THE CREDIT CONSUMPTION PATTERN IN SOUTH AFRICA: A TREND ANALYSIS

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Abstract

While the developed countries witnessed a significant contraction in credit consumption in response to the financial crisis in 2008, South Africa's household debt continues to be on the increase. This article is based on empirical research on the relationship between household debt and disposable income, net wealth, interest rates and inflation for the period between 1975 and 2013. Using regression analyses, the study examines the linkage between household debt and consumption spending in South Africa to capture the short-run and long-run dynamics. The results show that there is a significant relationship between household debt and disposable income, net wealth and inflation. Further tests indicate that there is a bidirectional causality running from economic growth to household debt and vice versa. However, it is revealed that there is no direct relationship between household debt and lending rates.

Keywords: Credit Consumption, Household Debt, Disposable Income, Economic Growth, South Africa

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1 Introduction

The global credit crunch of 2008-2009 that originated from the subprime mortgage imbroglio in the United States had wide-reaching socioeconomic and political implications that affected a host of countries globally. However, it appears that South Africa did not just survive but emerged relatively unscathed, being insulated from the worst of the financial contagion by the vestiges of the exchange controls that were introduced during the apartheid era to prevent capital flight. In addition, inflationary pressures that were caused by the commodities boom had already caused South African interest rates to rise. This process reduced demand for credit before the global crisis hit. Further, the tighter bank lending requirements imposed after the implementation of the Financial Intelligence Centre Act (FICA) of 2001 and the National Credit Act (NCA) of 2005 also helped to curb reckless lending practices that reduced the number of borrowers who were over-leveraged. Despite these regulatory measures in place, credit consumption is believed to have increased prior to- and post the global financial crisis period (Chipeta and Mbululu, 2012). In many countries, consumption accounts for more than half of GDP (Gerlach-Kristen, 2013). Consumption directly affects households' living standards and thus is an important measure of wealth (O'Toole, O'Connell and Gerlach-Kristen, 2013).

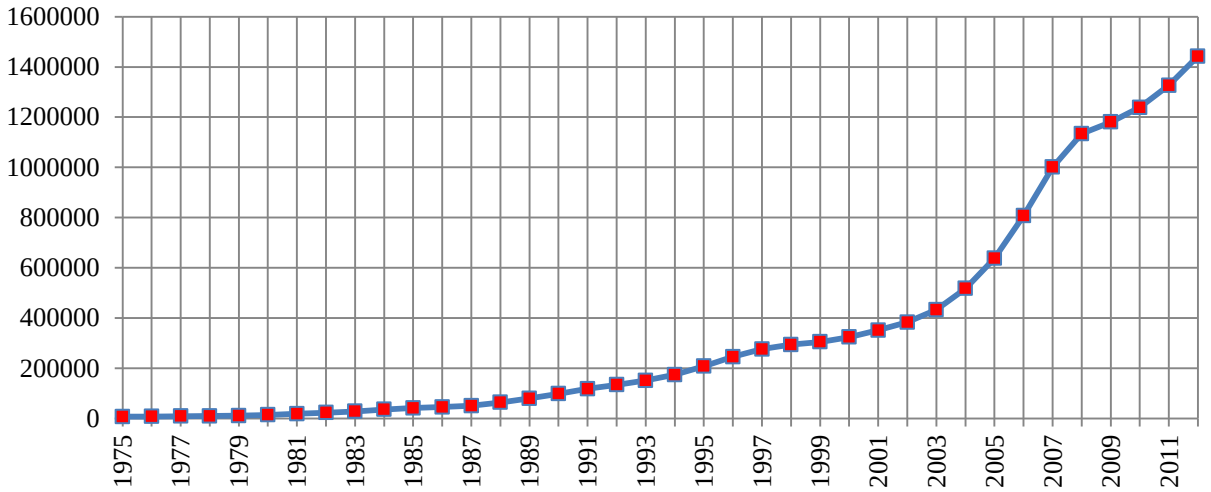
The aggregate household debt in South Africa has continued to increase over the past two decades especially among the rising black middle class (Cronje and Roux, 2010). As such, the process of credit provision has been under the spotlight for some time. Households use credit to fund purchases of durable consumer goods and assets, and they use it to bridge temporary drops in income. The total household debt for South Africa between 1975 and 2012 is shown in the Figure1 below.

The graph shows a steady and gradual increase of total household debt from 1975 to 1997, after which it stagnated until about 2004. The total household debt continued to rise sharply between 2005 and 2012. However, the developed countries have experienced a drop in household consumption post the global financial crisis (Žnuderl, O'Toole and O'Connell, 2012) while in South Africa, household consumption continues to be on the increase.

