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Article

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Analysis of South African Household Consumption Expenditure and its Determinants: Application of the ARDL Model

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Abstract: Aggregate consumption expenditure is considered to be a major variable in determining a country's growth, and is mostly used in forecasting the economic prospects of a country. Thus, understanding of a country's consumption behaviour plays a central role in macroeconomic analysis. The aim of this paper is to conduct an econometric analysis of the key macroeconomic determinants of consumption expenditure in South Africa from 1995 to 2015. The autoregressive distributed lag (ARDL) model was utilised to analyse short- and long-run relationships between real aggregate private consumption and selected macroeconomic variables. The sample period consists of quarterly time series from 1995 quarter 1 to the last quarter of 2015. Long-run results revealed that South African households consume a large portion of their real income and that real consumption increases with the appreciation of the domestic currency (rand). Additionally, price levels and interest rates were found to have a negative effect on real consumption expenditure in the long run. In the short run, price levels and interest rates were found to have negative effects on real consumption expenditure in South Africa, while the effect of real exchange rates were not statistically significant. Findings of this study suggest that macroeconomic stability factors play a crucial role in determining real consumption in the South African economy.

Keywords: Consumption expenditure; macroeconomic variables; ARDL; South Africa

JEL Classification: E210; E270

1. Introduction

Consumption expenditure by households is one of the fundamental components of Gross National Product (GNP) and Gross Domestic Product (GDP) and is generally considered to be a major variable in determining a country's growth. This is because, in most countries consumption expenditure represents a large proportion of GDP and to some extent it reflects the country's productive success (Ladaique, 2006). The level of aggregate consumption expenditure, which includes expenditure on durable and non-durable goods, can therefore reflect the general position of a country's economy (Ezeji & Ajudua, 2015). The nature of the consumption function has engaged much of the macroeconomic debate dating back to Stuart Mills and the classical economists of the 18th and 19th centuries, which include economists such as John Maynard Keynes, Milton Friedman and Ando Modigliani (Ezeji & Ajudua, 2015). This ongoing debate is significant because of the important role played by consumption expenditure in any economy as consumption expenditure accounts for approximately two-thirds of aggregate expenditure in most economies across the world (Tapsin & Hepsag, 2014). Neoclassical economists generally consider consumption to be the final product of economic activity, and thus argue that the level of consumption per person is seen as a central measure of an economy's success in productivity (Ezeji & Ajudua, 2015).

An understanding of consumption behaviour plays a central role in both macroeconomic and microeconomic analyses. Macroeconomists are interested in aggregate consumption because consumption determines aggregate saving or the portion of income that is not consumed (Ezeji & Ajudua, 2015). Aggregate saving is crucial in macroeconomic analysis as it flows through the financial system to create the national supply of capital. Thus, both aggregate consumption and saving have a powerful influence on an economy's long-term productive capacity (Ezeji & Ajudua, 2015).

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Additionally, macroeconomists are interested in aggregate consumption because consumption expenditure accounts for a great portion of national output. Therefore, understanding the dynamic of aggregate consumption expenditure is essential to understanding macroeconomic fluctuations and business cycles. Due to its high share in GDP, consumption expenditure is taken into account in macroeconomic policies for fiscal planning as policy makers try to predict how consumers will behave when faced with income fluctuations (Tapsin & Hepsag, 2014).

In the South African context, aggregate consumption expenditure is vital to the economy as it represented about 60 percent of GDP in 2015 (Trading Economics, 2016). In year 2014, household final consumption expenditure as a percentage of GDP was measured at 61.18 percent; whereas final consumption expenditure (the sum of household expenditure and general government expenditure) was measured at 81.50 percent (Trading Economics, 2016). These are high percentages and can explain the role of consumption in the state of the South African economy. The level of aggregate consumption expenditure greatly influences a country's growth rate, and this has been evident in the fluctuations in South Africa's growth rate due to changes in the country's aggregate consumption expenditure over the past years. In 2014, consumption expenditure was expected to be low due to the five months long platinum strike, higher inflation rate and the retracted growth in credit extension (Holmes, 2014). This decline resulted in a revision of forecasts for economic growth, down from 2.7 to around 2 percent with the prediction that South African GDP growth would follow private consumption growth (Holmes, 2014). Thus, fluctuations in consumption expenditures are of great concern for South African economic growth. It is therefore important to understand the key determinants of South Africa's consumption expenditure.

