands that allow the computation of expenditure elasticities as well as

compensated and uncompensated price elasticities. With the quaids command, we include the expenditure shares of either just the food consumption or total consumption and they should add up to one. We then include the prices or natural log of prices and not both. We also specify the total expenditure variable and we have the option to add demographic variables or not. (Poi, 2012). For this study, we include the household size (hhsize), reside, the variable that differentiate rural and urban, and group_var the variable that divides the households into 5 quantiles as the demographic variables. According to Abdelkhalek and Boccanfuso (2021), demographic variables serve as control variables and play a crucial role in preventing specification errors.

Apart from the QUAIDS model being consistent with demand theory assumptions, it can also allow for nonlinear Engel relationships between food group expenditure shares and food expenditure (Banks, Blundell, & Lewbel, 1997). Ignoring such nonlinear relationships could cause parameter estimates to be inconsistent (Banks et al. 1997). Mjeda, Lenz, and Cerovic (2020) argue that the use of AIDS and QUAIDS methodologies in modeling the demand system offers flexibility and allows for testing the assumptions of microeconomic theory on consumer choice. This approach enables simultaneous modeling of the entire demand system and considers various factors that influence the quantity of demand for a specific good. Compared to single or multiple linear regressions, modeling the demand system takes into account the interdependence of consumer decisions and incorporates the prices of related products within the system. This comprehensive approach ensures adherence to the theoretical constraints while capturing the complexity of the food demand system.The appropriateness of this model versus the Almost Ideal Demand Systems Model (AIDS) (nested within the QUAIDS) is tested in this study. The QUAIDS model will be appropriate when the joint significance of the parameter capturing the quadratic term of income on food group share, for all the food group equations, is significantly different from zero

1.3: Post Estimation Command

The predict command is used after fitting the QUAIDS model and we obtain the predicted values of expenditure shares. We also use the estat command to compute both the expenditure elasticity as well as the compensated and uncompensated elasticity (Poi, 2012) . In addition, commands such as test and testnl can be utilized to conduct Wald tests on the parameters, similar to any other estimation command.

Section 2: Results from the Estimation of the Quadratic Almost Ideal Demand System

2.1: Likelihood Ratio Test Results

The likelihood ratio test is a statistical technique that compares two models with different levels of complexity to determine which one fits a given dataset better. (Wooldridge, 2020). In this specific case, we estimate two models: the Almost Ideal Demand System (AIDS) and the Quadratic Almost Ideal Demand System (QUAIDS), with the assumption that the AIDS model is nested in the QUAIDS model. To test whether the additional quadratic term in the QUAIDS model improves its fit over the AIDS model, the Chi-Square value, which turns out to be 2158.24, with a p-value of 0.0000 is statistically significant at the 1 percent level, indicating that the QUAIDS model is a better fit for the data. In essence, the likelihood ratio test compares the maximum likelihood estimates of a parameter under the two models and determines whether the additional variables in the more complex model (in this case, QUAIDS) result in a significant improvement in the model fit. By rejecting the null hypothesis that the simpler model (AIDS) is sufficient, the test helps to justify the use of the more complex QUAIDS model over the simpler AIDS model.

2.2: Walds Test Results

To determine the significance of the variables that separate households into different strata (group_var) and by area of residence (rural/urban), we conduct a Wald test to examine their influence on the responsiveness of households to changes in prices. The null hypothesis of the Wald tests is that the dummy variables (group_var or reside) do not play a significant role in determining expenditure patterns (Poi, 2012). If this hypothesis is true, then all the elements of the row of the rho (η) matrix corresponding to group_var and reside must be jointly 0, along with the corresponding element of the ρ vector.

The Wald test results for the group_var variable show a chi-square value of 875.78 with a p-value of 0.0000, while for the reside variable, the chi-square value was 695.44 with a p-value of 0.0000. Based on these p-values, we reject the null hypothesis that all the elements of the row of the rho matrix corresponding to group_var and reside are jointly 0. This indicates that group_var and reside variables are significant in determining expenditure patterns, justifying their inclusion in the model.

2.3: Expenditure Elasticities at the National Level

Table 16: Presentation of Expenditure Elasticities for the Eight Food Groups

	Cereals	Vegetables	Meats	Fruits	Milk	Fats	Other Food	Beverages
Expenditure	0.90	0.53	0.80	0.85	1.67	1.13	0.71	2.28
Elasticity	(0.01)	(0.01)	(0.01)	(0.04)	(0.08)	(0.02)	(0.02)	(0.03)

Source: STATA results from QUAIDS estimation

Note: P-Values in parenthesis

Income elasticity is defined by Leser (1954) as the percentage increase or decrease in consumption of a good caused by a one percent increase or decrease in income. Because expenditure is used as a proxy for income in this study, the expenditure elasticities are a proxy for the income elasticities. Thus, the expenditure elasticities inform us how much consumption of products will change when spending varies (Bettah, Ezzrari, and Mourji 2022). Leser (1954) suggested that income elasticities for most food commodities are positive, indicating that as income increases, the demand for these goods also increases. However, in certain circumstances, some food commodities may have negative income elasticities, implying that they are inferior goods, which are consumed more by poorer households than by wealthier ones. The demand for goods can be categorized as elastic or inelastic. According to Leser (1954), a good with an income elasticity value between 0 and +1 is said to be inelastic, while a good with an income elasticity value above +1 is considered elastic. Elastic goods are typically luxury goods, while inelastic goods are necessities. The study finds that the income elasticities of cereals, vegetables, meats, fruits and other foods are below 1, indicating that these products are essential and necessary. In contrast, the income elasticities of milk, fats, and beverages are above 1, meaning that these goods are considered luxuries. For example, the results show that households will consume more cereals by 0.90 percent, vegetables by 0.53 percent, meats by 0.80 percent, fruits by 0.85 percent, milk by 1.67 percent, fats by 1.13 percent, other foods by 0.71 percent, and beverages by 2.28 percent respectively if there is a 1 percent increase in expenditure (income). Cereals, vegetables, and meats have elasticities that are statistically significant at the 1 percent significance level; fruits, fats, other foods, and beverages have elasticities that are statistically significant at the 5 percent significance level; and milk has elasticities that are statistically significant at the 10 percent significance level.