Inadequate regulation of the financial sector in many countries, including the United States, resulted in a lending explosion that allowed household debt to rise to unprecedented levels. Abundant credit and inadequate regulation led to the creation of products such as subprime mortgages which were targeted at vulnerable households which could only afford to repay their loans on the assumption that rapid house price and income growth would continue. The potential macroeconomic consequences of household borrowing also attracted much attention in the case of Spanish households, whose indebtedness has more than doubled in recent years. The total amount owed rose from around 46 to over 92 percent of annual income between 1995 and 2003 (Martinez-Carrascal

& del Rio, 2004). In the United States, it is believed that credit consumption has increased by more than 600% over the past two decades (Ekici and Dunn, 2010). Furthermore, in 2011 the total UK consumer spending was £851 billion out of a total gross domestic product (GDP) level of £1437 billion. Thus, credit consumption is by far the biggest single component of aggregate demand in the UK.

Figure 1. Total household debt for South Africa



According to literature, an economic cycle, particularly its turning points, plays an important role in the emergence of financial crises. An excessive debt accumulated in the foregoing period might become burdening for the borrower if market conditions reverse. In South Africa, the period prior to the financial crisis was characterised by rapid growth in credit extension that posed a risk to inflation target (Chipeta and Mbululu, 2012). The South African Reserve Bank then gradually raised the repo rate from 7% in 2005 to 12% by mid-2008 in an effort to curb excess credit (National Treasury, 2011). Then, as the financial crisis unfolded, the Reserve Bank reduced rates rapidly thereby cushioning the domestic economy from adverse global financial conditions.

The socio-economic base of credit usage has expanded tremendously over the last decade. This recent increase in the use of credit has occurred in tandem with the increase in income inequality. Different types of credit with varying characteristics have become available and as such, lower and middle-class households have increasingly turned to these financing tools to enjoy consumption opportunities that would not have been available otherwise (Krugman, 2007). There has been generally an increase in the number of credit facilities used in South Africa. (National Credit Regulator, 2012).These facilities include mortgages, collateralized credit such as vehicle finance and unsecured forms of debt such as credit cards, bank overdrafts, store cards and unsecured loans. It is interesting to also note that unsecured lending has seen some of the most spectacular growth rates since the implementation of the NCA with loans growing by more than 53% between 2010 and 2011(NCR, 2012). Unsecured credit transactions include all transactions in respect of which the borrower does not have any security. Unsecured borrowing has risen faster than household disposable income, raising concern among policy makers (Marcus, 2012).

According to Rajan and Zingles, (2003) increasing borrowing to finance consumption is seen as a stimulating factor for the economy. However there is concern that high levels of debt may prevent spending in the future and hence in the long run slow down economic growth. A high debt level therefore implies a higher debt service burden and restricts the ability of households to gain access to additional external funds. A high level of debt raises the households' vulnerability, reducing their ability to adjust to unexpected shock to their income, their assets or interest rates (Martinez-Carrascal and del Rio, 2004). Unexpected shocks may consequently lead to constrained household spending decisions. Against this backdrop, it is important to analyse the trend in household consumption, and its possible consequences for the economy's macroeconomic and financial stability (Nieto, 2007). Therefore, in the light of the contraction in GDP experienced during the crisis globally, movements in consumption represent a key economic indicator and it is important to understand their determinants. This paper examines these movements in South Africa between 1975 and 2013.

The approach used for the research on which the article reports differ from other approaches in three main respects. Firstly, the focus is mainly on the nature of the relationship between household debt and its determinants such as disposable income, household net wealth and macro-economic factors such as lending rates and inflation. The analysis includes the cointegration and causality relationships. Secondly, the author considers South Africa over a more recent

period, thus providing more appropriate and contemporary empirical evidence from emerging markets. Lastly, empirical analysis does not only focus on the nature of the relationship of variables in question but also looks at the implications of this interconnectedness in the context of household indebtedness and its impact on economic growth.

The aim of the paper is to investigate the nature of the relationship between household debt and some of the related macroeconomic determinants. The evidence was based on total household debt, household disposable income, household net wealth, household savings, gross domestic product per capita, interest rates and inflation during the period 1975 to 2013. The Johansen Cointegrating approach and Granger causality tests were utilized in an attempt to find the nexus between household debt and its determinants.