This study aims to conduct an econometric analysis of the key macroeconomic determinants of consumption expenditure in South Africa since the advent of democracy in 1994, to the end of 2015. The Autoregressive Distributed Lag (ARDL) model was adopted to analyse short-run and long-run effects of selected macroeconomic variables on private consumption expenditure. This study is relevant for the current economic conditions of the South African economy, where the patterns of household consumption expenditurere have changes after South Africa became a democratic state in 1994.

2. Literature Review

2.1. Theories of Consumption Expenditure

Over time, economists have conducted research to identify macroeconomic variables. Such research stems from various theories, which are now collectively known as theories of consumption. Since Keynes put forward his first theory of consumption, there have been developments in this field and various alternative theories of consumer behaviour have been put forward (Supriya, 2015). Firstly, Duesenberry's theory of consumption of 1949 proposed that consumption expenditure depends on an individual's relative income rather than absolute income. This theory is referred to as the Relative Income Theory of Consumption (Ahuja, 2013). Modigliani proposed a second theory, known as the Life Cycle Theory of Consumption, which states that individuals plan an even consumption profile over their lifetime depending on their income expectations throughout their whole lifetime rather than based on their current income (Gali, 1994). Lastly, Friedman proposed a hypothesis in relation to consumption behaviour known as the Permanent Income Hypothesis, according to which the consumption of individuals depends on their permanent income rather than on their current level of income (Supriya, 2015). Each of these theories is briefly discussed in the sub-sections that follow.

Keynes' Absolute Income Hypothesis mentioned various subjective and objective factors that determine the consumption of a society. However, all the factors mentioned by Keynes point to the current level of income as the key determinant of the consumption of both an individual and society (Ezeji & Ajudua, 2015). Keynes' theory stressed that the absolute level of income is the key determinant of consumption; hence, his consumption theory is known as the Absolute Income Theory

(Alimi, 2013). Furthermore, Keynes proposed a psychological law of consumption, which states that consumption increases as income increases just not by as much as the increase in income (Jhingan, 2002). Thus, the Keynesian proposition of the consumption function is illustrated as follows:

$$C_t = C_0 + bY_t \quad (1)$$

Where: C_t is real private consumption expenditure at time t; C_0 represents the autonomous consumption that is the proportion of consumption that does not vary with income; and Y_t is real disposable income, and b is the marginal propensity to consume, which is between 0 and 1 ($0 < b < 1$). Thus, when other factors are held constant, the consumption is function of income.

The relative Income Theory of Consumption augmented Keynesian theory by proposing that consumption of individuals does not only depend on their income but it is relative to the income of others in the society. Thus, consumption also depends on income levels that were previously reached by the individual (Supriya, 2015). Even if the absolute income of individuals increases without an increase in their relative income (when all other individuals in the society receive the same percentage increase in income); such individuals will still spend the same proportion of their income on consumption as they were doing before the increase in their absolute income (Ohale & Onyama, 2002). This means that individuals' average propensity to consume remains unchanged regardless of the increase in their absolute income. There are two effects that stem from absolute income, these being the demonstration effect and the ratchet effect. According to the demonstration effect, individuals or households tend to imitate their neighbours' consumption levels or those of other families within the community (Ohale & Onyama, 2002). On the other hand, the ratchet effect suggests that individuals tend to maintain the same consumption level even when times are tough in the economy and their incomes have decreased. The ratchet effect therefore suggests that individuals tend to decrease the proportion of income they previously saved or they borrow money to maintain the same level of consumption (Supriya, 2015). This means that regardless of the increase or decrease in relative income, consumption expenditure or average propensity to consume remains constant. This theory therefore seems to suggest that there would be no relationship between income and consumption.

