THE EFFECT OF INTEREST RATE ON HOUSEHOLD CONSUMPTION EXPENDITURE IN SOUTH AFRICA

by

MUSA LIGHT BALOYI

Submitted in fulfilment of the requirements for the degree of

MASTER OF COMMERCE

in

ECONOMICS

in the

FACULTY OF MANAGEMENT & LAW

(School of Economics and Management)

at the

UNIVERSITY OF LIMPOPO

SUPERVISOR: DR. S ZHANJE

2024

DECLARATION

I declare that the **effect of interest rate on household consumption expenditure in South Africa** hereby submitted to the University of Limpopo, for the degree of master of commerce in economics has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein has been duly acknowledged.

Surname, Initials (title)	**Date**
Baloyi ML (Mr)	26/02/2024

ACKNOWLEDGEMENTS

Embarking on a research project requires a great deal of self-respect, discipline, and dedication, especially at the master's level. It truly does require someone who is emotionally, physically, and psychologically prepared. As a result, I would want to sincerely thank the following individuals for their unwavering support throughout this entire time:

- My supervisor Dr S Zhanje. My dissertation was completed in large part thanks to his counsel, direction, incessant meetings, and persistent reminders.
- My colleagues in the department of economics at the University of Limpopo for their input and encouragement.
- My whole family for the support they afforded me throughout.
- Above all, I would like to express my gratitude to God for giving me the courage and discernment I need to complete this study and stay with it through to the very end.

ABSTRACT

The primary driver of the expansion of South Africa's Gross Domestic Product has been and continues to be household consumption. Conversely, interest rates have changed over time. These two economic indicators have the potential of determining the health of economy. Therefore, this study intends to reveal the effect of interest rate on household consumption expenditure in South Africa and ascertain the ways in which other carefully chosen explanatory either increase or decrease household consumption. This study absorbed a quantitative approach to analyse time series data over a 34-year period (1989 to 2022). The Autoregressive Distributed Lag (ARDL) bounds test was employed to test for the long run cointegrating relationship as well as to estimate the long run and short run models. The findings of the ARDL long run model indicate that household savings, interest rates, and inflation rates are inversely related to household consumption, while household disposable income, debt, and the real effective exchange rate are positively related to household consumption. The relationship between household debt, savings, and consumption is insignificant, nevertheless.

The ARDL error correction model indicates that all variables are statistically significant in the short run, with household consumption being positively correlated with the interest rate, real effective exchange rate, and household disposable income, and negatively correlated with the inflation rate, household debt, and saving. According to the error correction model, each year, roughly 64% of the household consumption model's imbalances are resolved. Lastly, the VAR Granger causality test reveals a unidirectional association between household consumption and the real effective exchange rate, inflation rate, and household disposable income, while a bidirectional relationship exists between household consumption and the interest rate. Savings is the only variable that does not link with household consumption. The impulse response revealed that household consumption expenditure responds negatively to shocks in interest rate, inflation rate, and household saving. The response to shocks in family debt and the real effective exchange rate is initially positive but gradually declines until year 10. The variance decomposition results revealed that during the next ten years, all determinant factors had a stronger impact on changes in household consumption spending. Therefore, the policy recommendation is that the interest rate ought to be changed by

SARB under an inflation targeting framework that takes inflation expectations into account. This strategy helps stabilise inflation expectations and offers a stable environment in which businesses and families can plan their investments and spending. The preservation of households' purchasing power through low and stable inflation promotes consumption.

KEY CONCEPTS: household consumption expenditure, interest rate, Autoregressive Distributed Lag (ARDL), error correction model, causality.

TABLE OF CONTENTS

ACRONYMS

ADF : Augmented Dickey Fuller

AFDB : African Development Bank

AIC : Akaike Information Criterion

ARDL : Autoregressive Distributive Lag

DLNDEBT : Differenced LDEBT

DLNHCONS : Differenced LNCONS

DLNHDI : Differenced LNHDI

DLNREER : Differenced LNREER

DLNSAV : Differenced LNSAV

ECT : Error Correction Term

GDP : Gross Domestic Product

GNP : Gross National Product

IMF : International Monetary Fund

IRF : Impulse Response Function

JB : Jarque Bera

LM : Lagrange Multiplier

LNCONS : Log of Household Consumption

LNHDI : Log of Household Disposable Income

LNDEBT : Log of Household Debt

LNSAV : Log of household Saving

LNREER : Log of REER

MPC	: Monetary Policy Committee
OECD	: Organisation for Economic Co-operation and Development
PP	: Phillips Perron
REER	: Real Effective Exchange Rate
RESET	: The Regression Specification Error Test
SARB	: South African Reserve Bank
VAR	: Vector Autoregressive
WB	: World Bank

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1
ORIENTATION TO THE STUDY

1.1. INTRODUCTION AND BACKGROUND

Household consumption expenditure is one of the key economic growth drivers as it is the main fundamental component of every nation's Gross Domestic Product (GDP). Household consumption expenditure make up a sizable component of GDP in almost every nation in the world (Muzindutsi & Mjeso, 2018). According to mainstream neoclassical economists, consumption is the ultimate goal of economic activity, and as such, per capita consumption is seen as a crucial measure of the productivity of an economy (Ezeji & Ajudua, 2015). From a global perspective, household wealth, consumption, and income are thought to be some of the major factors influencing residents' well-being (Gerstberger & Yaneva, 2013; Verter & Osakwe, 2014). Therefore, economists and policy makers focus on factors that accelerate or hinder household consumption in order to determine policy instruments that can rejuvenate the economy during a recession and moderate it during an inflationary period (Ekong & Effiong, 2020).

The African continent is the second most populous continent after Asia; however, its total household consumption expenditure is comparatively small (Onanuga, 2020). The Southern African, sub-Saharan, and North African average household consumption expenditure is relatively low as compared to the total household consumption expenditure in the North and South America as well as Asia and Europe (Onanuga, 2020). Generally, an expanding and a healthy economy is characterised by a corresponding increased household consumption expenditure level. Hence, a change in consumer spending is likely to alter the overall performance of the economy (Muzindutsi & Mjeso, 2018).

The research on household consumption and its determinants has also drawn increased attention from banks and national government policy makers. This has been due to the household consumption expenditure association with economic growth, capital accumulation, and banks' capacity to lend more money and thereby increase their revenue from borrowings derived from their clients' savings and investments (Ekong & Effiong, 2020). Over the past years, household consumption in developed nations has changed dramatically, especially after the industrial revolution (Haradhan, 2019). A greater range of goods and services were consumed by households in developed countries due to technological advancements, more urbanisation, easy access to credit and rising incomes (Stiglitz, 2019). The advent of consumer culture and mass production drove consumption, which in turn produced a large range of consumer goods and the widespread acceptance of a lifestyle focused on consumption (Firat et al. 2013). Conversely, lower levels of consumption have historically been associated with that of developing nations because of poor infrastructure, lower income levels, and restricted access to products and services (Meyimdjui & Combes, 2021). In these nations, access to non-essential goods has been restricted, with a primary focus on basic necessities including food, clothes, and shelter (Duflo & Banerjee, 2019). But the discrepancies in income distribution, access to financial resources, and economic development levels can be used as an explanation for the variations in household spending between developed and developing nations (Duflo & Banerjee, 2019).

In South African Development Community (SADC) and Sub-Saharan Africa (SSA), household consumption has been affected by several factors, including income and unemployment, financial inclusion and credit availability, demographics, government policies, and economic stability (AFDB, 2020). Government policies including social welfare programs, taxation, and subsidies in SADC and SSA have had a direct effect on household consumption by affecting disposable income and purchasing power (AFDB, 2020). Hove et al. (2019) found that nations with predictable and stable economies typically had greater levels of household consumption because people were more assured of their future income and expenses. However, as noted by Dabla-Norris et al. (2015), household spending may decline because of political unrest and economic uncertainty.

In the context of South Africa, there has been a slowdown in household consumption due to a combination of both domestic factors (high interest rates, rising inflation, unemployment, increasing number of households, change in preference and tastes etc) and international factors (strong currencies) (IMF, 2022). South African household spending increased by 1.4% annually on average between 2010 and 2019, according to the South African Reserve Bank (SARB, 2020). The degree of aggregate household consumption expenditure has a significant effect on a nation's growth rate, as seen by the variations in South Africa's growth rate as a result of changes in the nation's aggregate consumption expenditure (Muzindutsi & Mjeso, 2018). The five-month platinum strike, the elevated rate of inflation, and the curtailed expansion of credit extension were all factors contributing to the anticipated lower consumption spending in 2014 (Holmes, 2014). Forecasts for economic growth were revised as a result of this reduction, falling from 5 to about 4.7 percent, with the assumption that growth in private consumption would lead to GDP growth in South Africa (Holmes, 2014). However economic growth continued to slumber in subsequent years before it started rising in 2017 which also overlapped to 2018. The economy contracted 3.7% in 2019 before experiencing a significant downturn of -1.8% in 2020 (IMF, 2023). South Africa's full-year GDP growth dropped from 6.9% percent in 2021 to 4.1 percent in 2022 (IMF, 2023). This implies that South African economic growth fell from about 4.7% in 2014 to 4.1% in 2022 (IMF, 2023).

Numerous factors contributed to the poor growth household consumption expenditure, such as the nation's high unemployment rate, weak wage growth, high household debt levels, and unpredictable commodity prices that have restrained consumer spending (Muzindutsi & Mjeso, 2018). With respect to household debt, South Africans are heavily burdened (National Credit Regulator, 2021). South Africans spend R75 of every R 100 of disposable income to pay off debt, leaving only R25 for savings and investments (Feddersen, 2017). Consequently, the cost of living and financial sustainability of South Africans are also affected by changes in interest rates (Feddersen, 2017). In addition, the COVID-19 pandemic and the repercussions of the worldwide financial crisis affected the economy of South African and caused a decrease in consumption (SARB, 2020). Given that changes in South African's household consumption expenditures are therefore quite concerning hence, the understanding of the main factors that influence South Africa's consumption expenditure is crucial.

The effect of interest rates on household consumption has not received the maximum amount of research attention in South Africa, even though understanding the fundamental factors driving household consumption is crucial due to its ability to stimulate growth (Muzindutsi & Mjeso, 2018). On the other hand, technologically advanced economies have reasonably conducted a sizable and ongoing body of studies on the effect of interest rate on household consumption expenditure (Teuta, 2015; Bryan & Vengelen, 2015; Çiftçioğlu & Almasifard, 2015; Tzamourani, 2019 & Afzali, 2022). A handful of studies were conducted in emerging economies (Osei-Fosu et al., 2014; Combey, 2016; Yusuf et al., 2017; Manasseh et al., 2018; Mukhtar et al., 2020; Fadhil & Rajab, 2021). However, a relatively few studies were conducted in South Africa (Jordan, 2013 & Fikizolo, 2020). Therefore, due to the paucity of research on the country's experience, the study endeavours to establish the effect of interest rates on household consumption expenditure in South Africa using a modern econometric approach.

1.2. STATEMENT OF THE PROBLEM

The World Bank (2022) detailed that South African household consumption had averaged 63.61% of gross domestic product (GDP) three years prior to 2020 and deteriorated to 62.42% of GDP between 2020 and 2022, reflecting the negative effect of COVID-19 pandemic on the economic activity. Also, South Africa has been grappling with a high unemployment rate and sluggish economic growth, which are among the factors that have also affected household consumption. Household incomes are strained by high unemployment rates, which results in less money being spent on non-essential goods and services. Furthermore, consumer confidence has declined, and overall consumer spending has decreased as a result of the weak economic growth. South Africa's GDP growth rate was 0.6% in 2016 and reached 2.0% in 2022, which is indicative of the economy's sluggish progress and its effect on household consumption (World Bank, 2022). Income levels have also had an influence on household's capacity to make purchases and engage in consumption of goods and services. This has left many South Africans living below the poverty line as income inequality has been a major problem in the country (StatsSA, 2022).

The degree of household indebtedness and the ever-changing interest rate are noteworthy variables that has affected household consumption in South Africa. The stalling household consumption was further caused by high interest rates and a decline in household debt because consumption in South Africa is mainly driven by credit (Owusu-Sekyere, 2017). National Credit Regulator (2021) revealed that a significant proportion of South African households bear debt loads that are out of proportion to their income. Between July 2015 and March 2016, the Reserve Bank of South Africa's (SARB) monetary policy committee had to raise the repo rate three times in a little over a year (SARB, 2021). The goal was to control the inflationary pressures brought about by the South African rand's 13% decline since January 2015 (Owusu-Sekyere, 2017). In reaction to interest rate hikes by the SARB, which suggested that the cost of servicing existing debt increases along with a greater cost of obtaining new debt by households, household debt to disposable income progressively dropped from 78,5% in 2015 to 71.9% in 2018, which is still high beyond the expected levels (Karambakuwa & Ncwadi, 2021).

The SARB cut the repo rate to a record low of 3.5% by 2020 and 2021 in response to the COVID-19 pandemic that struck in 2020 (SARB, 2023). The goal of these rate reductions was to lessen household debt, lower the cost of borrowing, and stimulate consumption (SARB, 2023). Thus, there was a notable surge in household debt to income in 2020, suggesting that South African households are facing an increasingly heavy financial burden (Muneri & Kuhn, 2023). This growing trend raises concerns since it indicates that households might be overleveraged and may find it difficult to make ends meet. Hence it was of utmost importance to investigate how interest rates and hence debt burden affects household consumption expenditure in South Africa.

1.3. RESEARCH AIM AND OBJECTIVES

1.3.1. Aim

The aim of the study is to investigate the effect of interest rate on household consumption expenditure in South Africa for the period 1989 to 2022.

1.3.2. Objectives

The research objectives are:

- To determine a relationship between interest rate and household consumption.
- To discover the link between inflation rate and household consumption.
- To examine the nexus between household debt and household consumption expenditure.

- To determine the relationship between real effective exchange rate and household consumption expenditure.
- To establish causal relationship amongst the model variables.
- To project economic shocks of household consumption expenditure model.

1.4. RESEARCH QUESTIONS

- Is there a relationship between interest rates and household consumption expenditure?
- Does inflation rate and household consumption expenditure have a relationship?
- Is there a link between household debt and household consumption expenditure?
- Is there a relationship between real effective exchange rate and household consumption expenditure?
- Does a causal relationship amongst the model variables exist?
- Are there economic shocks of household consumption expenditure?

1.5. DEFINITION OF CONCEPTS

- Household consumption expenditure

Household consumption expenditure is the market value of all final goods and services (Tzamourani, 2019). It is the amount spent by a country's resident households, regardless of where the spending takes place (Stats SA, 2020). Household consumption expenditure is the study is the dependent variable on which the relationships and effects of the independent variables are tested on and is captured using the country's household consumption values sourced from Quantec EasyData.

- Prime rate

The prime rate is the interest charged to clients by the commercial banks (Rodeck & Curry , 2022). It is also referred as the bank rate that is generally applied to meet the short- and medium-term borrowing requirements of the private sector (World Bank, 2023). The prime rate is captured in the study using its absolute value, which was obtained from Quantec EasyData.

- Household disposable income

Household disposable income is income at the disposal of an income earner after deductions (Gohar, et al., 2022). Or rather the total amount of money that households have after all taxes have been paid (OECD, 2023). Household disposable income in the study is measured using household disposable per capita income and the values acquired from South African Reserve Bank (SARB) were used for quantification.

- Household debt

Household debt is described as all obligations of households, consisting of but not limited to zero profit organisations servicing households, that involve payments of interest to creditors at predetermined upcoming dates (OECD, 2022). It also described as the total amount of debt a customer has within their household (IMF, 2017). The household debt was measured in the study using SARB-provided data.

- Inflation

Inflation is a persistent increase goods and services prices (McKinsey&Company, 2022). Similarly, it is the persistent rise in the overall level of prices in an economy as assessed at a specific moment in time (Tokoya, et al., 2022). The World Bank provides inflation figures, which are used to measure inflation rate. The study used these inflation rate figures.

- Real Effective Exchange rate (REER)

The real effective exchange rate is the actual worth of a currency relative to a weighted average of multiple foreign currencies (Pettinger , 2017). It can alternatively be defined as nominal effective exchange rate divided by cost index or price deflator (IMF, 2023). The REER is captured using its own natural log and the data is derived from the SARB.

- Household savings

Household savings is the money left after paying expenses and spending on goods and services (Manasseh, et al., 2018). It is also the difference between household final consumption spending and household net disposable income post accounting for changes in pension benefits (OECD, 2023). The natural log of household saving is used in the study, and household saving will be quantified using the national household saving values acquired from SARB.

1.6. ETHICAL CONSIDERATIONS

The researcher is authorised to use the Quantec EasyData database because the University of Limpopo's School of Economics and Management has a licence for students to access the data. The World Bank and the South African Reserve Bank (SARB) allow public access to their data bases, and such permission or authorisation has been taken advantage in sourcing authentic secondary data for this study. Consequently, the data employed in this study is unaltered and has been obtained from reputable sources, specifically the SARB, Quantec EasyData, and the WB online databases. To avoid plagiarism, the researcher acknowledged all sources used.

1.7. SIGNIFICANCE OF THE STUDY

Numerous research carried out in developed and developing countries have produced contradictory findings. For instance, Osei-Fosu et al. (2014); Mukhtar et al. (2020); Fadhil and Rajab (2021); and Afzali (2022) highlighted a negative effect, on the other hand Bryan and Vengelen (2015) and Tzamourani (2019) indicated a positive relationship while Yusuf et al. (2017) and Manasseh et al. (2018) found an insignificant result on the effect of interest rate on household consumption. The effect of interest rates on household expenditure has been seldomly studied in South Africa. Jordan (2013) and Fikizolo (2020) estimated the effects of interest rate (repo) on household consumption in South Africa and did not use the prime rate.

In light of the foregoing justification, the study aims to address the gap in the body of literature by using the prime rate and integrating the real effective exchange rate, household debt, and household saving into the household consumption expenditure model which Jordan (2013) and Fikizolo (2020) excluded in their studies. This study is envisaged to provide some insight into the changing aspects of interest rate and how they affect South Africa's household consumption expenditure.

1.8. STRUCTURE OF THE STUDY

The study comprises of six chapters. The background and introduction of the study is presented in Chapter 1, In Chapter 2, the trend dynamics of household consumption expenditure model are explored. Chapter 3 is devoted to literature review under which the theoretical and empirical literature of the study are examined. In Chapter 4 the methodology which encompasses the econometric techniques used in the study is discussed. The findings of the study, along with their analysis and interpretation, are presented in Chapter 5. The study's final chapter, chapter 6, offers conclusions and recommendations.

CHAPTER 2

AN OVERVIEW OF HOUSEHOLD CONSUMPTION, PRIME RATE, INFLATION RATE, HOUSEHOLD DISPOSABLE INCOME, HOUSEHOLD DEBT, HOUSEHOLD SAVING AND REAL EFFECTIVE EXCHANGE RATE TRENDS AND STATISTICS

2.1. INTRODUCTION

Chapter 1 offered the introduction of the study of which the objectives were clearly outlined, significance of the study was explicitly stated, and the research study's outline was given. Chapter 2 presents an overview of household consumption, interest rate, inflation rate, household disposable income, debt, saving and the real effective exchange rate trends. It begins with a discussion of the trends of household consumption expenditure in South Africa, Egypt, Nigeria, and Kenya for comparison purposes, as well as the components that make household consumption in South Africa. The four nations' respective interest and inflation rate trends and statistics are then shown. Lastly is a brief discussion of the trends in disposable income, debt, saving, and the REER for South Africa from 1989 to 2022.

2.2. TRENDS AND COMPARISON OF MODEL VARIABLES

This section examines trends in household consumption expenditure as a percentage (%GDP), prime rate, inflation rate, household disposable income, debt, saving, and the real effective exchange rate covering the from the years 1989 to 2022.

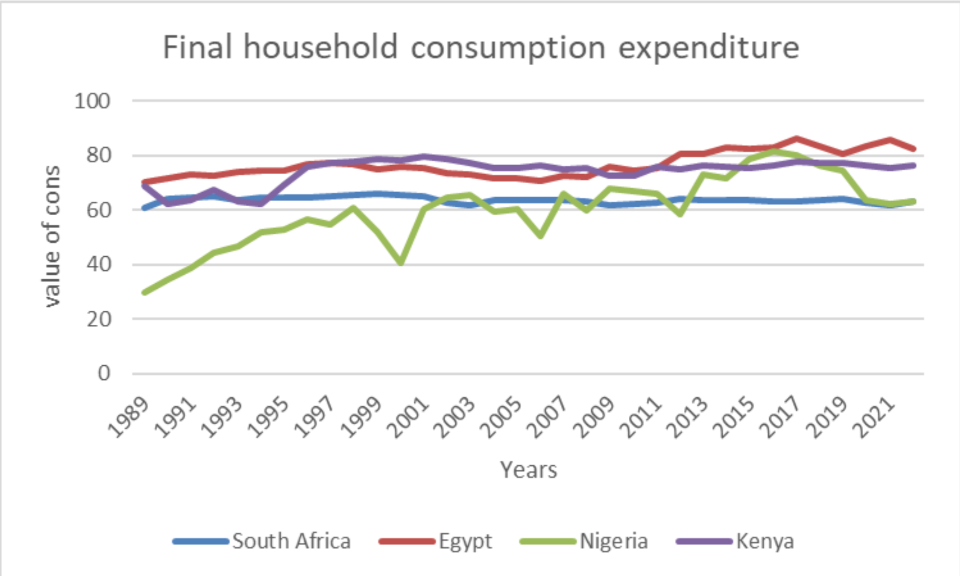
2.2.1. Household consumption (CONS)

Household consumption expenditure contributes significantly to economic growth. The country's total economic well-being and the standard of living of its citizens are significantly influenced by the household consumption spending.

2.2.1.1 Household consumption expenditure trend

The overview of household consumption expenditure offers useful information on a country's economic progress and standard of living. The analysis of trends and changes in household consumption expenditure in Figure 2.1 is grounded on the data attained from the World Bank for the years 1989 to 2022. The changes overtime of household spending in South Africa is compared with that of its regional counterparts such as Kenya in East Africa, Egypt in North Africa, and Nigeria in West Africa for comparative analysis and be able to position South Africa's performance within the continent.

Figure 2.1 : Trend of the household consumption expenditure for the period 1989 – 2022



Source: Own graph derived from World Bank (2023) data.

The period 1989 to 1994 marked a very critical time in South Africa as the country underwent tremendous political and economic upheaval that resulted in the abolition of apartheid and the establishment of democratic rule (Masipa, 2018). As the country made the transition to democracy and economic liberalisation throughout this time, household consumption expenditure (%GDP) fluctuated (Masipa, 2018). Household consumption expenditure (%GDP) showed a gradual rise from about 60% in 1989 to 64% by 1994, notwithstanding the racial tensions that persisted during this time and such an increase persisted until early 2000s (Muzindutsi & Mjeso, 2018). This increase was a result of the South African population's rising living standard levels and rising purchasing power (Masipa, 2018). During this period between 1989 and 1994 the average household consumption expenditure (% GDP) in South Africa was 63.86% as compared to Kenya with 64.61% and Egypt which had a very high average of 72.75%. It is crucial however to remember that these numbers show a comparatively high level of consumption, indicating a healthy economy and strong levels of consumer expenditure. This high household consumption expenditure levels in Egypt were as a result of improved income levels, low inflation, and an expanding middle class that in a way contributed to its stability (Knoema, 2018). Nigeria on the hand was the only country that had a lower household consumption expenditure (%GDP) initially. Due to economic difficulties throughout the 1990s because of political unrest and repeated changes in Nigeria's leadership, household consumption expenditure encountered difficulties. However, the situation in Nigeria started to stabilise after the switch to democratic rule in the late 1990s, which resulted in a gradual rise in household consumption expenditure percentages (Tokoya et al., 2022). Although Nigeria's household consumption expenditure (% GDP) started, it never reached the levels attained by South Africa, Egypt, and Kenya from 1989 to 2001.

From 2002 to 2011, South Africa recorded relatively low levels of consumption compared to the levels attained before which was similar to that of Egypt and it can be seen through their moderately decreasing trends in Figure 2.1 with Egypt hitting a low of about 70% in 2006 while South Africa fluctuated around 60% to 63%. A number of factors, including a halt in economic growth, high unemployment rates, rising levels of poverty, and social instability, contributed to this downturn in South Africa which resulted in less money available for personal use, and in turn there was a careful spending (Masipa, 2018). Kenya's economy grew as a result of a number of reforms and restored political stability in the late 90s (Gichohi, 2017). Household consumption expenditure (% GDP) gradually rose over this period. This encouraging development were attributed mostly to the growth of the middle class, easier access to financing, and an improved investment environment (Gichohi, 2017). Between 1997 to 2011, household consumption expenditure of Kenya fluctuated roughly around 72%-80% of GDP and it grew above that of Egypt according to World bank (2022) data depicted in Figure 2.1.

Nigeria saw rapid economic growth after the country's democratic transition, which was mostly powered by the nation's burgeoning oil and gas sector (Ikwuagwu et al., 2017). Rising oil prices, which boosted consumer purchasing power, helped household spending as a percentage of GDP rise. Therefore, from 2002 to 2012 household consumption expenditure oscillated around 58% to 68% of GDP except for 2006 when a major drop was experienced according to World Bank (2022) data depicted in Figure 2.1. This expansion can be attributed to the rise in oil prices, which increased government revenue and, as a result, increased public spending and investment in several areas (Ibbih & Peter, 2018). The economic climate at the time was favourable, which boosted consumer confidence and household spending on goods and services (Mukhtar et al., 2020).

Except for Kenya, South Africa, Egypt, and Nigeria saw negative effects from the global financial crisis in 2008 as household consumption expenditure declined. South Africa and Nigeria barely saw the consequences of this period, whereas Nigeria was the only nation to endure a significant decline of 60% from 66.17% in 2007. Only in the years that followed (2009 and 2010) the global financial crisis did Kenya witness a drop in household consumption expenditure from 75.33% in 2008 to 72.83% in 2010. Due to the economic unpredictability, households were less able to maintain their level of expenditure (kwechime et al., 2016). Households in these four countries became more susceptible to outside economic shocks because of the global financial crisis.

After the financial crisis, between 2009 and 2011 South Africa's household consumption expenditure (% GDP) kept on declining before rising and reaching a peak of 64.30% in 2012 as can be seen in Figure 2.1. However, based on the data from Word Bank, from 2013 to 2019 the fluctuation in South Africa's household consumption expenditure (%GDP) was steady around 63%. In contrast, after global financial crisis, household spending in Kenya, Nigeria, and Egypt showed a very steady and persistent increasing trend, accounting for roughly 78%, 80%, and 86% of GDP respectively.

The COVID-19 pandemic epidemic in 2020 caused a devastating economic collapse in South Africa, Nigeria, and Kenya (United Nations, 2020). Except for Egypt, household consumption as a percentage of GDP fell in the other three nations as lockdown measures were put in place to stop the virus's spread in 2020 and 2021 (OECD, 2020). Nigeria experienced a major drop in household consumption expenditure (%GDP) in 2020. Reduced wages, job losses, and constrained consumer spending during the pandemic can be blamed for the drop in household consumption expenditure (United Nations, 2020). Nevertheless, the economies of South Africa, Nigeria and Kenya began to rise in 2022 as the easing of took place (Anyanwu & Salami, 2021). In contrast, Egypt's began to deteriorate in 2022 after not being significantly affected by the effects of COVID-19 in 2020 or 2021 (World Bank, 2022).

2.2.1.2 Household consumption expenditure *statistics*

Table 2.1 show the summary of computed descriptive statistics that explains how South Africa performed compared to the other countries with the highest household consumption expenditure as percentage share of GDP in their respective regions.

Table 2.1: Summary of household consumption expenditure descriptive statistics during 1989 to 2022

	South Africa	*Egypt*	*Nigeria*	*Kenya*
Mean	63.718	76.809	59.913	74.091
Standard Error	0.207	0.807	2.188	0.850
Median	63.689	75.419	60.631	76.040
Standard Deviation	1.210	4.706	12.757	4.954
Sample Variance	1.464	22.146	162.746	24.542
coeffcient of variation	0.019	0.061	0.213	0.067
Kurtosis	-0.184	-0.975	-0.065	0.975
Skewness	-0.176	0.559	-0.459	-1.463
Range	5.172	15.820	51.658	17.181
Minimum	60.875	70.260	29.877	62.390
Maximum	66.047	86.080	81.535	79.570
Sum	2166.419	2611.500	2037.053	2519.108
Count	34	34	34	34
	1	3	5	7

Source: Own computation based World Bank (2023) data.

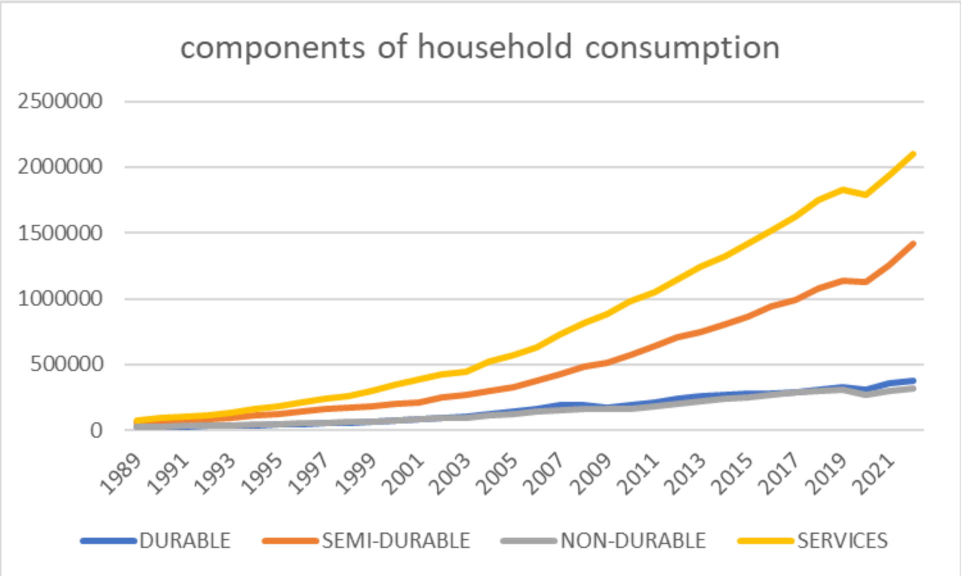
According to the calculated descriptive statistics derived from World Bank (2023) data in Table 2.1, the average household consumption expenditure in South Africa during the study period was 63.7% of GDP, compared to 76.81% for Egypt, 59.71% for Nigeria, and 74.09% for Kenya. Egypt's household consumption expenditure (% GDP) surpassed those of the other nations from 1989 to 2022, whereas South Africa only outperformed Nigeria. South Africa's minimum and maximum levels of household consumption expenditure (%GDP) were 66.05% and 60.88%, respectively, as opposed to 86.08% and 70.26% for Egypt, 81.54% and 2.88% for Nigeria, and 79.57% and 62.39% for Kenya. For South Africa, Egypt, Nigeria, and

Kenya, the respective coefficients of variation—a gauge of volatility—were 0.02, 0.06, 0.21, and 0.07 respectively. The statistics also revealed that the household consumption expenditure's coefficient of variation was the lowest in South Africa, indicating that the household consumption expenditure was more stable from 1989 to 2022 as compared to other countries whereas Nigeria had the highest coefficient of variation in household consumption expenditure. Once more, the descriptive statistics results show that all the nations, apart from Egypt, have negative value of skewness. This implies that the distribution of South Africa, Nigeria and Kenya is skewed to the left while that of Egypt signifies a rightward skewness.

2.2.1.3 Household components

Figure 2.2 displays the household consumption expenditure components in millions of rands, derived from data provided by the South African Reserve Bank (2022). From 1989 to 2022, the patterns for durable goods and services were mostly consistent, although Figure 2.2 illustrates an upward trend for semi-durable goods and services.

Figure 2. 2 : Trend of household consumption expenditure components



Source. Own graph based on the SARB (2022) data.

The trends and behaviour of each respective component are confirmed by the descriptive statistics provided in Table 2.2 representing South African household consumption expenditure data. The computed descriptive statistics confirms the steady trends of durable and non-durable goods as they have the least averages of

R160578.12m and R147128.09m respectively as compared to semidurable goods of R497728.50m and services of R803328.09m which is the highest for the period 1989 to 2022. This suggested that services component made up the largest portion of household consumption expenditure followed by semi-durable goods, durable goods, and non-durable goods which accounted the least share. The minimum and maximum values of household consumption expenditure were R21831m and R377933m for durable goods, R55436m and R1414814mfor semi-durable goods, R23928m and R316569 for non-durable goods and R71321m and R2100223m for services respectively. Non-durable goods were most stable variable while semi-durable variable experienced greater volatility for the period 1989 to 2022 according to the South Africa Reserve Bank (2023) data.

Table 2.2: Summary of descriptive statistics of components of household consumption expenditure during 1989-2022.

	DURABLE	*SEMI-DURABLE*	*NON-DURABLE*	*SERVICES*
Mean	160578.12	497728.50	147128.09	803328.09
Standard Error	19232.62	69018.46	16797.30	109358.04
Median	154422.50	352166.50	132817.00	598654.00
Standard Deviation	112144.49	402443.30	97944.24	637661.47
Sample Variance	12576386773.80	161960613666.20	9593073902.45	406612152447.23
coefficient of variation	0.70	0.81	0.67	0.79
Kurtosis	-1.28	-0.70	-1.28	-1.02
Skewness	0.34	0.74	0.40	0.59
Range	356102.00	1359378.00	292641.00	2028902.00
Minimum	21831.00	55436.00	23928.00	71321.00
Maximum	377933.00	1414814.00	316569.00	2100223.00
Sum	5459656.00	16922769.00	5002355.00	27313155.00
Count	34	34	34	34
	1	3	5	7

Source: Own construction based on SARB (2022) data

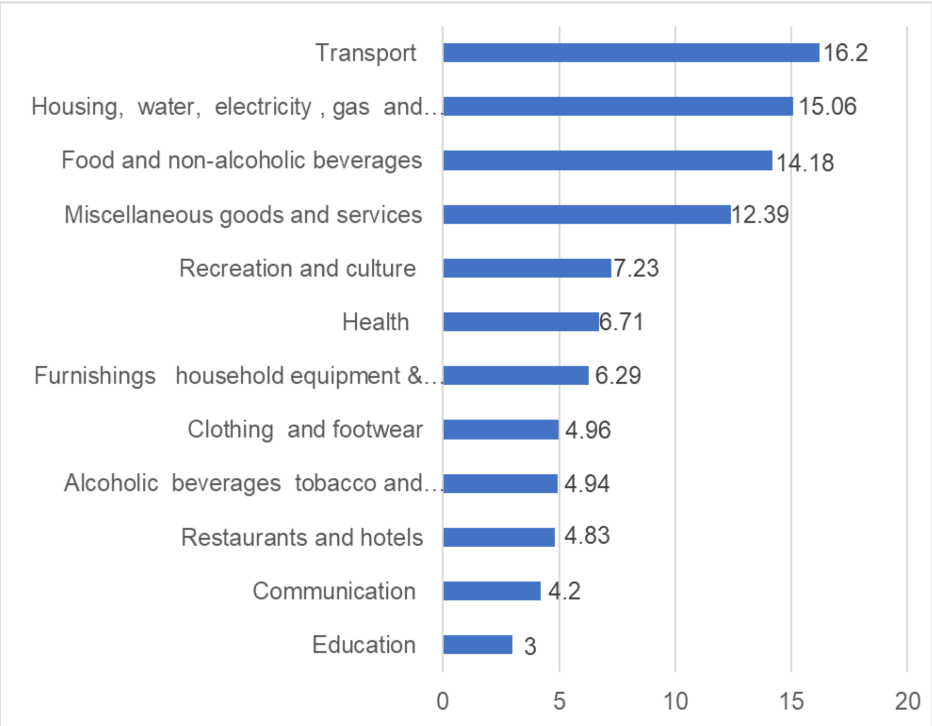
According to Table 2.3, household consumption expenditure is projected to be R45275614.00m from 1989 to 2022. During the time under review, the average household in South Africa spent roughly R1608762.50m according to the SARB (2022) data. The primary sources of this expenditure were transportation, housing and utilities, food, and other miscellaneous goods and services.