Financial intermediaries, especially banks, grant the household external funds, and consequently, the strength of the household financial position also affects the stability of the financial system. There is not much academic evidence of the impact of a relatively high level of indebtedness on consumption in South Africa. Given that household consumption expenditure accounts for almost 60% of GDP in South Africa, it is important to clarify the drivers of consumption as well as the potential factors which may hinder its growth. Understanding the determinants of credit consumption has policy implications at both micro and macro- levels. At the micro level the determinants of credit constraints help shed light on the credit granting process. At the macro level, credit constraints have been cited to explain the observed relationship between current consumption and income growth, and the rejection of the Permanent Income Hypothesis (Hoosain, 2012). Notwithstanding that the relationship between household debt and consumption spending has received much attention from academics; less focus has been given to the developing economies. The findings of this study may be useful to policy makers as this will help them make informed decisions on what aspects of household indebtedness to emphasize on.

The rest of the paper is organized as follows: section two constitutes a brief discussion of the relevant literature as applied in this paper. Section three discusses the research methodology by providing an overview of the data and variables used. Section four presents the empirical findings and finally, the discussion and conclusion are presented in section five.

2 Literature review

As is the case in many other economies, consumption may be placed as the epicentre of aggregate demand and therefore might play an important role in the art of economic analysis. According to Saad (2011), modern consumption revolves around three models namely: Keynes' (1936) absolute income hypothesis, Duesenberry's (1948) theory of consumption, Friedman's (1957) permanent income hypothesis (PIH) and Modigliani's (1975) life cycle hypothesis (LCH). Keynesian theory maintains that current household consumption patterns are a function of the current disposable income in a household. However, the theory is criticised on the grounds that it relates to the use of current as opposed to future potential income. As such consumption is based on the "fundamental psychological law" which states that on average people are likely to increase their consumption as income increases. Nevertheless, Keynes (1936) postulates that consumption patterns at the time were based on current income. However, today household consumption is believed to be dependent on future income. The central idea of these models is that households make their consumption choices on the basis of their wealth, current disposable income and future income expectations so as to guarantee a uniform level of consumption over their lifetimes.

According to the life cycle hypothesis (LCH) theory, Modigliani (1975) posits that consumption by a sensible consumer depends on available resources in conjunction with the allocation of income over a longer period of time. According to Dwivedi (2010) this enhances the principle of maximisation of utility. Modigliani's contribution to life cycle income hypothesis revolves around the fact that consumption is dependent on current income and net wealth. Modigliani asserts that households consider their entire life span when making decisions on how to spend (Saad, 2011). It is further argued that consumption is dependent on the position of the individual in the life cycle with the aim of the smoothening consumption over a life time in which income fluctuates substantially depending on age.

According to Duesenberry's (1948) consumption theory, the level of consumption is dependent upon the income received, but clarifies that this would be in relation to households with which it identified itself with. Duesenberry (1948) further suggests that consumption in relation to income earning could be categorised as "sticky downwards" since households tend to adjust their spending patterns upwards when income increases but are reluctant to do so when the contrary happens. The author refers to this as the "ratchet effect". Furthermore, there are transitory purchases made by households which do not require immediate consumption yet are attractive for various reasons such as discounted prices (Thornley, 2008). Purchases made from transitory cash include bonuses or winnings from lottery tickets or gambling. According to Saad (2011) Friedman's (1957) PIH manifests itself in a combination of both permanent income hypothesis as well as transitory income. In keeping with the insights of the relative income hypothesis (Duesenberry, 1949), households will seek to maintain consumption relative to standards

achieved in the past and contemporary standards established by others (Kim, Setterfield and Mei, 2014)

Thus as consumers age, their consumption growth is likely to be negatively affected by their overall debt. Using a calibrated partial equilibrium overlapping growth (OLG) model, Tudela and Young (2005) investigated the relationship between household debt and consumption income in the United Kingdom (UK). The results indicate that variables such as income growth expectations, wealth, real interest rates and the removal of credit constraints play a significant role in explaining the substantial rise in household debt in the 1990s. Magri (2002) suggests that rises in net wealth are tracked by falls in the demand for consumer credit as spending can be financed autonomously. Households with intermediate net wealth levels are more likely to participate in the consumer credit market due to increased spending patterns that characterise improvements in life style.