Life Cycle Theory of Consumption introduced by Modigliani and Brumberg in 1954, states that an individual's consumption in any period is not determined by the current income of that specific period but by the entire lifetime expected income (Gali, 1994). It is therefore assumed that individuals plan a pattern of consumption expenditure based on expected income over their entire lives and that they maintain a slightly increasing or less constant consumption level (Deaton, 2005). For example, in early years' individuals spend by borrowing or spend the assets inherited from parents. Therefore, once they start working they consume less than the income they earn as they save a proportion of their income thereafter. In times of retirement their consumption slightly increases as they now consume more than their income because of the wealth accumulated throughout their lifetimes by saving or investing in assets (Gali, 1994). This theory assumes that price levels and interest rates remain stable and that individuals inherit no assets from family therefore consuming their own wealth only (Ochechuku, 1998). The Life Cycle Theory of Consumption has been criticised in that it is unrealistic, in the sense that no individual has complete knowledge of the future or future emergencies (Supriya, 2015). However, Deaton (2005) argues that life-cycle theory is still relevant and still helps members of society to think about the future. This theory suggests that the relationship between income and household consumption can be negative as consumers may save for future consumption.

Another theory of consumption is the Permanent Income Theory of Consumption proposed by Milton Friedman in 1957. This theory also suggests that consumption is not determined by current income but by long-term expected income as for the Life Cycle Theory of Consumption (Supriya, 2015). According to Friedman (1957), people plan their consumption on expected average income over a long period, which Friedman refers to as permanent income. The average income comprises two sources of income; namely, labour income (income generated from offering labour services) and wealth income (income generated from assets and savings). Friedman (1957) also regards consumer

durables such as vehicles, television sets and refrigerators as part of wealth and the imputed value of the services flowing from these durables as consumption (Supriya, 2015). This theory therefore seems to suggest that current consumption is affected by income and wealth generated by individuals, implying that variables, such as interest rates, that affect wealth may affect consumption.

2.2. Empirical Evidence on Macroeconomic Determinants of Consumption

Although the aforementioned theories mostly focused on income and saving as key determinants of consumption, other macroeconomic variables, such as interest rates, inflation and exchange rates have been identified as determinants of consumption (Chari et al., 2002; Pettis, 2011; Verter & Osakwe, 2014; Ezeji & Ajudua, 2015). Interest rates change over time because of monetary policy decisions and links to changes in consumption expenditure (Pettis, 2011). When interest rates increase, individuals tend to spend less and save or invest a larger proportion of their income due to higher returns from increased interest rates (Blare, 1978; Aruoba & Schorfheide, 2011). Individuals who usually spend borrowed funds also spend less on consumption when interest rates are high (Pettinger, 2007). Additionally, consumption of borrowed funds goes down when interest rates are high as individuals refrain from borrowing when interest rates are high (Pettinger, 2007). On the other hand, a decrease in interest rates discourages saving and increases consumption and a greater proportion of income is channelled to consumption expenditure (Aruoba & Schorfheide, 2011). Thus, it can be said that an inverse relationship exists between consumption and interest rates.

Price levels in an economy also have considerable influence on consumption. This influence is observed through inflation, which is defined as a general increase in the price level (Stanlib, 2015). A higher inflation rate reduces disposable income available to consumers, which in turn means less purchasing power (Taylor, 2013). Thus, high inflation ultimately results in lower levels of consumption expenditure. In contrast, a lower inflation rate results in consumers having more disposable income, which therefore boosts consumption expenditure as consumers can afford to purchase more. This relationship was confirmed by Koskel & Viren (1985) and Ezeji & Ajudua (2015) who tested the effect of inflation on consumption expenditure and concluded that an inverse relationship exists between inflation and consumption expenditure.

The exchange rate is another macroeconomic variable that can affect consumption expenditure. As explained by Ezeji &Ajudua (2015), the exchange rate is the value of one currency expressed in terms of another currency. When the domestic currency depreciates against a foreign currency such as the United States (US) dollar, it costs more domestic currency to acquire one US dollar. This loss in value would have an effect on spending on imported goods, which become more expensive when the domestic currency depreciates. On the other hand, an appreciation of the domestic currency against other currencies implies that it costs less to acquire foreign currency, making imported goods more expensive. Thus, exchange rate and consumption expenditure are linked through trade flows (Choi & Devereux, 2006). Empirically, the link between exchange rate and consumption expenditure was proven to be valid in the US during the 2000 and 2008 period, when there was a decline in the US dollar (Heim, 2010). The depreciation of the US dollar made foreign goods purchased by Americans more expensive thereby decreasing American real incomes. This income effect reduced US demand for both imported and domestic goods, which in some cases resulted in a substitution effect; since imports were more expensive demand shifted towards cheaper American goods (Heim, 2010). The cheaper US dollar also made US goods cheaper abroad, which increased US exports. Ezeji & Ajudua (2015) also found that there is an inverse relationship between exchange rate and consumption expenditure in Nigeria. In other words, consumption expenditure decreases as the Nigerian currency (naira) depreciates (Ezeji & Ajudua, 2015). However, other the studies (Opazo, 2006; Benigno & Thoenissen, 2008; Corsetti et al., 2008) found that the depreciation of the local currency is associated with an increase in real consumption expenditure. Thus, the link between the exchange rate and consumption expenditure depends on the nature of the economy.