Table 2.3: Total and average household consumption expenditure contributions for the period 1989 to 2022.

Main expenditure group	Rand		Percentage Contribution
	Total (millions)	Average (millions)	
Transport	8 861 674.00	260 637.47	16.20
Housing, water, electricity, gas, and other fuels	8 239 000.00	242 323.53	15.06
Food and non-alcoholic beverages	7 758 478.00	228 190.53	14.18
Miscellaneous goods and services	6 778 114.00	199 356.29	12.39
Recreation and culture	3 952 603.00	116 253.03	7.23
Health	3 672 936.00	108 027.53	6.71
Furnishings, household equipment & routine household maintenance	3 438 010.00	101 117.94	6.29
Clothing and footwear	2 711 879.00	79 761.15	4.96
Alcoholic beverages, tobacco, and narcotics	2 703 339.00	79 509.97	4.94
Restaurants and hotels	2 644 197.00	77 770.50	4.83
Communication	2 294 955.00	67 498.68	4.20
Education	1 642 740.00	48 315.88	3.00
Total	45 275 614.00	1 608 762.50	100.00

Source. Own computation based on SARB (2022) data.

Figure 2.3 : Percentage distribution of total household consumption expenditure by main expenditure group for the period 1989 to 2022.



Source. Own construction based on South African Reserve Bank (2022) data.

According to the results in Table 2.3, the greatest category of spending, projected at R8 861 674.00m, or 16.2% of total household consumption spending, is transportation for South Africa. From 1989 to 2022, the average South African household spent about R260 637.47m on transportation. The second-largest share of household consumption expenditures by South African households is related to housing, water, electricity, gas, and other fuels. The South African household consumption expenditure averaged around R242 323.53m between 1989 and 2022, which is approximately 15.06% of all household consumption expenditures.

Figure 2.3 indicates that food and non-alcoholic beverages expenditures in South Africa made up the third-largest spending category, accounting for 14,18% of household consumption expenditures according to the SARB (2022) data. During the period under consideration, South African households spent an average of R228 190.53m on food and non-alcoholic beverages. The fourth largest contribution to the South African household consumption spending, with a percentage of 12,39%, was miscellaneous goods and services. During the years 1989 to 2022, an average household in South Africa spent R199 356.29 on miscellaneous goods and services as can be seen in Table 2.3.

The top 4 categories of household consumption expenditure, which are transportation, housing, water, electricity, gas, and other fuels, food and non-alcoholic beverages, miscellaneous goods and services, together account for 57.83% of all household consumption expenditure in South Africa. In essence, South African households allocated R31 637 266m out of R45 275 614m they spend to these four important categories.

South African recreation and culture and health expenditures were the 5th and 6th contributors towards household consumption expenditure. They both accounted for an average of R 116 253.03m and R108 027.53m respectively which is approximately 7.23% and 6.71%. The SARB (2023) data also revealed that the total amount spent on furnishings, household equipment & routine household maintenance account for the 7th category with an amount R3 438 010m, which is 6.29% of all household consumption expenditure. This corresponds to a R101 117.94m average household expenditure over the period of the study for South Africa. On the 8th position is the South African clothing and footwear expenditure category with an amount R2 711 879m, which equated to 4,96% of total household consumption expenditure. The spending on this category averaged R79 761.15m based on the SARB (2022) data. All of these statistics are provided in Table 2.3 and Figure 2.3. Therefore, it can be noted that the total household consumption expenditure in South Africa is made up of 25.19 percent of the top 5–8 categories: Recreation and culture, health, furnishings, household equipment & routine household maintenance and clothing and footwear. According to SARB (2022) data shows that households in South Africa essentially devoted R13 775 428m out of R45 275 614m of spending to these four significant areas.

According to Table 2.3, alcohol, tobacco, and narcotics accounted for about 4.94% of South Africa's household consumer expenditures between 1989 and 2022, with households spending averaging R79 509.97m on these products. From Figure 2.3, restaurants and hotels came in the 10th position with a 4.83% contribution and an average spending of R77 770.50m. The 11th and last category were communication and education which contributed 4.2% and 3% that was equivalent to the overall averages amounting to R67 498.68m and R48 315.88m respectively.

The last 4 groups of household consumption expenditure which is also the least contributors, that is, alcohol, tobacco, and narcotics, restaurants and hotels, communication and education accounted for 16.97% of all household consumption expenditure in South Africa. In essence, South African households allocated R9 285 231m out of R45 275 614m they spend to these four important categories.

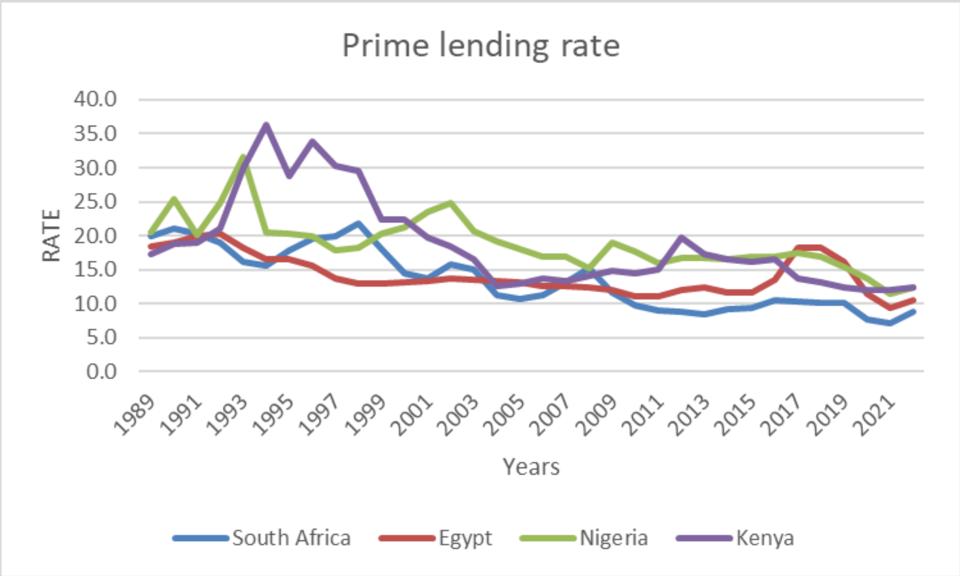
2.2.2. Prime rate (INT)

The prime lending rate is an important economic factor that affects several industries, including consumers, corporations, and the financial industry as a whole.

2.2.2.1 Prime rate trend

In any economy, prime rates are a key factor in influencing the cost and availability of lending. These trends attempt to examine the prime rates of South Africa against other African nations used for bench marking from 1989 to 2022. The analysis of this historical trends helps enlighten the financial policies and economic development that have shaped South Africa's lending environments over the past three decades. The prime rate trends are depicted in Figure 2.4 built on data found from World Bank.

Figure 2. 4 : Trend of prime rates for the period 1989-2022



Source: Own graph derived from World Bank (2022) data.

Over the past three decades, lending rates in South Africa have undergone substantial adjustments (Aziakpono & Wilson, 2013). Due to the necessity to draw in foreign investment and stabilise the economy, lending rates were high in the 1990s as the nation emerged from apartheid as shown in Figure 2.4. However, the rates significantly decreased between 2000 and 2007 as a strategy used by the SARB to encourage investment and economic growth (Aziakpono & Wilson, 2013). The SARB tried to stabilise the rand, which was depreciating against other currencies due to the global financial crisis, and control inflation in 2008 by raising the prime rate significantly from the previous year (Owusu-Sekyere, 2017). Between 2009 and 2013, as the world economy started to recover from the crisis, the nation's prime rates decreased as central banks worked to promote economic growth by lowering borrowing costs (Owusu-Sekyere, 2017). From 2014 the trend steadily increased as the prime rate rose until 2019 based on the World Bank (2022) data.

One of the largest economies in Africa, Egypt, has also seen changes in lending rates. Interest rates were relatively high in the early 1990s after economic reforms to draw investment and promote saving according to Kamal et al. (2018). However, the nation started a series of economic reforms that caused lending rates to decrease in the late 1990s and early 2000s (Shokr, 2020). Since that time, Egypt's interest rates have been comparatively constant until 2015, with the Central Bank of Egypt changing them based on inflation and economic factors (Shokr, 2020). Between 2016 and 2019 Egypt's prime rate dramatically increased above all countries in question according World Bank (2022) data

The largest economy in Africa, Nigeria, has experienced fluctuating lending rates over the past few decades according to the World Bank (2022) data. Due to its heavy reliance on oil exports and vulnerability to fluctuations in the price of oil, Nigeria's lending rates have historically been more volatile than those of South Africa. As a results of poor financial management and economic mismanagement during the years 1989 to 2002, prime rates sharply increased (Maiga, 2017). But the switch to democratic governance in 1999 signalled a move toward economic reforms and better macroeconomic policies, which resulted in a decline in lending rates in the early 2000s (Maiga, 2017). But overall, Nigeria's prime rates have remained high due to inflation, fluctuating currency exchange rates, and a lack of credit availability (Utile et al., 2018).

Finally, over the past thirty years, prime rates have seen a considerable change in Kenya as per the World Bank (2022) data. Early in the 1990s, the nation experienced a time of high inflation and economic unpredictability, which resulted in skyrocketing interest rates (Kamweru & Ngui, 2017). However, the rates began to fall in Kenya in the middle of the 1990s as the country adopted market-oriented economic policies (Kamweru & Ngui, 2017). Kenya experienced a period of relatively low interest rates from 2005 to 2010, which encouraged investment and economic growth (Musyoka & Ocharo, 2018). Kenya, however, experienced an increase in lending rates during the 2008 global financial crisis, much like South Africa. Since then, the Central Bank of Kenya has frequently increased the prime rate with a major rise seen in 2012 according to the World Bank (2022) data. Until then the country experienced lower but relatively high prime rates compared to its counterparts (Musyoka & Ocharo, 2018).

The COVID-19 pandemic disrupted the world economy and compelled central banks to adopt accommodative monetary policies, including those of South Africa, Egypt, Nigeria, and Kenya (IMF, 2022). In response, South Africa's prime rates decreased as the SARB lowered its repo rates to an all-time low of 3.5% in 2020 as well as Egypt, Nigeria and Kenya that also experienced historically lower prime rates in 2020

(SARB, 2023). Lending rates have remained relatively low to support economic growth as the world economy try to recover from the effects of the pandemic (SARB, 2023). In 2021, the prime was 7% for South Africa, 9.4% for Egypt, and 11.5% for Nigeria according to the World Bank (2022) data. Kenya's prime rate, in contrast to the other countries in question, began to gradually rise in 2021, however, a slight increase in prime rates started in 2022 for South Africa, Egypt, and Nigeria.

2.2.2.2 Prime rate descriptive statistics

Section 2.2.2.1 provided a detailed analysis of prime rate trends. It was seen that trend lines of Nigeria and Kenya surpassed those of South Africa and Egypt indicating that the prime rates of South Africa and Egypt are comparatively low and have shown signs of stability.

Table 2. 4 : Summary table of prime rate descriptive statistics

	South Africa	*Egypt*	*Nigeria*	*Kenya*
Mean	13.54	14.15	18.79	18.72
Standard Error	0.77	0.50	0.68	1.15
Median	12.44	13.25	17.87	16.57
Standard Deviation	4.47	2.92	3.95	6.73
Sample Variance	19.99	8.55	15.58	45.27
coefficient of variation	0.33	0.21	0.21	0.36
Kurtosis	-1.23	-0.62	2.40	0.57
Skewness	0.39	0.70	1.04	1.23
Range	14.75	10.90	20.17	24.24
Minimum	7.04	9.43	11.48	12.00
Maximum	21.79	20.33	31.65	36.24
Sum	460.27	481.15	638.98	636.50
Count	34	34	34	34
	1	3	5	7

Source: Own computation based on data from World Bank (2022) data.

A summary of descriptive statistics is provided in Table 2.4 to support the performance of the corresponding countries in question. In comparison to Egypt's average prime rate of 14.15%, Nigeria's 18.79%, and Kenya's 18.72%, South Africa's average prime rate for the period under consideration was 13.54%. This low average for South Africa confirms its lowest trend of the prime rate. According to statistics derived from World Bank (2023) data in Table 2.4, Nigeria had the highest prime rate, while South Africa had the lowest. The maximum and minimum rates in South Africa were 21.79% and 7.04% respectively, while they were 20.32% and

9.42% for Egypt, 44.48% and 31.65% for Nigeria, and 36.24% and 12% for Kenya. Nigeria, South Africa, and Egypt all experienced their lowest prime rates in 2021, while Kenya did so in 2020. Kenya had the highest maximum prime rate, while South Africa had the lowest minimum prime rate in 1994 and 2021 respectively. Between 1989 and 2022, Egypt and Nigeria had the same lowest coefficient of variability of 0.21%, while Kenya had the highest 0.36%, and South Africa lagged behind Kenya with a coefficient of 0.33%. Again, the descriptive statistics results indicate that all the countries have positive skewness values, meaning that their distribution is skewed to the right.

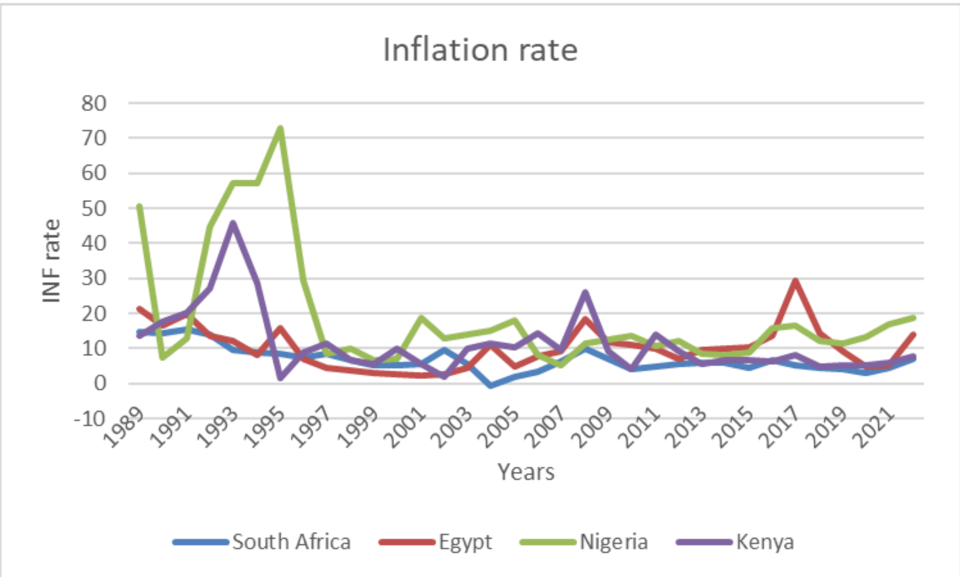
2.2.3. Inflation rate (INF)

Inflation is a vital economic concept that signifies a continued rise in the overall prices of goods and services over a specific period. It has an impact on many facets of people's lives as well as business activities, making it an essential indicator of the strength and stability of an economy.

2.2.3.1 Inflation rate trend

Figure 2.5 displays the trends in inflation rates across the four African economies for the period 1989 to 2022.

Figure 2. 5 : Trend of inflation rate for the period 1989-2022



Source: Own graph computed based on World Bank (2022) data

Figure 2.5 shows a soaring inflation rate in South Africa in the early 90s where it reached an alarming rate of 15.3% in 1991. During this period between 1989 and 1994 South Africa underwent substantial political changes as the apartheid system was abolished (Masipa, 2018). After the country's first democratic election in 1994, the inflation rate fell continuously until the early 2000s according to the World Bank (2023) data depicted in Figure 2.5. A major increase of inflation was experienced in 2002, however the rate was successfully brought down in year 2004, hitting the lowest rate of -0.7% in South Africa as shown in Figure 2.5. South Africa's economy was severely impacted by the global financial crisis of 2008, which temporarily increased inflation rates (Madito & Odhiambo, 2018). By 2009, inflation had increased to 7%, requiring monetary policy responses by the SARB to mitigate its impacts. However, as the world economy recovered, inflation rates progressively decreased to about 5.7% by 2012 in South Africa according to World Bank (2023) data. In the years that followed until 2019, inflation rates fluctuated between 4 and 6 percent (World Bank, 2023). The COVID-19 pandemic created supply chain disruptions and supply-side shocks, which raised consumer prices (National Tressury, 2023). The inflation rate decreased to 3.2% in 2020 before surging to 4.6% and 7% in 2021 and 2022 respectively as economic activity progressively picked up (National Tressury, 2023).

In contrast to South Africa, Egypt's inflation rate trend during the same studied period were more erratic according to World Bank (2022) data. From 1989 until the middle of the 1990s, high rates of inflation were common, partially due to structural flaws, unstable political environments, and economic reforms. On the other hand, inflation has significantly decreased as a result of recent monetary and fiscal reforms (Reda & Nourhan, 2020). Despite a spike above 30% in 2017, inflation was effectively controlled to single digits by 2019. Egypt's inflation stability was impacted by the COVID-19 pandemic, but the effects were limited by the central bank's proactive measures (Reuters, 2023).

Over the course of the study period, Nigeria's inflation rates have experienced notable fluctuations. Nigeria's ability to maintain stable inflation rates has been hampered by political unpredictability, an excessive reliance on oil, and a lack of economic diversification (Musa, 2021). The 1990s saw a sharp rise in inflation, which peaked in 1995 at 72.8%. This was primarily caused by unstable fiscal policies and a shoddy institutional framework (Musa, 2021). While inflation decreased somewhat in the 2000s, it reappeared as a recurring problem in 2021, with COVID-19 disruptions, security issues, and insufficient food supply being the main causes of the most recent spike to over 18.84% (Coulibaly, 2021).

(Muzindutsi & Mjeso, 2018)

In comparison to the other nations under discussion, Kenya's inflation trajectory has been comparatively stable according to the World Bank (2023) data. Due to structural economic problems and political unrest, Kenya experienced high double-digit inflation in the late 1980s and early 1990s, all thanks to careful macroeconomic management and strict budgetary controls, the nation was able to contain inflation by the late 1990s (Kiptum, 2022). Kenya had single-digit inflation in the 2000s, with rates averaging between 5 and 7 percent (World Bank 2023). The global financial crisis that occurred in 2008 was the cause of the high rates of inflation that year (Saungweme & Odhiambo, 2021). On the other hand, inflation decreased in 2009, reaching a low of 3.9% in 2010, and then increased to 14% in 2011 according to World Bank (2023) data. Over the nine years from 2011 to 2019, the economy grew at an average rate of 5.48% while inflation averaged 6.79% (Kiptum, 2022).

2.2.3.2 Inflation rate descriptive statistics

The descriptive statistics for South Africa and other countries inflation rates are displayed in Table 2.5 which is based on World Bank (2022) data for the period 1989 to 2022.

Table 2. 5 : Summary table of inflation rate descriptive statistics

	South Africa	*Egypt*	*Nigeria*	*Kenya*
Mean	6.90	10.32	19.04	11.38
Standard Error	0.62	1.05	2.88	1.56
Median	5.96	9.77	12.94	9.05
Standard Deviation	3.61	6.11	16.81	9.11
Sample Variance	13.04	37.30	282.44	82.92
coefficient of variation	0.52	0.59	0.88	0.80
Kurtosis	0.76	1.55	3.17	5.57
Skewness	0.80	1.04	2.01	2.17
Range	16.03	27.24	67.45	44.42
Minimum	-0.69	2.27	5.39	1.55
Maximum	15.33	29.51	72.84	45.98
Sum	234.43	350.92	647.26	387.09
Count	34	34	34	34
	1	3	5	7

Source: Own computation based on World Bank (2023) data.

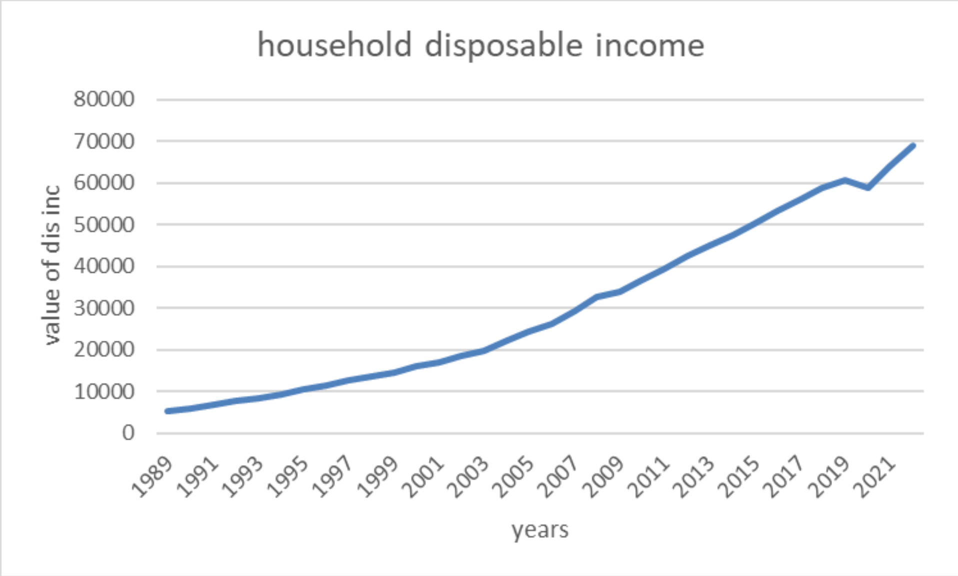
From 1989 to 2022 South Africa had the lowest average inflation rate of 6.9% as compared to Egypt 10.2%, Nigeria 19.04%, and Kenya 11.38%. similarly, the coefficient of variation indicate that South Africa had the least variability of 0.52% in comparison 0.59% for Egypt, 0.88% for Nigeria which is the highest and 0.80% for Kenya. This implies that South African inflation rate was stable in relation to other community member countries. The minimum and maximum inflation rates for South Africa were 15.33% and -0.69, as compared to 72.24% and 5.39% for Nigeria meanwhile Egypt had 29.51% and 2.275 and for Kenya it was 45.95% and 1.55%. The skewness results according to World Bank (2022) data indicated a rightward skewness in the series for every country.

2.2.4. Household disposable income (HDI)

Household disposable income is a critical measure of the economic well-being, and it represents the amount of money that is left over after taxes for people and families to spend and save.

2.2.4.1 Household disposable income trend

Figure 2. 6 : Trend of household disposable income for the period 1989-2022



Source: Own graph computed based on SARB (2022) data.

Figure 2.6 based on SARB (2022) data shows the trend of household disposable income. The period 1989 to 1999 which encompasses the last years of apartheid era and four years of democracy show that household disposable income levels grew at a steady rate. South Africa experienced a surge in household disposable income from 2000 reaching a peak in 2019. Lockdown measures and restrictions in 2020 made it more difficult for households to retain their previous income levels, which led to a reduction in household disposable income (Quantec, 2023). However, in 2021 and 2022 household disposable income started to bounce back as the easing of lockdown took effect (Quantec, 2023).

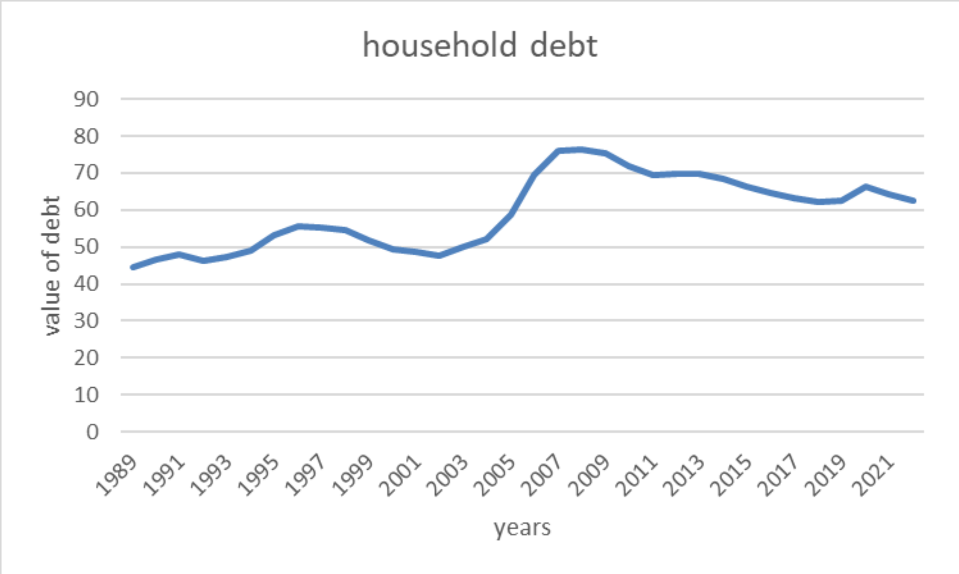
2.2.5. Household debt (DEBT)

Household debt is One important metric for assessing the stability and health of a country's finances. household debt dynamics in South Africa have changed significantly over time a several factors.

2.2.5.1 Household debt trend

Figure 2.7 depicts the trend of household debt recoded in millions of rand in South Africa for the period 1989 to 2022. The trend is constructed on data from South African Reserve Bank (2022) data.

Figure 2. 7 : Trend of household debt for the period 1989-2022



Source: Own graph based on SARB (2022) data.

The amount of household debt in South Africa has fluctuated significantly over time from 1989 to 2022. Following the end of apartheid, the nation saw an increase in household debt in the early 1990s as previously marginalised communities began to have access to credit and began borrowing for housing and consumption (Smith, 2021). But in the late 1990s, this pattern gave rise to a financial crisis that necessitated massive debt restructuring plans (Kereeditse & Mpundu, 2021). Household debt increased drastically increased once more in the in 2003 to 2008, driven by a rise in mortgage lending and a desire for consumer goods (Meniago et al., 2013). Between 2009 and 2019, there was a notable increase in both personal loan and mortgage borrowing, but financial strain resulted from high debt levels, a slowing economy, and rising unemployment (Bosch et al., 2022). In response, households started to reduce their loans intake, which led to a decrease in the total debt ratios of households in recent years (Bosch et al., 2022). Household borrowing capacity was further lowered by stricter lending laws and affordability assessments, while the COVID-19 pandemic's effects may have temporarily raised debt levels in 2020 as a result of economic downturns and lower incomes (Bosch et al., 2022).

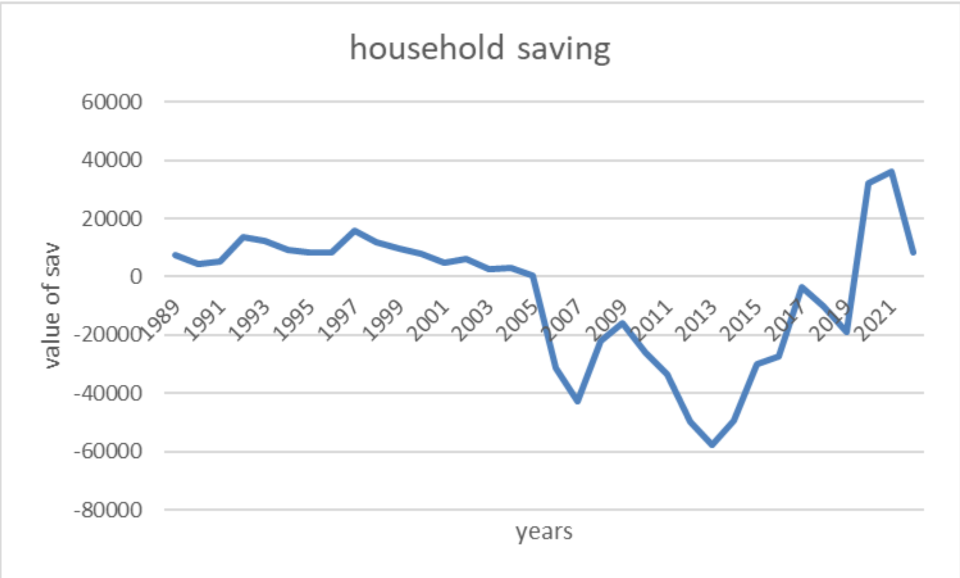
2.2.6. Household saving (SAV)

A nation's economy depends heavily on household savings since they support general financial stability and growth. Household saving in South Africa is of great concern due to low saving rates in the country.

2.2.6.1 Trend of household saving

The Figure 2.8 which is based on South African Reserve Bank (2022) data in millions of rands reflect the household saving trend in South Africa for the period 1989 to 2022.

Figure 2. 8 : Trend of household saving for the period 1989-2022



Source. Own graph based on SARB (2022) data.

Pre-democracy South Africa was characterised by economic hardship and political unrest (Syden, 2014). Nonetheless, during this period, households were able to sustain quite moderate levels of net saving (Odhiambo, 2015). Following the inauguration of democracy, South Africa encountered various economic obstacles, such as elevated rates of joblessness and consistently elevated inflation (Syden, 2014). Household savings were consequently hindered as families found it difficult to cover their fundamental demands and while a small percentage of households were able to save, most had little extra money that they could put aside for savings in the future (Orthofer, 2017). As a result, household saving slowly diminished until 2004 (Orthofer, 2017). Although the post-apartheid era improved things for savers, there were a lot of financial difficulties between 2005 and 2019 (Joubert & Van der Merwe, 2021). High unemployment rates, growing inflation, and several recessions all made it more difficult for households to save money and build wealth (Joubert & Van der Merwe, 2021). Many households found it difficult to sustain continuous net savings despite government initiatives to encourage saving because of rising living expenses and constrained disposable incomes and that led to a high deficiency in saving as the trend reached the negative side of the figure from 2005 to 2019 (Tregenna et al., 2021). The COVID-19 pandemic lessened the challenges South African households faced in terms of saving money SARB (2023). Lockdowns and the ensuing recessions resulted in a lower interest rate which could have been the reason for an increase in household savings in 2020 and 2021. But however, the household saving trend decreased again in 2022 based on Figure2.8.

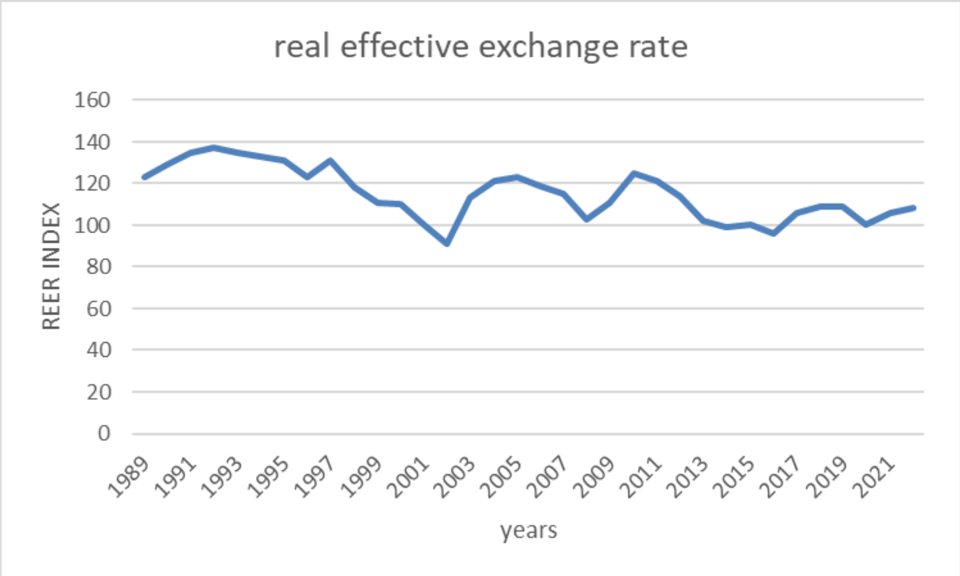
2.2.7. Real effective exchange rate (REER)

The real effective exchange rate is one of the most important metrics for determining a nation's level of international competitiveness. It accounts for changes in currency rates to determine how much a nation's goods and services cost in relation to those of its trading partners. Regarding South Africa, the country's economic performance and competitiveness in the international market are significantly influenced by the REER.

2.2.7.1 Real effective exchange rate trend

The REER trend and behaviour from 1989 to 2022 are depicted in Figure 2.9 based on SARB (2022) data. The graph makes it quite evident that the rand reached its highest points between 1989 and 1997. From 1998 onwards, the rand progressively declined in value relative to the majority of global currencies until the 2002, at which point it hit its lowest rate (Odhiambo, 2015). However, it began to rise again from 2003 until 2005 after which it started experiencing severe decline from 2006 to 2008 and between 2009 and 2010 the REER rose sharply according to the SARB (2022) data. A gradual declining trend in the REER was then experienced from 2011 to 2016. The COVID-19 pandemic of 2020 presented fresh difficulties for South Africa's REER, resulting in a decrease in foreign trade and a subsequent depreciation of the rand (IMF, 2022). As a result, the REER decreased and after that, as the nation moved through the recovery phase, the REER began to rise in 2021 and 2022 according to the SARB (2022) data.

Figure 2. 9 : Trend of the real effective exchange rate for the period 1989-2022



Source. Own graph based on SARB (2022) data.

2.3. SUMMARY

The trends of household consumption expenditure, the prime and inflation rate and the respective descriptive statistics for South Africa, Egypt, Nigeria, and Kenya were covered in this chapter based on World Bank (2022) data followed by the trends of household disposable income, debt, saving and real effective exchange rate in South Africa based on the South African Reserve Bank (SARB) (2022) data during 1989 to 2022. The breakdown of household consumption expenditure components, as well as the total, average, and percentage distribution of household consumption expenditures by major expenditure group for the years 1989 to 2022 were also discussed using data from the SARB (2022). In Chapter 3 provides reviews and discussions of the theoretical and empirical literature pertaining to the impact of interest rate on household consumption expenditure. This comprises a critical evaluation of the theories that serve as the basis of the study.

CHAPTER 3

LITERATURE REVIEW

4.1. INTRODUCTION

Chapter 2 provided an overview of the patterns of household consumption expenditure, interest and inflation rate, household disposable income, debt and saving and the real effective exchange rate in South Africa. Both the theoretical framework and the empirical theory are examined in Chapter 3. The first section of Chapter 3 looks at the theories underlying household consumption expenditure, interest rates and empirical literature. The theories provide the conceptual framework for the study and help the researchers create sound policy propositions while the empirical literature is examined in light of findings on research studies on the effect of interest rate on household consumption spending and other economic variables Therefore, chapter 3 is broken into two sections: the theoretical framework section comes first, and the empirical literature section comes last.

4.2. THEORETICAL FRAMEWORK

One of the main factors that make up aggregate demand is consumption. The expansion of an economy is significantly influenced by consumer choices. Household consumption expenditure is undoubtedly one of the fundamental drivers of overall economic activity. However, there is no precise method that can be used to quantify the volume of consumption in an economy. There numerous schools of thought regarding consumption behaviour of a rational consumer (Fadhil & Rajab, 2021). There are some significant theories related to interest rate and household consumption expenditure that are among the many hypotheses that define the relationship between the two.This section mainly review theories that relate to household consumption expenditure and interest rate. The theories of household consumption behaviour are reviewed first.

3.2.1. Review of household consumption theories

This section of literature discusses the forefront theories of household consumption behaviour authored by different scholars. These theories include the Absolute Income theory, Life Cycle Permanent Income theory and the intertemporal income theory.