However, Bayar and Mc Morrow (1999) also argue that other than current disposable income, other influences such as wealth can impact on current levels of consumer spending. The link between aggregate household debt and consumption has been investigated. Barchetta and Gerlach (1997) and Ludvigson (1999) found that a rise in the growth of household debt raises the growth of consumption. Bacchetta and Gerlach (1997) reported a significant impact of credit aggregates on consumption in the United States, Canada, United Kingdom, Japan and France, indicating liquidity constraints. The authors argue that credit tightness (difference between banks' borrowing and lending rates), appears to be negatively related to the growth of consumption. Ludvigson (1999) analysed the implications for the excess sensitivity of changes in the fraction of income that can be borrowed by households. Differently from other studies, the author considered a random variation in the credit ceilings, a key feature in order to explain the findings; consumption growth is not just correlated with predictable income growth, but also with predictable consumer credit growth. However, Johnson (2007) establishes that a rise in the growth of revolving consumer debt reduces the growth of consumption.

Using a Vector Error Correction Model (VECM) where variables such as labour income, wealth and nominal interest rates were included, Martinez-Carrascal and del Rio (2004) investigated the impact of household borrowing and consumption in Spain. The authors established that The results indicate that both consumption and lending are positively related to both types of wealth and labour income in the long run, and negatively related to interest rates.

Chipeta and Mbululu (2012) examined the effects of the National Credit Act (2007) and the global financial crisis on domestic extension in South Africa. The authors establish a general increase in the consumer credit provision in the period subsequent to the implementation of the NCA. There was a general increase in the use of credit cards, and other conventional loans. Apart from the three models discussed above, the social exchange theory (SET) indicates there are other factors that cause individuals to incur debt (Cropanzano and Mitchell, 2005). Consumers are influenced by their social status, which indirectly determine their financial decision-making. Some of these factors are discussed in the following paragraphs.

From a theoretical perspective, changes in credit obtained by households are linked to both supply- and demand-side factors. Rajan and Zingales (2003) suggest that household expenditure generally stimulates economic growth, and is therefore seen as an important driver of growth. Household expenditure is sturdily influenced by the current and anticipated disposable income of households, the asset holdings of households and changes in the market value of their assets, the cost of credit, the age distribution of consumers and regulatory measures. Prinsloo (2002) further contends that the spending and saving behaviour of household is determined by factors such as social and material needs, taste, fashion, cultural and traditional beliefs, cost and standard of living, current debt to income ratio and the possibility of a future increase in aggregate income. Overall household consumption expenditure is therefore determined by consumer access to credit (O'Toole, O'Connell and Gerlach-Kristen, 2013) and the debt to income ratio.

Underlying these credit consumption trends have been flexible housing markets and favourable credit conditions. These developments have been reinforced by financial liberalisation and innovation which have eased the access to credit of borrowers who had previously been denied. According to Aron and Muellbauer (2013), credit liberalisation affects consumption in three ways. Firstly, it reduces the credit constraints on households engaging in smoothing consumption when they expect significant income growth. Secondly, financing constraints on first-time home buyers are relaxed and finally it increases the availability of collateral-backed loans for households already in possession of collateral.

Muellbauer (2007) finds that housing wealth effect occurs with financial market liberalisation which provides a collateral channel in response to information asymmetries between borrowers and lenders. He finds that housing wealth effect is twice as large in the United States as the UK. Using regression analysis, Hoosain (2012) examined the relationship between consumer credit and consumption spending in South Africa. The findings indicate a significant positive relationship between household debt and consumption spending. Other factors that influence an individual's propensity to consume or save depending on the importance attached to current as opposed to future income (Girouard, Kennedy and Andre, 2007). Some of these factors include the time horizon, the preference effects and capital market imperfections.