The relationship between consumption expenditure and various macroeconomic variables has been investigated by several studies conducted by researchers across the globe. Kweka & Morrissey (1998)

investigated the impact of economic growth on consumption expenditure in Tanzania and found that GDP has no significant effect on consumption expenditure. In Nigeria, a study by Adedotun (1978) showed a positive correlation between consumption expenditure and per capita income. On the other hand, other studies (Uwujaren, 1977; Akekere & Yousuo, 2012) found that aggregate income has a positive and significant impact on private consumption expenditure in Nigeria. Besides income, Tomori (1972) and Ajayi et al. (1974) found that monetary aggregates such as interest rates are among the major determinants of consumption expenditure in Nigeria. Forgha (2008) also attempted to formulate econometric models of consumption and savings functions for Cameroon during the period 1970 to 2007 and found that disposable income, general price level, expected inflation, interest rate and dependency ratio have a positive impact on private consumption.

3. Methodology

3.1. Data and Variables Description

The study used a quantitative analysis of quarterly observations, from the first quarter of 1995 to the last quarter of December 2015. The selection of the sample period was informed by the changes in economic structures introduced after South Africa became a democratic state in 1994. The data was accessed from the South African Reserve Bank (SARB) and Statistics South Africa (Stats SA). The abbreviations and description of all variables used in the study are provided in Table 1.

Table 1. Summary description of the variables

Abbreviation	Variable name	Description	Measurement
HC	Household consumption	Final consumption expenditure by households (constant 2010 prices)	Millions of rand
GDP	Gross Domestic Product	Seasonal adjusted real Gross Domestic Product (constant 2010 prices) as a proxy of income	Millions of rand
CPI	Consumer Price Index	consumer price index (Headline)	Index
LTIR	Long-term real interest rate	Real yield on loan stock traded on the stock exchange: Government bonds - 10 years & over	Percentage
STIR	Short-term real interest rate	Real yield on government bonds - 0 to 3 years	Percentage
RER	Real effective exchange rate	Average exchange rate of the rand against 20 trading partners	Index

3.2. Model Specification

Utilising the variables listed in Table 1, the function of household consumption expenditure can be expressed as follows:

$$HC = f(GDP, CPI, RER, LTIR, STIR) \quad (2)$$

Considering that the aim of this study is to test both short-run and long-run responses of household consumption expenditure to the selected variables, the autoregressive distributed lag model (ARDL) model was used. This model was selected because it uses a single equation to estimate short-run and long-run relationships (Pesaran & Shin, 1998). The ARDL can also be utilised when all variables are stationary (I(0)), non-stationary (I(1)) or even when they are a mixture of I(0) and I(1) variables (Pesaran et al., 2001). Additionally, the ARDL model permits the use of a different number of optimal lags for each variable. The following ARDL model was generated from the function in Equation 2.

$$\begin{aligned}\Delta \mathrm{LHC}_t = {} & \mathrm{c} + \sum_{j=1}^{k} \emptyset_j \Delta \mathrm{LHC}_{t-j} + \sum_{j=0}^{k} \propto_j \Delta \mathrm{LGDP}_{t-j} + \sum_{j=0}^{k} \beta_j \Delta LCPI_{t-j} + \\ & \sum_{j=0}^{k} \gamma_j \Delta LRER_{t-j} + \sum_{j=0}^{k} \delta_j \Delta \mathrm{LLTIR}_{t-j} + \sum_{j=0}^{k} \lambda_j \Delta \mathrm{LSTIR}_{t-j} + \varphi_1 LHC_{t-1} + \\ & \varphi_2 LDPG_{t-1} + \varphi_3 LCPI_{t-1} + \varphi_4 LRER_{t-1} + \varphi_5 LLTIR_{t-1} + \varphi_6 \mathrm{LSTIR}_{t-1} + u_t\end{aligned} \quad (3)$$