3.2.1.1 Keynesian's Absolute Income Hypothesis

A British economist John Maynard Keynes developed a consumption theory named the Absolute Income Hypothesis in his book titled "The General Theory of Employment' interest rates and money" (Alimi, 2013). This theory is a key component of Keynesian economics, which aid in forming the total aggregate economic behaviour. Various scholars including Damane (2018), Kereeditse & Mpundu (2021) and Ewane & Abonongi (2022) have since adopted this theory by stating that the level of consumption in an economy is primarily determined by current disposable income. After paying taxes and receiving government transfers, households have disposable income. Keynes (1936) argued that as disposable income rises, so does consumption, but the relationship is not one-to-one. Given this basis, current consumption expenditure is a function of disposable income and can be expressed in a linear form as follows:

$$C = \bar{C} + cY_d \qquad (3.1)$$

But

$$Y_d = Y - T \qquad (3.2)$$

Therefore, equation (3.1) can be written as:

$$C = \bar{C} + c(Y - T) \qquad (3.3)$$

where C denotes current consumption, $\bar{C}$ represent consumption when income is zero, also referred to as autonomous consumption, meaning consumption that does not depend on disposable income, Y_d or $(Y - T)$ represent current disposable income, and c is the marginal propensity to consume (MPC) which relate to the additional income spent by an individual as a result of an increase in income. This MPC is also a slope of the current consumption function. Ofwona (2013) accentuated that in Keynesian consumption function MPC is positive and less than 1 but greater than zero. In short MPC falls within $0 < c < 1$ range. Furthermore, the

MPC is lower than the average propensity to consume (APC), and the APC decreases as income rises (Nikbin & Panahi, 2016). According to Alimi (2013) MPC is expressed as follows:

$$MPC = \frac{\partial C}{\partial Y} = c \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

The ratio of total consumption to total disposable income, APC, is also provided as follows:

$$APC = \frac{C}{Y} = \frac{a}{Y} + b \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

Additionally, Keynes (1936) posited a fundamental psychological law of household consumption expenditure, suggesting that consumption rises in tandem with income, but not at the same rate. Given the non-proportional consumption function, it can be inferred that, in the short run, the APC is greater than the MPC: APC > MPC, where $APC = \frac{c}{y}$ and $MPC = \frac{\partial c}{\partial y}$ (Drakopoulos, 2021). This is because autonomous consumption in the short run does change with income however over a long period of time, consumption rises as wealth and income increase; that is, the MPC out of long-term income is closer to the APC (Drakopoulos, 2021). The proportion of income consumed decreases as income rises: $\frac{\xi APC}{\xi Y} < 0$; so, the income elasticity of consumption, measured as $\frac{MPC}{APC}$ would be smaller than unity (Drakopoulos, 2021). The stability of the consumption function prevails both in the short and long run.

According to the Keynesian consumption theory interest rates do not have a significant influence on consumer spending choices as the substitution and the income effects of interest rate eradicate one another (Damane, 2018). Thus, borrowing is completely excluded by the Keynesian consumption theory (Nkala & Tsegaye, 2017). This theory is pertinent as it explains the relationship between income and consumption as well as the part that household consumption plays in propelling the economy. In times of economic recession, it also emphasizes the significance of government initiatives designed to increase consumer spending (Alimi, 2013).

Based on the results of initial linear econometric consumption functions estimated using ordinary least squares (OLS), consumption appeared to be positively correlated with current disposable income and the MPC appeared to be positive and smaller than one (Fikizolo, 2020). These findings were consistent with Keynes's theory and the Nobel-laureate, Trygve Haavelmo was the first to criticize Keyne's general theory by pointing out that OLS estimation is biased when income is associated with the error term (Fikizolo, 2020).

About the same time, Kuznets (1946) used long-run time series in his groundbreaking work, which also marked a turning point in the evolution of the literature on consumption functions. Kuznets demonstrated that the APC in the United States from 1869 to 1938 ranged very little between 0.84 and 0.89, apart from for the depression years. Put otherwise, the APC was roughly mean-reverted, meaning that even in cases where income rose significantly, consumption remained essentially a constant percentage of income; in other words, consumption was a proportion rather than an outcome of income (Alimi, 2013). These empirical discrepancies are referred to as the "consumption puzzle" or Kuznets puzzle. Therefore, because of this paradoxical outcome with Keynes, other theories of consumption based on variables other than income that are significant in influencing consumption have been developed.

3.2.1.2 Life Cycle Permanent Income Theory (LCPIH)

The life cycle permanent income theory was created as a result of the merging of the two initially disparate hypothesis, the life cycle hypothesis, and the permanent income hypothesis (Damane, 2018). The life cycle hypothesis was created by Modigliani and Brumberg (1954), while Friedman (1957) created the permanent income hypothesis. Nikbin and Panahi (2016) determined that the Keynesian consumption model was improved by the life cycle and the permanent income hypothesis by taking into consideration time horizon and psychological aspects of consumption. The life cycle theory is an economic concept that describes how individuals or households make consumption and saving decisions over the course of their lives. According to Damane (2018), individuals seek to sustain a relatively persistent level of consumption throughout their lives by adjusting their saving and borrowing patterns. Individuals typically experience three stages in their economic lives, according to the life cycle permanent income theory: youth, middle age, and old age. households experience a constrained income during their adolescence, so they borrow to finance their education, housing, and other needs. As they reach middle age, their income rises and they begin to save for future expenses such as raising a family, buying a home, or planning for retirement (Nagawa et al., 2020). Finally, as people age and their income declines, they draw on their savings to maintain their desired level of consumption (Nagawa et al., 2020). One of the obvious consequences of LCPIH is that consumption is a function of price, interest is steady, and individuals do not inherit any assets; as a result, the net assets of consumers depend on their savings (Nkala & Tsegaye, 2017).

On the other hand, Nikbin and Panahi (2016) elucidated the permanent income hypothesis as an economic theory positing that an individual's purchasing patterns are dictated by their average income over an extended period, as opposed to their current income level. The permanent income theory states that people make decisions about their consumption based on their expected lifetime income, or permanent income (Yusuf et al., 2017). Permanent income is the average income an individual expects to earn over a long period of time, such as a year or several years (Nikbin & Panahi, 2016). It is thought to be a more precise depiction of a person's long-term financial resources than their current income, which can rise and fall owing to a range of circumstances. Friedman then stated that temporary and transitory changes in income have little impact on consumer purchasing behaviour, while permanent changes can have a significant impact (Damane, 2018). According to the permanent income theory, individuals strive to maintain a consistent level of consumption over time and will adjust their spending habits based on changes in their permanent income rather than temporary fluctuations in their current income (Ali et al., 2021). For example, if a person receives a one-time income boost, such as a year-end bonus or a tax refund, they are doubtful to considerably raise their consumption because they perceive it as a one-time event (Ali et al., 2021).

As per the life cycle permanent income theory, borrowing will only have an impact on household consumption in so far as it has an impact on permanent income and lifetime resources, respectively (Osei-Fosu et al., 2014). The life cycle permanent income theory is included in the study as it provides insight into borrowing behaviour by emphasising the significance of future income expectations. People are prepared to take on debt in anticipation of future income growth because they believe they will be able to pay it back when their income increases in the future. This theory also implies that borrowing is not always an indication of financial distress but rather a calculated move to enhance future consumption (Drakopoulos, 2021).

3.2.1.3 Intertemporal Choice Hypothesis

In his book, the Theory of Interest (1930), economist Irving Fisher developed a model termed intertemporal choice. Fisher's model demonstrates how rational, forward-thinking consumers make intertemporal decisions, Unlike Keynes' model, which related current household consumption expenditure to current income. In order to maximise utility, Irving Fisher devised a model that describes how rational consumers decide how much to consume today and save for tomorrow. (Liquisearch, 2021). Fischer (2012) noted that although people want to spend more, their income limits them. Because of this, they are unable to indulge in as much consumption as they would have liked. The intertemporal choice theory further continued by contrasting consumers' choices of how much to spend today and how much to save for the future in relation to the overall resources at their disposal. This is known as the Intertemporal Budget Constraint, and it is predicated on the principal source of household consumption expenditure being household income (Fadhil & Rajab, 2021).

The intertemporal budget constraint can be explained by straightforward two-period model which has two periods: period 1 (the present) and period 2 (the future). This can be explained by letting Y1 and Y2 to represent income for periods 1 and 2, respectively while S stand for savings and C1 and C2 stand for period 1 and period 2 consumption expenditure, respectively (Fischer, 2012). According to Fischer (2012) the consumers' budgetary constraint initially is:

$$Y_1 = C_1 + S \ OR \ S = Y_1 - C_1 \ldots \ldots \ldots \ldots \ldots \ldots \ldots (3.6)$$

A consumer is saving if S is more than zero, and borrowing if S is less than zero. The cost of saving (borrowing) is the interest rate (r). Therefore, the budget constraint in the subsequent period is:

$$C_2 = Y_2 + (1+r)S \ OR \ C_2 = Y_2 + (1+r)(Y_1 + C_1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

The rate of return on savings is denoted by the expression (1 + r) S. The expression can be rearranged to write:

$$(1+r)C_1 + C_2 = Y_2 + (1+r)Y_1 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.8)$$

Dividing the expression (3.8) by 1+r yield:

$$C_1 + \frac{C_2}{(1+r)} = Y_1 \frac{Y_2}{(1+r)} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.9)$$

As can be seen from the equation above, the present values of lifetime income and consumption (on the right and left sides of the equation, respectively) are identical (Drakopoulos, 2021). Value in terms of consumer goods during period 1 is referred to as present value. To put it another way, 1/(1+r) represents the relative cost of future consumption relative to current consumption, where one unit of consumption today is equal to 1+r units of consumption tomorrow (Drakopoulos, 2021). Therefore, according to the intertemporal consumption hypothesis, consumption decisions are exclusively influenced by the present value of lifetime income, not by current disposable income (Drakopoulos, 2021). The level of interest rates has a significant effect on consumption decisions since consumers can borrow or lend money between periods.

Fisher argues that the present value of current and future income, where future income is discounted by the interest rate, determines consumption at any given time (Fadhil & Rajab, 2021). Furthermore, when making consumption and savings decisions, households consider both the present and the future (Fadhil & Rajab, 2021). therefore, as households consume more in the present, they save less money, and the less money they save, the less they will be able to consume in the future (Fadhil & Rajab, 2021). The theory also implies that while people are making intertemporal decisions about consumption and saving, they could be influenced by variables like interest rates, inflation, and future uncertainty. The deposit rate is currently a significant inducement for households to save in the current period. This study is anchored more on the intertemporal choice hypothesis although some attributes are derived from other hypothesis.

4.3. EMPIRICAL LITERATURE

The empirical literature presents the findings of numerous authors from diverse nations, including developed, developing, and less developed nations.

3.3.1. Interest rate and household consumption expenditure

Several studies on the effect of interest rate increases on household consumption expenditure have been conducted. Some of these studies include an econometric model for household consumption expenditure in Ghana investigate by Osei-Fosu et al. (2014). The study used time series data from 1970 to 2009 to illustrate the effect of interest rates on deposits on household spending. The research also assessed additional macroeconomic factors that affected household consumption expenditure, such as GDP per capita and inflation rate. The cointegration between these variables was examined using the ARDL Bound test. The results showed a negative relationship between household consumption spending and deposit interest rates in both the short and long run. But it was found that the association was insignificant over the long term than it was in the short term.

Bryan and Vengelen (2015) also looked into the consequences of changing interest rates on household consumption expenditure in the United State using data from the Consumer Expenditure Survey and data from state-based Mortgage Interest Rate Surveys. The study discovered a small but substantial positive association, indicating that when interest rates fell, households cut back on their expenditure. These findings show that other key factors influenced household consumption expenditure, and that monetary and fiscal policymakers should try to figure out why families cut back on their spending even as the interest rates declined.

Teuta (2015) as well looked into the influence of interest rate in the Albania family consumption. The Albania National Sample Survey's monthly consumption data was utilised to generate regression discontinuity estimates based on age cut-offs. The findings indicated an intriguing age-related trend in the impact of a greater interest rate. Aside from that, when the interest rate is raised, there was an immediate drop in intertemporal substitution or consumption. However, the impact on consumption is smaller in the long run. This was attributed to an income effect, meaning that when interest earnings are higher, spending rises.

In 2016, Combey (2016) studied the effects of interest rates on private consumption in the West African Monetary Union utilising panel data analysis for the years 2006 to 2014 using mean group, pooled mean group, and dynamic fixed effects. The outcome was highly disputed because it demonstrated that interest rates are substantial and that there was no statistical evidence for the assertion that interest rates either raise or decrease private consumption in Western African nations. These results were distinct and did not agree with earlier research on the same topic. Additionally, the results were consistent with theories already in existence that claim interest rates do have an effect on private consumption, either positively or negatively. Therefore, there was no greater interpretation that could be made from the results.

Yusuf et al. (2017) in Nigeria applied the autoregressive distributed lag (ARDL) framework to evaluate the effects of interest rates on private consumption behaviour between the years of 1981 and 2013. However, it was found that interest rates in Nigeria do not explain any variations in household consumption expenditure because the results were statistically insignificant. Instead, there is a long-term relationship between household consumption expenditure and its drivers.

Manasseh et al. (2018) studied the effects that interest and inflation rates might have on household consumption expenditure in Nigeria using annual data encompassing the periods of 1981 to 2011. Their study found that interest rates were positively and insignificantly related to household consumption expenditure whereas inflation was significant and had a positive relationship with household consumption expenditure.

On the other hand, Tzamourani (2019) found a quite distinctive conclusion in a study on the influence of interest rate on household consumption expenditure in Europe in 2019. Using a cross-sectional study and a method for multiple regression model estimation, the author analysed data from a survey on household finances and consumption. According to the findings, countries like Belgium, Germany, Italy, and Austria are among those in Europe where rising interest rates had a favourable effect and a positive association with household consumption expenditure. This implies that if interest rates rise, consumption will also rise indicating a connection that is purely positive. Furthermore, according to the author, some nations including Spain, Portugal, Cyprus, and Ireland had a negative relationship with each other. Compared to previous studies, this inference is highly contested and unique.

Mukhtar et al. (2020) sought to determine how changes in household consumption expenditure in Nigeria would be impacted by changes in energy consumption, interest rates, and imports. Nigeria is the most populous nation in Africa, home to 200 million different citizens, 70% of whom are categorised as poor and spend most of their income on subsistence necessities. Over the aim of data analysis, the study used the generalised method of moments (GMM) and the log linear regression model over the time from 1985 to 2018. The findings revealed that the association between interest rate and energy consumption and household consumption expenditure was inverse and positive, respectively, and that the relationship was statistically significant. However, the relationship between foreign exchange and household consumption expenditure was not statistically significant.

Fikizolo (2020) looked at how changes in interest rates affected South African household final consumption spending. Data for the study were provided on a quarterly basis by Statistics South Africa (Stats SA) and the South African Reserve Bank (SARB). The study's extremely important findings showed that rising interest rates are associated with falling household consumption expenditures.

A study was recently undertaken in Central Asia Afzali (2022) to reveal a correlation between interest rate variation and ultimate household consumption expenditure. For the time period covering 1995–2017, the study incorporated quantitative analysis through panel data analysis and used a multiple regression approach. The ARDL fixed effect and random effect were employed in an effort to find a long-term link between the variables while considering the data type and its quality. The random effect test produced appropriate inferences that satisfied the study's goal. Results of the study showed that Interest Rate Variation, the main independent variable, is significant both economically and statistically, that it gained a negative relationship with final household consumption expenditure, meaning that if one grows, the other falls, which is known as a vice versa relationship. Other major explanatory factors with positive associations included GNI and inflation.

3.3.2. Inflation and household consumption expenditure

Hakim & Bustaram (2019) looked into Indonesian consumer spending and inflation expectations. This analysis used information from 2003 to 2018. The findings of the Chow test indicated that there was a structural break in the second quarter of 2008, causing the data to be divided into the 2003Q1-2008Q1 and 2008Q3-2018Q2 periods. The findings demonstrated that consumption spending in the two eras was unaffected by inflation forecasts. The same result was obtained even when using the entire set of data.

Using an ordinary least squares econometric technique, Obinna (2020) empirically estimated the effect of inflation on household consumption spending in Nigeria from 1981 to 2018. The study's empirical results showed that there was a positive and substantial long-term link between household consumption spending and inflation in Nigeria.

Furthermore, Ewane and Abonongi (2022) in Cameroon used an ex-post facto research method because they had no control over the variables in their attempt to investigate the impacts of volatility of inflation rate volatility on household final consumption expenditure. World Bank data from 1980 to 2020 was employed in the study. The long- and short-term effects of the inflation rate on household final consumption expenditure were found to be positive and considerable, defying the assumptions that were set forth beforehand.

3.3.3. Disposable income and household consumption expenditure

Siman et al. (2020) used quantitative data with 130 samples of respondents to study the impact of the number of household members, health, working hours, and income on the consumption expenditure. They used primary data such as surveys, questionnaires, and interviews, as well as secondary data such as literature reviews. The study was conducted in the Merauke District, Merauke Regency and Papua Province. The study findings indicated that the number of household members had no bearing on household consumption expenditure. While health did not directly or indirectly affect household consumption expenditure, working hours had a positive and considerable impact on it. Income has a favourable and considerable impact on household spending on goods and services.

Gohar et al. (2022) looked at the connection between consumption and income. Their investigation sought to ascertain the asymmetric impact of price and income across various consumption quantiles in the rising seven nations. They applied the quantile ARDL together with the nonlinear ARDL techniques. The nonlinear ARDL results revealed that positive shocks in income had a significant and positive relationship consumption both in the short and long run while negative shocks in income had no significant impact on consumption which in a way suggested an asymmetric effect of income on consumption. Similar findings were observed in quantile ARDL, where income increased consumption through all quantiles except the 95th. Furthermore, all seven emerging countries' consumption was negatively impacted by price changes, according to the quantile ARDL estimates.

3.3.4. Household debt and household consumption expenditure

In the UK, Bunn and Rostom (2015) looked into the connection between consumer spending and household debt. According to the data, households with high levels of debt reduced their spending more after the 2007 financial crisis. Their econometric study predicted that after 2007, debt-related spending cuts would have reduced overall private consumption by as much as 2%.

Researchers Andersen et al. (2016) used administrative registration data on approximately 500,000 Danish households to investigate if and how the amount of household debt prior the financial crisis affected expenditure during the crisis. A strong and statistically significant negative correlation was found between a household's 2007 debt-to-income ratio and the changes in its spending from 2007 to 2009.

Kukk (2016) analysed how much household debt restrained spending during the 2008–2009 financial crisis. The study made use of a special quarterly panel dataset that includes financial data on more than 100 000 people. The data spanned the years 2005 through 2011, when Estonia, a recent EU member, experienced significant deviations in credit volume, income, and consumption. According to the estimates, debt, as shown by the debt-to-income ratio and the debt service ratio, reduced consumption across the whole economic cycle. However, as compared to both the pre- and post-crisis periods, the negative impact of the debt service ratio was significantly greater during recessions, whereas the negative impact of the debt-to-income ratio was comparatively steady during the sample period.

In the period 2006-2015, Ji et al. (2019) estimated the relationship between household debt and consumption in the Netherlands. According to Dutch administrative data, the average consumption of high-debt households decreased significantly more than that of other households during the crisis. They distinguished between the effect of credit availability for direct consumption and the effect of household debt overhang. On a micro level, households that were less able or willing to finance high-volume purchases with fresh debt in the wake of the crisis experienced the worst decline in consumption. But the consumption declines of households with negative home equity over a longer period of time had a considerably greater effect on macro consumption because their numbers expanded significantly during the crisis.

Using data from 1994 to 2013, Nkala and Tsegaye (2017) investigated the connection between household debt and consumption expenditure. For testing the long- and short-term relationships between the variables, the Johansen cointegration technique and the Vector error correction model (VECM) were employed. Another method used to determine which way the variables were causally related was the Granger causality test. In South Africa, household debt and consumption spending are related, as demonstrated by the study's findings, which also indicate that the relationship runs both ways. Research indicates that rather than using borrowing to finance their consumption, South Africans use borrowing to boost their spending.

Kereeditse and Mpundu (2021) examined household debt in South Africa from 2005Q1 to 2019Q2 with an intention to determine the amount of debt held by households before, during, and after the financial crisis of 2007–2009, as well as shortly before the COVID-19 pandemic. Using the VECM approach the results showed household debt and consumption to be positively related however the relationship was insignificant implying that it did not hold in South Africa.

3.3.5. Real effective exchange rate and household consumption expenditure

Bahmani-Oskooee et al. (2015) carried out a study in an attempt to discover whether exchange rate volatility harmed domestic consumption. In response, they analysed data from twelve emerging economies and showed that although exchange rate uncertainty affected domestic consumption in the short term in almost all the countries, these impacts persisted in the long term in only half of them.

The impact of exchange rate volatility and external debt on domestic spending in Pakistan was examined by Kumar et al. (2019) using annual data spanning from 1980 to 2014. They were examined for their short- and long-term effects on domestic consumption using error correction modeling and the bounds testing approach to cointegration. Their research expanded the body of knowledge in two ways: The bound test results showed that interest rates, income, exchange rates, exchange rate volatility, and external debt all had a long-term relationship with domestic consumption. In the short and long term, interest rates, income, and exchange rates have a positive impact on domestic consumption, while external debt and exchange rate volatility have a negative impact.

Onanuga (2020) investigated the relationship in Sub-Saharan Africa between household consumption, lending rates, and exchange rates. From 2008 to 2017, they used a sample of 37 African nations to analyze panel data using the mean group estimator. The findings showed that lending and exchange rates cause favorable changes in household consumption in Sub-Saharan Africa.

A study conducted in South Africa by Habanabakize (2021) examined how sensitive household consumption expenditure is to changes in disposable income, petrol prices, and exchange rate volatility. The first quarter of 2008 through the second quarter of 2020 were the study's data sets from Quantec EasyData. Using the ARDL model, the short- and long-term associations between the regressed and regressor variables were equally ascertained. To establish a long-run relationship, the ARDL bounds test was employed. Exchange rate volatility and disposable income were shown to be the main predictors of household consumption spending, both of which were statistically significant. In the near term, however, the price of gasoline had minimal bearing on household consumption expenditure.

Modified non-linear autoregressive distributed lag (ARDL) and multiple threshold non-linear ARDL models were employed by Uche et al. (2022) to reevaluate the relative adjustments of household consumption expenditure to extremely small and extremely large disparities in exchange rate in African emerging economies (AEE). This means that, apart from Nigeria, the empirical estimates showed that changes in exchange rates had different effects on household consumption expenditure in each country. In addition, consumption expenditure increased at the upper quantile of appreciation and significantly decreased at all quantiles of exchange rate depreciation in Algeria, Egypt, and Morocco. These findings suggest that household consumption expenditure in these three North African countries is more vulnerable to large positive exchange rate shocks. Exchange rate inelasticity is seen in household consumption expenditure in South Africa, Kenya and Nigeria since these countries households continue to consume at the same levels despite fluctuations in the direction and magnitude of exchange rates.

3.3.6. Causality of model variables

Fadhil and Rajab (2021) performed Granger causality testing and Dynamic Ordinary Least Square (DOLS) tests in order to ascertain the exact effect of interest rates on household consumption expenditure in Tanzania as well as the direction of causality between the variables during the period of 1990 to 2017. The results of the Granger causality test indicated a bidirectional causal relationship between the interest rate and household consumption spending, while the expected result indicated that the impact of deposit interest rates on household consumption spending was insignificant.

3.3.7. Accounting innovation of model variables

In order to investigate the macroeconomic variables influencing household consumption spending in Ghana, Bonsu and Muzindutsi (2017) used a multivariate cointegration approach. The sample period was annual time series covering 1961–2013. The Johansen cointegration approach and the vector autoregressive model were used to capture the short- and long-term relationships between a few macroeconomic variables and household consumption spending in Ghana. A significant long-term relationship between real household spending and specific macroeconomic determinants was demonstrated by the cointegration analysis, with a marginal propensity to spend of 0.7971. Household consumption spending is only strongly impacted by changes in price levels in the short run, according to Granger causality, impulse response analysis, and variance decomposition; in contrast, real exchange rates and real economic growth were significantly impacted.

Additional empirical evidence that is pertinent to the topic is the study conducted by Ezeji and Ajuduo (2015), which examined the factors influencing aggregate consumption expenditure in Nigeria. A model based on the Keynesian consumption function was used in the study, and it contained explanatory variables like inflation, income, interest rates, and currency rates. The Johansen cointegration test was used in the study to attempt to determine a long-term link among variables. The study confirmed that the Nigeria consumption function mimics the Keynesian consumption model and incorporates variables from other well-known theories, such as price level, exchange rate, and interest rate, as significant variables explaining household consumption expenditure behavior in Nigeria. It also found a positive association between household consumption expenditure and income.

Jordan (2013) explored the influence of interest rate changes on households and the South African GDP. Using a macroeconomic model and a social accounting matrix, the research examined the influence on the economy caused by a 100 basis point rise in the interest rate, with an emphasis on households. Given a three-quarter lag, the macroeconomic model predicted a 0.54 percent drop in nominal GDP caused by a 100 basis point surge in the nominal interest rate. This translated to an R13 billion drop in GDP (in 2009 prices). The impact on real GDP was anticipated to be -0.22 percent, or R5.3 billion. Over 26 000 job opportunities were expected to be lost. The findings of the impact study per household and per expenditure decile demonstrate that, as expected, higher income households are hit the worst by the 100 basis point increase in interest rates. The wealthiest households saw a 0.6 percent decrease in spending, while the poorest households experienced a -0.23 percent decline.

From 1993 to 2010, Çiftçioğlu and Almasifard (2015) investigated the correlation among (GDP share of) consumption and two distinct metrics of financial development and real interest rate using eight Central and East European countries sample. The panel estimation of two different consumption regression calculations revealed that the direction of the net effect of financial development on consumption varies subject to the measure of financial development used. It was discovered that, though the ratio of broad measure money supply (M2) to GDP had an adverse and statistically significant outcome on consumption, the ratio of domestic credit to GDP had a positive effect but insignificant association. In addition, the results of the estimation revealed that the real interest rate had a positive and statistically significant influence on consumption. Finally, consumption was shown to be (statistically) insignificantly related to per capita real GDP and real GDP growth rate.

Muzindutsi and Mjeso (2018) investigated the key factors of household consumption expenditure in South Africa from 1995 to 2015. The short term and the long-run connection among real total private consumption and the specified macroeconomic variables were examined using the autoregressive distributed lag (ARDL) model. Quarterly time series data from quarter one of 1995 through to the final quarter of 2015 were used. Long-term findings showed that households in South Africa spend a greater share of their actual revenue, and that real consumption rises when the home currency appreciates (rand). Furthermore, it was discovered that pricing levels and interest rates have a long-term detrimental impact on actual expenditure on consumption. Similarly, South African pricing levels and interest rates were discovered to have an adverse effect on actual household consumption expenditure in the short run, although real exchange rates had no statistically significant impact.

4.4. SUMMARY

Chapter 3 basically presented an overview of the existing literature related to the research topic. This chapter likely included a review and analysis of various theoretical frameworks and models that have been developed in the field. The first section of the chapter looked at the theories that underlie household consumption spending, specifically the Keynesian absolute income hypothesis, the life cycle permanent income hypothesis, and intertemporal choice theory. The end part of the chapter presented the viewpoints and findings of other authors in a logical and organised manner, demonstrating a comprehensive understanding of the existing research in the field. The effect of interest rates on household consumption expenditure studies was covered in the first part, which was then followed by studies on inflation, disposable income, household debt, exchange rates on household expenditure, as well as granger causality among the models' variables and other related studies on the determinants of household consumption expenditure. Chapter 4 provides the research procedure, which clearly outlines the essential steps that must be taken and carried out while working with time series data.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. INTRODUCTION

The research methodology outlines the econometric analytical framework applied in the study. This section describes the types and sources of data used in the study, as well as the model formulation. Estimation techniques follows, explaining the unit root test which is constituted by the Augmented Dickey Fuller test and the Phillips Perron test. Therefore, an explanation of the Autoregressive Distributed Lag model follows together with the analysis of the Error Correction Model. The Granger causality analysis will therefore follow. This chapter ends with an explanation of stability and diagnostic tests employed in the model.

4.1.1. Research design

The character of the study is quantitative to be able to fulfil goals stated previously in chapter 1. This indicates that the researcher can accurately capture interest rate effect on household consumption expenditure South African through a quantitative study.

4.1.2. Study area

The study is based in South Africa to determine how interest rates affect household consumption expenditure there. After completion, it is envisaged that the study would serve as a model for future household consumption expenditure and interest rate studies in South Africa.

4.1.3. Data collection

This study depends on yearly time series secondary data exclusively for the years 1989 to 2022. Data is extracted from the South African Reserve Bank (SARB) for the following variables: household savings, household disposable income, household debt and real effective exchange. Data for total household consumption expenditure, prime rate is obtained from Quantec EasyData portal. Lastly, data for inflation is sourced from the World Bank's online database. Furthermore, the study’s primary variables are household consumption expenditure, interest rate, household debt while household disposable income, inflation, real effective exchange rate and household savings are control variables which are shown in Table 4.1.

Table 4. 1 : Summary description and data sources of the variables

Variables	Sources	Description	Measurement
Household consumption	Quantec	Total consumption expenditure (constant 2015 prices)	Millions of rand
Interest rate	Quantec	Interest rate (prime overdraft rate). Average of Quarterly values	percentage
Inflation	World bank	Inflation, consumer prices	Percentage
Household disposable income	SARB	Disposable income per capita of households	Millions of rand
Household debt	SARB	Household debt to disposable income	Millions of rand
Household saving	SARB	Net savings by households	Millions of rand
Real effective exchange rate	SARB	Average exchange rate of the rand against 20 trading partners	Index

Source: Own construction

4.1.4. Data analysis

This section describes all of the econometric methods used in the study. These consist of the Granger causality, stability, unit root test, ARDL bounds test, and ARDL error correction models.

4.2. MODEL SPECIFICATION

The study broadens the intertemporal consumption function (4.1) for the estimation of the effects of interest rate on household consumption expenditure through the consumption function to include other factors that may influence household consumption expenditure. Thus, the household consumption expenditure's functional form (4.2) and regression model (4.3) are as follows:

$$C_2 = Y_2 + (1+r)S \; OR \; C_2 = Y_2 + (1+r)(Y_1 + C_1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.1)$$

$$CON = (INT_t, INF_t, Y_t, DEBT_t, S_t, EXC_t) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.2)$$

$$LnCON_t = B_0 + B_1INT_t + B_2INF_t + B_3LnY_t + B_4LnDEBT_t + B_5LnS_t + B_6LnEXC_t + \varepsilon_t \quad (4.3)$$

where: $LnCON_t$ denotes the log of household consumption expenditure at constant 2015 prices denominated in South African rands, INT_t represents interest rate which is determined by the SARB Monetary Policy Committee (MPC), INF_t stands for inflation rate. The data for INT_t and INF_t is a percentage form hence the variables are not logged. LnY_t denotes the log of household disposable income per capita. The data comes in millions of rand hence it is logged to be in percentage form, LnD_t denotes the log of household debt to disposable income denominated in South Africa Rands, LnS_t denotes the log of net saving by households denominated in South African Rands and $LnEXC_t$ denotes the log of real effective exchange rate. β_0 denotes the intercept of the model. β_1- β_6 signifies the coefficients of each explanatory variables of the model. ε_t = stochastic term. Four explanatory variables are transformed into logarithm to interpret their coefficients in elasticities. This stems from the fact that logarithm has the ability to linearise non-linear data. Moreover, issues of heteroskedasticity through the sample period and a stable pattern can also be dealt with when the data is logged (Ncanywa & Letsoalo, 2019). Table 4.2 below provides a summary of the variables and the signs which they are expected to assume under data analysis pre-model estimation.

Table 4. 2 : Expected signs of variables

Variables	Expected signs
Interest rate	Negative
Inflation rate	Negative
Disposable income	Positive
Household debt	Positive
Household saving	Negative
Real effective exchange rate	Positive

Source: Author's compilations based on study's literature review

4.3. ESTIMATION TECHNIQUES

The autoregressive distribution lag (ARDL), developed by Pesaran, Shin, and Smith (2001), was used in this investigation. This technique concurrently captures cointegration between a group of variables throughout the long and short run terms. The causal correlation between the variables was also determined using the Granger approach (Granger, 1969).

4.3.1. Stationarity/Unit root test

One of the first steps in econometric evaluation is the stationarity test. A time series with stationarity, according to Fikizolo (2020), has statistical properties like mean and variance that are constant across time. Regression and estimate of reliable outcomes require stationarity. Non-stationarity is the root cause of erroneous regression findings (Gujarati & Porter, 2009). According to Granger and Newbold (1974), the t-statistic, DW statistic, and R^2 values are not reliable for drawing conclusions in this kind of circumstance. The study employed the traditional versions of the Phillips – Perron unit root tests (Phillips, 1986; Phillips & Perron, 1988) and the Augmented Dickey–Fuller (ADF) hypothesised by (Dickey & Fuller, 1979) as a security measure to determine the order of integration of the variables.

These tests are performed to determine the study's long-term properties of the variables. Should the time series be discovered to be stationary, it will suggest that their mean, covariance, and variance remain persistent throughout time, and that the analysis' results are dependable and may be used to forecast the country's future economic activities (Hakim & Bustaram, 2019). Meanwhile, if the variables are not rejected in their levels by the tests but are rejected in their first order of integration, the series will be said to have one unit root and be integrated at first difference (Fadhil & Rajab, 2021).

Moreover, should the assessments not reject the variables in level or at the first difference but do reject them in second difference, the series must have two-unit roots and will integrate of order two. Therefore, determining the order of integration requires testing for stationarity. The goal is to avoid spurious results by ensuring that second-order variables are not incorporated (Arfaoui et al., 2016). Stationarity properties can be expressed as follows:

Mean: $E(X_t)\mu \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.4)$

Variance: $Var(X_t) = E(X_t - \mu)^2\sigma^2 \ldots \ldots \ldots \ldots \ldots \ldots (4.5)$

Covariance: $\gamma_k = E(X_t - \mu)(X_{t+k}\mu) \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. (4.6)$

where γ_k indicates the covariance (auto-covariance) at lag k between the values of X_t and X_{t+k} at intervals of k periods, and μ and σ^2 represent constant mean and variance across time.

4.3.1.1 *Informal unit root test (visual inspection)*

Prior to performing formal unit root testing on ADF and having PP confirm it, stationarity will first be visually inspected and tested using graphs. Therefore, the study utilised graphical presentation to visually inspect stationarity. The visual inspection of stationarity can be done by graphs or correlogram tests. Visual inspection, according to Mah (2012), enables analysts to understand the nature of their time series data. The graphical displays make it easier to see whether the variables are changing, that is, increasing, decreasing, or remaining constant over time (Ncanywa & Letsoalo, 2019). The time series data is stationary, in accordance with Guajarati and Porter (2009), when it oscillates around the mean of zero and is constant—that is, not falling or rising.

4.3.1.2 *Augmented Dickey-Fuller unit root test*

The augmented Dickey-Fuller (ADF) test is a statistical test used to determine whether a time series is stationary or non-stationary. The test is based on the Dickey-Fuller test, which tests for the unit root availability in a time series. The ADF test is an improvement over the Dickey-Fuller test, as it includes additional terms to account for serial correlation in the data. The test is used to test three models which are trend and intercept, intercept, and none respectively (Meniago et al., 2013). The ADF test the null hypothesis (H0) that the series has a unit root and is non-stationary, while the alternative hypothesis (H1) is that the series is stationary. The null hypothesis is rejected if the corresponding p-value is greater than the predetermined threshold of significance, indicating that the series is stationary and devoid of a unit root. In contrast, it is determined that there is a unit root in the time series if the null hypothesis is not rejected. The following is the equation for the ADF test:

$$\Delta y_t = \alpha_0 + \beta t + \gamma y_{t-1} + \delta_1 \Delta y_{t-1} + \cdots + \delta_{p-1} \Delta y_{t-p+1} \varepsilon_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.7)$$

where p is the lag order of the autoregressive process, β, the coefficient on a time trend and α is a constant. Radnia (2014) suggested that the log-likelihood function must be exploited in choosing the ideal optimal lag length for the model. This is accomplished by opting for the model with the lowest Schwartz Bayesian Information Criterion (SBS) and use the Akaike Information Criterion (AIC) to verify the finding for correctness.