The results of this study are consistent with the expectations. Cereals, vegetables and meats are some of the staple foods in Malawi. The majority of the population in Malawi consumes these foods on a daily basis while milk, fats and beverages are indeed luxuries which are consumed during cerebrations for beverages, and when income of households increase for the fats and milk. The results are different from those of Asare, Segarra, and Agyekum (2018), who found that the staple food group in Ethiopia, which includes the same food items as the cereals food group in our study, is considered a luxury. This finding contradicts the expectation that most staple foods are normal commodities. Asare, Segarra, and Agyekum (2018) suggest that this result may be due to the aggregate nature of the food group, which may imply that some food goods are mostly consumed by the rich, resulting in this outcome in Ethiopia. On the other hand, Bettah, Ezzrari and Mourji (2022) found that in Morocco, milk and dairy products have income elasticities greater than 1, implying that expenditure on these products increases more than proportionally to income growth which is consistent with the results we have found in Malawi. However, it is important to note that, according to Leser (1954), the income elasticity of demand for a commodity group is an average of the income elasticities obtained for the individual commodities in the group.

2.4: Expenditure Elasticities by Household Strata

Table 17: Expenditure Elasticities by Household Strata

	Cereals	**Vegetables**	**Meats**	**Fruits**	**Milk**	**Fats**	**Other Food**	**Beverages**
Quantile 1	0.94 (0.01)	0.65 (0.01)	0.82 (0.02)	0.86 (0.04)	8.31 (1.01)	1.22 (0.03)	0.75 (0.02)	4.39 (0.10)
Quantile 2	0.94 (0.01)	0.60 (0.01)	0.81 (0.02)	0.85 (0.05)	4.31 (0.41)	1.16 (0.02)	0.72 (0.02)	3.40 (0.06)
Quantile 3	0.91 (0.01)	0.55 (0.01)	0.80 (0.01)	0.85 (0.04)	3.00 (0.22)	1.12 (0.02)	0.70 (0.02)	2.77 (0.04)
Quantile 4	0.88 (0.01)	0.50 (0.01)	0.78 (0.01)	0.83 (0.04)	1.73 (0.08)	1.10 (0.01)	0.69 (0.02)	2.45 (0.03)
Quantile 5	0.79 (0.01)	0.36 (0.01)	0.79 (0.01)	0.80 (0.04)	1.27 (0.03)	1.11 (0.02)	0.66 (0.02)	1.90 (0.01)

Source: STATA results from QUAIDS estimation

Note: P-values in parenthesis

Our analysis goes further to examine how expenditure elasticities vary across different household strata. The findings show that households in the first quantile tend to increase their consumption of cereals, vegetables, meats, fruits, fats, other food, and beverages by 0.94 percent, 0.65 percent, 0.82 percent, 0.86 percent, 1.22 percent, 0.75 percent, and 4.39 percent, respectively, for every 1 percent increase in income. However, the elasticity of milk is statistically insignificant for the first quantile. Additionally, while the elasticities of most goods are significant at various levels of 1 percent, 5 percent, and 10 percent, the significance levels vary across goods. Interestingly, our findings also reveal that expenditure elasticities tend to decrease as we move from one household stratum to another. For instance, households in the fifth quantile increase their consumption of cereals, vegetables, meats, fruits, milk, fats, other food, and beverages by 0.79 percent, 0.36 percent, 0.79 percent, 0.80 percent, 1.27 percent, 1.11 percent, 0.66 percent, and 1.90 percent, respectively, for every 1 percent increase in income. Notably, all the elasticities for the fifth quantile are statistically significant at 1 percent and 5 percent levels of significance. The results suggest that households in the first quantile tend to have higher expenditure elasticities compared to those in higher quantiles, implying that lower-income households are more likely to change their consumption patterns in response to changes in income.

2.5: Direct Price Elasticities at National Level

Table 18: Compensated Price Elasticities of the Eight Food Groups

	Cereals	**Vegetables**	**Meats**	**Fruits**	**Milk**	**Fats**	**Other Food**	**Beverages**
Cereals	**-0.34** **(0.01)**	0.10 (0.00)	0.10 (0.00)	0.01 (0.00)	-0.01 (0.00)	0.08 (0.00)	0.03 (0.00)	0.02 (0.00)
Vegetables	0.41 (0.02)	**-0.57** **(0.02)**	0.06 (0.00)	0.00 (0.00)	0.00 (0.00)	0.06 (0.00)	0.00 (0.01)	0.05 (0.00)
Meats	0.40 (0.01)	0.06 (0.00)	**-0.74** **(0.00)**	0.02 (0.00)	0.02 (0.00)	0.11 (0.00)	0.04 (0.00)	0.09 (0.00)
Fruits	0.27 (0.03)	0.02 (0.02)	0.13 (0.01)	**-0.53** **(0.01)**	-0.01 (0.01)	0.05 (0.01)	0.10 (0.02)	-0.02 (0.01)
Milk	-0.26 (0.04)	-0.01 (0.03)	0.24 (0.02)	-0.01 (0.02)	**-0.21** **(0.02)**	0.06 (0.02)	0.08 (0.02)	0.10 (0.02)
Fats	0.39	0.06	0.13	0.01	0.01	**-0.72**	0.04	0.08