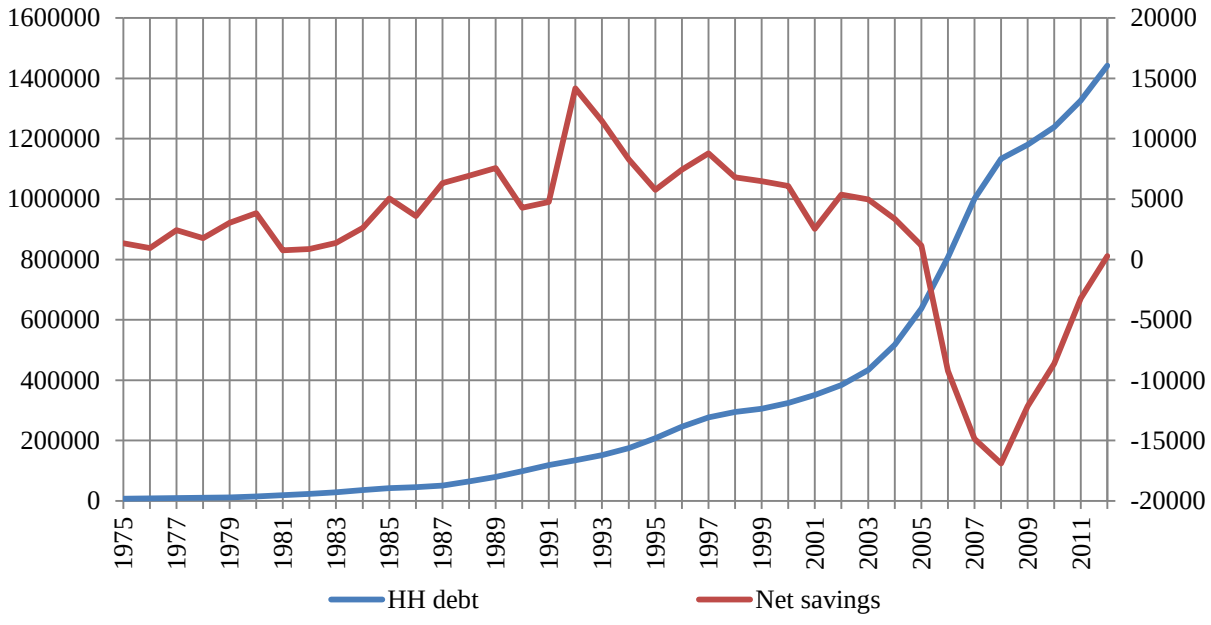
An individual consumer needs to determine whether he has a short- or long-term planning horizon in terms of consumption. The time preference effects take into account the impact of interest rate on consumption and savings. Deacon (1991) put forward a model relating consumption growth to expected income growth. The author established that consumers who expect their income to grow in future tend to increase their current consumption. In addition to that Ekici (2010) found that income expenditures of individual consumers are positively related to their borrowing. It has therefore been argued that it is income expectations rather than debt that drive consumptions decisions (Maki, 2000). For example, in the 1970s the fairly low cost of credit in South Africa during the cyclical upswings in 1973/74 and 1979/81 led to increases in the demand for consumer credit.

Interest rates tend to reduce aggregate consumption because of the wealth declines associated with the heavier discounting of future income (Bayar and McMorrow, 2007; Moroke, 2014). An increase in interest rates gives rise to rising inflation which makes it difficult for consumers to repay their debts. Higher inflation increases the growth of household consumption. The reduction in interest rates both in nominal and real terms, contribute to a significant easing of liquidity constraints on households. In a study of South African households between 1980 and 2005, Aron, Muellbauer and Prinsloo (2007) establish a positive correlation between the real interest rate on borrowing and the debt-to-income ratio. A reduction in interest rate between 2003 and 2005 saw a reduction of the debt service ratio by 6% in 2004. As expected, the amount of credit accessed by all sectors soared significantly until 2006 before reverting to the same low levels that existed prior to 2004 after the interest rate shock.

Thus changes in interest rates have an adverse bearing on the demand for credit/loans. On one hand, there is bound to be a positive effect on the volume of loanable funds provided that a rise in interest rate increases the net income attained by credit institutions. But on the other hand, a credit rationing situation may arise, as indicated by Stiglitz and Weiss (1981), where the financial sector might perceive greater risks associated with an increase in interest rates. Taken as a whole, interest rate increases would appear to reduce aggregate consumption because of the wealth declines associated with heavier discounting of future income.

South Africa, in contrast to many other developing countries, has a culture of debt rather than one of saving (Cronje and Roux, 2010) as shown in Figure 2. Household net savings graph has been positive but fluctuating until about 2005 when it took a dip into the negative, with the lowest net savings being recorded in 2008 which coincided with the global financial crisis. Although on the increase again, household net savings is still way below the total household debt level necessitating the need for households to continue to thrive on credit.

Figure 2. Household debt and Net savings



A number of other factors have been shown to be influencing the high credit consumption in South Africa. These factors include demographic trends, ageing population, urbanisation and the impact of regulatory framework such as the National Credit Act (NCA). South Africa is characterised by high population growth rate which gives rise to high dependency ratios. For example, the ageing population in South Africa has given rise to an increase in the old age dependency ratio, which has contributed to the increase in debt (Cronje and Roux, 2010). High urbanisation trends also impact positively on

consumption as more and more households join the credit market.