4.3.1.3 Phillips-Perron unit root test

The Phillips - Perron unit root test is one of the most common substitutes for the ADF test in the analysis of time series data. The distinction between the PP and ADF tests lies in how heteroskedasticity and serial correlation are handled. The ADF test employs parametric autoregression to imprecise the ARMA structure of the errors in the test regression, whereas the PP adjusts the test statistic to eliminate the need for extra lags of the dependent variable in the case of serially correlated errors (Phillips & Perron, 1988). The PP test has the advantage of assuming no functional form for the error process of the variable, meaning that it can be applied to a very broad range of issues. The drawback of the PP test is that it performs poorly in small sample sizes since it needs large sample volumes to yield accurate results. The Phillips - Perron test regression is provided by:

$$\Delta y_t \beta' D_t + \pi y_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.8)$$

where u_t might be heteroskedastic and is I (0). The PP test amends for any heteroskedasticity and serial correlation in the errors u_t of the test regression by adjusting the test statistic $t_{\pi=0}$ and $T_{\hat{\pi}}$ so that no extra lags of the dependant variable are required in a situation where serially correlated errors exist.

The time series contains a unit root, according to the null hypothesis (H0) of the PP test, while the alternate hypothesis (H1) states that the time series is stationary. If the test probability value is less than the predetermined significance level, the series is considered nonstationary, and the null hypothesis is accepted. If the test probability value is higher than the predefined level of significance, rejecting the null hypothesis, it is concluded that the series does not contain unit root and is stationary is stationary.

4.3.2. Auto-Regressive Distributed Lag Approach (ARDL).

The Auto Regressive Distributed Lag method (ARDL) was introduced by Pesaran and Shin (1995) and has seen significant recent growth. It is also referred to as the bounds testing approach and was further advanced by Pesaran, Shin, and Smith (2001). It is employed to investigate whether cointegration relationships between variables exist. In comparison to other previous and traditional cointegration procedures such as the Engle and Granger (1987) and Johansen and Juselius (1990) approaches, the (ARDL) test model has significant advantages in that it is relevant even in situations where the order of integration among variables varies, for example, when variables are either at level I(0) or first order I(1) which is not the case with older techniques (Alimi, 2014). The long-run relationship test approach, on the other hand, is more suited to small samples than most standard cointegration procedures (Mohsen et al. 2020). Finally, the application of the bounds test (ARDL) approach produces long run estimates that are unprejudiced (Alimi, 2014). Therefore, in estimating the short and long run parameters of the models, this study employed the ARDL approach.

4.3.2.1 ARDL specification for the household consumption expenditure *model*

The ARDL technique is recommended for its capability to incorporate variables with various level of integration. The Bounds test cointegration approach encompasses some econometric advantages over the alternative cointegration test. These advantages include the ability to concurrently measure both the long and short run relationship (Pesaran et al., 2001), being used independently of whether the order of integration of the variables is stationary at level or at first difference and can accommodate structural breaks in time series. Therefore, the ARDL model for household consumption is expressed as follows:

$$\Delta LnCON_t = B_0 + \beta_1 INT_t + \beta_2 INF_t + \beta_3 LnY_t + \beta_4 LnDEBT_t + \beta_5 LnS_t + \beta_6 LnEXC_t + \sum_{i=1}^{p} \eta_7 \Delta INT_{t-1} + \sum_{i=1}^{p} \eta_8 \Delta INF_{t-1} + \sum_{i=1}^{p} \eta_9 LnY_{t-1} + \sum_{i-1}^{p} \eta_{10} \Delta LnDEBT_{t-1} + \sum_{i-1}^{p} \eta_{11} \Delta LnS_{t-1} + \sum_{i=1}^{p} \eta_{12} \Delta LnEXC_{t-1} \varepsilon_t \dots\dots\dots (4.9)$$

where:

Δ denotes the first difference operator in the model i.e., D(LnY),

B_0 represent the constant term,

ε_t is the error term also known as the white noise disturbance.

The household consumption expenditure is indicated on the left side of equation (4.3), and the long-run relationship between the variables and their coefficients is represented by (β_1-β_6) on the right-hand side. In equation (4.9), the remaining parameters (η_7-η_{12}) represent the short-run relationships between the variables as well as the short-run coefficients of the model.

4.3.2.2 ARDL Cointegration Test (Bounds test)

The ARDL bound test for cointegration has its origins from the Wald-test (F-statistic). Pesaran et al. (2001) have supplied two critical values for the ARDL Bounds test of cointegration: the upper limit critical value and the lower bound critical value. Whereas the upper limit critical value assumes that all the variables are I(1), indicating that there is cointegration among the variables, the lower bound critical value assumes that all the variables are I(0), indicating that there is no cointegration relationship between the analysed variables. The variables in the model are considered to cointegrate if the estimated F-statistic is greater than the upper critical value, hence rejecting H(0). However, H0 cannot be rejected if the lower critical value is higher than the computed F-statistic, indicating that there is no cointegration between the variables. Lastly, if the calculated Wald-test F-statistic falls between the upper and lower critical values, then the association between the variables cannot be established and the result remains ambiguous until further evidence is received. This hypothesis is evaluated against the F-statistics test, which is essentially a test of the absence of cointegration between the variables against the presence or absence of cointegration (Pesaran et al., 2001).

The null hypothesis of no cointegration (H0) is defined by:

$$H_0 = \xi_0 = \xi_1 = \xi = \xi_3 = \xi_4 = \xi = \xi_6$$

Should the above situation stand, then there will be no cointegration among variables.

The alternative hypothesis of cointegration (H1) is defined by:

$H_1 \neq \psi_0 \neq \psi_1 \neq \psi_2 \neq \psi_3 \neq \psi \neq \psi_5 \neq \psi_6$

If the above situation persists, there is cointegration between variables.

4.3.2.3 Error Correction Model (ECM)

Co-integration between variables would imply a long-term relationship among the variables, necessitating the estimation of Error Correction Model (ECM) which is known as the speed of adjustment. Therefore, the ECM is also developed in the study to determine the speed of adjustment and the long-term convergence of the variables in the data set towards equilibrium. According to Chipote and Tsegaye (2014), ECM measures dependent variable's rate of adjustment to changes in the independent variables. Since a negative and significant coefficient of short-run fluctuations between the variables will lead to a stable long-run relationship between variables, the speed of adjustment must be negative (Mah, 2012). Eventually, the model will converge towards equilibrium, owing to the frequency of the data used. Positive ECM coefficients are not economically viable and are therefore explosive. Equation (4.9) of the ARDL model yields the ECM equation and is expressed as follows:

$$\Delta LnCON_t = B_0 + \sum_{i=1}^{p} \beta_1 \Delta INT_{t-1} + \sum_{i=1}^{p} \beta_2 \Delta INF_{t-1} + \sum_{i=1}^{p} \beta_3 LnY_{t-1} + \sum_{i-1}^{p} \beta_4 \Delta LnDEBT_{t-1} + \sum_{i-1}^{p} \beta_5 \Delta LnS_{t-1} + \sum_{i=1}^{p} \beta_6 \Delta LnEXC_{t-1} + \emptyset ECT_{t-1} + \varepsilon_t \ldots \ldots (4.10$$

where ECT signifies the Error Correction Term (ECT) which is generated from the residuals found in equation (4.9) and $\emptyset$ denotes the ECT coefficient, which gauges the speed of adjustment to equilibrium.

4.3.3. Diagnostic testing

Diagnostics tests are carried out on the error correction model to evaluate whether any of the assumptions of the classical normal linear regression model have been violated. Ordinary Least Squares (OLS) is considered the best model when all the assumptions are met. Any assumptions that are violated make the OLS estimation methodology less superior to other estimation methods. When certain assumptions are violated, problems such as heteroscedasticity, serial correlation or autocorrelation, model misspecification, residual variance instability, endogeneity issues, and residuals that are not normally distributed might arise.

To achieve more robust results, the study tests for possible violations of OLS assumptions which are conducted on the error correction model. Therefore, the study employs what is referred to as the battery of diagnostic tests, which includes the Jarque-Bera test for residual normality, Breusch-Pagan LM test to test for heteroscedasticity, Breusch-Godfrey LM test for serial correlation, and test for constant error terms.

4.3.3.1 Normality test

The Jarque-Bera test is used as the standard normality test in the study. This test is named after Maxico's Carlos M. Jarque Uribe and Indian-born Anil K. Bera (Shukla, 2016). It is abbreviated as *JB* Test. The null and alternative hypothesis for this test is stated as follows:

Null hypothesis H_0 : variables are normally distributed.

Alternative hypothesis H_1 : variables are not normally distributed.

This test combines the skewness and kurtosis into a single *JB* statistic which is asymptotically X^2 distribute. With small sample numbers, the X^2 makes the test less efficient, but with high sample sizes, it may be the most effective (Georgiev, 2022).

In the statistical literature, the Jarque-Bera *JB* test statistic is represented as follows:

$$JB = n\left(\frac{S^2}{6} + \frac{(K-3)^2}{24}\right) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.13)$$

Of which the measure of skewness is depicted by S and K represent the measure of kurtosis (Shukla, 2016). When the skewness is zero (0) and the kurtosis is three (3), the *JB* test may have no ability to detect deviations from the distribution. This implies that the hypothesis of residual normality is met. As a result, the probability value (p-value) is used in the study to determine if the variables are normally distributed or not. If the level of significance is higher than the p-value, therefore, H_0 will be rejected, implying that the variables are not normally distributed. However, in the case where the level of significance is lower than the p-value, H_0 is not rejected. This is so as there would not be sufficient evidence to conclude that the variables are not normally distributed.

4.3.3.2 Serial correlation

The Breusch-Godfrey Correlation LM test for autocorrelation in the errors in a regression model and utilises residuals from the model. Therefore, the study used the Breusch-Godfrey LM test to determine the possibility of serial correlation in the model. The following is the hypothesis formulation is used:

Null hypothesis H_0 : no serial correlation in the model

Alternative hypothesis H_1 : serial correlation exists in the model.

The test uses the p-value as the rule of thumb to test the presence of serial correlation among residuals. In an event where the 5% level of significance is greater than the probability value, H_0 is rejected. When the 5% level of significance is less than the probability values H_0 is not rejected, suggesting that the model is without any serial correlation.

4.3.3.3 Heteroskedasticity

Heteroskedasticity, according to Stock and Watson (2012), occurs when the error term in the model doesn't have a constant variance. The Breusch-Pagan Godfrey, Harvey, Glejser, ARCH and white tests were applied in the study to assess the presence of heteroskedasticity in the estimated regression model. The tests use the following hypothesis:

Null hypothesis H_0 : there is heteroskedasticity, that is, the residuals are distributed with equal variance.

Null hypothesis H_1 : there is heteroskedasticity, that is, the residuals are not distributed with equal variance.

According to Fadhil and Rajab (2021) the null hypothesis will be rejected, and it will be assumed that heteroscedasticity exists in the fitted regression model if the p-value of the tests is less than the 5% level of significance. However, the residuals are stated to be distributed with equal variance in the absence of sufficient evidence in the data to reject H_0, which is what the study desired to achieve.

4.3.4. Stability testing

4.3.4.1 Ramsey RESET

The study used the Ramsey RESET test to check for model specification. A test for model specification in regression model errors is the Ramsey RESET. As such, it utilises the model's residuals. The null hypothesis, which maintains that the model is correctly specified, is compared to the alternative hypothesis, which argues that the model is misspecified. If the p-value is greater than the 5% level of significance, then the null hypothesis is not refuted, and the opposite is true.

4.3.4.2 CUSUM test

The cumulative sum of the recursive residuals serves as the foundation for the CUSUM test. The cumulative sum and the 5% crucial lines are plotted in this option. In case the cumulative sum surpasses the distance between the two bound lines, the test identifies parameter unsteadiness (Gujarati, 2003). The following statistic serves as the foundation for the CUSUM test:

$$W_t = \sum_{r=K=1}^{r=t} \frac{W_r}{\hat{\sigma}} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots . \dots \dots \dots \dots (4.14)$$

It is implied that the null hypothesis will be rejected if the test discovers parameter instability when the cumulative sum of squared residuals is greater than the area between the two critical lines (5% confidence level).

4.3.4.3 CUSUM of Squares

The CUSUM test is supplemented by the subsequent CUSUM of Squares Test which is a derivative of the recursive residual's squares. The following test statistic is the basis of the CUSUM of squares test:

$$S_t = \frac{\sum_{r=K+1}^{r=1} W_r^2}{\sum_{r=K+1}^{r=T} W_r^2} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots . \dots \dots \dots \dots . (4.15)$$

The test finds parameter instability when the cumulative sum of squared residuals is greater than the area between the two critical lines (5% confidence level).

The stability of the model was also assessed by applying the CUSUM and CUSUM of Squares tests. Next, the findings were confirmed by examining the graph of the AR root. The characteristic AR polynomial's inverse roots are displayed on this graph. If the modulus of each root is contained within a unit circle, the VAR is considered stable. The model must be re-estimated if it is not well-fitted, otherwise, it can be utilised for policy analysis.

4.3.5. Granger causality test

The statistical hypothesis test known as the Granger causality test, which assesses whether one time series may predict another, concludes the estimation process (Wei, 2016). The Granger causality test, as suggested by Engle and Granger (1987), is used in the study to ascertain the causal relationship between the model variables. The results of this test suggest three possible model causal directions: (1) bi-directional causality, which suggests that changes in both dependent and independent variables follow one another; (2) unidirectional granger causality, which assumes that changes in either a dependent or independent variable follow the other; and (3) no causal relationship between variables.

The Granger causality test is used to determine whether household consumption expenditure causes the interest rate, whether interest rate causes household consumption spending, or whether there is no causal relationship at all. The Granger causality can be determined as follows:

The null hypothesis that interest rate does not Granger cause household consumption expenditure is defined by:

The alternative hypothesis which state that interest rate Granger cause household consumption expenditure is defined by:

Likewise, testing the null hypothesis that household consumption expenditure does not Granger cause interest rate is given by:

The alternative hypothesis which asserts that household consumption expenditure does Granger cause interest rate is given by:

Should the interest rate and household consumption expenditure null hypothesis be not rejected, it will imply that the claims that interest rate does not Granger cause household consumption and household consumption also does not Granger cause interest rate are true. This will indicate that the two variables are independent of each other. Rejection of the interest rate hypothesis means that interest rate Granger causes household consumption and there is a unidirectional relationship. By contrast, if interest rate alternative hypothesis is not accepted it will imply that causality runs from consumption to interest rate. If all four hypotheses are rejected, there is bi-directional causality between interest rate and household consumption. The null hypothesis is tested at a significance level of 5%. This means that it will be rejected if the p-value is less than 5%. Furthermore, the null hypothesis will not be rejected if the p-value is higher than the 5% level of significance. The same process is applied on the other variables employed in the study.

4.4. IMPULSE RESPONSE

In econometrics, the impulse response function (IRF) is a useful tool for comprehending the dynamic relationship between variables. It measures how a particular variable responds over time to a unit shock in another variable (Gonçalves, et al., 2021). A recursive VAR (Vector Autoregression) model estimation is used to calculate the impulse response function. This model assumes that the variables being considered are dependent on both their own historical values and the historical values of the other variables in the system. To comprehend the interaction of various economic variables, impulse response analysis is crucial since it offers a clear picture of how shocks spread throughout the system. Thus, impulse responses will be utilised to track how each variable's shocks affect the dependent variables in the VAR.

4.5. VARIANCE DECOMPOSITION

The impulse response function, as mentioned above, tracks how innovations, impulses, or shocks to one endogenous variable affect the other variables in the VAR system; however, the variance decomposition divides endogenous variable variation into component shocks to the VAR system (Wang et al., 2021). Consequently, more details regarding the relative significance of each random innovation in influencing the variables in the VAR are provided by the variance decomposition (Wang et al., 2021). Variance decomposition techniques yield superior results when used in conjunction with VAR methodology than other conventional methods, as noted by Engle and Granger (1987) and Wang et al. (2021). The study will ascertain the percentage of changes in the dependent variables that can be ascribed to their own shocks as opposed to shocks to other variables. Therefore, to examine how one standard shock originating from exogenous variables attributes to the endogenous variable, the variance decomposition technique was employed. This calculates the percentage amount by which a shock to any independent variable would explain variations in a dependent variable (i.e., household consumption expenditure) over the ensuing ten years (Zaefarian et al., 2022). This analysis considered both the short- and long-term. Additionally, changes over time were emphasised. The statistical package E-Views 12 was utilised by the study for data analysis.

4.6. SUMMARY

The unit root test, the Granger causality test, and every step of the Auto-Regressive Distributed Lag Approach (ARDL) for cointegration and long/short run coefficient estimation were all covered in this chapter. The ARDL method was chosen as the preferred estimation method due to the numerous advantages it provides over other alternative approaches. The ARDL was used to estimate the household consumption model. The Error Correction Model (ECM) is also developed based on ARDL to estimate the speed of adjustment that the variables in the data set converges toward equilibrium in the long run. The Granger causality is used to test the causal relationship between variables in the household consumption model. The diagnostic test is carried out to ensure that neither of the classical normal linear regression model assumptions have been violated, while the stability test ensures that the model is stable. Lastly, to evaluate how shocks to economic variables ripple through a system, the impulse response function and variance decomposition were also employed. Specifically, how a shock to any of the dependent variables will affect household consumption and how it will react. In order to achieve the goals outlined in Chapter 1, every method discussed in this chapter was used to annual South African data in the following chapter. In Chapter 5 all of the procedures described in this chapter were subsequently applied to South African yearly data to accomplish the goals previously stated in chapter 1

CHAPTER 5

DISCUSSION / PRESENTATION / INTERPRETATION OF FINDINGS

5.1. INTRODUCTION

In Chapter 5, the research techniques presented in Chapter 4 were applied to achieve the study goals outlined in Chapter 1. To ascertain if the time series is stationary or not, the first step is to use the Phillips Perron and Augmented Dickey Fuller tests. Second, to determine the long-term link between economic variables in the household consumption model, the F bounds test approach is used. The Granger causality test is used to ascertain the casual relationship between the variables, and the ARDL technique is also utilized to estimate the long run and short run parameters. Next come the diagnostic tests to ensure the accuracy of the outcomes derived from the ARDL model. The impulse response function and variance decomposition were the last tools employed to assess system-wide effects of shocks to economic variables.

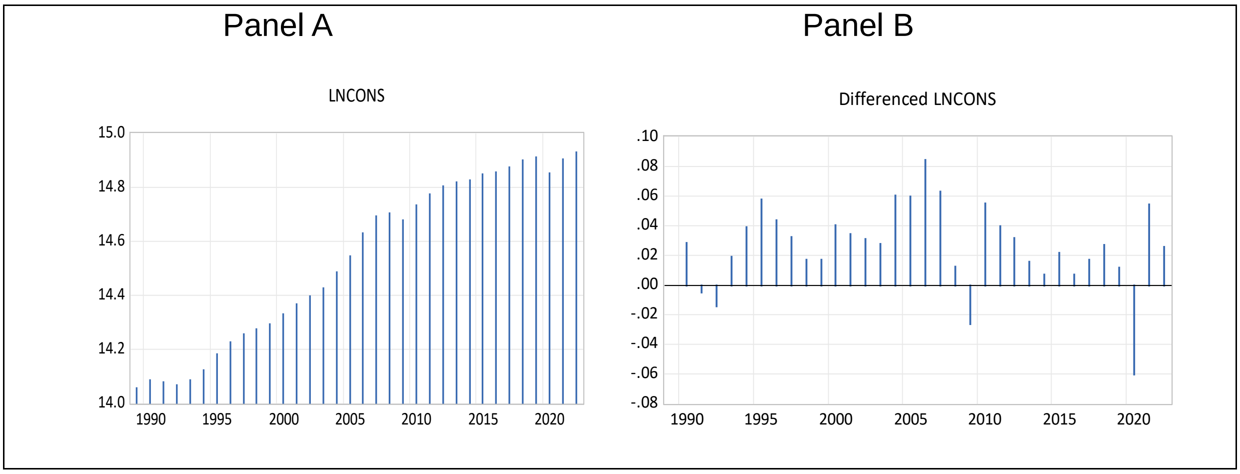
5.2. HOUSEHOLD CONSUMPTION EXPENDITURE MODEL

5.2.1. The visual inspection test results

The initial stage before the session begins with proper analysis of the econometric model is to ensure stationarity of the data of the considered variables. The requirement by the bounds testing procedure is that variables be integrated either at level I(0) or I(1) and disregard variables that are integrated at 2^{nd} difference I(2) (Pesaran et al., 2001). A proper visual review of the variables in their level form and 1^{st} differences is presented in Figures 5.1 to 5.7.

Figure 5.1 represent the log of household consumption expenditure (LCONS) in its level form (Panel A) and first difference (Panel B) respectively. The graphical visual review of household consumption expenditure reveals non stationarity in LCONS in Panel A since the variable does not oscillate around the mean. However, LCONS in Panel B still does not appear to be stationarity although the series seems to oscillate around the mean of zero, this is after the variable was differenced once. Hence LCONS does not seem to be stationary under informal unit root test.

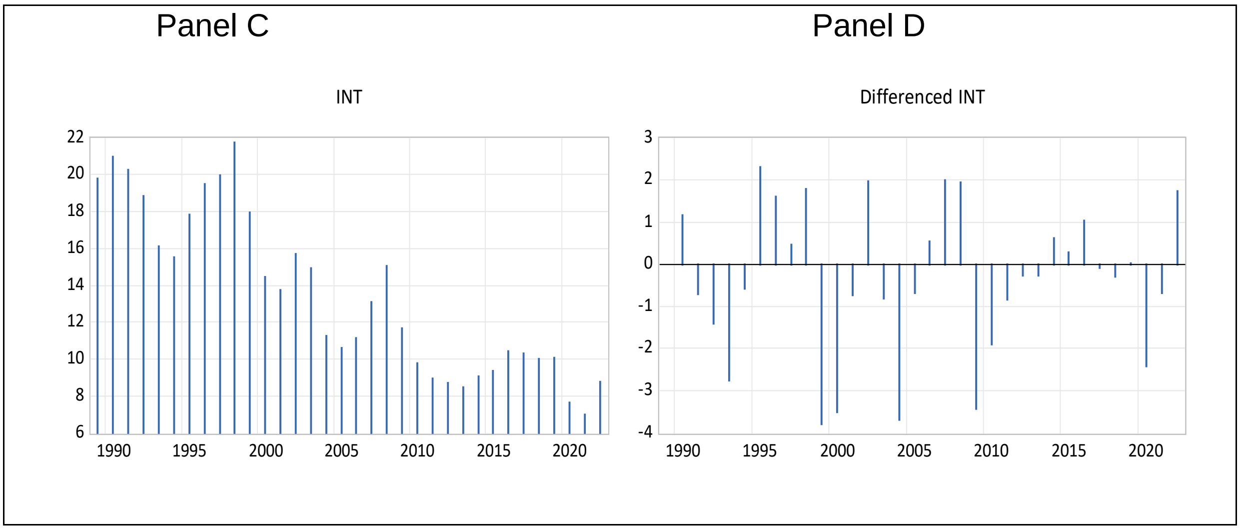
Figure 5. 1 : Household consumption expenditure variable.



Source: Author’s construction using EViews 12

Figure 5.2 contains Panel C which shows interest rate (INT) at its level form together with Panel D representing the differenced interest rate variable, that is, I (0) and I(1) respectively. Paned (C) shows that the interest rate has been trending down during the entire observed period rather than staying near the mean of zero. As a result, it doesn't seem like the interest rate is stationary at level. On the other hand, Panel (D) displays the interest rate at first difference fluctuating around the zero mean. It seems that the interest rate integrates at order I (1).

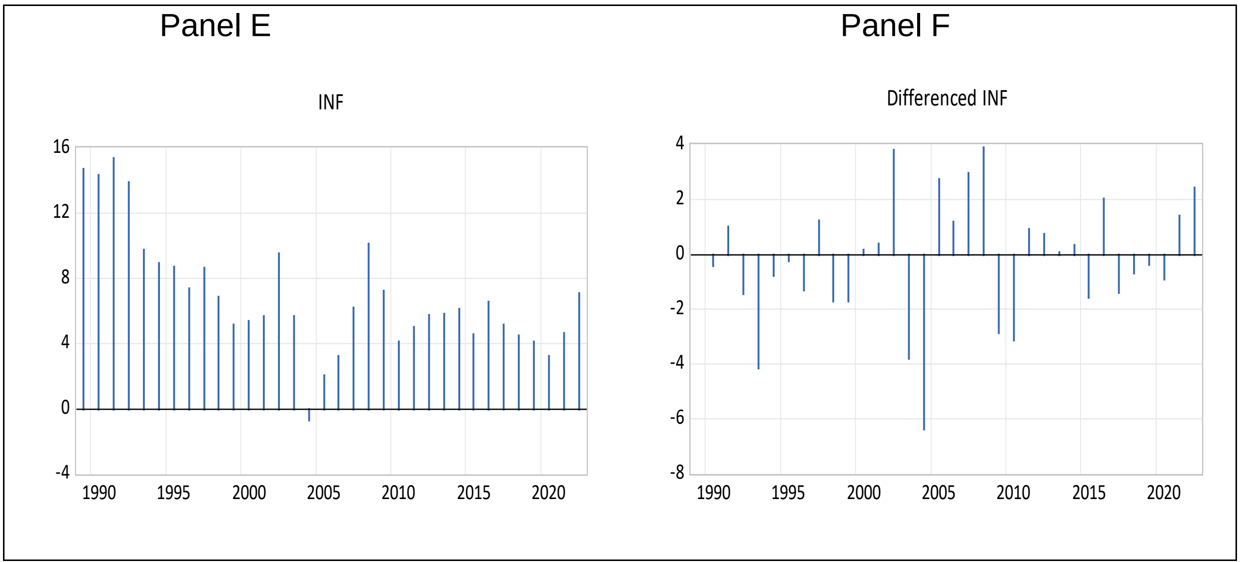
Figure 5. 2 : Prime rate variable.



Source: Author’s construction using EViews 12

The standard version of inflation rate is depicted by Panel E while the differenced version is depicted by Panel F in Figure 5.3. The expectation was finding stationarity at level however the series does not oscillate around the mean of zero hence the variable had to be differenced to test for stationarity and inflation rate appear to become stationary after differencing it once in Panel F.

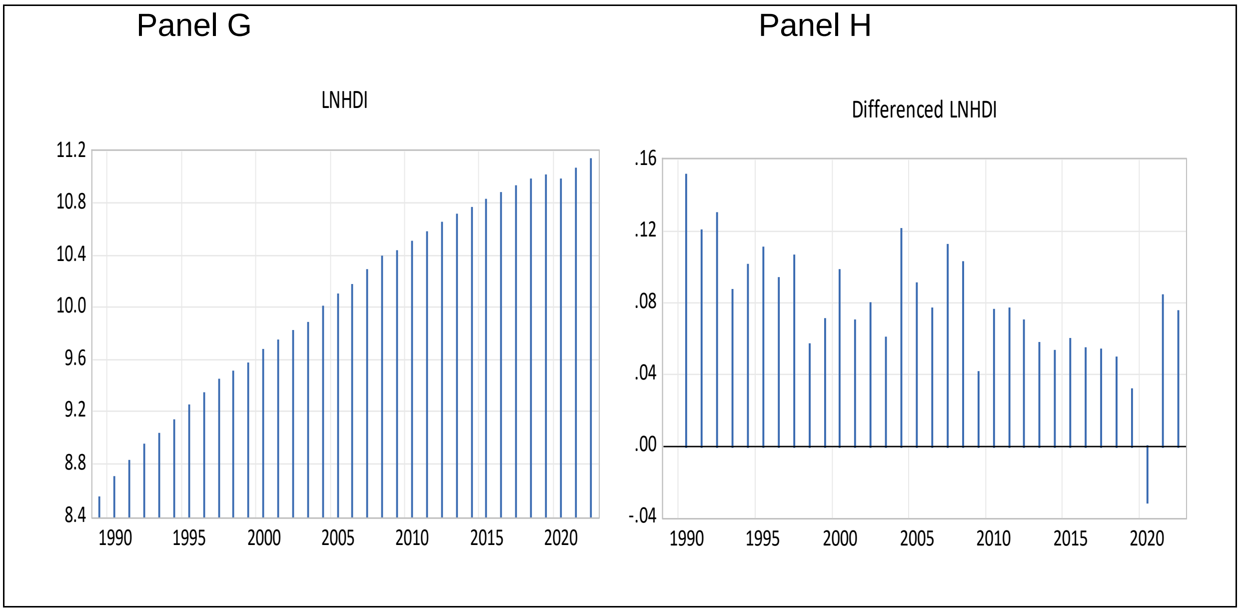
Figure 5. 3 : Inflation rate.



Source: Author’s construction using EViews 12

Figure 5.4 shows the log of household disposable income (HDI) at level and log of HDI at first difference in Panel G and H respectively. The pattern of the data shows that HDI income has been increasing coupled by some mini downfall over the sample period of the study. Panel G shows no oscillation of the series around the mean at the standard form of log of HDI. After differencing the log of HDI the series still does not seem to oscillate around the mean in Panel H.

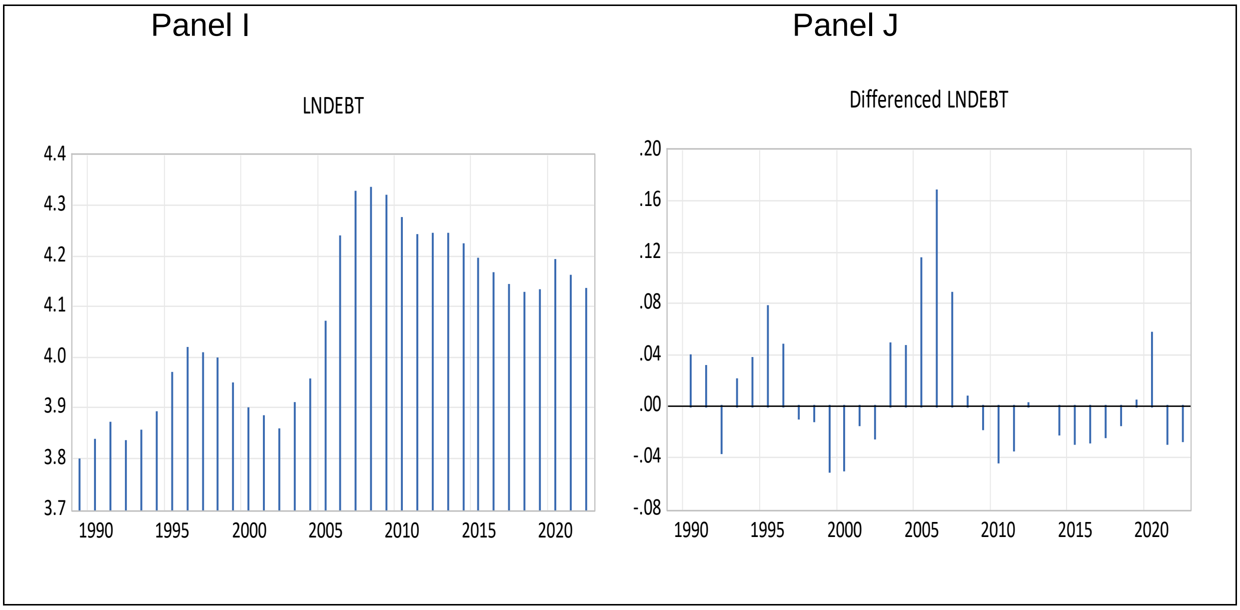
Figure 5. 4 : Household disposable income variable.



Source: Author's construction using EViews 12

In Figure 5.5, Panel I depict the standard form of log of household debt (LNDEBT) and on the right is differenced log of household debt depicted by panel J. The graphical visual representation shows the fluctuations of the household debt levels of South Africans over the period of the study. This variable is integrated at order 1 as it seemingly becomes stationary after being differenced once in Panel J.

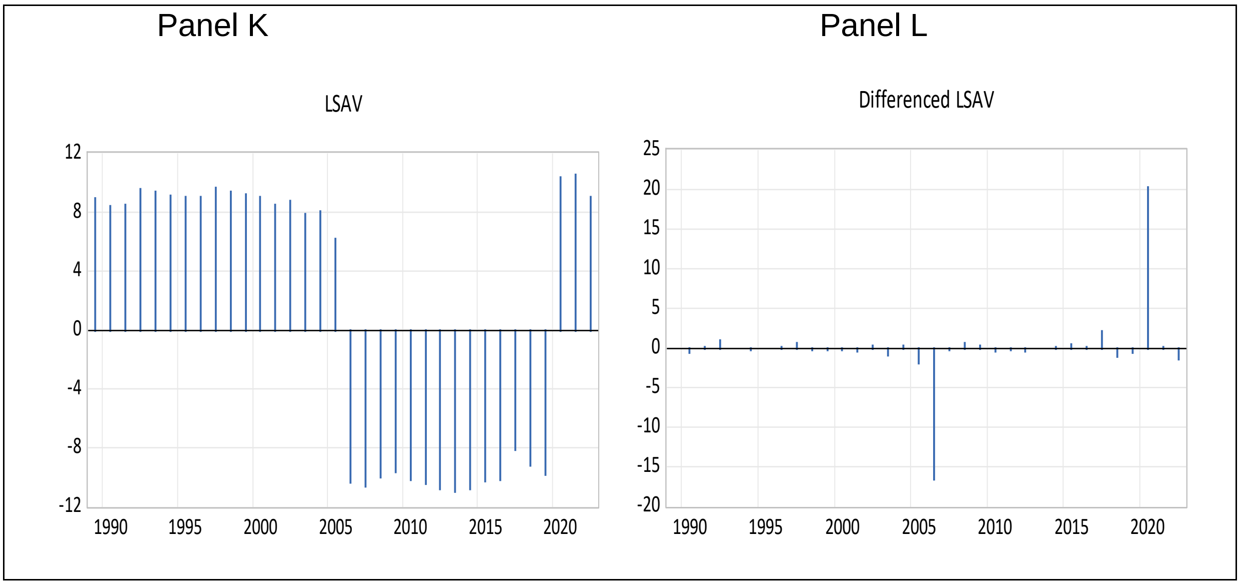
Figure 5. 5 : Household debt variable



Source: Author's construction using EViews 12

Moreover, using Figure 5.6 the standard form of log of household saving (LNSAV) is depicted by panel K and the differenced log of household saving by Panel L. For most of the sample period in question in Panel K the variable does not oscillate around the mean and shows no stationarity. For it to be stationary it had to be differenced once and that when it appeared to be stationary in panel L. It can be said that the log of LNSAV appear to be stationary at order 1 that is, I (1) as it oscillates around the mean in Panel L.