	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	**(0.00)**	(0.00)	(0.00)
Other Food	0.29 (0.04)	0.00 (0.03)	0.11 (0.01)	0.04 (0.01)	0.02 (0.01)	0.09 (0.01)	**-0.62** **(0.04)**	0.07 (0.01)
Beverages	0.14 (0.01)	0.02 (0.00)	0.10 (0.00)	0.00 (0.00)	0.02 (0.00)	0.10 (0.00)	0.03 (0.00)	**-0.41** **(0.01)**

Source: STATA results from QUAIDS estimation

Note: P-values in parenthesis

Table 19: Uncompensated Price Elasticities of the Eight Food Groups

	Cereals	**Vegetables**	**Meats**	**Fruits**	**Milk**	**Fats**	**Other Food**	**Beverages**
Cereals	**-0.78** **(0.01)**	0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)	-0.02 (0.00)	-0.01 (0.00)	-0.01 (0.00)	-0.06 (0.00)
Vegetables	0.15 (0.02)	**-0.64** **(0.02)**	0.00 (0.00)	-0.01 (0.00)	-0.01 (0.00)	0.00 (0.00)	-0.03 (0.01)	0.00 (0.00)
Meats	0.01 (0.01)	-0.03 (0.00)	**-0.83** **(0.00)**	0.00 (0.00)	0.01 (0.00)	0.03 (0.00)	0.00 (0.00)	0.01 (0.00)
Fruits	-0.14 (0.03)	-0.07 (0.02)	0.02 (0.01)	**-0.55** **(0.01)**	-0.02 (0.01)	-0.04 (0.01)	0.05 (0.02)	-0.10 (0.01)
Milk	-1.07 (0.06)	-0.20 (0.03)	0.04 (0.02)	-0.04 (0.02)	**-0.23** **(0.02)**	-0.11 (0.02)	0.00 (0.02)	-0.06 (0.00)
Fats	-0.16 (0.01)	-0.06 (0.00)	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)	**-0.84** **(0.01)**	-0.01 (0.00)	-0.03 (0.00)
Other Food	-0.05 (0.04)	-0.08 (0.03)	0.02 (0.01)	0.02 (0.01)	0.01 (0.01)	0.02 (0.01)	**-0.65** **(0.04)**	0.01 (0.01)
Beverages	-0.97 (0.01)	-0.24 (0.00)	-0.18 (0.00)	-0.05 (0.00)	-0.01 (0.00)	-0.14 (0.00)	-0.08 (0.00)	**-0.62** **(0.01)**

Source: STATA results from QUAIDS estimation

Note: P-values in parenthesis

Leser (1954) defines the price elasticity of demand as the percentage change in consumption associated with a one percent increase or decrease in price. In most cases, the price elasticity of

demand for a commodity is negative, meaning that as the price increases, consumption decreases, and as the price decreases consumption increases. However, there are some exceptions known as Giffen goods, where consumption increases as prices increase. Leser (1954) further states that the demand for a commodity is considered elastic or inelastic based on the value of the price elasticity, which is between 0 and -1 or below -1. If a commodity has an inelastic demand and its price increases, people will spend more money on it because the reduction in consumption is not enough to compensate for the price increase. Conversely, if a commodity has an elastic demand and its price increases, people will spend less on it because the decrease in consumption is greater than the price increase.

The concept of direct price elasticities is an important tool in measuring the responsiveness of consumption to changes in the price of a particular food product (Bettah, Ezzrari, & Mourji,2022). In essence, it is a measure of how much the quantity demanded of a food product changes when its price changes. The results of such analysis are presented in the diagonal line in tables 18 and 19 above. Table 18 is showing the compensated price elasticities while table 19 is showing the uncompensated price elasticities which are what we will use in our interpretations. The direct price elasticities are negative which is in line with theoretical expectations, indicating that as prices go up, demand goes down. The study finds that fats, meats, and cereals are the most responsive food products in terms of price changes. Specifically, fats have the highest elasticity of -0.84, followed by meat with an elasticity of -0.83, and then cereals with an elasticity of -0.78. This means that a 1 percent increase in the price of cereals, for instance, will lead to a reduction of 0.78 percent in the consumption of cereals. Similarly, a 1 percent increase in the price of meats will result in a reduction of 0.83 percent in the consumption of meats, and a 1 percent increase in the price of fats will lead to a reduction of 0.84 percent in the consumption of fats. In terms of the other food groups, our analysis shows that a 1 percent increase in the price of vegetables will result in a decrease in vegetable consumption by 0.64 percent. Similarly, a 1 percent increase in the price of fruits will lead to a reduction in fruit consumption by 0.55 percent, while a 1 percent increase in the price of milk will result in a decrease in milk consumption by 0.23 percent. For other food items, a 1 percent increase in price will reduce the consumption of other foods by 0.65 percent. Finally, a 1 percent increase in the price of beverages will lead to a decrease in beverage consumption by 0.62 percent. All the direct price elasticities are statistically significant, others at 1 percent and others at 5 percent significance levels. These results are consistent with similar studies conducted in

other countries, such as Morocco, where the most responsive food products were found to be cereals and meats (Bettah, Ezzrari, & Mourji,2022).

Unlike expenditure (income) elasticity, where the elasticity of the commodity group is an average of the elasticities of the individual commodities, for example, if we consider "meat" as a group of beef, lamb, and pork, and assume that there is no rationing, the finding that the demand for each meat is inelastic (or elastic) with respect to income would allow us to conclude that the demand for meat as a group is inelastic (or elastic) (Leser, 1954). However, this is not the same for price elasticities. It is important to note that even if the demand for a commodity group is relatively inelastic, the demand for each individual commodity within that group may be highly elastic with respect to price due to the possibility of substitution between items. For instance, a price increase for beef alone may lead to a significant decrease in beef consumption, accompanied by an increase in the purchases of lamb and pork. Similarly, a price increase for lamb or pork alone may have comparable effects. Therefore, the elasticity of demand for a commodity group is not necessarily indicative of the elasticity of demand for each individual commodity within the group.