The South African economy is characterised by income inequality where the greater proportion on the population has very little income. This segment of the population is mainly concerned about immediate survival and therefore shows a high propensity to consume. South Africa has experienced considerable credit market liberalisation and rising consumption and debt-to-income ratios. Financial liberalisation involved the deregulation of institutions coupled with interest rate liberalisation, elimination of credit ceilings and the increased extension of credit to individuals. Cronje and Roux (2010), argue that credit liberalisation has three effects on consumption. Firstly it reduces the credit constraints on households engaging in smoothing consumption when they expect significant income growth. Secondly it reduces deposits required of first-time house buyers. Finally it increases the availability of collateral-backed loans for households already in possession of collateral (Aron and Muellbauer, 2013). Cronje and Roux (2010), posit that financial liberalisation often leads to lower interest rates and consequently increased consumer spending. Free access to credit made possible by the NCA has afforded households the opportunity to maintain higher levels of consumption than would otherwise have been impossible (Chipeta and Mbululu, 2012).

The key episodes of credit market liberalisation in South Africa that explain the trends in credit consumption levels are discussed below. Following the de Cock Commission reports (de Cock, 1978, 1985) the government initiated liberalisation by advocating for a more market-oriented monetary policy. Prior to 1994 a lot of black South Africans were not able to get credit due to the laws of apartheid. After the democratic elections in 1994 more black South Africans joined the formal job market and started to gain access to credit that was previously rationed on racial lines (Aron and Muellbauer, 2013). Following the international financial crisis of 1997-1998, tougher capital requirements were imposed on banks in 1998 in an effort to curb excessive mortgage lending in banks. In May 2002, Saambou Bank was placed under curatorship and bank supervision was subsequently tightened. In 2005 the National Credit Regulator was created and the National Credit Act came into effect in an endeavour to regulate credit lending. Thus, South Africa's well-regulated financial system escaped the global financial crisis relatively unharmed.

Despite the maximum interest rates introduced by the NCA in 2007, the level of indebtedness is still high. The NCA was put in place to ensure that credit providers do not lend recklessly and consumers of credit do not borrow more than they can afford (NCR, 2012). Instead, over the past year, there has been a 53-percent growth in unsecured lending due to the unintended consequences of the NCA (Chipeta and Mbululu, 2012), and predatory practices and pricing by unscrupulous credit providers are all contributing to the over-indebtedness of consumers (Arde, 2012). Aggressive marketing by banks and retail chain stores through promotions and reduced fees and rates has led to an increase in unsecured debt such as credit cards, personal loans and bank overdrafts. This has attracted marginal borrowers who were unable to borrow due to low incomes or lack of creditworthy track records. However, Thornley (2008) argues that unsecured debt attracts higher interest rates than that of secured lending and in most cases is confined to the segment of a population falling within a lower standard of living. Hence, the recent credit crunch provides a valuable opportunity to assess the consumption behaviour of households in a period of expanding credit followed by a period of restricted lending.

Using a quarterly panel data set of 23 economies over 32 years O'Toole, O'Connell and Gerlach-Kristen (2013) examine the impact of the financial crisis on credit consumption. Their findings indicate that in the long-run, consumption appears to be linked to income, housing and other financial wealth.

From the empirical literature discussed above, it should be noted that there are limitations in these studies. Firstly, some of these studies use basic descriptive statistics to show the factors that influence household debt. Secondly, the OLG method that was used by Tudela and Young (2005), Jacobsen (2004) and Martinez-Carrascal and del Rio (2004)fail to take into consideration the methods which the current study intends to adopt for the analysis. Problems of Unit root in time series variables which result in spurious regression results are not taken care of. This study intends to use cointegration in estimating the model describing the short-run and long-run relationships from the South African household data and the related macro-economic factors. Furthermore, multivariate causality tests are employed in order to confirm causality between variables.

3 Methodology

3.1 Data sources and definition of variables

Data were collected from the South African Reserve Bank's (SARB) website. The data used in this study are mainly annual time-series data, which span 1975-2013 in an effort to show the consumption patterns prior to- and post the global financial crisis of 2008/2009. The dependant variable is total household debt. The explanatory variables are household disposable income (HDI) and household net wealth and household consumption. Control variables such as inflation, interest rate and economic growth proxied by gross domestic product per capita (GDPPC) were included because they are macro-economic variables which are likely to influence the up-take of credit by households. Initially the regression model was run to

determine the short-run relationship of consumption as measured by household debt and independent variable. Then, in an attempt to establish a long-run relationship between consumption and debt, the Johansen cointegration technique was employed.