Where: LRHC is the log of real household consumption expenditure; LGDP is the log of the real GDP; LCPI is the log of the CPI, and LRER is the log of the real effective exchange rate. LLTIR is

the log of the long-term real interest rates and LSTIR is the log of the short-term real interest rates, and t refers to the specific time period. $\emptyset_j, \propto_j, \beta_j, \gamma_j, \delta_j, \lambda_i, \delta_j \; and \; \varphi_j$ are the coefficients to be estimated; while c and u_t, represent the intercept and the error terms, respectively. To test for co-integration or the long-run relationship between the variables, the hypotheses were set as follows:

- Null hypothesis (H_0) - there is no co-integration: $\varphi_1 = \varphi_2 = \varphi_3 = \varphi_4 = \varphi_5 = \varphi_6 = 0$;
- Alternative hypothesis (H_1) - there is a co-integration: $\varphi_1 \neq \varphi_2 \neq \varphi_3 \neq \varphi_4 \neq \varphi_5 \neq \varphi_6 \neq 0$.

To test the null hypothesis, a bounds test was conducted using Wald F-statistics, with estimated F-values compared to the critical value (estimated by E-Views 9). If the calculated F-value was greater than the upper critical value, H_0 was rejected and the conclusion was that there is a co-integrating relationship between the variables. However, if the lower critical value was greater than the estimated F-value, the H_0 could not be rejected, implying that there was no co-integration between the variables. Lastly, unless there was additional information, the result remained inconclusive if the estimated F-statistics were between the upper and lower critical values (Habanabakize & Muzindutsi, 2016). The existence of co-integration between variables would suggest that there is a long-run relationship between the variables and this would require the estimation Error Correction Model (ECM). The ECM equation derived from our ARDL model in Equation (3) is as follows:

$$\Delta \mathrm{LHC}_t = \mathrm{c} + \sum_{j=1}^{k} \emptyset_j \Delta \mathrm{LHC}_{t-j} + \sum_{j=0}^{k} \propto_j \Delta \mathrm{LGDP}_{t-j} + \sum_{j=0}^{k} \beta_j \Delta LCPI_{t-j} + \sum_{j=0}^{k} \gamma_j \Delta LRER_{t-j} + \sum_{j=0}^{k} \delta_j \Delta LLTIR_{t-j} + \sum_{j=0}^{k} \lambda_j \Delta LSTIR_{t-j} + \vartheta u_{t-1} + e_t \quad (4)$$

where u_{t-1} is the error correction term (ECT) and ϑ is the ECT coefficient that measures the speed of adjustment towards equilibrium. The ARDL model estimation was preceded by the correlation analysis to determine the associations between variables. The necessary diagnostic tests such as normality, parameter stability, autocorrelation and heteroscedasticity tests were conducted to ensure our ARDL model met the basic econometric assumptions.

4. Empirical Results and Discussion

Table 2 presents the results from unit root testing of the underlying variables, which are based on the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The null hypothesis for these two tests is that a variable has unit root against the alternative hypothesis that the variable is stationary. Both the ADF and the PP tests show that the null hypothesis is not rejected at levels but it is rejected at the first difference. This means that all the variables are stationary at the first difference or integrated of order one, I(1). Therefore, the ARDL model can be utilised to analyse the data since none of the variables is I(2). Thus, the next step is to use the bound co-integration to test for the existence of the long-run relationship between the variables.

Table 2. Results of unit root test

Variable	Model	ADF		PP		Order of integration
		Levels	1st Difference	Levels	1st Difference	
LHC	Constant	-0.8217	-3.8526***	-1.1820	-3.8368***	
	Trend	-2.5705	-3.9025**	-1.2303	-3.9035**	I(1)
LGDP	Constant	-1.3887	-4.7302***	-1.2898	-4.6421***	
	Trend	-0.8522	-4.9058***	-0.6292	-4.8303***	I(1)
LCPI	Constant	-0.7667	-8.2923***	-0.7469	-8.3096***	
	Trend	-2.3514	-8.2792***	-2.4686	-8.2931***	I(1)
LRER	Constant	-2.6014*	-9.5556***	-2.6064*	-9.5571***	
	Trend	-2.8072	-9.4954***	-2.8465	-9.4966***	I(1)
LLTIR	Constant	-1.8503	-8.6827***	-1.8316	-9.0851***	
	Trend	-1.8913	-8.7990***	-1.6611	-10.850***	I(1)
LSTIR	Constant	-1.6729	-8.4017***	-1.6301	-8.3841***	
	Trend	-2.1670	-8.4024***	-2.3215	-8.3931***	I(1)