2.6: Cross-Price Elasticities at the National Level

Cross-price elasticities refer to the degree of responsiveness of the demand for one product to changes in the price of another product. In simpler terms, it measures how much the consumption of one good changes when the price of another good change. This concept is essential for understanding how consumers make purchasing decisions and how changes in prices affect market dynamics. (Leser,1954). When calculating cross-price elasticities, researchers consider both the sign and magnitude of the results. The sign can be positive or negative, indicating whether two goods are substitutes or complements. If the two products are substitutes, an increase in the price of one will lead to an increase in the demand for the other. Conversely, if the two products are complements, an increase in the price of one will lead to a decrease in the demand for the other. (Leser, 1954). The magnitude of the cross-price elasticity indicates how much the quantity demanded of one good changes in response to a change in the price of another good. A higher magnitude implies a more significant effect, while a lower magnitude indicates a smaller effect. For example, research conducted in Morocco by Bettah, Ezzrari, and Mourji (2022) found that the cross-price elasticities between various food products were very low. This means that changes in the prices of these goods had little impact on the consumption of other goods. As a result, the substitution or complementarity effects were

relatively insignificant. The results from our analysis however show that meats, fruits, milk, fats, other foods, and beverages are complements to cereals because they all have negative elasticities while vegetables are a substitute for cereals because they have a positive elasticity implying that if the prices of cereals increase, household will increase their consumption of vegetables while decreasing their consumption of the rest of the other food groups.

2.7: Elasticities by Location /Area of Residence

Table 20: Uncompensated Direct Price Elasticities by Location (Reside)

	Urban	**Rural**
Cereals	-0.73 (0.01)	-0.79 (0.01)
Vegetables	-0.55 (0.02)	-0.65 (0.02)
Meats	-0.87 (0.00)	-0.82 (0.00)
Fruits	-0.67 (0.01)	-0.51 (0.01)
Milk	-0.76 (0.01)	0.46 (0.04)
Fats	-0.83 (0.01)	-0.84 (0.01)
Other Food	-0.73 (0.03)	-0.63 (0.04)
Beverages	-1.02 (0.01)	-0.42 (0.01)

Source: STATA results from QUAIDS estimation

Note: P-values in parenthesis

Based on our analysis of the data, we investigate whether households in urban and rural areas respond differently to changes in prices. The results shows that although the differences are relatively small, households in rural areas are more responsive to changes in prices of cereals, vegetables, and fats. In contrast, households in urban areas are more sensitive to changes in prices of meats, fruits, milk, other foods, and beverages. Interestingly, our analysis also reveals

a Giffen effect for milk among rural households. This means that as the price of milk increase, demand for milk also increase, despite the usual inverse relationship between price and demand.

The findings reveal that in the case of cereals, an increase in price by 1 percent will lead to a reduction in consumption by 0.73 percent for urban households and reduction of 0.79 percent for rural households. When it comes to meats, urban households will decrease their consumption by 0.87 percent, while rural households will reduce their consumption by 0.82 percent, if the price of meats increases by 1 percent. As for vegetables, urban households will decrease their consumption by 0.55 percent, and rural households by 0.65 percent, in response to a 1 percent increase in the price of vegetables. Similarly, if the price of fruits increases by 1 percent, households in urban areas will reduce their consumption by 0.67 percent, and those in rural areas by 0.51 percent. In contrast, an increase in the price of milk by 1 percent will result in a reduction in the consumption of milk by 0.76 percent for urban households, while rural households will increase their consumption by 0.46 percent. For fats, urban households will decrease their consumption by 0.83 percent, while rural households will reduce their consumption by 0.84 percent, if the price of fats increases by 1 percent. In terms of other food groups, households in urban areas will decrease their consumption by 0.73 percent, and those in rural areas by 0.63 percent, if the price of other food group increases by 1 percent. Finally, for beverages, if the price of beverages increases by 1 percent, households in urban areas will reduce their consumption by 1.02 percent, while those in rural areas will reduce their consumption by 0.42 percent.

This finding can have important implications for policymakers and researchers interested in understanding consumer behaviour in rural areas. Overall, our findings suggest that households in different locations may have distinct patterns of responding to changes in food prices, which may reflect differences in income, preferences, and access to food.

2.8: Elasticities by Social Class

Table 21: Uncompensated Direct Price Elasticities by Strata

	National	First Quantile	Second Quantile	Third Quantile	Fourth Quantile	Fifth Quantile
Cereals	-0.78 (0.01)	-0.81 (0.01)	-0.81 (0.01)	-0.79 (0.01)	-0.77 (0.01)	-0.72 (0.01)

Vegetables	-0.64 (0.02)	-0.72 (0.01)	-0.68 (0.02)	-0.64 (0.02)	-0.61 (0.02)	-0.51 (0.03)
Meats	-0.83 (0.00)	-0.73 (0.01)	-0.79 (0.00)	-0.82 (0.00)	-0.84 (0.00)	-0.87 (0.00)
Fruits	-0.55 (0.01)	-0.59 (0.01)	-0.52 (0.01)	-0.53 (0.01)	-0.54 (0.01)	-0.57 (0.01)
Milk	-0.23 (0.02)	8.73 (0.28)	3.06 (0.12)	1.29 (0.07)	-0.21 (0.02)	-0.70 (0.01)
Fats	-0.84 (0.01)	-0.77 (0.01)	-0.83 (0.01)	-0.85 (0.00)	-0.86 (0.00)	-0.84 (0.01)
Other Food	-0.65 (0.004)	-0.64 (0.04)	-0.63 (0.04)	-0.63 (0.04)	-0.66 (0.04)	-0.69 (0.03)
Beverages	-0.62 (0.01)	1.19 (0.04)	0.32 (0.02)	-0.40 (0.01)	-0.75 (0.01)	-1.05 (0.01)