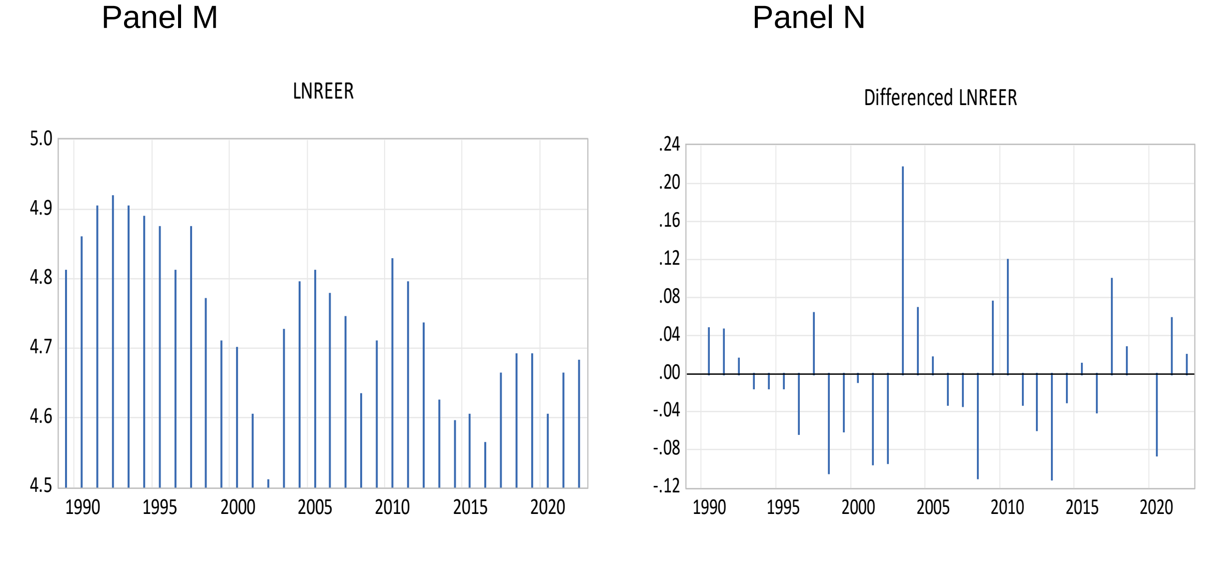
Figure 5. 6 : Household saving variable.



Source: Author's construction using EViews 12

In Figure 5.7 the log of real effective exchange rate (RRER) at level form and log of difference REER in panel M and N respectively. The volatility of REER is shown by the pattern of the data in the figure while panel M shows the appreciation and depreciation of the local currency (rand) through the period of the study. The bounds test requires that variables be stationary prior proper analysis of the econometric models hence panel M reveals no stationarity as the variable does not oscillate around the mean. The variable only meets the requirement of bounds test after being differenced. This variable appears to be stationary at 1st difference since it seems to oscillate around the mean in Panel N.

Figure 5. 7 : Real effective exchange rate variable



Source: Author's construction using EViews 12

The outcomes of the above figures are complemented by the Augmented Dickey – Fuller and Phillips – Perron unit root test in the succeeding section.

5.2.2. Stationarity/Unit root tests results

The study applied the Augmented Dickey – Fuller and Phillips – Perron test to check for the availability of stationarity within the variables. These tests also establish the order of integration.

Table 5. 1 : Unit root test

Series	**Model**	**ADF lags**	**ADF p-value**	**PP Bandwidth**	**PP p-value**	**Conclusion and order of integration**
LCONS	τ_τ	0	0.9575	2	0.9575	Do not reject H_0, series is not stationary
	τ_μ	0	0.7679	0	0.7815	
	μ	0	1.0000	0	1.0000	
DLCONS	τ_τ	0	0.0107*	4	0.0143*	Reject H_0, series is stationary
	τ_μ	0	0.0022**	6	0.0027**	
	μ	0	0.0070**	0	0.0070**	
INT	τ_τ	0	0.0130*	30	0.5190	Do not reject H_0, series is not stationary
	τ_μ	1	0.6011	11	0.7344	
	μ	2	0.0895	32	0.0014**	

DINT	τ_τ	1	0.0071**	31	0.0001**	Reject H_0, series is stationary
	τ_μ	2	0.0001**	31	0.0002**	
	μ	1	0.0000**	30	0.0003**	
INF	τ_τ	1	0.1444	21	0.6164	Do not reject H_0, series is not stationary
	τ_μ	1	0.0480*	13	0.0605	
	μ	4	0.0200*	25	0.0694	
DINF	τ_τ	3	0.0002**	17	0.0000**	Reject H_0, series is stationary
	τ_μ	3	0.0002**	31	0.0001**	
	μ	3	0.0000**	13	0.0000**	
LHDI	τ_τ	0	0.8795	1	0.8787	Do not reject H_0, series is not stationary
	τ_μ	0	0.0001**	1	0.00001**	
	μ	0	1.0000	4	1.0000	
DLHDI	τ_τ	0	0.0005**	3	0.0005**	Reject H_0, series is stationary
	τ_μ	0	0.0056**	3	0.0061**	
	μ	2	0.0730	2	0.0924	
LREER	τ_τ	1	0.1847	4	0.1898	Do not reject H_0, series is not stationary
	τ_μ	1	0.1593	3	0.3230	
	μ	0	0.5504	10	0.4573	
DLREER	τ_τ	0	0.0014**	12	0.0000**	Reject H_0, series is stationary
	τ_μ	0	0.0002**	13	0.0000**	
	μ	0	0.0000**	13	0.0000**	
LDEBT	τ_τ	1	0.2604	1	0.3631	Do not reject H_0, series is not stationary
	τ_μ	1	0.5424	0	0.7181	
	μ	2	0.6215	2	0.6201	
DLDEBT	τ_τ	1	0.0043**	9	0.0067**	Reject H_0, series is stationary
	τ_μ	1	0.0173*	9	0.0415*	
	μ	1	0.0002**	9	0.0003**	
LSAV	τ_τ	0	0.9428	1	0.9295	Do not reject H_0, series is not stationary
	τ_μ	0	0.5722	1	0.5443	
	μ	0	0.1441	1	0.1304	
DLSAV	τ_τ	0	0.0006**	0	0.0006**	Reject H_0, series is stationary
	τ_μ	0	0.0001**	1	0.0001**	
	μ	0	0.0000**	0	0.0000**	

Source: Author's construction using EViews 12

where * depicts stationarity at 5% and ** depicts stationarity at 1%.

Unit root results are shown in Table 5.1. The ADF and PP at level shows that the log household consumption expenditure and interest rate are nonstationary at level. However, the variables become stationary after first difference, implying that the log of household consumption expenditure and interest rate are an I (1) variables.

Inflation rate is stationary at level under trend and none in ADF test as well as trend and none model in PP test. Panel A in Figure 5.3 proves this outcome however the variable had to be differenced and the results shows that inflation rate is stationary under all models in both the ADF and PP tests. This implies that INF is stationary after first difference. The log of household disposable income is stationary when using the trend model for both tests. After first difference, it becomes stationary under all models when the ADF and PP test are conducted.

The log of household debt is nonstationary at level for both tests. Hence, the variable is differenced once, and the outcome reveals that the log of LDEBT is stationary under all models when both ADF and PP tests are employed. When the PP test is employed LDEBT reveals stationary under trend, and none models. Results of the ADF test is a reliable test for unit root and produce good results for time series with a larger sample size (Arltová and Fedorová, 2016). Given this outcome the study concludes that the log of household disposable income is integrated of order 1, that is, after 1st difference.

The ADF and PP results implies that LSAV and LREER are not stationary at level. These two variables were differenced, and it appears that both are stationary and integrated of order I (1). Therefore, it is concluded that the variables are integrated of order 1, that is, after first difference. With the evidence of the individual variables being integrated of order 1 the focus is then shifted toward establishing the presence of a long run relationship between household consumption expenditure and interest rate by conducting cointegration test.

5.2.3. ARDL Bounds test results

The F bounds test results are presented in Table 5.2 and 5.3. Appendix B provides fully computed F bounds test results. The selected quantity of independent variables in the model are 6, henceforth k=6. The computed F-statistic of 22.34795 is above both the lower bound I0 critical value of 2.88 and upper bound I1 critical value of

3.99 at 1% level of significance. The variables in the model are therefore cointegrated.

Table 5. 2 : F bounds test

Equation	F-statistic	K	Lower bound I0 AT 1%	Upper bound I1 at 1%	Outcome
$F(INT, CPI, Y, D, S)$	22.34795	6	2.88	3.99	Cointegrated

Source: Author's construction using EViews 12

Table 5. 3 : Critical value bounds

Significance	Lower bound (0)	Upper bound (1)
10%	1.99	2.94
5%	2.27	3.28
2.5%	2.55	3.61
1%	2.88	3.99

Source: Author's construction using EViews 12

The study moves to the estimation of the long and short run cointegrating equation together with the model's coefficients since there is evidence of a long run relationship between the variables which is provided by the F bounds testing approach.

5.2.4. ARDL Long run household consumption expenditure model

Table 5.4 provides the ARDL long run results with the fully complete results being provided in Appendix C. Interest rate, inflation rate and household saving all have a negative long run influence on household consumption expenditure while household disposable income, debt and real effective exchange rate have a positive effect. INT and HDI are statistically significant at 1% level, INF is statistically significant at 5% level, REER is statistically significant at 10% level while DEBT and SAV are not statistically significant.

Table 5. 4 : ARDL Long run household consumption expenditure results

Variable	Coefficient	P-value
INT	-0.007863	0.0043
INF	-0.008689	0.0394
HDI	0.329265	0.0000
DEBT	0.061490	0.2243
SAV	-0.001658	0.2952
REER	0.156138	0.0513
C	10.43274	0.0000

Source: Author's construction using EViews 12

$$CON_t = 10.43274 - 0.007863INT_t - 0.008689INF_t + 0.329265Y_t + 0.061490D_t - 0.001658SAV_t + 0.156138REER_t + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5.1)$$

Equation 5.1 indicates that the interest rate (INT) and household consumption expenditure (LCONS) are negatively correlated. The coefficient of -0.0078% implies that when interest rate increases by one percent, holding other things constant, household consumption expenditure will decrease by 0.0078%. These results conform to the monetary policy expectations that increased cost of borrowing exert negative influence on aggregate consumption and agrees with the classical theory. The results of the study are also consistent with those that were obtained by other scholars (Mukhtar et al. 2020; Fikizolo 2020; Afzali 2022) and disagrees with those that were found by Combey (2016), Yusuf et al. (2017) and Fadhil and Rajab (2021).

Inflation rate with a coefficient of -0.008689 indicates a negative significant relationship between INF and LCONS at 5% level. This means that in the long run holding other variables constant when INF increases by 1% then LCONS will contract by 0.0086%. This means that the more inflation rises in SA the more reduction in household consumption expenditure as consumers purchasing power loses value and the outcome is in line with economic theory. Other studies that found an inverse relationship include the ones done by Ezeji and Ajuduo (2015), Muzindutsi and Mjeso (2018) while Hakim and Bustaram (2019), Osuji (2020) and Ewane & Abonongi (2022) found contradicting results.

The elasticity of LHDI stands at 0.329265 and significant at 1% level and is positive as expected. This implies that when LHDI increase by 1%, LCONS will moderately increase by 0.3292% when other factors are held constant. This result in accordance and conforms to Keynes theory and consistent with the results of the studies conducted by Diacon and Maha (2015), Habanabakize (2021), Gohar et al. (2022) and Siman et al. (2020).

LDEBT has a coefficient of 0.061490 signifying a positive relationship between LDEBT and LCONS in the long run. A 1% increase in debt ceteris paribus will result in a 0.0614% increase in LCONS. The results are in sync with the priori expectations and imply that households borrow to finance a portion of their consumption however the relationship is statistically insignificant. Nkala and Tsegaye (2017) found a positive significant relationship as opposed to a study by Kereeditse & Mpundu (2021) that found a positive insignificant results.

LSAV carries an expected coefficient of -0.001658 and is statistically insignificant. When all other things are held constant, an increase of 1% in SAV will reduce LCONS by 0.0016%. The theory states that there is a negative relationship between LSAV and LCONS and the results exhibit exactly that. While the coefficient aligns with the initial hypothesis, the long-term association between SAV and LCONS in SA does not hold because the associated p-value exceeds the significance level of 5%. Manasseh et al. (2018) also found a negative relationship between household consumption expenditure and saving with an expection that theirs were signficant.

LREER bears a positive and statistically significant relationship with LCONS. A coefficient of 0.156138 implies that a 1% appreciation in ZAR will cause LCONS to appreciate by 0.1561 ceteris paribus. This result corroborates with economic theory although the South African rand is weaker against its major trading partners hence most of the imported goods are ridiculously expensive locally. The outcomes agree with the research conducted by Kumar et al. (2019), Onanuga (2020) and Habanabakize (2021). However, Uche et al. (2022) found household consumption expenditure to be independent of variations in exchange rate.

The positive coefficient of constant represents the intercept and is statistically significant at 1% level of significance. The calculated coefficient of 10.43274 represent the value that LCONS (which represents autonomous consumption) will take when all other selected independent variables are zero. The intercept has the right sign as expected and supported by the Keynesian theory (Keynes, 1936).

5.2.5. ARDL error correction model

Contrary to the long run results, LCONS is found to be positively influenced by INT in the short run at 5% level of significance. An elasticity of 0.001709 of INT suggest that a 1% increase in INT ceteris paribus will have residents increase their spending by 0.0017%. however, the inverse relationship between INT and LCONS does not exist in the short run and does not make economic sense. The findings are consistent with the ones found by Kumar et al. (2019) and Çiftçioğlu and Almasifard (2015) who also concluded that INT exert a positive influence on LCONS in the short run.

Table 5. 5 : ARDL short run household consumption results

Variable	Coefficient	P-value
D(INT)	0.001709	0.0119
D(INF)	-0.002301	0.0023
D(LNHDI)	0.309817	0.0000
D(LNDEBT)	-0.073964	0.0081
D(LSAV)	-0.002427	0.0000
D(LNREER)	0.087912	0.0001
CointEq(-1)	-0.636879	0.0000

Source: Author's construction using EViews 12

Table 5.5 shows the estimated regression short run results. All the independent variables are significant at 1% level except for INT which is significant at 5% level.

Like the long run results, INF has a negative effect on LCONS, and the relationship is statistically significant at 1% level. The coefficient of -0.002301 translates to a decrease of 0.0023% in LCONS when INF is raised by 1% holding other factors constant. This result align with economic theory as the expectation is to see a reduction in households purchasing power or disposable income as the prices of products rises which ultimately hamper household consumption expenditure. Not only is this the case in this study but Muzindutsi and Mjeso (2018) as well, found CPI to be negatively associated with LCONS in the short run, whereas the negative effect revealed in the study contradicts the positive association found by Osei-Fosu et al. (2014) in the short run.

The findings once more demonstrate that LHDI and LCONS have a positive connection that is statistically significant at 1%. This implies that a 1% rise in LHDI will lead to a 0.3098% increase in LCONS, holding other factors constant. Kumar et al. (2019) also found similar findings. Additionally, the emphasis of income being positively related to consumption is also supported by the findings of the study and supports Keynes claim which says that when income increases consumption also increase but the increase in consumption is not equivalent to the increase in income (Keynes, 1936).

LDEBT coefficient stands at-0.073964, suggesting that LDEBT is negatively related to LCONS in the short run. A 1% increase in LDEBT will lead to a decrease in

LCONS by 0.0.0739% ceteris paribus. The relationship is statistically insignificant as the p-value is greater all levels of significance. However, this result does not support the priori expectations. This could mean that households borrow to finance other activities other than their consumption.

The elasticity of LSAV is -0.002427 suggesting a negative relationship between LSAV and LCON. Its probability value is 0.0000 and is statistically significant at 1% level of significance. The results indicate that when LSAV goes up by 1% LCONS goes down by 0.0024% in the short run with all other variables remaining unchanged. The results are also in line with the economic theory in that households opt to save portion of their incomes when interest rate is hiked with expectations of higher returns and cut down consumption and this theory is confirmed to hold in the short run unlike the long run. However, the effect is low which perhaps translates to the increased LCONS in the long run as compared to a relatively low percentage in the short run.

The sign of the elasticity of REER variable is positive (0.087912) and indicates its positive effect on LCONS in the short run. The positive influence is also statistically significant at 1% level of significance because probability value (0.0001) is less than 0.01. this imply that an increase of 1% in LNEER will see LCONS increase by approximately 0.0879% ceteris paribus. This is line with economic theory which implies that an appreciation of local currency (ZAR) will see South Africans increasing their spending on consumption since the rand would be stronger against the currencies of its trading partners. The study by Muzindutsi and Mjeso (2018) also found this to be the case whereas Bahmani-Oskooee et al. (2015) found LREER to be negatively related to LCONS in Bulgaria, Poland, Hungary Czech Republic, Bolivia, Chile, and Philippines.

The error correction term in the model which measures the speed of adjustment at which variables converges to equilibrium has an expected negative estimated coefficient and is statistically significant at 1% level of significance given that the associated probability value is 0.0000 which is even smaller than 0.01. The coefficient of the ECM is -0. 636879, which represents an accelerated speed of adjustment towards equilibrium after a shock in the system. This is so, since a 63.7%

of disequilibrium from the previous year will converge to equilibrium or corrected each year.

5.2.6. Diagnostic tests

The classical assumptions were put through diagnostic testing to see if they were violated because non violation results in more accurate estimations.

Table 5. 6 : Diagnostics test of the ARDL Model

Test	Null hypothesis (Ho)	t-statistic	p-value	Decision
Jarque-Bera	There is normality in residuals	1.1007	0.5767	Do not reject Ho as the PV (0.58) is greater 5% L.O.S. this implies that the residuals of the model are normally distributed
White heteroscedasticity test	No Heteroskedasticity	16.4212	0.7455	Do not reject Ho as PV (0.74) > 5%% L.O.S, therefore there is no heteroskedasticity in the model.
Lagrange multiplier test	No serial correlation	3.1999	0.2090	Do not reject Ho as PV (0.76) > 5%% L.O.S, therefore there is no heteroskedasticity in the model.
Brusch-Pagan-Godfrey	No Heteroskedasticity	16.1492	0.7612	Do not reject Ho as PV (0.76) > 5%% L.O.S, therefore there is no heteroskedasticity in the model.
Arch	No Arch Heteroskedasticity	0.0510	0.8213	Do not reject Ho as PV (0.82) > 5% L.O.S. the model does not contain heteroskedasticity.
Hervey	No Heteroskedasticity	21.7455	0.4143	Do not reject Ho as PV (0.41) > 5%% level of significance. The model does not contain heteroskedasticity.
Glejser	No Heteroskedasticity	19.1600	0.5749	Do not reject Ho as PV (0.57) > 5%% level of significance, therefore there is no heteroskedasticity in the model.
Ljung-Box Q	No Autocorrelation	20.877	0.183	Do not reject Ho as PV (0.18) > 5%% level of significance, therefore there is no heteroskedasticity in the model.

Source: Author's construction using EViews 12

Table 5. 7 : Stability diagnostics test on the ECM results

Ramsey RESET	The model is correctly specified	1.4655	0.2261	Do not reject Ho as PV (0.22) is greater than 5% level of

				significance, therefore the model is correctly specified.

Source: Author's construction using EViews 12

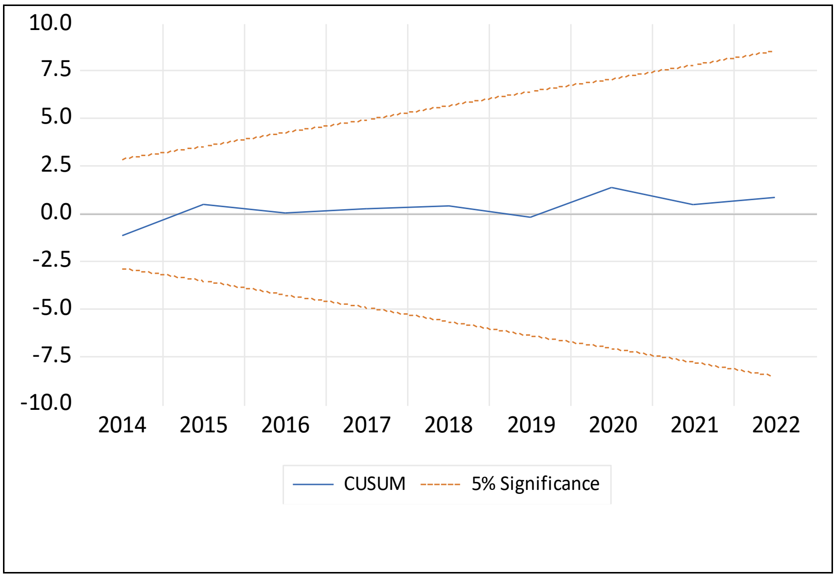
Table 5.6 presents the results of the residual diagnostics test of the household consumption expenditure model. Appendix F provide detailed results of the residual diagnostics. The Jarque-Bera normality test tested the null hypothesis (H0) that the residuals are normally distributed. The computed p-value of 58% (0.58) surpassed the 5% level of significance. The rejection of the null hypothesis was ruled out meaning that the variable is normally distributed. To determine if serial correlation exists or not, the Breusch-Godfrey LM test was applied. A p-value of 0.2090 was obtained. Since the 5% significance level was less than the p-value, the null hypothesis was not rejected. Consequently, the equation does not contain serial correlation.

The White test, Brusch-Pagan-Godfrey test, Arch test, Hervey test, Glejser test and the Ljung-Box Q test were employed to test the null hypothesis of no heteroskedasticity in model. Their probability values of 75%, 76%, 82%, 41%, 57% and 18% respectively all surpass the 5% level of significance. These findings imply that the null hypothesis cannot be rejected, therefore it can be concluded that the model does not contain any form of heteroskedasticity.

Table 5.7, Figure 5.8, and Figure 5.9 provide stability diagnostics test results as well as the backup and strengthening the residual test. The Ramsey RESET test was employed to test the null hypothesis which states that the model is correctly specified. The corresponding probability value of 22% is greater than the 5% level of significance hence the null hypothesis cannot be rejected. Hence, the model is correctly specified.

The CUSUM and CUSUM of squares are carried out to determine the structural stability of the model together with parameters stability. In Figure 5.8, the CUSUM test plotted the cumulative sum with 5% significance lines grounded to the cumulative sum of the residuals. The outcome suggested the presence of parameter or variance stability over the sample period understudy owing to the cumulative sum remaining within the area bounded by two critical lines, therefore the model is correctly specified and stable.

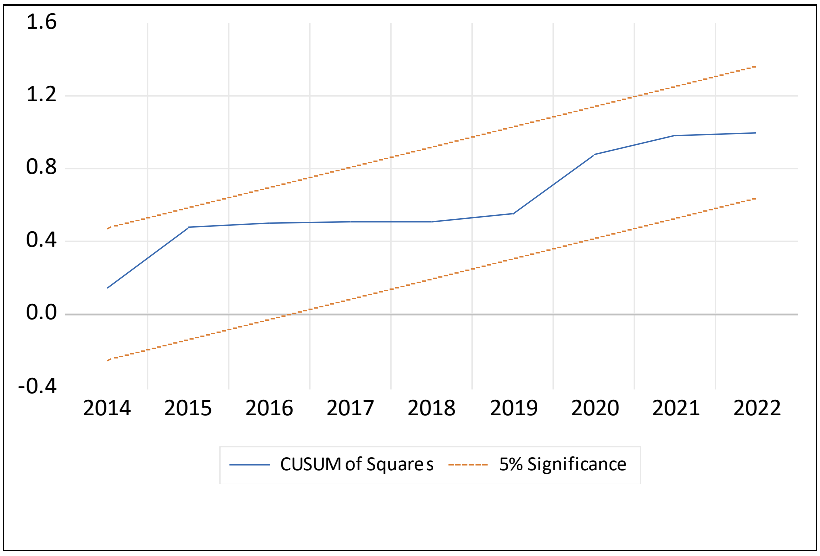
Figure 5. 8 : CUSUM test results



Source: Author's construction using Eviews 12

The CUSUM of squares test in Figure 5.9 was also conducted. Figure 5.9 reveals that the cumulative sum of squares falls within the 5% critical bounds lines which shows the consistency of the variables throughout the period of the study and the stability of the model.

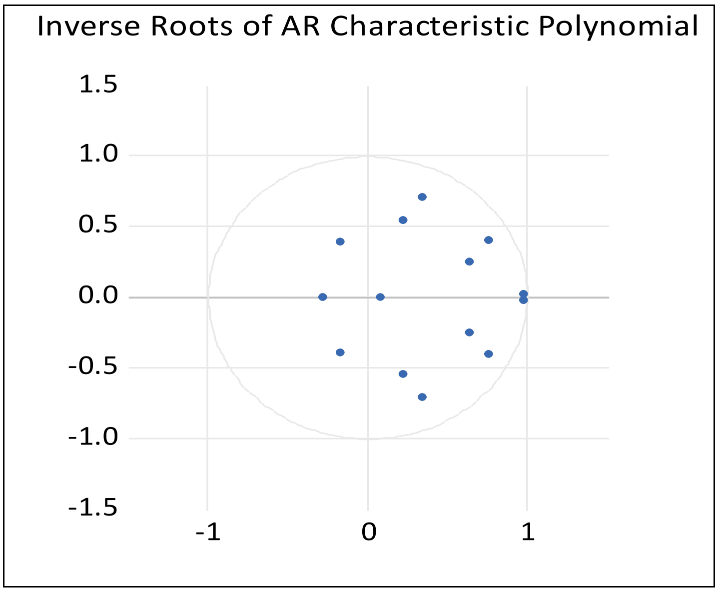
Figure 5. 9 : CUSUM of squares test results



Source: Author's construction using Eviews 12

Figure 5.10 depicts the AR root graph in support of the ARDL stability test results which shows the inverse roots of AR characteristics polynomial. The inverted roots of the lag polynomial must reside within unit circle according to the standard procedure for general AR(p) processes. If every root has a modulus that is less than one and lies inside a unit circle, the estimated VAR is stable or stationary.

Figure 5. 10 : AR Roots Graph



Source: Author's construction using EViews 12

Figure 5.10 shows that every root of the AR characteristic polynomial has an absolute value less than one and lies within the unit circle. The fact that two roots are on the circle (modulus = 1) and that the root does not extend outside the unit circle is statistically acceptable. This indicates that the model satisfies the prerequisites for stationarity or stability. As a result, the ARDL model employed in this research satisfies all pertinent econometric presumptions.

5.2.7. Granger causality test results

The causality between household consumption expenditure and its determinants (prime rate, inflation rate, household disposable income, debt, saving and real effective exchange rate), which are provided in Appendix G, is estimated in Table 5.8. According to the decision rule, when the P-Value is less than the level of significance, the alternative hypothesis must be accepted, and the null hypothesis must be rejected. The dependent variable (y) is not Granger-caused by the independent variable (x), or the null hypothesis. The opposition is expressed as the alternate premise.

Table 5. 8 : Granger causality test

Null hypothesis	F-statistics	P-value	Conclusion
INT does not granger cause LNCONS	6.98290	0.0036**	Reject null hypothesis
LNCONS does not granger cause INT	9.89877	0.0006**	Reject null hypothesis
INF does not granger cause LNCONS	8.35082	0.0015**	Reject null hypothesis
LNCONS does not granger cause INF	1.68806	0.2038	Do not reject null hypothesis
LNHDI does not granger cause LNCONS	4.66246	0.0182*	Reject null hypothesis
LNCONS does not granger cause LNHDI	1.33818	0.2792	Do not reject null hypothesis
LNDEBT does not granger cause LNCONS	1.03523	0.3688	Do not reject null hypothesis
LNCONS does not granger cause LNDEBT	5.39786	0.0107*	Reject null hypothesis
LNSAV does not granger cause LNCONS	1.70661	0.2005	Do not reject null hypothesis
LNCONS does not granger cause LNSAV	0.97622	0.3896	Do not reject null hypothesis
LNREER does not granger cause LNCONS	0.57303	0.5705	Do not reject null hypothesis
LNCONS does not granger cause LNREER	3.99396	0.0302*	Reject null hypothesis
INF does not granger cause INT	0.28806	0.7520	Do not reject null hypothesis
INT does not granger cause INF	0.04229	0.9587	Do not reject null hypothesis
LNHDI does not granger cause INT	7.05050	0.0034**	Reject null hypothesis
INT does not granger cause LNHDI	2.63314	0.0902	Reject null hypothesis
LNDEBT does not granger cause INT	2.35292	0.1143	Do not reject null hypothesis
INT does not granger cause LNDEBT	4.792289	0.0165*	Reject null hypothesis
LSAV does not granger cause INT	3.17312	0.0578	Do not reject null hypothesis
INT does not granger cause LSAV	0.82288	0.4499	Do not reject null hypothesis
LREER does not granger cause INT	2.26476	0.1232	Do not reject null hypothesis
INT does not granger cause LNREER	2.10143	0.1418	Do not reject null hypothesis
LNHDI does not granger cause INF	2.19494	0.1308	Do not reject null hypothesis
INF does not granger cause LNHDI	0.74186	0.4857	Do not reject null hypothesis
LNDEBT does not granger cause INF	0.75514	0.4796	Do not reject null hypothesis
INF does not granger cause LNDEBT	3.17857	0.0576	Do not reject null hypothesis
LSAV does not granger cause INF	0.24679	0.7830	Do not reject null hypothesis
INF does not granger cause SAV	1.22974	0.3082	Do not reject null hypothesis
LNREER does not granger cause INF	3.14383	0.0592	Do not reject null hypothesis
INF does not granger cause LNREER	4.29390	0.0240*	Reject null hypothesis
LNDEBT does not granger cause LNHDI	3.07429	0.0627	Do not reject null hypothesis
LNHDI does not granger cause LNDEBT	7.53209	0.0025**	Reject null hypothesis
LSAV does not granger cause LNHDI	0.16868	0.8577	Do not reject null hypothesis
LNHDI does not granger cause LNSAV	0.80088	0.4593	Do not reject null hypothesis
LNREER does not granger cause LNHDI	0.78432	0.4666	Do not reject null hypothesis
LNHDI does not granger cause LNREER	2.86299	0.0745	Do not reject null hypothesis
LSAV does not granger cause LNDEBT	1.34925	0.2764	Do not reject null hypothesis

LNDEBT does not granger cause LSAV	1.68434	0.2045	Do not reject null hypothesis
LNREER does not granger cause LNDEBT	0.65594	0.5270	Do not reject null hypothesis
LNDEBT does not granger cause LNREER	1.16287	0.3278	Do not reject null hypothesis
LNREER does not granger cause LSAV	0.02256	0.9777	Do not reject null hypothesis
LSAV does not granger cause LNREER	1.20065	0.3166	Do not reject null hypothesis

where * depicts probability at 5%, ** depicts probability at 1%.

Source: Authors computations using Eviews 12

The existence of a causal relationship between household consumption spending and its explanatory variables was investigated using the VAR Granger Causality/Block Exogeneity technique was used. The nature of the relationship should ideally be directional, unidirectional, or without any direction at all. Table 5.8 provides results of the granger causality test. Thorough results of the test are provided in Appendix E. The findings show that interest rate (INT) and the log of household consumption expenditure (LCONS) granger cause one another and have a bidirectional relationship despite that INT has a positive sign. This infers that rise in INT leads to an increase in LCONS and decrease in INT result in reduction in LCONS. Fadhil and Rajab (2021) also found a bidirectional relationship between INT and LCONS in their study conducted in Tanzania on the precise influence of interest rate on household spending.

Inflation rate (INF) and the log of household disposable income (LHDI) have a unidirectional relationship with LCONS as they both grangers cause it and not likewise. These results support the short run dynamics and suggests that increase in INF will result in contraction in LCONS while an increase in LHDI will cause LCONS to increase and the opposite is true. Bonsu and Muzindutsi (2017) found similar results (unidirectional) about the granger causality relationship between INF, LHDI and LCONS whereas Nkala and Tsegaye (2017) revealed no directional relationship between LHDI and LCONS.

LCONS granger cause the log of household debt (LDEBT) together with the log of real effective exchange rate (LREER), implying a unidirectional relationship. These findings support those in ECM in Table 5.5 except that LDEBT is negative suggesting that when LCONS significantly influence short term changes in HDEBT and LREER. In other words, increment in LCONS results in a reduction in HDEBT and an upsurge in LREER while a decline in LCONS implies an increase in LDEBT and a decline in LREER. Bonsu and Muzinduts (2017) also found that LREER is granger caused by LCONS implying that adjustments in LCONS have an effect on LREER. Habanabakize (2021) also established a unidirectional relationship between LCONS and LREER. However, results reveal non causal relationship between LDEBT, log of household saving (LSAV) and LREER thereby supporting the ARDL long run results between these three variables.

The results further show no causal relationship between CPI and INT. This result contradicts the one found by Alimi (2014) who established a unidirectional relationship between INT and INF in that the lagged INF granger caused INT. However, LNHDI granger cause INT and not likewise which implies a unidirectional relationship. This might imply that money in the hands of the public tempts the hiking of interest rate in trying to limit the circulation of cash as well as avoiding the up-surging inflation due to high demand because of more money in the hands of consumers. INT granger cause LDEBT but the latter does not have any influence on INF. This could mean that perhaps during periods of low interest rates, borrowing rises or it could mean the opposite. INT and LSAV do not have any causal relationship.

Additionally, INT and LNREER do not granger cause one another and do not have any causal relationship. This result was also obtained by (Alimi, 2014). Since high interest rates are also meant to boost the local currency instead of cooling down inflation and fixing other factors, it appears not to hold in South Africa as the imports are expensive while the level of interest rates is always kept at high levels coupled by a weaker rand. LNHDI and INF, LDEBT and INF and INF and LSAV do not granger cause one another and have no causal relationship. INF granger cause LREER and have a unidirectional relationship which implies that changes in INF have effects on LREER. Alimi (2014) did not find any causal relationship between INF nad LREER.

Moreover, LHDI granger cause LDEBT implying that changes in LHDI affect LDEBT. This suggests that there is a high debt service ratio, which is inversely correlated with LCONS since higher debt service ratios necessitate higher income levels in order to settle debt (Baker, 2018). Finally, the remaining variables do not exhibit a Granger causal link.

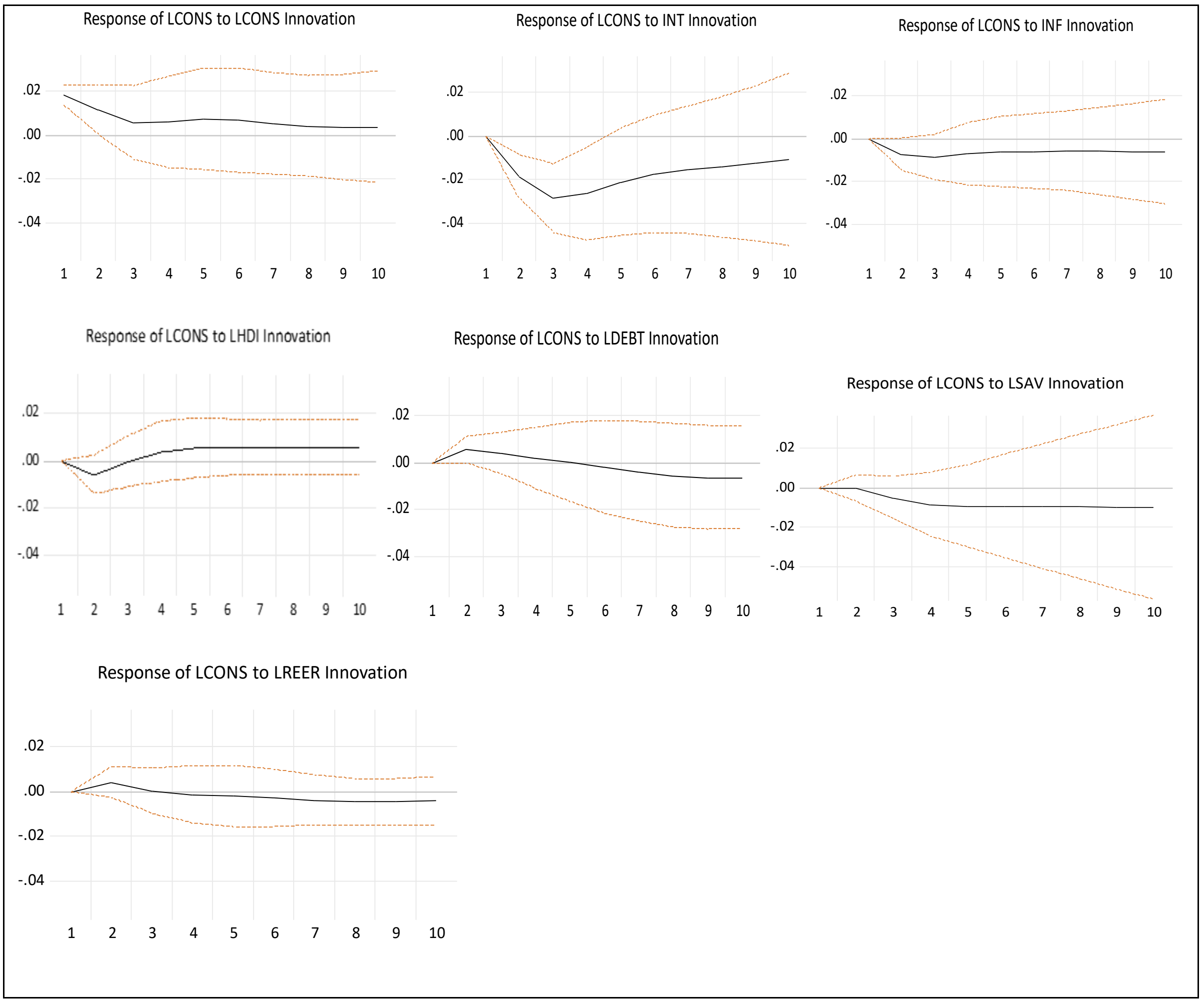
5.3. ANALYSIS OF IMPULSE RESPONSE FUNCTION

The impulse response function links one of the advances on present and future values of the other variables to the effects of a standard deviation shock in a single variable. For the variables of interest to innovation in each of the other variables, an estimation of the impulse response functions was made. An excerpt of the results is presented in Figures 5.11 to 5.17, which include the seven variables of interest, household consumption expenditure (LCONS), real effective exchange rate (REER), household debt (DEBT), household saving (LSAV), household disposable income (HDI), household disposable income (INT), and inflation rate (INF).The impulse response of each variable to shock waves in each of the other variables is displayed in the graphs.