The theoretical underpinning is that household debt is driven by consumption. A high degree of household debt is believed to increase a country's inclination to financial crisis, and this acts as a hindrance for economic growth. Household debt is assumed to have a negative relationship with economic growth. The cost of financing is proxied by nominal interest rates because credit market conditions are typically related to nominal rather than real interest rates. In this regard, a drop in interest rate will normally lead to an increase in the supply of credit, and could therefore have an influence on consumption (Prinsloo, 2002). A change in interest rate could have an effect on credit extended to households and this would ultimately influence aggregate demand. Net wealth signifies consumption by households, reflecting their perceptions of the wealth effect; hence households care about their net worth (total assets minus liabilities). The inflation variable is represented by the annual Consumer Price Index (CPI) figures. Inflation is assumed to have a negative relationship with household debt.

3.2 Model specification

The objective of this study was to determine the relationship between household debt and credit consumption in South Africa. The model specification for this study is portrayed in the equation below:

$$TOT\_HD_t = \beta_0 + \beta_1 HDI_t + \beta_2 HCE_t + \beta_3 GDPPC_t + \beta_4 H\_SAV_t + \beta_5 WEALTH_t + \beta_6 INT_t + \beta_7 CPI_t + \varepsilon_t \quad (1)$$

Where: TOT_HD_t = is the total household debt
HDI = the annual household disposable income
HCE = the household consumption expenditure
GDPPC = economic growth rate as measured by the gross domestic product (GDP) per capita
WEALTH = net wealth of households
H-SAV = household savings
INT = the real interest rate per annum at time t
CPI = the consumer price index (inflation rate at time t)
ε_t = white noise
t = time
B_0 - β_4 = the coefficients explaining the elasticities of explanatory variables. These values are constants determined by available technology

4 Data analysis and discussion

The first step was to find whether there is a deterministic or short-run relationship between household debt and consumption variables. The results of the OLS are shown in Table 1 below:

Table 1. Ordinary Least Squares method

Variable	*Coefficient*	*Std-Error*	*t-Statistic*	*Probability*
LNGDPPC	-5.699967	1.496609	-3.808588	0.0006
LNHCE	5.524280	1.393239	3.965063	0.0004
LNHDI	-0.482049	0.279956	-1.721872	0.0947
NETWEALTH	0.000722	0.000103	6.974480	0.0000
INT	0.047960	0.017778	2.697787	0.0110
CPI	0.051899	0.014439	3.594387	0.0011
H_SAV	6.67E-05	1.60E-05	4.175519	0.0002
R-squared	0.930884	Mean dependent var		11.96054
Adjusted R-squared	0.917924	S.D. dependent var		1.967850
S.E. of regression	0.563766	Sum squared resid		10.17064
Durbin-Watson stat	1.867394	J-statistic		0.740912
Instrument rank	8			

The results indicate that household debt is negatively correlated with the natural logarithm of GDP per capita and household disposable income indicating that as debt increases disposable income and economic growth decreases. Household debt is positively and significantly correlated to consumption expenditure, net wealth, interest rates, inflation and household savings. The model has a 92% explanatory power as indicated by the adjusted R-squared value. All variables are significant at the 1% level except household disposable income which is significant at the 10% level.

4.1 Unit root test

The data were subjected to unit root tests using the Augmented Dickey-Fuller Schwarz Info Criterion before they were tested for cointegration. The results of the stationarity tests on differenced variables are presented in Table 2.

Table 2. Stationarity tests of variables on first difference – Augmented Dickey Fuller (ADF) test

Variable	*No trend*	*Intercept*	*Trend & Intercept*
D(LNTOT_HD)	0.464448	-1.053952	-0.535542
D(LNHDI)	-1.161296	-2.831510*	-6.306365***
D(LNGDPPC)	-3.878767***	-3.935965***	-4.247757***
D(LNHCE)	-2.250778**	-3.961001***	-3.963555**
D(NETWEALTH)	-1.587653	-2.560565	-4.754383***
D(INT)	-5.797494***	-5.730793***	-5.751871***
D(CPI)	-5.630101***	-5.571873***	-5.510422***
D(H_SAV)	-4.875803***	-4.808290***	-4.753057***

Note: ***, **, * Denotes 1%, 5% and 10% level of significance

The results of the unit root tests suggests that the data does not show statistical indication of the presence of unit roots, as all variables tested were stationary in the first difference or 1(1). Unit root test is important because it lays a basis for cointegration tests and therefore satisfies one of the important assumptions of regression analysis. After unit root testing the variables were tested for serial correlation. The Breusch-Godfrey Serial Correlation Lagrange Multiplier Test was conducted. This technique was found to be appropriate for this series because it analyses how well the lagged residuals explain the residuals of the original equation (Studenmund, 2011).