(***), (**) indicate the rejection of the H_0 at the 1% and 5% level of significance, respectively

4.1. Long-Run Analysis

The bound co-integration under ARDL was used to test the existence of the long-run relationship. Using EViews 9, ARDL (2, 1, 0, 3, 4, 2) was automatically selected based on the Akaike Information criteria. This model was estimated with a trend and intercept and the results of the bound co-integration are in Table 3. The F-statistic is greater than the upper bound value at 0.05 significance level, implying that the null hypothesis for no co-integration was rejected. This result suggests that there is a long-run relationship between real household consumption and the selected macroeconomic variables.

Long-run coefficients in Equation 5 show that only real GDP and exchange rates have a positive long-run effect on real household consumption. Since GDP was used as a proxy for income, a coefficient of 0.82671 reflects a marginal propensity to consume. This implies that about 83 percent of the increase in real income is spent on real consumption. The negative coefficient for CPI suggests that, in the long run, an increase in price levels leads to a decrease in real consumption. The positive log-run relationship between the real effective exchange rate and real consumption implies that real consumption increases with the appreciation of the local currency against the other major currencies. The positive coefficients for both short-term and long-term interest rates imply that, in the long run, the increase in interest rates reduces household consumption spending. This finding is in line with the monetary policy expectation that the increasing costs of borrowing have negative implications for aggregate consumption.

Table 3. Results of ARDL Bounds Test

F-statistic	4.336244	
Critical Value Bounds		
Significance	**Lower Bound**	**Upper Bound**
10%	2.75	3.79
5%	3.12	4.25
2.5%	3.49	4.67
1%	3.93	5.23

LHC = 3.86896 + 0.82671LGDP - 0.56882LCPI + 0.06460LRER - 0.047 LLTIR

-0.02669LSTIR + 0.00981 @TREND (5)

The long-run results support the Cycle Theory of Consumption and Permanent Income Theory of Consumption, which suggest that income affects consumption over a long-term period. These results are also supported by Keynes' Absolute Income Theory of Consumption, which suggests that a positive relationship exists between income and consumption. The psychological law of consumption proposed by Keynes also supports the above results as it states that consumption increases as income increases just not by as much as the increase in income (Jhingan, 2002). Taylor (2013) supports the notion that an inverse relationship exists between the price level (also referred to as inflation) and real consumption. Ezeji & Ajudua (2015) also tested the effect of inflation on consumption expenditure and found that increases in inflation hamper consumers' purchasing power, which results in lower consumption expenditure. The long-run results on the effect of the real exchange rate on consumption suggest that real consumption tends to benefit from the appreciation of the local currency. This finding is in line with previous studies (Chari et al., 2002; Obstfeld, 2007; Ezeji & Ajudua, 2015), which found that consumption expenditure decreases as the local currency depreciates and increases as the local currency appreciates. However, findings from other studies (Benigno & Thoenissen, 2008; Corsetti et al., 2008; Opazo, 2006) support the notion that a real depreciation of the local currency can lead to an increase in real consumption. According to Devereux et al. (2012), this notion can be explained by the wealth effect where an unanticipated positive shock to the output of traded goods generates a wealth effect, which raises the demand for non-traded goods.

4.2. Short-Run Relationships

After the establishing of the long-run relationship, the ECM was estimated to establish the short-run dynamics. The results in Table 4 show that ECT is negative and significant at 0.01 significance level. The coefficient of -0.143705 suggests that about 14.71 percent of the deviations from equilibrium is eliminated each quarter. It therefore takes about 6.8 (1/0.1471) quarters to restore the long-run equilibrium in real consumption expenditure. This speed of adjustment in the consumption function is lower than 45.291 percent estimated by Forgha (2008) in the Cameroonian context. Most of the short-run coefficients are significant at the 0.05 significant level, implying that the selected macroeconomic variables have short-run effects on real household consumption. In the short-run, real consumption responds positively to changes in the real GDP; implying that income has an immediate effect on real consumption. Real consumption responds negatively to previous changes in CPI, LTI and STRI, implying that increases in price level and both short- and long-term interest rates tend to decrease real consumption in the short run. The real exchange rate coefficient is not significant at the 0.05 significant level, suggesting that exchange rate fluctuations seem to have no effect on real household consumption in the short run.