Source: STATA results from QUAIDS estimation

Note: P-values in parenthesis

The analysis is extended to include the calculation of elasticities for different strata of the population, and the results are presented in the table 21 above. There are no significant differences in the responsiveness of households in different strata to changes in the price of various food groups. However, the results shows that households in the first and second quantiles the most responsive to changes in cereal and vegetables prices, with an elasticity of -0.81 for cereals and elasticity of -0.72 and -0.68 for vegetables for the first quantile and second quantile, respectively. This suggests that a 1 percent increase in the price of cereals will result in a reduction of 0.81 percent in the quantity demanded of cereals by households in the first and second quantiles. On the other hand, households in the third, fourth and fifth quantiles have a price elasticity of -0.79, -0.77 and -0.72 respectively for cereals. Interestingly, Beverages had a Giffen effect on the households in the first and second quantiles. The results shows that elasticities of beverages are 1.19 for the first quantile and 0.32 for the second quantile suggesting that these households increase the consumption of beverages with an increase in the price of beverages. While on the other hand, third, fourth and fifth quantile households have negative elasticities for beverages. The elasticities by household strata are statistically significant at different levels of significance from 1 percent, 5 percent, and 10 percent

significance levels, except for the elasticities of milk for first and second quantiles which are statistically insignificant.

Section 3: Simulations of the Effect of VAT Change on Cereals

Bettah, Ezzrari, and Mourji (2020) highlights that indirect tax system reforms, such as changes in VAT rates, can have a significant impact on consumer prices. To examine the effects of commodity VAT reforms on cereal consumption across different household groups, we utilize non-compensated price elasticities presented in table 21 above. These elasticities allow us to run simulations by expressing the percentage change in quantity demanded of a good i in response to a percentage change in the price of a good j using the elasticity ($\in_{ij}$) formula. We assume a 16.5 percent increase in cereal prices due to a full reflection of the VAT increase and then use the cross-price elasticity of demand for each group of goods to calculate the percentage change in the quantity of cereals demanded by each household group.

($\in_{ij}$) = variation in percentage of the quantity demanded of good i/Variation in percentage of the price of good j

To estimate the impact of a 16.5 percent price variation in cereals on the quantity demanded by group i in percentage terms, we use the cross-price elasticity of demand for good i in relation to cereals multiplied by the VAT rate (Bettah, Ezzrari, and Mourji, 2022). The results of our simulations for each group of goods are presented in the table 22 below. For this study, we assumed a 16.5 percent variation in the price of cereals, which is mostly exempt.

Table 22: Percentage Changes in Prices as a Result of the Introduction of 16.5% VAT on the Price

	National	**First Quantile**	**Second Quantile**	**Third Quantile**	**Fourth Quantile**	**Fifth Quantile**
Cereals	-12.87	-13.37	-13.37	-13.04	-12.71	-11.88
Vegetables	-10.56	-11.88	-11.22	-10.56	-10.07	-8.42
Meats	-13.70	-12.05	-13.04	-13.53	-13.86	-14.36
Fruits	-9.08	-9.74	-8.58	-8.75	-8.91	-9.41
Milk	-3.80	144.05	50.49	21.29	-3.47	-11.55

Fats	-13.86	-12.71	-13.70	-14.03	-14.19	-13.86
Other Food	-10.73	-10.56	-10.40	-10.40	-10.89	-11.39
Beverages	-10.23	19.64	5.28	-6.60	-12.38	-17.33

Source: STATA results from QUAIDS estimation

The simulations indicate that if VAT on cereals is to be increased by 16.5 percent, this will result in a decrease of 12.87 percent in the consumption of cereals nationally. For the different household strata, lower quantile households will experience a reduction of 13.37 percent in cereal consumption, while the highest quantile households will reduce their consumption by 11.88 percent.

After incorporating the elasticities to calculate the new quantities of the food groups, we compute the new expenditure. We then evaluate the Gini coefficient, and we observe that if a Value-Added Tax (VAT) is introduced on all food groups, assuming a price increase of 16.5 percent, the Gini coefficient is projected to rise from its current value of 0.385 to 0.544. This indicates a significant increase in income inequalities, an increase of 42.1 percent. The increase in the Gini coefficient signifies a higher concentration of income among a smaller portion of the population. In other words, the introduction of VAT on all food items would disproportionately affect low-income households, exacerbating the existing income disparities in the country. This finding raises concerns about the potential negative impact of the proposed VAT policy on the welfare and economic well-being of vulnerable segments of the population. It is crucial to carefully consider the potential consequences and distributional effects of such policy changes, particularly in terms of their impact on income inequalities. Policymakers should explore alternative strategies to mitigate the adverse effects on vulnerable households and ensure that any tax reforms are designed in a way that promotes equitable economic growth and social welfare.

Conclusion.

This study utilizes the Quadratic Almost Ideal Demand System (QUAIDS) model to analyse the elasticities of eight food groups in Malawi. The main objective is to assess the potential changes in consumption patterns resulting from an increase in food prices due to the introduction of a Value-Added Tax (VAT). By employing the QUAIDS model and drawing on data from the Malawi Integrated Household Survey 2019/2020 (IHS5), the study aims to capture the complex relationships and interdependencies among different food groups in

response to price variations. The calculated elasticities shed light on how consumers may adjust their consumption behaviour in the face of higher food prices caused by the implementation of VAT. The utilization of the recent and representative IHS5 data ensures that the analysis is based on up-to-date information on household consumption patterns in Malawi. This data serves as a valuable resource for understanding the dynamics of food demand and evaluating the potential impacts of policy changes, such as the introduction of VAT

The study examines the price and income elasticities of different food products. The direct price elasticities are negative, indicating that as prices increase, consumption decreases. Fats, meats, and cereals are found to be the most responsive to price changes. The income elasticities are below 1 for cereals, vegetables, meats, fruits, and other foods, indicating that they are essential goods, while milk, fats, and beverages have elasticities above 1, indicating they are luxury goods. Additionally, the study reveals that households in rural and urban areas exhibit distinct responses to changes in food prices. Similarly, households belonging to different income strata display varying levels of responsiveness to price fluctuations. Specifically, households in the lower income quantiles, such as the first and second quantiles, are found to be more sensitive to price changes compared to higher-income households.