The impulse response function of household consumption expenditure to shocks in all endogenous variables is shown by the graphs in Figure 5.11. The results indicate that the response of household consumption expenditure to its own shock was negative in the first three years but reached peak in the firth year over the period of the study. Overall LCONS remain within the positive segment. INT and INF respond negatively to a one standard deviation shock is applied in LCONS. These negative responses fluctuate throughout the ten years. LHDI responded negatively in the first 2 years over the period. However, it started increasing at a decreasing rate until mid-third year. Thereafter it started increasing the become steady from 5th year through to the last year of the period. Shocks in LCONS resulted in an increase in LDEBT for the first 2 years. It then started declining at an increasing rate through to mid-5th year. Afterwards a negative response is experienced until the last year of the period. On the other hand, response of LSAV to a shock in LCONS is positive initially until the second year. It then starts declining in year 3 and 4 and becomes consistently negative from 5th year until the tenth year. From the first to the second year of the examined period, there is a considerable positive reaction of LREER to LCONS.

After that, it begins to decline but stays in the positive sector for a year. An unfavourable reaction is seen from the third to the tenth year.

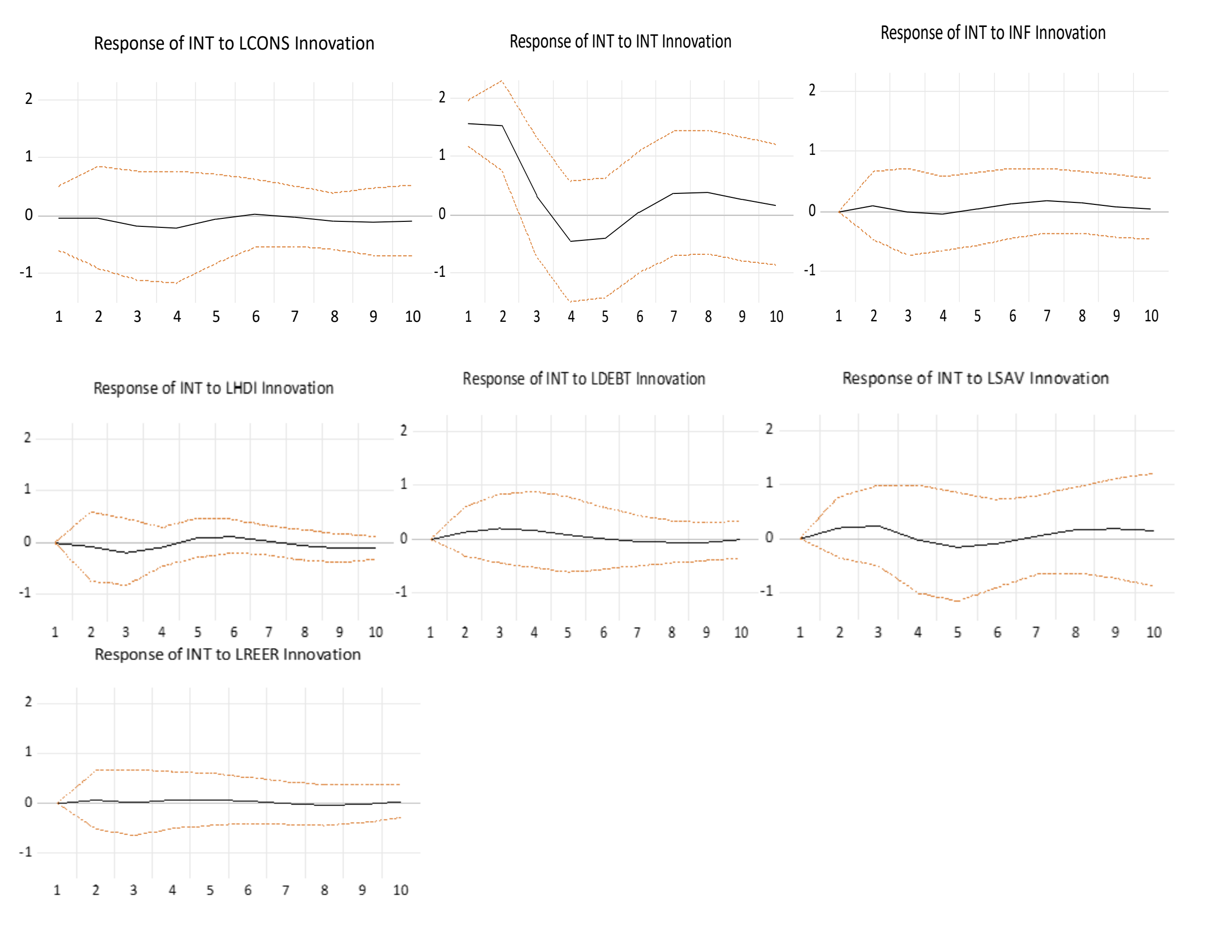
Figure 5. 11 : Impulse response function of household consumption expenditure



Source: Author’s construction using EViews 12

The impulse response of the prime rate to innovation for each of the endogenous variables is depicted in the graphs in Figure 5.12. From the first to the fifth year, INT's response to an innovation in LCONS is negative. After that, it started to rise and turned positive in the sixth year. Then, in the seventh year, it started to fall again and returned to the negative segment until the final year. Up until the second year, INT's response to an innovation was positive; however, by the third year, that response had declined (albeit still positively). After that, the response fell into the negative section starting in the fourth year and responded favourably from the seventh year all the way up to the tenth. The INT’s reaction to an INF shock was positive up until the second year, then it declined (but remained positive) in the third year. It then had a negative reaction in the fourth year and a positive reaction the following year. Halfway through year 4, LHDI had a negative response to INT. Halfway through year 7, the response turns positive; the remaining years see the response return to negative. When a shock in INT occurs, LDEBT responds positively up until the seventh year, at which point it turns negative and rises in the final year.

Figure 5. 12 : Impulse response function of prime rate

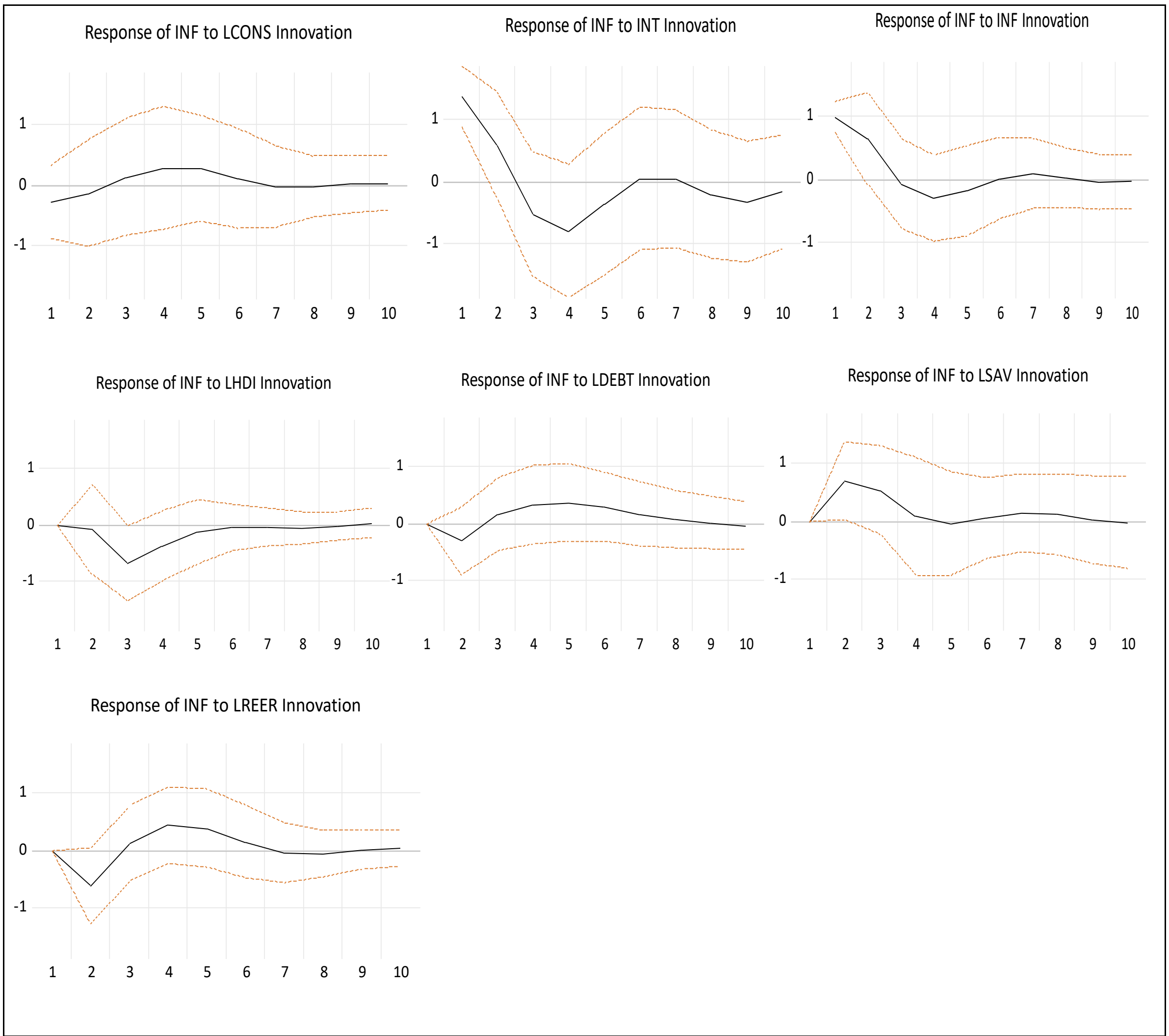


Source: Author's construction using EViews 12

The response of LSAV to innovation in INT exhibits a positive variation up until the fourth year of the study. After that, it veers off into the negative until the seventh year, at which point it returns to the positive until the final year of the interval. Up until the seventh year, INT consistently fluctuated positively in response to a shock to REER. It responded somewhat negatively in the eighth year, but in the ninth and tenth years, but it returned back to being positive.

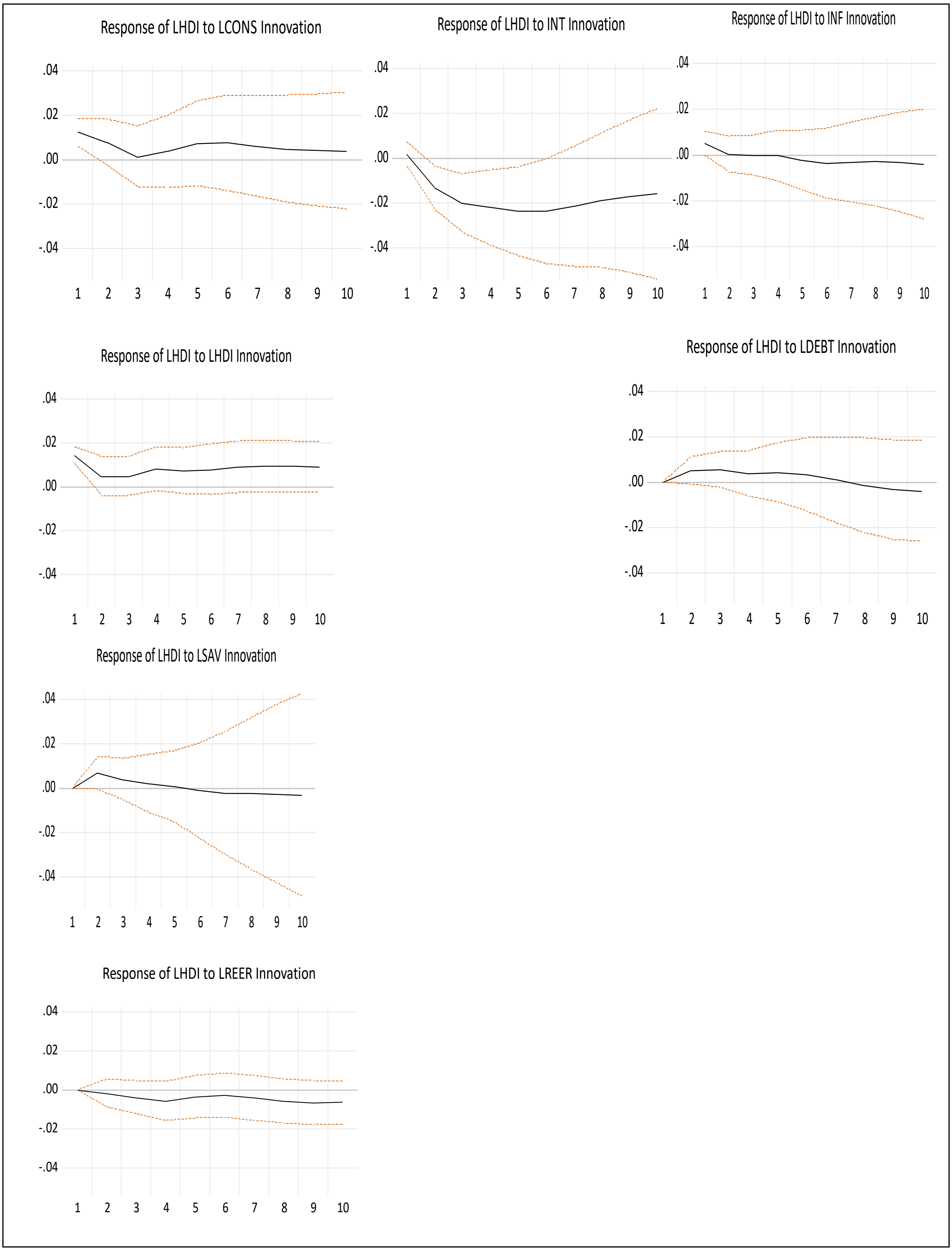
The response of INF to an innovation applied to LCONS was shown in Figure 5.13 to be increasing (though negative) up until two and a half years. After that, there was a consistent and positive response in years four and five, and it persisted until the tenth year. Conversely, up until two and a half years, the shock to INT decreased (albeit positively). Up until the fifth year, the response was negative; however, in the sixth and seventh years, it consistently turned positive before returning to its previous negative state. Up until year three, INF responds to its own shock favourably but at a decreasing rate. But this response is initially negative and only turns positive in the sixth and eighth years, at which point it turns negative once more. INF had a negative reaction for the first three years to a shock in LDEBT. From the ninth year onward, the response was positive; however, in the final year, it turned negative. Up until year four, LSAV responds favourably to innovations implemented in INF. The response starts to trend downward in the fifth year and then turns back up in the following years. In the first three years, INF experiences an adverse reaction to a shock in LREER. After that, the reaction is positive for the next seven years, turns negative for the eighth year, and then gradually turns positive once more for the ninth and tenth years.

Figure 5. 13 : Impulse response function of inflation rate



Source: Author's construction using EViews 12

Figure 5. 14 : Impulse response function of household disposable income

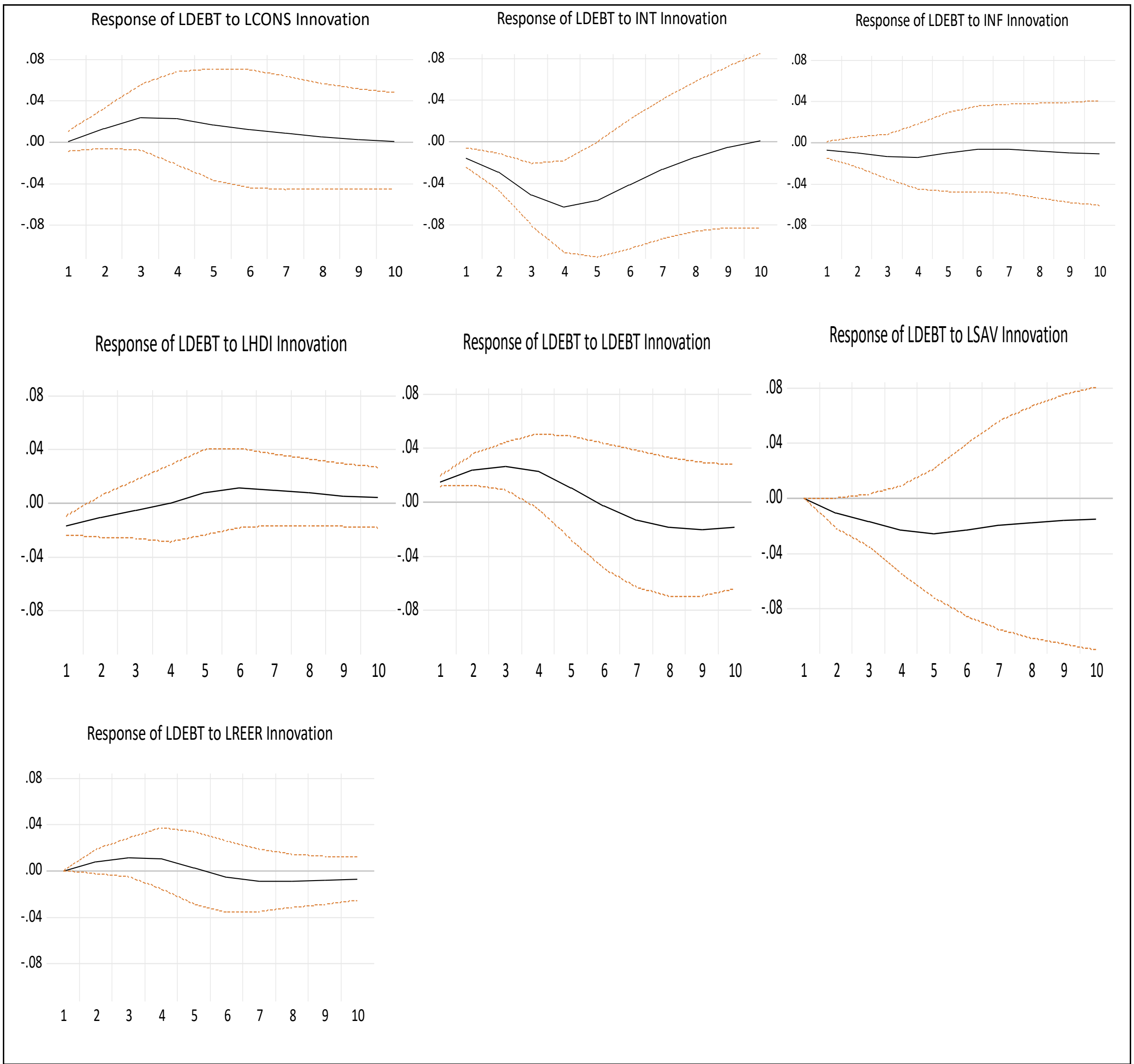


Source: Author’s construction using EViews 12

In Figure 5.14, the LCONS reaction was positive for all 10 years when a single standard deviation shock was applied to the LHDI, while the reactions of INT and

LREER were negative. Over the course of the ten years, both the overall INT and LREER were negative. The findings in Figure 5.13 demonstrate that the LHDI's response was favourable over the course of the ten years, even with its own shock (innovation). Up until years 4 and 7, respectively, LHDI reacted positively to shocks in INF and LDEBT; thereafter, the response turned negative for the remainder of the time. The findings also demonstrate that an increase in LSAV of one standard deviation raises LHDI until the second year, when it reaches its maximum. Up until the halfway point of year 5, the response begins to decline while still falling within the positive segment of the graph, and it stays unfavourable after that.

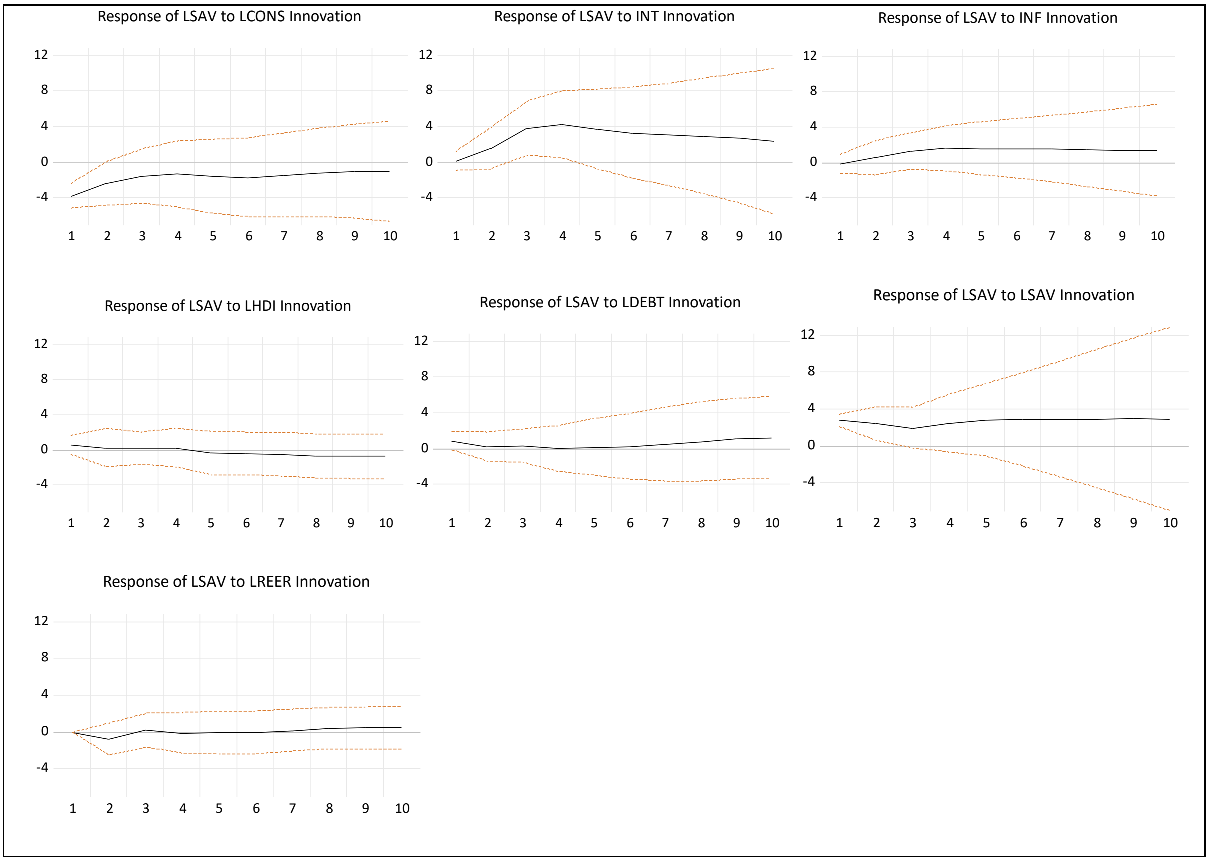
Figure 5. 15 : Impulse response of household debt



Source: Author’s construction using EViews 12

The impulse response of LDEBT to shocks to the endogenous variables is displayed in Figure 5.15. The first graph shows that LDEBT fluctuated positively in response to an LCONS shock. Nevertheless, LDEBT's positive response gradually loses significance following an LCONS shock. Over a ten-year period, the response of INT, INF, and LSAV to an innovation applied to LDEBT shows a negative fluctuation. These three variables all stayed in the graphs' negative areas overall. LDEBT rose in response to the shock to the LHDI, but it did so in a negative segment until year 4. Over time, though, the response was favourable. LDEBT first responded favourably to its own shock, but it was forced to drop from the fourth to the fifth year. The sixth year of the period and the final year thereafter see a decline in response. LDEBT increased after an LREER shock and then declined, but it continued to be positive in the fourth and fifth years. The response then turned negative in the sixth year, and from the seventh to the final year, there was a consistent decline.

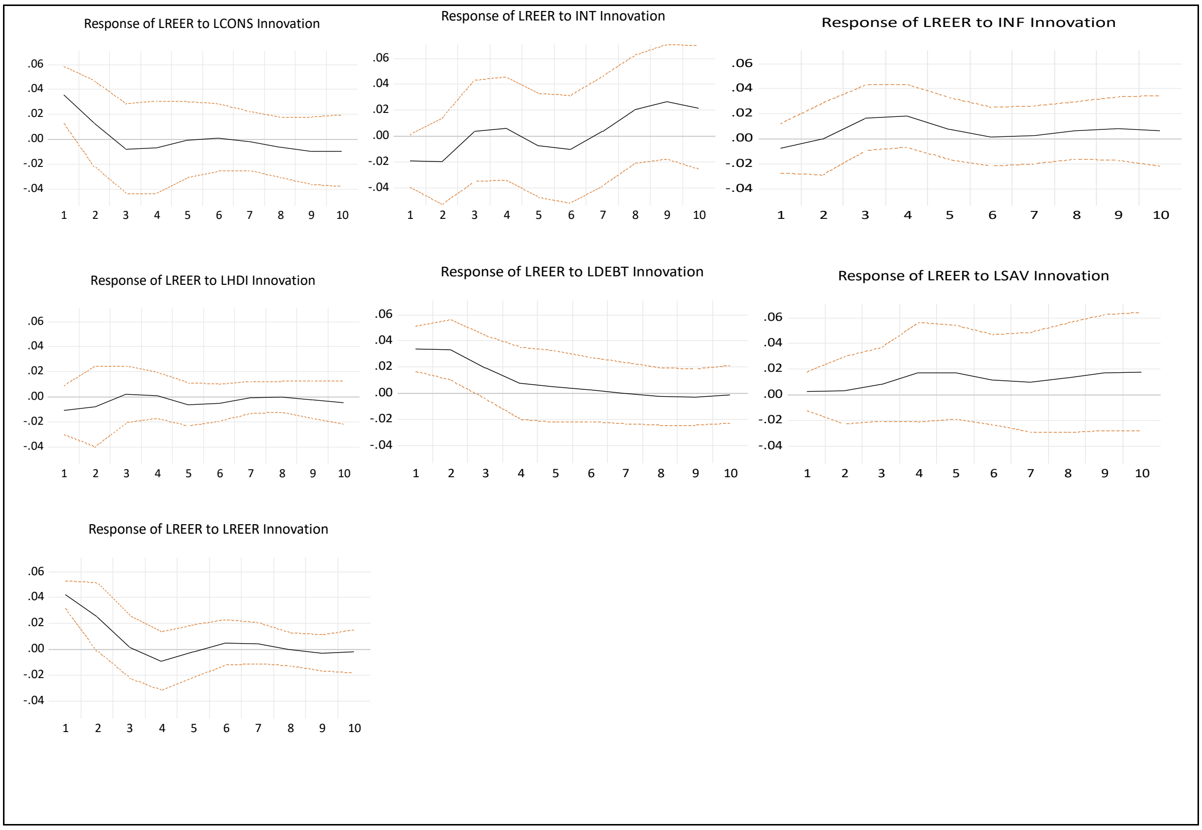
Figure 5. 16 : Impulse response function of household saving



Source: Author’s construction using EViews 12

Figure 5.16 displays the impulse response of LSAV to shocks on all the endogenous variables. LSAV reacts favourably to shocks administered to INT, INF, and LDEBT in addition to its own shock. Over the course of the observed period, these responses show positive fluctuations. But LSAV reacts adversely to shock to LCONS. Over a ten-year period, this negative response varies. Up until the fourth year, the reaction to a shock to LHDI was favourable and consistent. After that, it begins to decline in year five and eventually turns negative for the balance of the year. LSAV is initially negative under a shock to LREER until year 2. After that, there is a negative segment that is followed by a positive one in year three that continues steadily for the duration of the remaining period.

Figure 5. 17 : Impulse response of real effective exchange rate (LREER)



Source: Author’s construction using EViews 12

Figure 5.17 displays graphs that illustrate LREER's impulse response to innovation for each of the endogenous variables. The first year's response of LCONS to an innovation in LREER is positive, but it shifts negatively until the middle of the second year. In the third and fourth years, the response is negative; it then turns positive again until the sixth year. Until the end of the time frame, the response is negative after that. Up until year 2, INT's response to an innovation implemented in LREER was negative. It then increased and reacted positively until year 4, at which point it continued to react negatively until year 6. Nonetheless, the response turned positive in year 7 and persisted for the rest of the time frame noted. The findings demonstrate that a one standard deviation shock to INF raises (though negatively) LREER through year two, at which point it stays positive. The impulse to LREER, however, had a negative initial effect on LHDI until the third year. Up until the fourth year, the response was positive; after that, it remained in the negative category. Up until the seventh year, LDEBT responds favourably; after that, it loses significance. Over the course of the observed period, there has been a positive fluctuation in the response of LSAV to innovations applied to LREER. Finally, up until the third year, LREER's reaction to its own innovation was favourable but slowed down. Up until the fifth year, the response was negative. LREER responds favourably to shocks until the seventh year, at which point it responds unfavourably until the tenth year.

The variance decomposition technique was used as an inventive accounting strategy to support the impulse response outcome and VECM Granger causality test outcomes.

5.4. VARIANCE DECOMPOSITION

Using the Vector Autoregressive (VAR) system, the generalised forecast error variance decomposition technique was applied to examine the relationship between household consumption expenditure and interest in South Africa. Appendix H contains the complete results of the Variance decomposition, making forecasting for the ensuing ten years conceivable. Table 5.9 depicts the variance decomposition of household consumption expenditure. The findings indicate that in the first year, LCONS (own innovative shock) fully explains changes in LCONS, that is, 100%. In the short term as well, specifically in year 3, an innovative shock resulting from LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER accounts for 26.75%, 60.18%, 6.40%, 1.82%, 2.59%, 1.28%, and 0.98% of the variation in LCONS, respectively.

Table 5. 6 : Variance decomposition of household consumption expenditure (LNCONS)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.0185	100.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.0308	20.0248	35.5475	5.4625	3.6166	3.4234	0.0007	1.9215
3	0.0435	26.7514	60.1818	6.3972	1.8220	2.5894	1.2822	0.9761
4	0.0525	19.7143	66.2973	6.1703	1.7978	1.9296	3.3628	0.7280

5	0.0584	17.6020	66.5213	6.0953	2.2993	1.5624	5.2168	0.7029
6	0.0625	16.5574	65.5205	6.1676	2.7833	1.4365	6.7374	0.7975
7	0.0661	15.5263	64.2633	6.2755	3.2502	1.6187	8.0211	1.0448
8	0.0692	14.5370	62.7473	6.4087	3.6713	2.0847	9.1898	1.3611
9	0.0718	13.7302	61.0104	6.5899	4.0275	2.6708	10.3400	1.6313
10	0.0742	13.1259	59.2305	6.8100	4.3121	3.2106	11.4828	1.8280

Source: Author's estimations using EViews 12

Consequently, the overall variation in LCONS adds up to 100%. However, over time, that is, in year 10, one standard shock resulting from contributions to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER by 13.13%, 59.23%, 6.81, 4.31%, 3.21%, 11.48%, and 1.83%, respectively. Thus, with time, LCON's contribution to LCONS considerably decreases, whereas INT's contribution increases dramatically from the short to the long run.

The prime rate variance decomposition is shown in Table 5.10. Its own innovation in the first year accounted for 99.94% of the prime rate variance, which explains its own shock. Contributions gradually decrease until the final year when they reach 89.98%. But even after ten years, it continues to be the largest contributor. This leads to the conclusion that South Africa's prime rate changes can be mostly attributed to its own shock.

Table 5. 7 : Variance decomposition of prime rate (INT)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	1.5784	0.0624	99.9375	0.0000	0.0000	0.0000	0.0000	0.0000
2	2.2199	0.0480	98.3013	0.1914	0.1030	0.4001	0.8768	0.0792
3	2.2784	0.6181	95.3573	0.1835	0.7468	1.1121	1.9056	0.0768
4	2.3408	0.3208	94.1013	0.2020	0.8270	1.6064	1.8076	0.1348
5	2.3845	0.3280	93.4115	0.2295	0.9869	0.6699	2.1630	0.2113
6	2.3943	1.3367	92.6916	0.5493	1.2112	1.6628	2.2899	0.2586
7	2.4303	1.3010	92.2682	0.0730	1.1972	1.6322	2.2769	0.2514
8	2.4764	1.3867	91.4570	1.4164	1.1934	1.6329	2.6400	0.2736
9	2.5044	1.5504	90.5727	1.5107	1.3236	1.6342	3.1354	0.2728
10	2.5196	1.6482	89.9820	1.5197	1.4750	1.6160	3.4667	0.2924

Source: Author's construction using EViews 12

Third-year results indicate that a single standard shock originating from LCONS contributes 0.62% to INT, whereas INF, LHDI, LDEBT, LSAV, and LREER contribute 0.18%, 0.75%, 1.11%, 1.91%, and 0.08% to INT, respectively. INT decreased over time, as seen from the first to the tenth year, and was less able to be explained by its own innovation. By the tenth year, 1.65%, 1.52%, 1.47%, 1.62%, 3.47%, and 0.29% of the variations in INT were attributed to the innovations of LCONS, INF, LHDI, LDEBT, LSAV, and LREER, respectively.

According to variance decomposition results in Table 5.11, in the short term, shocks to LCONS, INT, INF (own shock), LHDI, LDEBT, LSAV, and LREER in year 3 can result in INF fluctuations of 1.92%, 43.5%, 24.13%, 8.19%, 1.97%, 13.51%, and 6.77% respectively. On the other hand, a ten-year innovation to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER can, in the long run, explain 3.55%, 43.28%, 19.20%, 8.06%, 5.96%, 10.40%, and 9.54 variations in INF, respectively. In this instance, INF is mostly influenced by innovations to INT shocks, which are then followed by its own shocks.

Table 5. 8 : Variance decomposition of inflation rate (INF)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	1.7131	2.5344	64.3411	33.1243	0.0000	0.0000	0.0000	0.0000
2	2.1635	1.9902	47.6911	29.7472	0.1033	1.8895	10.542	8.0365
3	2.4063	1.9203	43.4970	24.1305	8.1932	1.9729	13.512	6.7732
4	2.6521	2.7231	44.7016	21.1431	8.7875	3.1201	11.2272	8.2972
5	2.7515	3.5563	43.2207	20.0560	8.3647	4.6780	10.4479	9.6765
6	2.7740	3.6423	42.5484	19.7352	8.2545	5.7090	10.3136	9.7969
7	2.7851	3.6216	42.2363	19.6782	8.2148	6.0255	10.4841	9.7396
8	2.7974	3.5979	42.3963	19.5156	8.1815	6.0452	10.5731	9.6905
9	2.8166	3.5565	43.1280	19.2704	8.0767	5.9669	10.4392	9.5623
10	2.8224	3.5547	43.2840	19.2021	8.0570	5.9579	10.4034	9.5408

Source: Author's construction using EViews 12

The findings displayed in Table 5.12 demonstrate that, in the short run, defined as the third year, an innovation to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER can result in 17.56%, 48.10%, 2.06%, 20.86%, 4.68%, 5.20%, and 1.54% variation in LHDI, respectively. In contrast, a shock to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER in year 10 can, over time, account for 8.09%, 67.53%, 1.69%, 14.51%, 2.45%, 1.83%, and 3.90% of the variations in LHDI, respectively. Over time, the relationship between INT and LHDI becomes more and more significant, with INT ultimately having the biggest impact on LHDI, followed by LCONS and LHDI itself.