Table 4. ECM results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LHC(-1))	0.299529	0.085709	3.494712	0.0008
D(LGDP)	0.472296	0.093807	5.034754	0.0000
D(LCPI)	-0.081743	0.027842	-2.935976	0.0045
D(LRER)	0.009284	0.005184	1.790991	0.0777
D(LRLTI)	-0.008546	0.008442	-1.012322	0.3149
D(LRLTI(-1))	0.037484	0.010208	3.672133	0.0005
D(LRLTI(-2))	-0.033715	0.010198	-3.305935	0.0015
D(LRLTI(-3))	0.023283	0.008093	2.876974	0.0053
D(LRSTI)	-0.003836	0.003988	-0.961931	0.3394
(@TREND	0.001410	0.000397	3.551483	0.0007
ECT	-0.143705	0.049650	-2.894355	0.0051

The results in Table 4 relating to the inverse relationship between interest rates and consumption expenditure are supported by the study by Pettinger (2007), which showed that when interest rates are high, individuals who spend borrowed funds tend to spend less as borrowing costs become high during this period of high interest rates. Alternatively, borrowers spend more when interest rates are low as low borrowing costs discourage saving, leaving individuals with more disposable income. Studies by Koskel and Viren (1985) and Ezeji and Ajudua (2015) support the notion that an inverse relationship exists between inflation and real consumption expenditure in the short run. Their studies showed that when inflation is high consumption expenditure decreases as individuals have less purchasing power and this finding is also evident in our results.

4.3. Diagnostic Tests

Results from residual diagnostic tests and stability tests in Table 5, show that the estimated ARDL model is reliable. The null hypothesis for no heteroscedasticity and no serial correlation cannot be rejected, indicating that the residuals are homoscedasticity and are not autocorrelated. The Ramsey RESET test shows that the null hypothesis that the model is correctly specified cannot be rejected, suggesting that the parameters in the model are stable. The stability was also confirmed by the CUSUM graph (not reported here). This evidence of parameter stability implies that the relationship between real consumption and the macroeconomic variables was consistent throughout the sample period. Thus, the presence of major economic or financial events did not affect the consistency of the estimated relationship.

Table 5. Results of diagnostic tests

Test	Null hypothesis (H_0)	P-values	Decision
White Heteroscedasticity Test	No conditional heteroscedasticity	0.1936 (F) 0.1954 (Chi-Square)	Do not reject H_0
Breusch-Godfrey Serial Correlation LM Test	No serial correlation	0.6831 (F) 0.6254 (Chi-Square)	Do not reject H_0
Jarque-Bera (JB)	There is normality in residuals	0.1171	Do not reject H_0
Ramsey RESET Test	The model is correctly specified	0.5188 (F)	Do not reject H_0

5. Concluding Remarks

This study conducted an empirical analysis of the macroeconomic determinants of household consumption expenditure in South Africa. The ARDL model was used to analyse short- and long-run relationships between real consumption expenditure and selected macroeconomic variables, namely, aggregate income, short-term and long-term interest rates, inflation and the real effective exchange rate. Long-run results showed that South African households consume a large portion of their real income and that real consumption increases with the appreciation of the domestic currency. Our findings suggest that recent depreciation of the South African currency (rand) have negative consequences on real household consumption. Price levels and interest rates were found to have negative long-run effects on real consumption expenditure. In the short-run, an increase in price levels and interest rates was found to have adverse effects on real consumption expenditure. On the other hand, exchange rate fluctuations seem to have no effect on real household consumption in the short run. This means that macroeconomic stability variables such as inflation, real exchange rate and interest rates play a crucial role in determining real consumption in the South African economy. This result implies that monetary policy plays a critical role in stabilising household consumption expenditure. Hence, policy makers should manage inflation expectations, exchange depreciation and interest rate changes accordingly in order to maintain stable spending patterns among South African households.

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