Furthermore, the study examines the cross-price elasticities, which measure the responsiveness of consumption of one food product to changes in the price of another related product. However, the results indicates that the magnitudes of the cross-price elasticities are relatively low. The simulation results regarding the impact of VAT reform reveals that eliminating the existing exemptions on all eight food groups will lead to a significant increase in inequalities. Specifically, the removal of these exemptions will result in a 42 percent rise in inequality levels. This finding suggests that the proposed VAT reform, which involves subjecting all food groups to taxation, will disproportionately affect different segments of the population. The increased burden of VAT on food items can potentially worsen existing inequalities by placing a greater financial burden on households with lower incomes. It is therefore important to consider the potential social and economic consequences of such a reform, as it may have adverse effects on vulnerable or marginalized groups. Policymakers should carefully evaluate the equity implications and consider implementing measures to mitigate the potential negative impacts on low-income households.

In summary, the study highlights the differential responses of households in different areas and income groups to changes in food prices. It underscores the importance of considering these variations in understanding consumer behaviour and designing effective policies related to food pricing and consumption. Additionally, the study suggests that the interdependence between different food products, as indicated by cross-price elasticities, may not play a significant role in shaping consumption patterns in the context of the examined food items. Furthermore, the simulation results indicate that removing VAT exemptions on all eight food groups will significantly increase inequalities, highlighting the need for a comprehensive assessment of the potential repercussions and the implementation of appropriate measures to ensure a fair and equitable outcome for all segments of society.

Limitations of the Study

The study relies on household survey data, which typically do not include market prices. Instead, households report their expenditures and the quantities of each item purchased during a specific period, which can be used to estimate the unit prices. However, this method has limitations because prices may be influenced by the quality of goods purchased by the household. In addition, there are differences in consumption patterns between traditional and modern inhabitants, with the latter relying more on market purchases. These differences have important implications for the design of pricing and tax systems, as well as their effects on resource allocation and income distribution between urban and rural sectors. (Deaton, 1987). Another area where this study is limited is its focus only on the impact of VAT reform on food consumption. This study did not investigate the potential impact of numerous VAT exemptions on producers, which requires further research. Basing on the results from this study, further research should consider looking at testing different scenarios on which VAT can be structured so that it maximizes the benefits to the poor.

References

Abdelkhalek, T., & Bocconfuso, D. (2021). Impact of Tax Reforms in Applied Models: Which Functional Forms Should be Chosen for the Demand System? Theory and Application for Morocco. *Center for Interuniversity Research and Analysis on Organisation*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3793692

Adoho, F. M., & Gansey, R. J. (2019, 6). Welfare Impact of Value-Added Tax Reform: The Case of The Democratic Republic of Congo. *The World Bank Group: Poverty and Equity Global Practice Working Paper 8923*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3430535

Ansah, I. G., Marfo, E., & Donkoh, A. S. (2020). Food Demand Characteristics in Ghana: An Application of the Quadratic Almost Ideal Demand Systems. *Scientific African, 8*. Retrieved May 4, 2023, from https://www.sciencedirect.com/science/article/pii/S2468227620300314

Asare, E., Segarra, E., & Agyekum, M. (2018). Food Inflation and Households' Welfare: The Case of Ethiopia. *African Journal of Agricultural Economics and Rural Development , 6*, pp. 650-658.

Atkinson, A. B., & Stiglitz, J. E. (1972). The Structure of Indirect Taxation and Economic Efficiency. *Journal of Public Economics, 1*, 97-119. Retrieved May 4, 2023, from https://www.sciencedirect.com/sdfe/pdf/download/eid/1-s2.0-0047272772900217/first-page-pdf

Banda, M. C. (2018). Value Added Tax Incidence in Malawi: An Empirical Estimation and Analysis. *African Tax and Customs Review*(1). Retrieved May 3, 2023, from https://atcr.kra.go.ke/index.php/atcr/article/view/30/18

Banks, J., Blundell, R., & Lewbel, A. (1997). Quadratic Engel Curves and Consumer Demand. *Review of Economics and Statistics, 79*(4), 527-539.

Bettah, M., Ezzrari, A., & Mourji, M. (2022). Impact of VAT Reforms on Moroccan Household's Food Consumption: Microsimulation Analyses Through the QUAIDS Model (2001-2014). *Journal of Development and Economic Policies, 24*(2), 5-43.

Bird, R. M., & Gendron, P. P. (2009). *The VAT in Developing and Transitional Countries.* Cambridge, UK: Cambridge University Press. Retrieved May 4, 2023, from

https://www.cambridge.org/core/books/abs/vat-in-developing-and-transitional-countries/key-issues-in-vat-design/D71083813AB287287EE1B85ED241E053

Bye, B., Strom, B., & Avitslad, T. (2011). Wlefare Effects of VAT Reforms: a General Equilibrium Analysis. *International Tax Public Finance*. doi:https://doi.org/10.1007/s10797-011-9193-9

Cnossen, S. (2019). *Modernizing VATs in Africa.* Oxford University Press.

Dal, E., Rivera, R., Opazo, C., & Madrigal, M. (2022). Fiscal Reform in Costa Rica: Price Elasticities of Major Food Categories to Inform Decision-Making. *Frontiers in Nutrition*. Retrieved from https://www.frontiersin.org/articles/10.3389/fnut.2022.836501/full

Deaton, A. (1987). Estimation of Own and Cross Price Elasticities from Household Survey Data. *Journal of Econometrics, 36*, 7-30.