Table 5. 9 : Variance decomposition of household disposable income (LNHDI)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	1.0197	39.0616	0.8300	6.4308	53.6775	0.0000	0.0000	0.0000
2	0.0268	29.3692	24.4884	3.4722	32.0472	3.6082	6.5645	0.4504
3	0.0347	17.5571	48.1035	2.0596	20.8576	4.6823	5.1998	1.5402
4	0.0427	12.3694	58.4440	1.3703	17.4477	3.9088	3.6854	2.7743
5	0.0503	11.0228	64.4316	1.2287	14.6798	3.4689	2.6763	2.4920
6	0.0571	10.3537	67.6740	1.3589	13.2868	3.0247	2.1307	2.1711
7	0.0622	9.6615	68.8785	1.4211	13.2781	2.5655	1.9171	2.2784
8	0.0663	9.0268	68.8484	1.4484	13.7537	2.3103	1.8206	2.7918
9	0.0697	8.5013	68.2777	1.5235	14.1933	2.3061	1.7873	3.4105
10	0.0726	8.0942	67.5267	1.6860	14.5125	2.4464	1.8334	3.9006

Source: Author’s construction using EViews 12

An impulse to LCONS, INT, INF, LHDI, LDEBT (own innovative shock), LSAV, and LREER, respectively, explain 10.86%, 50.09%, 4.15%, 5.27%, 21.54%, 5.10%, and 2.98% of the variation in LDEBT in the short run, based on the results in year 3 as shown in Table 5.13. In the long run, as defined by tenth year, an innovation to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER can result in 8.01%, 55.09%, 3.62%, 3.39%, 14.23%, 13.09%, and 2.57% variation in LDEBT, respectively. The variance decomposition results indicate that LDEBT can be significantly increased by an innovation to INT, with LDEBT (own shock) coming in second and LREER coming in last.

Table 5. 10 : Variance decomposition of household debt (LDEBT)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.0282	0.2092	29.3962	5.6012	33.7661	31.0274	0.0000	0.0000
2	0.0524	6.9592	38.2119	4.5618	13.1792	30.4339	4.0123	2.6415
3	0.0853	10.860	50.0946	4.1456	5.2748	21.5433	5.0996	2.9827
4	0.1141	10.1198	57.8260	3.7006	2.9389	16.0633	6.7437	2.6088
5	0.1318	9.3335	61.3857	3.2331	2.6170	12.6982	8.7347	1.9977
6	0.1412	8.9889	61.8723	2.9819	2.9497	11.0980	10.2491	1.8602
7	0.1466	8.7641	60.7029	2.9335	3.2338	11.0363	11.2818	2.0475
8	0.1500	8.5124	58.7662	3.0601	3.3711	11.9858	12.0190	2.2855
9	0.1529	8.2474	56.7383	3.3149	3.4087	13.2352	12.5933	2.4621
10	0.1551	8.0146	55.0883	3.6194	3.3909	14.2291	13.0893	2.5685

Source: Author’s construction using EViews 12

The variance decomposition results of the LSAV are displayed in Table 5.14. By the tenth year, its own shock accounts for only 32.91% of the variance in LSAV. Over the observed period of ten years, LREER barely contributed 2% of the variations in the LSAV, whereas INT is the major contributor to the variation in LSAV. The least amount of variation in LSAV fluctuations is caused by LREER, which contributed 1.57% in the second year and 0.59% in the final year of the observation period.

Table 5. 11 : Variance decomposition of household saving (LNSAV)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	4.8170	60.8215	0.1251	0.0202	1.5984	3.4680	33.9369	0.0000
2	6.2097	51.3958	6.6029	0.8550	1.1281	2.2390	36.2101	1.5691
3	7.8532	36.1407	28.0398	3.4008	0.7834	1.5835	28.9984	1.0531
4	9.5216	26.5103	39.0884	5.3113	0.6187	1.0807	26.6667	0.7239
5	10.8683	22.4875	41.8854	6.3258	0.5548	0.8612	27.3297	0.5557
6	11.9665	20.5351	42.2479	7.0726	0.5598	0.7553	28.3710	0.4585
7	13.9039	18.8732	42.1840	7.5533	0.6235	0.7930	29.5613	0.4114
8	13.7426	17.3577	41.8465	7.8169	0.7600	1.0596	30.7117	0.4478
9	14.5007	16.1107	41.1149	8.0095	0.9097	1.5288	31.8025	0.5239

10	15.1682	15.1517	40.0008	8.2088	1.0379	2.0962	32.9142	0.5903

Source: Author's construction using EViews 12

According to the results in third year as presented in Table 5.15, an impulse to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER (own innovative shock) respectively accounts for 18.80%, 9.44%, 4.25%, 2.14%, 33.41%, 1.08%, and 30.89% of the variation in LREER in the short run. In the long, measured by the tenth year, an innovation made to LCONS, INT, INF, LHDI, LDEBT, LSAV, and LREER can lead to variations in LREER of 13.92%, 20.51%, 7.22%, 2.05%, 21.96%, 13.70%, and 20.63%, in that order. According to the variance decomposition results, an innovation to the LDEBT can significantly increase LREER, with LDEBT (own shock) coming in second and LREER coming in third. But there is hardly any distinction between these three significant contributors. LHDI contributes the least overall.

Table 5. 12 : Variance decomposition of real effective exchange rate (LNREER)

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.0693	26.7203	7.6742	1.1081	2.2708	24.2339	0.1448	37.8476
2	0.0845	20.1510	10.3026	0.7426	2.3327	31.8148	0.2527	34.4033
3	0.0894	18.7982	9.4420	4.2468	2.1425	33.4057	1.0756	30.8893
4	0.0940	17.4258	8.9319	7.6382	1.9452	30.8003	4.4756	28.7831
5	0.0967	16.5063	9.0546	7.9340	2.2514	29.4543	7.5156	27.2836
6	0.0983	16.0042	9.8550	7.7154	2.4074	28.6642	8.6938	26.7079
7	0.0990	15.7854	9.8607	7.6996	2.3763	28.1868	9.5695	26.5219
8	0.1024	15.1096	13.2814	7.6481	2.2186	26.3709	10.6099	24.7617
9	0.1081	14.3209	18.0736	7.4501	2.0360	23.7582	12.0543	22.3070
10	0.1124	13.9186	20.5122	7.2211	2.0505	21.9609	13.7021	20.6345

Source: Author's construction using EViews 12

5.5. SUMMARY

Chapter 5 detailed the analytical findings constructed on the research methodology conferred in chapter 4. The chapter took off by discussing the time series properties of the variables. It then proceeded to test the unit root. The findings revealed that the variables are integrated of first order that is after being differenced. The F-bounds test discovered a long run relationship between the variables under consideration. The ARDL test was applied for the analysis of a long and short run household consumption expenditure model. The granger causality test and stability diagnostics test then followed. The Granger causality test outcomes, which are summarised in Table 5.5, and the impulse response were corroborated by the variance decomposition results which wrapped the chapter. Chapter 6 concludes with policy recommendations and prospective extensions of the study to guide impending studies.

CHAPTER 6

SUMMARY, RECOMMENDATIONS, CONCLUSION

6.1. INTRODUCTION

The discoveries of the study were presented in Chapter 5. Using an econometric approach, the results demonstrated the effect and proved that household consumption expenditure is affected by interest rates.

In Chapter 6, the research study is concluded, its findings are summarised, and recommendations are made for South Africa based on the research findings. To draw conclusions on the effect of interest rates on household consumption expenditure, a summary will be given based on each chapter's results. Next, the research summary and interpretation of findings and the contributions of the study are discussed. Ultimately, the study is concluded with a summary and recommendations for additional research, along with limitations.

6.2. SUMMARY AND INTERPRETATION OF FINDINGS

The research project examined the effect of interest rate on household consumption expenditure in South Africa. consequently, the following is discussed regarding the research study's summary:

- Introduction and background of the research study
- Trends of prime rate, household consumption expenditure, inflation rate, household disposable income, debt, saving and real effective exchange rate.
- Literature review
- Methodology
- Analysis
- Conclusion

6.2.1. Chapter 1: Introduction and background of the research study

Chapter 1 laid out the foundation for the entire research project. It served as an introduction of the study by giving an overview of the research, its significance, and its objectives. The author demonstrated the importance and necessity of the investigation by outlining the problem statement. In the end, Chapter 1 introduced the dissertation and ensured that it is understood why, how important it was, and where it was going.

6.2.2. Chapter 2: Trends of the model variables

The past three decades have seen varied trends in household consumption expenditure (%GDP) in South Africa, in comparison to Egypt, Nigeria, and Kenya, and in the process reflecting on the various economic and social factors. South Africa over the period of the study has witness stable consumer spending patterns as opposed to Nigeria and Kenya who have witnessed rising household consumption expenditure as a percentage of GDP due to expanding populations and rising disposable incomes. Amongst the components of household consumption expenditure in SA, services, was the highest component, followed by semi-durable, durable, and non-durable components. Transport was the greatest contributor towards household consumption expenditure while education least contributed.

With respect to prime rate, South Africa experienced a highest diminishing trend of the prime rate, reaching the lowest of 7.04% in relation to those that were experienced by Egypt, Kenya, and Nigeria. Inflation rate has been relatively stable over time, averaging 10.32% for South Africa. However, Nigeria, Egypt and Kenya experienced more volatile inflation rates.

Over the review period, household disposable income has been observed to grow positively in South Africa. A halt in household disposable income was seen in 2020 during the outbreak of Covid-19. There have been upswings in South Africa's household debt trend whereas a slow decline started towards the beginning of the last decade of the observed period. with respect to household saving, the overall trend shows how domestic challenges have affected people's ability to save, even though there have been periods of increase and decrease. Coming to the real effective exchange rate, the trend has been characterised by stable, depreciating, and appreciating periods from 1989 to 2022 emanating from local and global factors.

6.2.3. Chapter 3: Literature review

The Keynesian absolute income, lifecycle permanent income, and intertemporal choice theories serve as the foundation for this research. One idea that is vital to the study of economics is the absolute income theory of consumption. This theory focuses on the direct relationship between an individual's income and consumption level. Put simply, it implies that an individual's propensity to spend money on goods and services increases with their income. Because of its substantial implications for comprehending consumer behaviour and economic policies, this theory has generated a great deal of discussion and debate among economists and policymakers. The theory in question has generated a great deal of discussions and disagreement among economists and decision-makers due to its noteworthy consequences for comprehending consumer behaviour. The lifecycle permanent income theory of consumption offers an insightful conceptual framework for comprehending the lifetime consumption decisions made by households. This theory contributes to the understanding of why people save, invest, and gradually reduce their consumption by considering people's expectations of their future income and the idea of permanent income. The Intertemporal choice theory is a useful framework for understanding how people decide what to consume over time. It draws attention to the fact that people have to choose between their current and future levels of satisfaction, and emphasises how variables like interest rates, discounting, and time inconsistency affect their decisions.

6.2.4. Chapter 4: Methodology

The character of the study is quantitative and uses annual data from 1989 to 2022. A unit root test was used to find out the order of integration, which was necessary to estimate the ARDL bounds testing technique, which tests the long run cointegration/relationship between the variables in the household consumption expenditure equation. The study employed the Autoregressive Distributed Lag Approach to examine the short- and long-term effect of interest rate on household consumption expenditure. Then, in order to corroborate the ARDL findings, a variety of tests were conducted including the diagnostic test, Granger causality test, impulse response, and variance decomposition techniques.

6.2.5. Chapter 5: Analysis

Unit root results exhibited that the variables in question are stationary after being differenced, that is, stationary at I (1). The results from the ARDL bounds test revealed the existence of a long run cointegrating relationship among the variables in the household consumption expenditure model. When evaluating the long run equation, it was revealed that a rise in interest rate exerts negative influence of 0.0078% on household consumption expenditure in the short run (Afzali, 2022). Interest rate leads to a rise in household consumption expenditure. The results contradict the Keynesian view that interest rates have no effect on household consumption (Kumar, et al., 2019). Inflation rate had a significant negative effect on household consumption expenditure both in the long and short run. Household disposable income results were consistent with Keynes absolute income theory as it was found to positively affect household consumption expenditure both in the short and long run (Kereeditse & Mpundu, 2021). Household saving and debt have also been found to negatively affect household consumption expenditure in the short run, while they had no effect on household consumption spending in the long run. Real effective exchange rate was reported positive for both the long and short-term models (Onanuga, 2020). The error correction model satisfied a priori expectations and discovered that 64% of the disequilibrium in the household model is corrected in each year.

The VAR Granger causality test outcome indicated that while household consumption expenditure and the interest rate have a bidirectional relationship, household consumption expenditure and the real effective exchange rate, inflation rate, and household disposable income have a unidirectional relationship. The only variable that did not correlate with household consumption expenditure was saving. The model's absence of heteroscedasticity, autocorrelation/serial correlation, and normally distributed residuals was validated by the diagnostic test results, and the stability tests demonstrated the model's stability. The findings of variance decomposition and the impulse response enhanced the ARDL findings.

6.3. CONCLUSION

The study's conclusion—that interest rates have a long-term detrimental effect on household consumption expenditure —and its findings were in line with preconceived notions. There is evidence of a positive short-term effect on household consumption expenditure, which is good for the expansion of the economy even though it was not expected. In the long and short run, the inflation rate has a negative significant relationship with household consumption spending, meaning that any increase in inflation will cause household consumption to decline. As expected, household disposable income has a positive significant relationship with household consumption expenditure in both terms, and the findings are consistent with the postulations of absolute income theory. Household debt and savings have a positive and negative insignificant association with household consumption spending, respectively. However, in the short run, they both have a negative impact on household consumption expenditure. A positive significant association was found between the real effective exchange rate and household consumption spending in both the long and short run, implying that the stronger the rand, the higher household consumption expenditure.

The VAR Granger causality test demonstrated that household consumption spending is caused by the interest rate, inflation rate, and household disposable income. This implies household consumption spending flows changes of these variables. However, household debt, savings, and the real effective exchange rate do not contribute to household consumption spending.

With respect to the impulse response function result showed that household consumption expenditure responds negatively to shocks in interest rate, inflation rate, and household saving. The response to shocks in household debt and real effective exchange rate is positive initially and gradually becomes negative until year 10. The results of the variance decomposition indicated that throughout the next ten years, all the determinant factors had a greater effect on changes in household consumption expenditure.

6.4. RECOMMENDATIONS OF THE STUDY

There are some policy implications to the findings presented in the preceding section. The previous chapter's findings have provided some insight into a key policy tool that significantly affects household consumption expenditure. Given this, recommendations have been made to assist policy makers in influencing household consumption expenditure in accordance with the state of the South African economy.

A statistically significant and undesirable relationship between interest rate and household consumption expenditure means that monetary authority can boost household consumption spending by adequate monetary policy reforms which can result in borrowers, especially businesses, not making additional payments on their debts which then passes the burden to consumers by increasing prices. Ensures that consumers will have enough cash on hand to save or spend to support themselves. Many instances exist where individuals who obtained bank loans to finance their purchases or businesses are paying interest and other fees; however, as interest rates rise, these payments increase and the borrowers' funds for savings and consumption are depleted. Therefore, interest rate ought to be changed by SARB under an inflation targeting framework that takes inflation expectations into account. This strategy helps stabilise inflation expectations and offers a stable environment in which businesses and families can plan their investments and spending. The preservation of households' purchasing power through low and stable inflation promotes consumption.

Additionally, the results showed that rising inflation reduces consumption, which is bad for South Africans. To put it another way, people pay more when prices are high but purchase fewer goods, meaning that inflation erodes their purchasing power. The study concludes that, in light of this, policymakers ought to regulate inflation rates among households in order to promote price level stability. This can be accomplished through the fostering of an atmosphere by the government which lowers interest rates and stabilises inflation by upholding fiscal discipline, both of which will increase household consumption spending.

In terms of household disposable income, the creation of jobs and raising income levels should be the top priorities for governments and policymakers in order to increase household disposable income. More people can obtain steady, well-paying employment by putting pro-employment policies into practice, such as promoting business expansion, incentivising innovation, and funding skill-development initiatives. A fairer distribution of disposable income can also be achieved through the adoption of progressive taxation laws and efficient wealth redistribution strategies. More equitable taxation can be achieved by implementing progressive tax systems, which give higher-income persons a higher tax rate and, consequently, a bigger percentage of disposable income for lower- and middle-class households. Disposable income that is allocated more fairly creates the framework for more inclusive economic growth and increases household consumption expenditure.

With respect to real effective exchange rate, they ought to lay out measures to stop fluctuations in exchange rates. Policies aimed at daunting excessive reliance on and favouring imported products over locally produced ones are appropriate given South Africa's higher degree of openness and vulnerability.

6.5. CONTRIBUTIONS OF THE STUDY

The study added to the body of knowledge in the field of economics, particularly in relation to the effect of interest rates and other specific macroeconomic variables on household consumption expenditure, an area in which not many previous studies had been done in South Africa. The study's main finding is that the interest rate, inflation rate, and disposable income of households all have a significant influence on household consumption spending.

6.6. LIMITATIONS OF THE STUDY

This dissertation has examined how interest rates affect household consumption expenditure in South Africa, but it has not determined which aspects of household consumption spending are most affected by changes in interest rates. The study is restricted to South Africa, which is in fact one of its limitations. This suggests the study's inferences only apply to and have an effect on South Africa. As a recommendation, another method might be employed to examine how the interest rate affects particular aspects of household consumption expenditure. The results pertain to the 34-year period under investigation, as the study only examined the 34 years of the 1989–2022 timeframe. This implies that results could vary if data were collected over a longer time span and at different frequencies.

6.7. FUTURE RESEARCH

Future studies should look into using panel data to assess the effect between the variables for certain African regions. The ARDL technique was utilised in the study, which concentrated on a few (amongst a lot) numbers of variables that affect household consumption expenditure. Similar research may be approached differently in the future using a distinct methodology and additional pertinent variables.

REFERENCES

AFDB, 2020. *African Economic Outlook 2020.* [Online] Available at: https://www.afdb.org/en/documents/african-economic-outlook-2020 [Accessed 15 February 2023].

Afzali, F. A., 2022. The Influence of Interest Rate Fluctuation on Final Consumer Consumption in Central Asia: Empirical Study. *International Journal of Scientific and Research Publications,* 12(10), pp. 382-396.

Ali, A. F. M. et al., 2021. Estimating Expenditure Pattern and Permanent Income Hypothesis: Evidence from Kelantan Malaysia. *Jurnal Ekonomi Malaysia,* 55(2), pp. 39-40.

Alimi, A. R., 2013. *Keynes' Absolute Income Hypothesis and Kuznets Paradox, MPRA_paper_49310..* Ondo State : Adekunle Ajasin University, Akungba-Akoko.

Alimi, R. S., 2014. Modelling ARDL Bounds Testing Approach to Cointegration: A Re-Examination of Augmented Fisher Hypothesis in an Open Economy. *Asian Journal of Economic Modelling,* 2(2), pp. 103-114.

Andersen, A. L., Duus, C. & Jensen, T. L., 2016. Household Debt And Spending During the Financial Crisis: Evidence from Danish Micro Data. *European Economic Review,* Volume 89, pp. 96-115.

Anyanwu, J. C. & Salami, A. O., 2021. The Impact of COVID-19 on African Economies: An Introduction. *African Development Review,* 33(1), pp. 1-16.

Arfaoui, Lamia, Z. A. M. S., 2016. The Relationship between Democracy and Economic Growth in Tunisia: An Application of Autoregressive Distributed Lag Model. *International Journal of Social Science Research,* 4(1), pp. 137-150.

Arltová, M. & Fedorová, D., 2016. Selection of Unit Root Test on the Basis of Length of the Time Series and Value of AR(1) Parameter. *Statistika,* 96(3), pp. 47-64.

Aziakpono, M. J. & Wilson, M. K., 2013. Interest Rate Pass-Through and Monetary Policy Regimes in South Africa. *African Finance Journal,* 17(1), pp. 67-90.

Bahmani-Oskooee, M., Kutan, A. M. & Xi, D., 2015. Does Exchange Rate Volatility Hurt Domestic Consumption? Evidence from Emerging Economies. *International Economics,* 144(14), pp. 53-65.

Baker, S. R., 2018. Debt And the Response to Household Income Shocks: Validation and Application of Linked Financial Account Data. *Journal Of Political Economy,* 126(4), pp. 1504-1557.

Bonsu, C. O. & Muzindutsi, P.-F., 2017. Macroeconomic Determinants of Household Consumption Expenditure in Ghana: A Multivariate Cointegration Approach. *International Journal of Economics and Financial Issues,* 7(4), pp. 737-745.

Bosch, A., Clance, M. & Koch, S. F., 2022. Household Debt and Consumption Dynamics: A Non-Developed World View Following the Financial Crisis. *Applied Economics,* 54(8), pp. 897-917.

Bryan, M. & Vengelen, B. S., 2015. *Household Consumption and Long-Term Interest Rates.* Washington, DC: Georgetown Universit.

Bunn,P. Rostom,M, 2014. *Household Debt and Spending.* London: Bank of England .

Chiloane, L., Pretorius, M. & Botha, I., 2014. The Relationship between the Exchange Rate and the Trade Balance in South Africa. *Journal of Economic and Financial Sciences,* 7(2), pp. 299-314.

Chipote, P. & Tsegaye, A., 2014. Determinants of Household Savings in South Africa: an Econometric Appproach. *Mediterranean Journal of Social Sciences,* 5(15), pp. 183-190.

Çiftçioğlu, S. & Almasifard, M., 2015. The Response of Consumption to Alternative Measures of Financial Development and Real Interest Rate in a Sample of Central and East European Countries. *Journal of Economics and Development Studies,* 3(2), pp. 1-6.

COMBEY, A., 2016. Private Consumption in The WAEMU Zone: Does Interest Rate Matter?. *Journal of Economics and Sustainable Development ,* 7(22), pp. 211-216.

Coulibaly, S., 2021. COVID-19 Policy Responses, Inflation and Spillover Effects in the West African Economic and Monetary Union. *Africa Developemnt Review,* 33(1), pp. 139-151.

Dabla-Norris, E. et al., 2015. Investing in Public Investment: An Index of Public Investment Efficiency. *Journal of Development Economics,* Volume 17, pp. 235-266.

Damane, M., 2018. Empirical Analysis of Private Consumption in Lesotho: An ARDL Bound Test Approach. *Modern Economy,* 9(3), pp. 400-421.

Diacon, P. E. & Maha, L. G., 2015. The Relationship between Income, Consumption and GDP: A Time Series, Cross-Country Analysis. *Procedia Economics and Finance,* Volume 23, pp. 1535-1543.

Dickey, D. A. & Fuller, W. A., 1979. Distribution of Estimators for Autoregressive Time Series. *Journal of American Statistical Association,* 74(366a), pp. 427-431.

Dickey, D. A. & Fuller, W. A., 1981. The Likelihood Ratio Statistics for Autoregressive Time Series with a Unit Root. *Econometrica,* 49(4), pp. 1057-1072.

Drakopoulos, S. A., 2021. *Theories of Consumption.* [Online] Available at: https://mpra.ub.uni-muenchen.de/108215/ [Accessed 25 June 2023].

Duesenberry, J.S, 1949. *Income, Saving, and the Theory of Consumer Behavior.* United States: Harvard University Press, 1949.

Duflo, P. E. & Banerjee, A. V., 2019. *Good Economics for Hard Times.* 1st ed. New York: Public Affairs.

Ekong, C. N. & Effiong, U. E., 2020. Economic Determinants of Household Consumption Expenditures in West Africa: A Case Study of Nigeria and Ghana. *Global Scientific Journals,* 8(9), pp. 385-398.

Engle, R. F. & Granger, C. W. J., 1987. Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica,* 55(2), pp. 251-276.

Ewane, E. B. & Abonongi, A. S., 2022. Inflation Rate Volatility and Household Final Consumption Expenditure: Evidence from Cameroon. *Journal of Economics, Management and Trade,* 28(10), pp. 89-89.

Ezeji, C. E. & Ajuduo, E. I., 2015. Determinants of Aggregate Consumption Expenditure in Nigeria. *Journal of Economics and Sustainable Development,* 6(5), pp. 164-169.

Fadhil, D. M. & Rajab, N. A., 2021. Impact of Interest Rate on Household Consumption in Tanzania Impact of Interest Rate on Household Consumption in Tanzania. *Journal of Economics, Management and Trade,* 27(8), pp. 44-62.

Feddersen, M., 2017. *4 Misconceptions About SA's Interest Rate Policy.* [Online] Available at: https://www.fanews.co.za/article/economy/43/general/1198/4-misconceptions-about-sa-s-interest-rate-policy/22163
[Accessed 15 February 2023].

Fikizolo, S. L., 2020. *The Asymetric Effects of Interest Changes on Household Consunsumption: A Case of for South Africa-How Household Consumption Reacts to Changes in the Interest Rate(Doctoral Dessertation).* [Online] Available at: https://run.unl.pt/handle/10362/95288 [Accessed 26 June 2022].

Firat, A., Kutucuoğlu, K. Y., Saltık, I. A. & Tunçel, O., 2013. Culture and Consumer Ethics. *Journal of Community Positive Practices,* 13(1), pp. 182-203.

Fischer, I., 2012. *The Theory of Interest.* Reprint ed. New York: Macmillan.

Friedman, M., 1957. *A Theory of the Consumption Function.* New York: Princeton University Press.

Georgiev, G. Z., 2022. *Normality Test Calculator.* [Online] Available at: https://www.gigacalculator.com/calculators/normality-test-calculator.php [Accessed 22 june 2022].

Gerstberger, C. & Yaneva, D., 2013. *Analysis of EU-27 Household Final Consumption Expenditure: Baltic Countries and Greece Still Suffering Most from the Economic and Financial Crisis.* s.l.:Eurostat Statistics in Focus No. 2/2013.

Gichohi, G. M., 2017. Effects of Government Expenditure on Household Consumption in Kenya. *International Journal of Science and Research (IJSR),* 6(10), pp. 822-831.

Gohar, R., Bagadeem, S., Chang, B. H. & Zong, M., 2022. Do the Income and Price Changes Affect Consumption in the Emerging 7 Countries? Empirical Evidence Using Quantile ARDL Model. *Annals of Financial Economics,* 17(4), pp. 1-24.

Gonçalves, S., Herrera, A. M., Kilian, L. & Pesavento, E., 2021. Impulse Response Analysis for Structural Dynamic Models with Nonlinear Regressors. *Journal of Econometrics,* 225(1), pp. 107-130.

Granger, C., 1969. Investigating Casual Relation by Econometric and Cross-Sectional Method. *The Econometric Society,* 37(3), pp. 424-438.

Granger, C. W. J. & Newbold , P., 1974. Spurious Regression in Econometrics. *Journal of Econometrics,* 2(2), pp. 111-120.

Gujarati, D. N., 2003. *Basic Econometrics.* 4 ed. New York: McGraw Hill.

Gujarati, N. & Porter, C., 2009. *Basic Econometrics.* 4 ed. New York: McGraw-Hill.

Habanabakize, T., 2021. Determining the Household Consumption Expenditure's Resilience towards Petrol Price, Disposable Income and Exchange Rate Volatilities. *Economies,* 9(2), pp. 2-15.

Hakim, R. & Bustaram, I., 2019. Inflation Expectation and Consumption Expenditure in Indonesia. *IOP Conference Series: Earth and Environmental Science,* 243(1), pp. 1-8.

Haradhan, M., 2019. The First Industrial Revolution: Creation of a New Global Human Era. *Journal of Social Sciences and Humanities,* 5(4), pp. 377-387.

Holmes, T., 2014. *Expect Low Private Consumer Spending in 2014.* [Online] Available at: https://mg.co.za/article/2014-07-09-sas-private-consuming-in-2014-expected-to-be-low/
[Accessed 15 February 2023].

Hove, N. A., Vilakazi, T. & Akinboade, A. O., 2019. Fiscal Policy and Household Consumption in Sub-Saharan Africa. *Journal of Economics and Development,* 16(2), pp. 56-72.

Ibbih, J. M. & Peter, S., 2018. Analysis of the Determinants of Consumption in Nigeria: An Autoregressive Distributed Lag Approach. *Global Journal of Management and Business Research,* 18(2), pp. 67-73.

Ikwuagwu, E. B., Ariwa, F. O. & Onyele, K. O., 2017. Determinants of Aggregate Consumption Expenditure in Nigeria. *International Journal of Economics and Financial Management,* 2(3), pp. 51-63.

IMF, 2017. *Household Debt and Financial Stability.* [Online] Available at: www.imf.org
[Accessed 15 October 2023].

IMF, 2022. *2021 Individual Economy Assessments.* [Online] Available at: www.imf.org/..../ESR/2022/ENGLISH/ch3.ashx
[Accessed 25 10 2023].

IMF, 2023. *GDP Per Capita, Current Prices.* [Online] Available at: www.imf.org
[Accessed 28 June 2023].

IMF, 2023. *What is Real Effective Exchange Rate (REER)?.* [Online] Available at: https://datahelp.imf.org/knowledgebase/articles/537472-what-is-real-effective-exchange-rate-reer
[Accessed 15 October 2023].

Johansen, S. & Juselius, K., 1990. Maximum Likelihood Estimation and Inference on Cointegration with Application to the Demand for Money. *Oxford Bulletin of Economics and Statistics,* 52(2), pp. 169-210.

Jordan, J. C., 2013. Impact of Interest Rate Changes on South African GDP and Households. *Southern African Business Review,* 17(3), pp. 156-186.

Joubert, F. & Van der Merwe, T., 2021. Household Saving and Wealth in South Africa. *South Africa Journal of Economic and Mangement Science,* 24(1), pp. 1-10.

Kamal, A. M. L., Lotfy, A. & Kamal, M., 2018. The Impact of Tressury Bill and Interest Rate on the Stock Market Returns in Egypt. *International Journal of Development and Sustainability,* 7(2), pp. 605-619.

Kamweru, E. & Ngui, M., 2017. Effects of Interest Rates on the Perfomance of Real Estate Industry in Kenya: A Vase ofF Nairobi Country. *International Journal ofFinance,* 2(6), pp. 35-59.

Karambakuwa, R. T. & Ncwadi, R., 2021. Determinants of Household Over-Indebtedness in South Africa. *International Journal of Business and Economic Development,* 9(2), pp. 11-24.

Kereeditse, M. K. & Mpundu, M., 2021. Analysis of Household Debt in South Africa Pre- and Post-Low-Quality Asset Financial Crisis. *International Journal of Economics and Finance Issues,* 11(5), pp. 114-121.

Keynes, J. M., 1936. *The General Theory of Employment, Interest and Money.* London: Macmillan.

Kiptum, G. K., 2022. Relationship between Kenya's Economic Growth and Inflation. *SN Business and Economics,* 2(189), pp. 1-16.

Knoema, 2018. *Egypt - Household Consumption Expenditure in % of GDP.* [Online] Available at: https://knoema.com/atlas/Egypt/topics/Economy/National-Accounts-GDP-by-Expenditure-Percentage-Distribution-Shares/Household-consumption [Accessed 10 October 2023].

Kukk, M., 2016. How did Household Indebtedness Hamper Consumption During the Recession? Evidence from Micro Data. *Journal of Comparative Economics,* 44(3), pp. 764-786.

Kumar, A., Bhutto, N. A., Mangrio, K. A. & Kalhoro, M. R., 2019. Impact of External Debt and Exchange Rate Volatility on Domestic Consumption. New Evidence from Pakistan. *Cogent Economics and Finance,* 7(1), pp. 1-11.

Kuznets , S., 1946. *National Product Since 1869.* New York: National Bureau of Economic Research.

kwechime,, I., Yange, J. T. & Aduloju, A. A., 2016. Africa and the Global Economic and Financial Crisis. *World Review of Political Economy,* 7(2), pp. 208-225.

Liquisearch, 2021. *Intertemporal Choice.* [Online] Available at: https://www.liquisearch.com/intertemporal_choice [Accessed 26 june 2022].

Madito, O. & Odhiambo, N. M., 2018. The Main Determinants of Inflation in South Africa: An Empirical Investigation. *Organizations and Markets in Emerging Economies,* 9(2), pp. 212-232.

Mah, G., 2012. *An Econometric Analysis of the Eurozone Sovereign Debt Crisis: The Case of Greece.* North West: North West University.

Maiga, F. K., 2017. Impact of Interest Rate on Economic Growth in Nigeria. *Pyrex Journal of Business and Finance Management Research ,* 3(3), pp. 98-111.

Manasseh, C. O. et al., 2018. The Effects of Interest and Inflation Rates on Consumption Expenditure: Application of Consumer Spending Model. *International Journal of Economics and Financial Issues,* 8(4), pp. 32-38.

Masipa, T., 2018. South Africa's Transition to Democracy and Democratic Consolidation: A Reflection on Socio-Economic Challenges. *Journal of Public Affairs,* 18(4), pp. 1-6.

Mathe, T., 2020. *South Africa's Economy is in a Severe Recession.* [Online] Available at: https://mg.co.za/business/2020-09-08-south-africas-economy-is-in-a-severe-recession/
[Accessed 27 june 2022].

McCormick, K., 2018. James Duesenberry as a Practitioner of Behavioral Economics. *Journal of Behavioral Economics for Policy,* 2(1), pp. 13-18.

McKinsey&Company, 2022. *What is Inflation?.* [Online] Available at: https://www.mckinsey.com/featured-insights/mckinsey-explainers/what-is-inflation
[Accessed 10 June 2022].

Meniago, C., Mukuddem-Petersen, J., Petersen, M. A. & Mongale, I. P., 2013. What Causes Household Debt to Increase in South Africa. *Economic Modelling,* Volume 33, pp. 482-492.

Meyimdjui, C. & Combes, J.-L., 2021. *Food Price Shocks and Household Consumption in Developing Countries: The Role of Fiscal Policy.* s.l., IMF.

Modigliani, F. & Brumberg, R., 1954. Utility Analysis and the Consumption Function. In: K. K. Kurihara, ed. *Post-Keynesian Economics.* New Brunswick: NJ: Rutgers University Press, pp. 388-436.

Mohsen, B.-O., Ilir, M. & Altin, T., 2020. Exchange Rate Changes and Money Demand in Albania: A Nonlinear ARDL Analysis. *Economic Change and Restructuring,* 53(4), pp. 619-633.

Mukhtar, S., Abdullahi, S. I. & Murtala, I., 2020. Do Energy Consumption, Interest Rate and Import Affect Household Consumption in Nigeria: What the Empirical Evidence Says?. *Lapai Journal of Economics,* 4(2).

Muneri , K. P. & Kuhn, K., 2023. *Note on Household Sector Debt and Debt-Service Cost Statistics.* [Online] Available at: www.resbank.co.za
[Accessed 15 October 2023].

Musa, N., 2021. Impact of Exchange Rate Volatility on Inflation in Nigeria. *Journal of Contemporary Research in Business, Economics and Finance,* 3(1), pp. 26-38.

Musyoka, N. & Ocharo, K. N., 2018. Real Interest Rate, Inflation, Exchange Rate, Competitiveness and Foreign Direct Investment in Kenya. *American Journal of Economics,* 3(1), pp. 1-18.

Mutezo, A., 2014. Household Debt And Consumption Spending In South Africa: An ARDL-Bounds Testing Approach. *Banks and Bank Systems,* 9(4), pp. 73-81.