Deaton, A., & Muellbauer, J. (1980). An Almost Ideal Demand System. *American Economic Review, 70*(3), 312-326.

Giha-Revoredo, C., Toma, L., & Akaichi, F. (2020). An Analysis of the Tax Incidence of VAT to Milk in Malawi. *MDPI Sustainability Journal*.

Henningsen, A. (2017). Demand Analysis with the Almost Ideal Demand System in R; Package mic EconAids. *Semantic Scholar*. Retrieved April 27, 2023, from https://cran.r-project.org/web/packages/micEconAids/vignettes/micEconAids_vignette.pdf

Hossan, S. M. (1994). The Equity of the Value Added Tax in Bangladesh. *International Monetary Fund Working Paper 94/125*. Retrieved from https://papers.ssrn.com/Sol3/papers.cfm?abstract_id=883868

Inchauste, G., & Rubil, I. (2017). The Distributional Impact of Taxes and Social Spending in Croatia. *World Bank Policy Research Working Paper 8203*. Retrieved from https://openknowledge.worldbank.org/entities/publication/d8f95aa3-54a9-5175-a384-01d800419a5e

Jann, B. (2016). Estimating Lorenz and Concentration Curves. *The Stata Journal 16*(4), 837-866.

Lait, A. A. (1988). Value Added Tax: International Practice and Problems. *International Monetary Fund*.

Leser, C. E. (1954, June). The Measurement of Elasticities of Demand. *Journal of the Royal Statistical Society. Series C (Applied Statistics) Vol 3, No 2*, pp. 74-84.

Malawi College of Accountancy. (2013). *Students' Taxation Manual.*

Malawi Revenue Authority. (n.d.). *VAT Induction Course.*

Malawi Value Added Tax Act. (2005).

Mjeda, T., Lenz, N. V., & Cerović, L. (2021). The microeconomic approach to food demand modelling: empirical results for Croatian households. *Economic Research-Ekonomska Istraživanja, 34*(1), 1079-1093. Retrieved from https://www.tandfonline.com/doi/full/10.1080/1331677X.2020.1819850

Mussa, R. (2014). Household Expenditure Components and the Poverty and Inequality Relationship in Malawi. *African Development Review, 26*(1), pp. 138-147.

Mwale, J. (2018, 10 17). Malawi Shines on Tax Reforms. *The Nation Online*. Retrieved from https://mwnation.com/malawi-shines-on-tax-reforms/

Naz, L., Ahmad, M., & Arif, G. (2018). Estimating Food Demand System and Rural Household Welfare: A Case Study from Pakistan. *Business and Economic Review, 10*(4), 55-82. Retrieved from https://www.researchgate.net/publication/337031994_Estimating_Food_Demand_System_and_Rural_Household_Welfare_A_Case_Study_from_Pakistan

OECD. (2014). Addressing the Tax Challenges of the Digital Economy. Retrieved May 3, 2023, from https://www.oecd-ilibrary.org/taxation/addressing-the-tax-challenges-of-the-digital-economy/fundamental-principles-of-taxation_9789264218789-5-en;jsessionid=cY-BWYwDDlM-sa1AF3zX04lP970n3MfDL4hR2xbF.ip-10-240-5-12

OECD. (n.d.). *Tax and Economic Growth*. Retrieved from https://www.oecd.org/mena/competitiveness/41997578.pdf

Otomani, W. (2016, 5 30). *Malawi Embarks on VAT reforms*. Retrieved from Malawi Revenue Authority: https://www.mra.mw/news/malawi-embarks-on-vat-reforms#:~:text=Malawi%20embarks%20on%20VAT%20reforms%20Malawi%20wil

l%20introduce,a%20simple%2C%20efficient%2C%20transparent%20and%20fair%20tax%20system.

Poi, B. P. (2012). Easy Demand System Estimation with Quaids. *Stata Journal*(12), pp. 433-446.

Quatrebarbes, C., Boccanfuso, D., & Savard, L. (2016). Beyond representative households: The macro-micro impact analysis of VAT design applied to Niger. *economic Modelling, 57*, 76-92. Retrieved from https://www.sciencedirect.com/science/article/pii/S0264999316300694?via%3Dihub

Ramsey, F. P. (1927). A contribution to the theory of taxation. *Economic Journal, 37*, 47-61. Retrieved from https://www.jstor.org/stable/pdf/2222721.pdf?refreqid=excelsior%3A232cfb305b8318%094241a504b88785163a&ab_segments=&origin=&initiator=&acceptTC=1

Ravallion, M. (1998). Poverty Lines in Theory and Practice. *LSMS Working Paper, 133*. Retrieved April 27, 2023, from https://elibrary.worldbank.org/doi/epdf/10.1596/0-8213-4226-6

Saez, E. (2002). The Desirability of Commodity Taxation under non-linear income taxation and Heterogenous tastes. *National Bureau of Economic Research, 83*, 217-230.

Sangala, T. (2016, 10 11). *Government Taxes Water Bread*. Retrieved from The Times Group: https://times.mw/government-taxes-water-bread/

The Malawi Government. (2020). *The Fifth Integrated Household Survey (IHS5).* Zomba: National Statistical Office.

The Malawi Government. (2020). *The Malawi Poverty Report.* Zomba: The National Statistical Office.

The National Statistical Office. (2019/2020). *The Fifth Integrated Household Survey (IHS5)*. Retrieved from Reference ID: MWI_2019_IHS-V_v05: https://microdata.worldbank.org/index.php/catalog/3818/get-microdata

Todaro, M. P., & Smith, S. C. (2015). *Economic Development* (13th ed.). Harlow: Pearson Education Limited.

Toth, P., Cupak, A., & Rozov, M. (2020). Measuring the Efficiency of VAT Reforms: a Demand System Simulation Approach. *Oxford Economic Papers*, 1-26. Retrieved from https://www.researchgate.net/publication/347582874_Measuring_the_efficiency_of_VAT_reforms_a_demand_system_simulation_approach

Wooldridge, J. M. (2020). *Introductory Econometrics: A Modern Approach* (7th ed.). Boston, USA: Cengage Learning, Inc.

World Bank. (2007). Malawi Poverty and Vulnerability Assessment: Investing in our Future. *2*. Retrieved April 28, 2023, from https://documents.worldbank.org/en/publication/documents-reports/documentdetail/645221468272375497/full-report

Appendices

Estimation Results of the QUAIDS Model

VARIABLES	(1) alpha	(2) beta	(3) gamma	(4) lambda	(5) eta	(6) rho
gamma_1_1			0.114***			
			(0)			
gamma_2_1			-0.0113***			
			(1.06e-05)			
gamma_3_1			-0.00942***			
			(0)			
gamma_4_1			-0.00271***			
			(9.30e-06)			
gamma_5_1			-0.00750***			
			(0)			
gamma_6_1			-0.00699***			
			(0)			
gamma_7_1			-0.00880***			
			(2.80e-05)			
gamma_8_1			-0.0675***			
			(0)			
gamma_2_2			0.0455***			
			(0)			
gamma_3_2			-0.00298***			
			(1.50e-09)			
gamma_4_2			-0.00181***			
			(1.60e-06)			
gamma_5_2			-0.00292***			
			(0)			
gamma_6_2			-0.00868***			
			(0)			
gamma_7_2			-0.00337**			
			(0.0174)			

gamma_8_2	-0.0145***
	(0)
gamma_3_3	0.0190***
	(0)
gamma_4_3	0.000145
	(0.461)
gamma_5_3	0.000739**
	*
	(0.000560)
gamma_6_3	-0.000360
	(0.337)
gamma_7_3	0.000109
	(0.689)
gamma_8_3	-0.00723***
	(0)
gamma_4_4	0.00849***
	(0)
gamma_5_4	-0.000296*
	(0.0862)
gamma_6_4	-
	0.000860**
	*
	(0.000323)
gamma_7_4	0.000899**
	*
	(0.00238)
gamma_8_4	-0.00386***
	(0)
gamma_5_5	0.00874***
	(0)
gamma_6_5	0.000114
	(0.658)
gamma_7_5	9.41e-06

		(0.973)
gamma_8_5		0.00112***
		(0.00248)
gamma_6_6		0.0194***
		(0)
gamma_7_6		-0.00132***
		(5.41e-05)
gamma_8_6		-0.00127**
		(0.0418)
gamma_7_7		0.0173***
		(0)
gamma_8_7		-0.00485***
		(0)
gamma_8_8		0.0981***
		(0)
alpha_1	0.324***	
	(0)	
alpha_2	-0.121***	
	(0)	
alpha_3	0.0213***	
	(0.00450)	
alpha_4	0.0310***	
	(0)	
alpha_5	0.0780***	
	(0)	
alpha_6	0.152***	
	(0)	
alpha_7	-0.0178***	

	(0.00134)		
alpha_8	0.533***		
	(0)		
beta_1		0.165***	
		(0)	
beta_2		-0.0666***	
		(0)	
beta_3		-0.00502	
		(0.129)	
beta_4		-0.000245	
		(0.898)	
beta_5		0.00219	
		(0.270)	
beta_6		0.0398***	
		(0)	
beta_7		-0.0172***	
		(0)	
beta_8		-0.118***	
		(0)	
lambda_1			0.0317***
			(0)
lambda_2			-0.000159
			(0.672)
lambda_3			0.00238***
			(5.04e-09)
lambda_4			0.00153***

	(2.83e-10)	
lambda_5	0.000365	
	(0.134)	
lambda_6	0.00228***	
	(9.05e-07)	
lambda_7	0.00154***	
	(1.43e-05)	
lambda_8	-0.0396***	
	(0)	
eta_hhsize_1		-0.00242***
		(0)
eta_hhsize_2		0.00119***
		(0)
eta_hhsize_3		-0.000667***
		(7.19e-07)
eta_hhsize_4		0.000241***
		(0.000378)
eta_hhsize_5		0.000303***
		(5.35e-05)
eta_hhsize_6		-0.000355**
		(0.0218)
eta_hhsize_7		0.000828***
		(0)
eta_hhsize_8		0.000881***
		(0.000469)

eta_reside_1	-0.0210***
	(0)
eta_reside_2	0.00167***
	(0.00144)
eta_reside_3	0.00585***
	(0)
eta_reside_4	0.00118***
	(0.000711)
eta_reside_5	0.00172***
	(6.80e-06)
eta_reside_6	-0.00521***
	(1.21e-10)
eta_reside_7	0.00388***
	(0)
eta_reside_8	0.0119***
	(0)
eta_group_var_1	0.00107**
	(0.0102)
eta_group_var_2	0.00144***
	(0)
eta_group_var_3	-0.00453***
	(0)
eta_group_var_4	0.000683***
	(4.06e-08)
eta_group_var_5	0.000798***
	(5.64e-09)

eta_group_var_6					-0.000964***	
					(0.000390)	
eta_group_var_7					-7.42e-05	
					(0.635)	
eta_group_var_8					0.00158***	
					(2.23e-05)	
rho_hhsize						3.226***
						(0)
rho_reside						2.112***
						(0.00177)
rho_group_var						2.580***
						(0)
Observations	11,304	11,304	11,304	11,304	11,304	11,304

P Values in parentheses

*** p<0.01, ** p<0.05, * p<0.1