Muzindutsi, P. F. & Mjeso, T., 2018. Analysis of South African Household Consumption Expenditure and its Determinants: Application of the ARDL Model. *Euro Economica,* 3(37), pp. 79-169.

Nagawa, V., Wasswa, F. & Bbaale, E., 2020. Determinants of Gross Domestic Savings in Uganda: An Autoregressive Distributed Lag (ARDL) Approach to Cointegration. *Journal of Economic Structures,* 9(1), pp. 1-19.

National Credit Regulator, 2021. *Consumer Credit Market Regulator.* [Online] Available at: https://www.ncr.org.za/documents/CCMR/CCMR%202021Q1.pdf [Accessed 10 February 2023].

National Tressury, 2023. *The COVID-19 Shock and the Revised Economic Outlook.* [Online]
Available at: https://www.treasury.gov.za/documents/National%20Budget/2020S/review/Chapter%203.pdf
[Accessed 30 October 2023].

Ncanywa, T. & Letsoalo, T. E., 2019. Which Among Twin Deficits Hypothesis, Twin Divergence, and Ricardian's Equivalence Hold in a Developing Country. *Public Affairs,* 19(2), pp. 1-8.

Nikbin, B. & Panahi, S., 2016. Estimation of Private Consumption Function of Iran: Auto Regressive Distributed Lag Approach to Co-integration. *International Journal of Economics and Financial,* 6(2), pp. 653-659.

Nkala, P. & Tsegaye, A., 2017. The Relationship between Household Debt and Consumption Spending in South Africa. *Journal of Economics and Behavioral Studies,* 9(2), pp. 243-257.

Obinna, O., 2020. Effect of Inflation on Household Final Consumption Expenditure in Nigeria. *Journal of Economics and Development Studies,* 8(1), pp. 104-111.

Odhiambo, N. M., 2015. Exchange Rate Dynamics in South Africa: A Review of Past and Present Regimes. *Economics, Management, and Financial Markets,* 10(2), pp. 77-95.

OECD, 2020. *COVID-19 and Africa: Socio-Economic Implications and Policy Responses.* [Online]
Available at: https://www.oecd.org/coronavirus/policy-responses/covid-19-and-africa-

socio-economic-implications-and-policy-responses-96e1b282/
[Accessed 25 10 2023].

OECD, 2022. *Household Debt.* [Online] Available at: https://data.oecd.org/hha/household-debt.htm [Accessed 12 april 2022].

OECD, 2023. *Household Disposable Income.* [Online] Available at: https://data.oecd.org/hha/household-disposable-income.htm [Accessed 15 October 2023].

OECD, 2023. *Household Savings.* [Online] Available at: https://data.oecd.org/hha/household-savings.htm [Accessed 15 October 2023].

Ofwona, A. C., 2013. An Estimation of the Consumption Function for Kenya Using Keynes' Absolute Income Hypothesis for the Period 1992-2011. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS),* 4(1), pp. 103-105.

Okwu, A. T., Akpa, E. O., Oseni, I. O. & Obiakor, R. T., 2020. Oil Export Revenue and Exchange Rate: An Investigation of Asymmetric Effects on Household Consumption Expenditure in Nigeria. *Babcock Journal of Economics,* Volume 7, pp. 13-28.

Onanuga, A. T., 2020. Lending Rate , Exchange Rate and Household Consumption Relations in Sub-saharan Africa : Mean Group Approach. *Research Square,* Issue 9, pp. 1-21.

Orthofer, A., 2017. Concepts and Measures of Saving: Selected Issues for South Africa. *South African Journal of Economics,* 85(2), pp. 222-241.

Osei-Fosu, A. K., Osei, B. & Mensah, I. O., 2014. The Effect Of Interest Rate On Deposit On Household Consumption In Ghana: ARDL Cointegration Analysis. *Journal of Economics,* 2(8), pp. 1-8.

Osuji, O., 2020. Effect of Inflation on Household Final Consumption Expenditure in Nigeria. *Journal of Economics and Development Studies,* 8(1), pp. 104-111.

Owusu-Sekyere, E., 2017. The Impact of Monetary Policy on Household Consumption in South Africa : Evidence from Vector Autoregressive Techniques. *South African Journal Economic and Management Science,* August, 20(1), pp. 1-14.

Pesaran , M. H., Shin, Y. & Smith, R. J., 2001. Bounds Testing Approach to the Analysis of Level Relationships. *journal of applied economics,* 16(3), pp. 289-326.

Pesaran, M. H. & Shin, Y., 1995. *An Autoregressive Distributed Lag Modelling Approach to Aointegration Analysis.* Cambridge, UK: Department of Applied Economics, University of Cambridge.

Pettinger , T., 2017. *Real Effective Exchange Rate.* [Online]
Available at: https://www.economicshelp.org/blog/11422/economics/real-effective-exchange-rate/
[Accessed 4 August 2022].

Phillips, P. C. B., 1986. Understanding Spurious Regressions in Econometrics. *Journal of Econometrics,* 33(3), pp. 311-340.

Phillips, P. C. B. & Perron, P., 1988. Testing for a Unit Root in Time Series Regression. *Biometrika,* 75(2), pp. 335-346.

Quantec, 2023. *South Africa Household Sector — March 2023 Report.* [Online]
Available at: https://www.easydata.co.za/
[Accessed 24 10 2023].

Radnia, K., 2014. The Impacts of Oil Price and Selected Macroeconomic Variables on Consumer Price Index in Iran (1971-2010). *European Journal of Business and Management,* 6(2), pp. 154-166.

Reda, A. M. & Nourhan, E., 2020. Using the ARDL Bounds Testing Approach to Study the Inflation Rate in Egypt. *Economic Consultant,* 3(31), pp. 24-41.

REUTERS, 2023. *Egypt Inflation Soars to 5-1/2-Year High, Core Inflation at Record.* [Online]
Available at: https://www.reuters.com/world/middle-east/egypts-annual-urban-consumer-inflation-increases-319-february-capmas-2023-03-09/
[Accessed 15 10 2023].

Rodeck , D. & Curry , B., 2022. *What Is The Prime Rate?.* [Online]
Available at: https://www.forbes.com/advisor/investing/prime-rate-definition/
[Accessed 12 april 2022].

SARB, 2021. *Monetary Policy Review.* [Online]
Available at: https://www.resbank.co.za/content/dam/sarb/publications/monetary-policy-review/2021/MPR%20October%202021.pdf
[Accessed 10 February 2023].

SARB, 2023. *Monetary Policy Review.* [Online]
Available at: https://www.resbank.co.za/content/dam/sarb/publications/monetary-policy-review/2023/Monetary%20Policy%20Review%20April
[Accessed 15 May 2023].

SARB, 2023. *South Africa Reserve Bank Annual Report 2022/23.* [Online]
Available at: https://resbank.onlinereport.co.za/2023/downloads/Full-Annual-Report-2022-23.pdf
[Accessed 25 10 2023].

Saungweme, T. & Odhiambo, N. M., 2021. *Inflation and Economic Growth in Kenya: An Empirical Examination.* Johannesburg: UNISA.

Schoeman, L., 2021. *South Africa's Repo Rate – A Useful Guide.* [Online] Available at: https://sashares.co.za/repo-rate/#gs.cwvexd [Accessed 15 8 2021].

Shokr, M. A., 2020. Real Interest Rate, Income and Bank Loans: Panel Evidence from Egypt. *Journal of Financial Economic,* 12(2), pp. 227-243.

Shukla, S., 2016. *Normality Test.* Ahmedabad, Indian Institute of Teacher Education Gandhinagar.

Siman, S., Tawakal, M. A., Risamasu, P. I. M. & Kadir, R., 2020. Effect of Household Size, Working Hours, Health and Income on Consumption Expenditure of Poor Household. *Enfermería Clínica,* Volume 30, pp. 512-515.

Smith, G., 2021. *Where Credit is Due: How Africa's Debt can be a Benefit, not a Burden.* Oxford: Oxford University Press.

South African Market Insights, 2020. *Unemployment and Economics.* [Online] Available at: http://www.southafricanmi.com/south-africas-unemployment.html [Accessed 26 june 2022].

Stats SA, 2020. *Gross Domestic Product.* [Online] Available at: https://www.statssa.gov.za/publications/P0441/P04411stQuarter2020.pdf [Accessed 15 October 2023].

StatsSA, 2022. *National Poverty Lines.* [Online] Available at: https://www.statssa.gov.za/publications/P03101/P031012022.pdf [Accessed 10 February 2023].

StatsSA, 2022. *Quarterly Labour Force Survey (QLFS) – Q2:2022.* [Online] Available at: https://www.statssa.gov.za/?p=15685 [Accessed 10 February 2023].

Stiglitz, J., 2019. *People, Power, and Profits: Progressive Capitalism for an Age of Discontent.* London: Penguin UK.

Stock, J. H. & Watson, M. W., 2012. *Introduction to Econometrics.* 3 ed. New York: Pearson Education Limited .

Supriya, G., 2015. *Three Important Theoris of Consumption Expenditure.* [Online] Available at: https://www.yourarticlelibrary.com/ [Accessed 14 april 2022].

Syden, M., 2014. Trends and Determinants of Household Saving in South Africa. *Economic Affairs,* 59(2), pp. 191-208.

Teulings, R., Wouterse, B. & Ji, K., 2023. Disentangling the Effect of Household Debt on Consumption. *Empirical Economics,* pp. 2215-2239.

Tokoya, B. 0. et al., 2022. Income and Household Consumption Expenditure in Nigeria (1986–2020). *Journal of Economics, Management and Trade,* 28(3), pp. 30-41.

Tregenna, F., Ewinyu, A. K., Oqubay, A. & Valodia, I., 2021. *Challenges and Complexities of the South African Economy.* Johannesburg: SARChI Industrial Development Working Paper Series.

Tzamourani, P., 2019. The Interest Rate Exposure of Euro Area Households. *European Economic Review,* Volume 132, pp. 2-26.

Uche, E., Chang, B. H. & Effiom, L., 2022. Household Consumption and Exchange Rate Extreme Dynamics : Multiple Asymmetric Threshold Non-Linear Autoregressive Distributed Lag Model Perspective. *International Journal of Finance and Economics,* pp. 1-14.

United Nations, 2020. *Impact of COVID-19 in Africa.* [Online] Available at: https://unsdg.un.org/sites/default/files/2020-05/Policy-brief-Impact-of-COVID-19-in-Africa.pdf
[Accessed 25 10 2023].

Utile, B. J., Okwori, A. O. & Ikpambese, M. D., 2018. Effect of Interest Rate on Economic Growth in Nigeria. *International Journal of Advanced Academic Research,* 4(1), pp. 66-76.

Verter, N. & Osakwe, C. N., 2014. A Time Series Analysis of Macroeconomic Determinants of Household Spending in the Era of Cross-Cultural Dynamics: Czech Republic as a Case Study. *Procedia Economics and Finance,* Volume 12, pp. 733-742.

Wang, Y. C., Tsai, J. J. & Dong, Y., 2021. Research on Impulse Response and Variance Decomposition Analysis of Co-Integrated Systems. *Journal of Physics: Conference Series,* 1941(1), pp. 1-10.

Wei, W., 2016. Vertical Specialization and Upgrading Utilization of Foreign Capital. In: W. Wei, ed. *Achieving Inclusive Growth in China Through Vertical Specialization.* Hong Kong: Chandos Publishing, pp. 271-348.

World Bank, 2022. *GDP Growth (Annula %) - South Africa.* [Online] Available at: data.worldbank.org
[Accessed 15 June 2022].

World Bank, 2022. *Metadata Glossary.* [Online] Available at: https://databank.worldbank.org/metadataglossary/world-development-indicators/series/NE.CON.PRVT.PC.KD
[Accessed 10 June 2022].

World Bank, 2023. *Metadata Glossary.* [Online] Available at: https://databank.worldbank.org/metadataglossary/world-development-indicators/series/FR.INR.LEND
[Accessed 15 October 2023].

Yusuf, H. A. et al., 2017. Interest Rate and Private Consumption Behaviour in Nigeria: Some Empirical Evidence. *Business and Economics Journal ,* 3(2), pp. 131-147.

Zack, 2020. *The Breusch-Pagan Test: Definition & Example.* [Online] Available at: https://www.statology.org/breusch-pagan-test/
[Accessed 26 june 2022].

Zaefarian, G., Iurkov, V. & Koval, M., 2022. Variance Decomposition Analysis: What is it and how to Perform it – A Complete Guide for B2B Researchers. *Industrial Marketing Management,* Volume 107, pp. 315-322.

APPENDICES

APPENDIX A: UNIT ROOT TEST

LCONS (ADF)

Null Hypothesis: LNCONS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.923884	0.7679
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNCONS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.779429	0.9575
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNCONS has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		5.393533	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.244734	0.0022
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.243551	0.0107
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.777839	0.0070
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LCONS (PP)

Null Hypothesis: LNCONS has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.881625	0.7815
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNCONS has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.779429	0.9575
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNCONS has a unit root
Exogenous: None
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		5.393533	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: Constant
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.173581	0.0027
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.120294	0.0143
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNCONS) has a unit root
Exogenous: None
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.777839	0.0070
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

INT (ADF)

Null Hypothesis: INT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.335743	0.6011
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.160834	0.0130
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INT has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.667928	0.0895
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.385248	0.0001
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.440025	0.0071
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.161671	0.0000
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

INT (PP)

Null Hypothesis: INT has a unit root
Exogenous: Constant
Bandwidth: 30 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.020163	0.7344
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INT has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 11 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.130039	0.5109
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INT has a unit root
Exogenous: None
Bandwidth: 32 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.373915	0.0014
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: Constant
Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.113962	0.0002
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.248366	0.0001
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INT) has a unit root
Exogenous: None
Bandwidth: 30 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.969926	0.0003
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

INF (ADF)

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.976346	0.0480
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.013076	0.1444
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
Exogenous: None
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.361268	0.0200
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.274854	0.0002
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.016407	0.0002
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.072351	0.0000
Test critical values:	1% level	-2.647120	
	5% level	-1.952910	
	10% level	-1.610011	

*MacKinnon (1996) one-sided p-values.

INF (PP)

Null Hypothesis: INF has a unit root
Exogenous: Constant
Bandwidth: 21 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.864625	0.0605
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.933466	0.6146
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: INF has a unit root
Exogenous: None
Bandwidth: 25 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.794939	0.0694
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant
Bandwidth: 17 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.352284	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-10.12238	0.0000
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(INF) has a unit root
Exogenous: None
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.240725	0.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LHDI (ADF)

Null Hypothesis: LNHDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.437188	0.0001
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNHDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.263716	0.8795
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNHDI has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		11.50039	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.887608	0.0056
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.465067	0.0005
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.770166	0.0730
Test critical values:	1% level	-2.644302	
	5% level	-1.952473	
	10% level	-1.610211	

*MacKinnon (1996) one-sided p-values.

HDI (PP)

Null Hypothesis: LNHDI has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.444488	0.0001
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNHDI has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.266886	0.8787
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNHDI has a unit root
Exogenous: None
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		6.903990	1.0000
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.852225	0.0061
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.488861	0.0005
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNHDI) has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.651345	0.0924
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LDEBT (ADF)

Null Hypothesis: LNDEBT has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.062341	0.2604
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNDEBT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.069598	0.5424
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNDEBT has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.156499	0.6215
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.001301	0.0043
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.048574	0.0173
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.064602	0.0002
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

*MacKinnon (1996) one-sided p-values.

LDEBT (PP)

Null Hypothesis: LNDEBT has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.823339	0.3631
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNDEBT has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.723312	0.7181
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNDEBT has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.161958	0.6201
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: Constant
Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.816315	0.0067
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.645837	0.0415
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNDEBT) has a unit root
Exogenous: None
Bandwidth: 9 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.918055	0.0003
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LSAV (ADF)

Null Hypothesis: LSAV has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.396207	0.5722
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LSAV has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.910200	0.9428
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LSAV has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.412270	0.1441
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.288986	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.288986	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.288986	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

LSAV (PP)

Null Hypothesis: LSAV has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.453274	0.5443
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LSAV has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.005742	0.9295
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LSAV has a unit root
Exogenous: None
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.467986	0.1304
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.288986	0.0001
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.385924	0.0006
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LSAV) has a unit root
Exogenous: None
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.376456	0.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LREER (ADF)

Null Hypothesis: LNREER has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.364713	0.1593
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNREER has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.298435	0.0847
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNREER has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.351978	0.5504
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.139980	0.0002
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.059927	0.0014
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.196744	0.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

*MacKinnon (1996) one-sided p-values.

LREER (PP)

Null Hypothesis: LNREER has a unit root
Exogenous: Constant
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.911823	0.3230
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNREER has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.853398	0.1898
Test critical values:	1% level	-4.262735	
	5% level	-3.552973	
	10% level	-3.209642	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LNREER has a unit root
Exogenous: None
Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.582500	0.4573
Test critical values:	1% level	-2.636901	
	5% level	-1.951332	
	10% level	-1.610747	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: Constant
Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.996620	0.0000
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.651558	0.0000
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LNREER) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 13 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.651558	0.0000
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

APPENDIX B: F-BOUNDS TEST

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	22.34795	10%	1.99	2.94
k	6	5%	2.27	3.28
		2.5%	2.55	3.61
		1%	2.88	3.99

APPENDIX C: LONG RUN ARDL RESULTS.

Levels Equation
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.007863	0.002080	-3.780876	0.0043
INF	-0.008689	0.003610	-2.407032	0.0394
LNHDI	0.329265	0.031961	10.30204	0.0000
LNDEBT	0.061490	0.047118	1.305011	0.2243
LSAV	-0.001658	0.001492	-1.111423	0.2952
LNREER	0.156138	0.069513	2.246181	0.0513
C	10.43274	0.420509	24.80982	0.0000

EC = LNCONS - (-0.0079*INT -0.0087*INF + 0.3293*LNHDI + 0.0615
*LNDEBT -0.0017*LSAV + 0.1561*LNREER + 10.4327)

APPENDIX D: SHORT RUN RESULTS

ARDL Error Correction Regression
Dependent Variable: D(LNCONS)
Selected Model: ARDL(1, 1, 3, 3, 1, 3, 3)
Case 2: Restricted Constant and No Trend
Date: 06/20/23 Time: 23:29
Sample: 1989 2022
Included observations: 31

ECM Regression
Case 2: Restricted Constant and No Trend

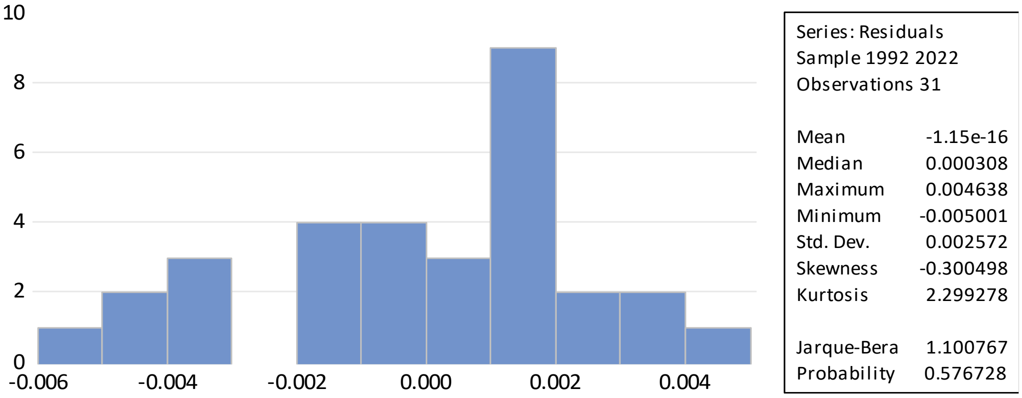
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INT)	0.001709	0.000544	3.142956	0.0119
D(INF)	-0.002301	0.000546	-4.210442	0.0023
D(INF(-1))	0.003865	0.000579	6.674998	0.0001
D(INF(-2))	0.002628	0.000489	5.370367	0.0005
D(LNHDI)	0.309817	0.032137	9.640637	0.0000
D(LNHDI(-1))	-0.157243	0.027751	-5.666269	0.0003
D(LNHDI(-2))	-0.110849	0.029326	-3.779930	0.0043
D(LNDEBT)	-0.073964	0.021868	-3.382287	0.0081
D(LSAV)	-0.002427	0.000157	-15.41992	0.0000
D(LSAV(-1))	-0.000617	0.000169	-3.645841	0.0054
D(LSAV(-2))	-0.000933	0.000170	-5.494914	0.0004
D(LNREER)	0.087912	0.012425	7.075672	0.0001
D(LNREER(-1))	0.020466	0.012492	1.638281	0.1358
D(LNREER(-2))	0.047564	0.014461	3.289102	0.0094
CointEq(-1)*	-0.636879	0.035724	-17.82800	0.0000

R-squared	0.991769	Mean dependent var	0.027475
Adjusted R-squared	0.984567	S.D. dependent var	0.028350
S.E. of regression	0.003522	Akaike info criterion	-8.153241
Sum squared resid	0.000198	Schwarz criterion	-7.459377
Log likelihood	141.3752	Hannan-Quinn criter.	-7.927059
Durbin-Watson stat	2.858699		

* p-value incompatible with t-Bounds distribution.

APPENDIX E: RESIDUAL DIAGNOSTICS TEST RESULTS

Jarque-Bera Residual Test



Breush-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	1.073786	Prob. F(2,20)	0.3606
Obs*R-squared	3.199893	Prob. Chi-Square(2)	0.2019

Heteroskedasticity Test: Breusch-Pagan-Godfrey

Heteroskedasticity Test: Breusch-Pagan-Godfrey
Null hypothesis: Homoskedasticity

F-statistic	0.466044	Prob. F(21,9)	0.9281
Obs*R-squared	16.14924	Prob. Chi-Square(21)	0.7612
Scaled explained SS	0.884272	Prob. Chi-Square(21)	1.0000

Heteroskedasticity Test: White

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	0.482733	Prob. F(21,9)	0.9187
Obs*R-squared	16.42121	Prob. Chi-Square(21)	0.7455
Scaled explained SS	0.899164	Prob. Chi-Square(21)	1.0000

Heteroskedasticity Test: ARCH

Heteroskedasticity Test: ARCH

F-statistic	0.047693	Prob. F(1,28)	0.8287
Obs*R-squared	0.051013	Prob. Chi-Square(1)	0.8213

Heteroskedasticity Test: Harvey

Heteroskedasticity Test: Harvey
Null hypothesis: Homoskedasticity

F-statistic	1.007013	Prob. F(21,9)	0.5254
Obs*R-squared	21.74543	Prob. Chi-Square(21)	0.4143
Scaled explained SS	11.54771	Prob. Chi-Square(21)	0.9510

Heteroskedasticity Test: Glejser

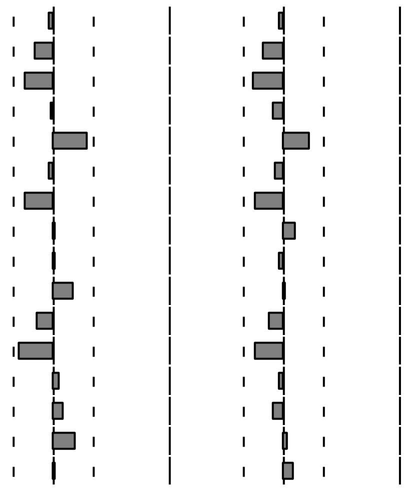
Heteroskedasticity Test: Glejser
Null hypothesis: Homoskedasticity

F-statistic	0.693526	Prob. F(21,9)	0.7667
Obs*R-squared	19.15993	Prob. Chi-Square(21)	0.5749
Scaled explained SS	4.697976	Prob. Chi-Square(21)	0.9999

Ljung-Box Q: Autocorrelation

Date: 06/21/23 Time: 14:58
Sample (adjusted): 1992 2022
Included observations: 31 after adjustments

Autocorrelation Partial Correlation



	AC	PAC	Q-Stat	Prob*
1	-0.040	-0.040	0.0541	0.816
2	-0.172	-0.174	1.0986	0.577
3	-0.248	-0.271	3.3432	0.342
4	-0.016	-0.092	3.3529	0.501
5	0.302	0.222	6.9318	0.226
6	-0.030	-0.075	6.9686	0.324
7	-0.260	-0.247	9.8526	0.197
8	0.014	0.105	9.8615	0.275
9	0.024	-0.028	9.8890	0.360
10	0.180	-0.003	11.464	0.323
11	-0.146	-0.137	12.555	0.323
12	-0.312	-0.246	17.786	0.122
13	0.048	-0.039	17.916	0.161
14	0.084	-0.091	18.343	0.192
15	0.198	0.033	20.849	0.142
16	0.020	0.085	20.877	0.183

*Probabilities may not be valid for this equation specification.

APPENDIX F: STABILITY DIAGNOSTICS

Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Omitted Variables: Squares of fitted values
Specification: LNCONS LNCONS(-1) INT INT(-1) INF INF(-1) INF(-2) INF(-3) LNHDI LNHDI(-1) LNHDI(-2) LNHDI(-3) LNDEBT LNDEBT(-1) LSAV LSAV(-1) LSAV(-2) LSAV(-3) LNREER LNREER(-1) LNREER(-2) LNREER(-3) C

	Value	df	Probability
t-statistic	0.622309	8	0.5511
F-statistic	0.387268	(1, 8)	0.5511
Likelihood ratio	1.465473	1	0.2261

APPENDIX G: GRANGER CAUSALITY RESULTS

Pairwise Granger Causality Tests
Date: 06/21/23 Time: 11:09
Sample: 1989 2022
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
INT does not Granger Cause LNCONS	32	6.98290	0.0036
LNCONS does not Granger Cause INT		9.86877	0.0006
INF does not Granger Cause LNCONS	32	8.35029	0.0015
LNCONS does not Granger Cause INF		1.68806	0.2038
LNHDI does not Granger Cause LNCONS	32	4.66246	0.0182
LNCONS does not Granger Cause LNHDI		1.33818	0.2792
LNDEBT does not Granger Cause LNCONS	32	1.03523	0.3688
LNCONS does not Granger Cause LNDEBT		5.39786	0.0107
LSAV does not Granger Cause LNCONS	32	1.70661	0.2005
LNCONS does not Granger Cause LSAV		0.97622	0.3896
LNREER does not Granger Cause LNCONS	32	0.57303	0.5705
LNCONS does not Granger Cause LNREER		3.99396	0.0302
INF does not Granger Cause INT	32	0.28806	0.7520
INT does not Granger Cause INF		0.04229	0.9587
LNHDI does not Granger Cause INT	32	7.05050	0.0034
INT does not Granger Cause LNHDI		2.63314	0.0902
LNDEBT does not Granger Cause INT	32	2.35292	0.1143
INT does not Granger Cause LNDEBT		4.79289	0.0165
LSAV does not Granger Cause INT	32	3.17312	0.0578
INT does not Granger Cause LSAV		0.82288	0.4499
LNREER does not Granger Cause INT	32	2.26476	0.1232
INT does not Granger Cause LNREER		2.10143	0.1418
LNHDI does not Granger Cause INF	32	2.19494	0.1308
INF does not Granger Cause LNHDI		0.74186	0.4857
LNDEBT does not Granger Cause INF	32	0.75514	0.4796
INF does not Granger Cause LNDEBT		3.17857	0.0576
LSAV does not Granger Cause INF	32	0.24679	0.7830
INF does not Granger Cause LSAV		1.22974	0.3082
LNREER does not Granger Cause INF	32	3.14383	0.0592
INF does not Granger Cause LNREER		4.29390	0.0240
LNDEBT does not Granger Cause LNHDI	32	3.07429	0.0627
LNHDI does not Granger Cause LNDEBT		7.53209	0.0025
LSAV does not Granger Cause LNHDI	32	0.16868	0.8457
LNHDI does not Granger Cause LSAV		0.80088	0.4593
LNREER does not Granger Cause LNHDI	32	0.78432	0.4666
LNHDI does not Granger Cause LNREER		2.86299	0.0745
LSAV does not Granger Cause LNDEBT	32	1.34925	0.2764
LNDEBT does not Granger Cause LSAV		1.68434	0.2045
LNREER does not Granger Cause LNDEBT	32	0.65594	0.5270
LNDEBT does not Granger Cause LNREER		1.16287	0.3278
LNREER does not Granger Cause LSAV	32	0.02256	0.9777
LSAV does not Granger Cause LNREER		1.20065	0.3166

APPENDIX H: VARIANCE DECOMPOSITION

Variance Decomposition of LCONS:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.018409	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.030802	50.02480	35.54746	5.462557	3.619511	3.423418	0.000705	1.921551
3	0.043528	26.75145	60.18180	6.397130	1.822036	2.589326	1.282235	0.976024
4	0.052522	19.71432	66.29725	6.170355	1.797718	1.929568	3.362884	0.727904
5	0.058382	17.60203	66.52135	6.095208	2.299252	1.562495	5.216718	0.702943
6	0.062557	16.55733	65.52055	6.167561	2.783319	1.436422	6.737361	0.797458
7	0.066015	15.52627	64.26334	6.275462	3.250257	1.618646	8.021178	1.044848
8	0.069129	14.53709	62.74723	6.408603	3.671328	2.084795	9.189771	1.361182
9	0.071892	13.73024	61.01042	6.589732	4.027466	2.670816	10.33996	1.631365
10	0.074265	13.12593	59.23050	6.809950	4.312157	3.210671	11.48285	1.827952

Variance Decomposition of INT:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	1.578445	0.062478	99.93752	0.000000	0.000000	0.000000	0.000000	0.000000
2	2.219882	0.047963	98.30136	0.191476	0.103073	0.400160	0.876761	0.079202
3	2.278322	0.618035	95.35721	0.183563	0.746785	1.112118	1.905543	0.076750
4	2.340847	1.320863	94.10133	0.202053	0.826984	1.606367	1.807528	0.134872
5	2.384544	1.327905	93.41157	0.229432	0.986876	1.669898	2.163010	0.211310
6	2.394332	1.336603	92.69165	0.549295	1.211223	1.662823	2.289845	0.258558
7	2.430302	1.301027	92.26819	1.073087	1.197128	1.632283	2.276842	0.251442
8	2.476309	1.386600	91.45690	1.416349	1.193488	1.632970	2.640051	0.273645
9	2.504486	1.550415	90.57273	1.510757	1.323631	1.634267	3.135398	0.272801
10	2.519616	1.648222	89.98204	1.519605	1.474987	1.615986	3.466691	0.292469

Variance Decomposition of INF:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	1.713150	2.534483	64.34115	33.12437	0.000000	0.000000	0.000000	0.000000
2	2.163595	1.990266	47.69116	29.74721	0.103333	1.889498	10.54209	8.036454
3	2.406244	1.920314	43.49696	24.13058	8.193253	1.972966	13.51267	6.773263
4	2.652181	2.723160	44.70168	21.14319	8.787430	3.120139	11.22724	8.297166
5	2.751535	3.556298	43.22070	20.05603	8.364728	4.678012	10.44780	9.676436
6	2.774055	3.642322	42.54838	19.73520	8.254596	5.708975	10.31365	9.796874
7	2.785085	3.621605	42.23628	19.67814	8.214844	6.025453	10.48412	9.739561
8	2.797377	3.597859	42.39628	19.51550	8.181501	6.045101	10.57317	9.690593
9	2.816519	3.556471	43.12803	19.27041	8.076646	5.966878	10.43922	9.562344
10	2.822446	3.554685	43.28406	19.20213	8.056974	5.957834	10.40344	9.540874

Variance Decomposition of LHDI:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.019624	39.06168	0.829994	6.430848	53.67747	0.000000	0.000000	0.000000
2	0.026794	29.36910	24.48833	3.472242	32.04716	3.608126	6.564573	0.450463
3	0.034799	17.55708	48.10350	2.059556	20.85753	4.682332	5.199710	1.540291
4	0.042734	12.36933	58.44406	1.370385	17.44766	3.908787	3.685380	2.774395
5	0.050346	11.02285	64.43162	1.228613	14.67978	3.468836	2.676258	2.492045
6	0.057025	10.35378	67.67401	1.358864	13.28675	3.024712	2.130722	2.171152
7	0.062211	9.661558	68.87841	1.421162	13.27809	2.565370	1.917077	2.278326
8	0.066253	9.026721	68.84837	1.448328	13.75376	2.310393	1.820613	2.791813
9	0.069654	8.501365	68.27765	1.523549	14.19338	2.306167	1.787298	3.410588
10	0.072666	8.094291	67.52684	1.685937	14.51252	2.446313	1.833467	3.900638

Variance Decomposition of LDEBT:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.028102	0.209174	29.39615	5.601271	33.76607	31.02734	0.000000	0.000000
2	0.052449	6.959167	38.21196	4.561846	13.17916	30.43398	4.012343	2.641538
3	0.085210	10.85931	50.09468	4.145553	5.274834	21.54336	5.099575	2.982686
4	0.114166	10.11875	57.82593	3.700625	2.938884	16.06331	6.743789	2.608712
5	0.131836	9.333567	61.38566	3.233152	2.617012	12.69815	8.734795	1.997663
6	0.141224	8.988871	61.87238	2.981945	2.949625	11.09796	10.24900	1.860222
7	0.146509	8.764151	60.70296	2.933519	3.233808	11.03624	11.28186	2.047464
8	0.150096	8.512439	58.76612	3.060113	3.371188	11.98570	12.01899	2.285442
9	0.152906	8.247373	56.73827	3.314976	3.408615	13.23529	12.59334	2.462141
10	0.155188	8.014688	55.08821	3.619359	3.390999	14.22907	13.08920	2.568476

Variance Decomposition of LSAV:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	4.816989	60.82155	0.125107	0.050209	1.598340	3.467991	33.93680	0.000000
2	6.209607	51.39571	6.602931	0.855034	1.128179	2.238967	36.21018	1.569006
3	7.853299	36.14077	28.03971	3.400885	0.783498	1.583575	28.99837	1.053193
4	9.521635	26.51031	39.08834	5.311397	0.618609	1.080776	26.66662	0.723941
5	10.86831	22.48749	41.88535	6.325797	0.554807	0.861299	27.32960	0.555670
6	11.96641	20.53506	42.24783	7.072654	0.559724	0.755213	28.37107	0.458452
7	12.90398	18.87321	42.18400	7.553346	0.623579	0.793036	29.56138	0.411450
8	13.74266	17.35765	41.84640	7.816850	0.760033	1.059561	30.71176	0.447745
9	14.50079	16.11077	41.11492	8.009410	0.909644	1.528757	31.80258	0.523919
10	15.16829	15.15175	40.00082	8.208797	1.037806	2.096171	32.91428	0.590367

Variance Decomposition of LREER:

Period	S.E.	LCONS	INT	INF	LHDI	LDEBT	LSAV	LREER
1	0.069221	26.72034	7.674289	1.108046	2.270897	24.23397	0.144882	37.84758
2	0.084557	20.15104	10.30265	0.742601	2.332767	31.81485	0.252725	34.40336
3	0.089310	18.79814	9.442083	4.246761	2.142584	33.40563	1.075554	30.88925
4	0.094064	17.42579	8.931956	7.638136	1.945115	30.80039	4.475506	28.78312
5	0.096651	16.50624	9.054614	7.934093	2.251473	29.45439	7.515571	27.28361
6	0.098222	16.00420	9.854978	7.715353	2.407340	28.61642	8.693825	26.70788
7	0.098969	15.78539	9.860731	7.699511	2.376240	28.18673	9.569474	26.52193
8	0.102426	15.10958	13.28141	7.648009	2.218533	26.37093	10.60983	24.76171
9	0.108070	14.32094	18.07360	7.450117	2.035905	23.75815	12.05436	22.30693
10	0.112421	13.91850	20.51224	7.221111	2.050542	21.96090	13.70214	20.63457

Cholesky One S.D. (d.f. adjusted)
Cholesky ordering: LCONS INT INF LHDI LDEBT LSAV LREER