4.2 Cointegration analysis

Thus having established that all variables are non-stationary and integrated of the order one, we proceed and test for the number of cointegrating relationships by applying the Johansen Test for Cointegration. Cointegrated values ensure that we eliminate spurious relations and as such share common stochastic trends. Further than that, they enable us to formulate an error correction model as we determine the long-run relationship among the variables. We first estimate a restricted VAR and determine the lag length selection criteria. The optimum lag length selected is 5. The results are presented in Table 2. We then apply the Johansen test using the optimum lag length of 5. Table 3 depicts the result of the cointegration test, in which the trace statistic suggests that there are five cointegrating relationships amongst the variables. The null hypothesis that there is no cointegrating vector is rejected. However, the maximum eigenvalue test indicates that there are two cointegrating relationships. According to Table 2, the results of the cointegration suggest that the null hypothesis of no cointegration is rejected. The Unrestricted Cointegration Rank Test indicates five cointegrating equations at the 5% level. This result is further reinforced by the Unrestricted Cointegration Rank Test (Eigenvalue) which indicates two cointegrating equations at the 5% level.

Table 3. Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	***Eigenvalue***	***Trace Statistic***	***0.05 Critical Value***	***Prob.*****
None*	0.910422	315.7699	187.4701	0.0000
At most 1*	0.864150	226.5019	150.5585	0.0000
At most 2*	0.692270	152.6423	117.7082	0.0001
At most 3*	0.659990	109.0367	88.80380	0.0008
At most 4*	0.592489	69.12180	63.87610	0.0170
At most 5	0.420290	35.90738	42.91525	0.2096
At most 6	0.235629	15.73394	25.87211	0.5140
At most 7	0.144903	5.791987	12.51798	0.4872
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				

Table 3. Cointegration Test (continued)

Hypothesized No. of CE(s)	*Eigenvalue*	*Max-Eigen Statistic*	*0.05 Critical Value*	*Prob.***
None *	0.910422	89.26800	56.70519	0.0000
At most 1 *	0.864150	73.85954	50.59985	0.0001
At most 2	0.692270	43.60565	44.49720	0.0623
At most 3 *	0.659990	39.91490	38.33101	0.0326
At most 4 *	0.592489	33.21442	32.11832	0.0366
At most 5	0.420290	20.17344	25.82321	0.2333
At most 6	0.235629	9.941955	19.38704	0.6251
At most 7	0.144903	5.791987	12.51798	0.4872
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level * denotes rejection of the hypothesis at the 0.05 level **MacKinnon-Haug-Michelis (1999) p-values Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):				

4.3 Test of Causality

Having established that there are at least two cointegrating relationships between household debt and consumption variables, the author proceeded to investigate the direction of causality among these variables. The Granger causality tests are therefore used in the study in order to determine whether there exists a long-run relationship between the variables under investigation. The results are reported in Table 4. The results further suggest that there is causal flow from net wealth and household saving to total household debt, while household debt influences inflation.

Table 4. Granger Causality Test

Pairwise Granger Causality Tests				
Serial number	*Null Hypothesis*	*F-Statistic*	*Probability*	*Direction of causality*
1	INT does not Granger Cause LNTOT_HD	0.74082	0.6415	≠ >
2	LNTOT_HD does not Granger Cause INT	2.24464	0.0822	≠ >
3	LNGDPPC does not Granger Cause LNTOT_HD	2.30731	0.0754	≠ >
4	LNTOT_HD does not Granger Cause LNGDPPC	9.63172	7.E-05	→
5	LNHCE does not Granger Cause LNTOT_HD	1.47513	0.2412	≠ >
6	LNTOT_HD does not Granger Cause LNHCE	2.04622	0.1080	≠ >
7	LNHDI does not Granger Cause LNTOT_HD	1.69634	0.1764	≠ >
8	LNTOT_HD does not Granger Cause LNHDI	1.44288	0.2524	≠ >
9	NETWEALTH does not Granger Cause LNTOT_HD	53.3015	2.E-10	→
10	LNTOT_HD does not Granger Cause NETWEALTH	1.16215	0.3734	≠ >
11	H_SAV does not Granger Cause LNTOT_HD	8.08595	0.0002	→
12	LNTOT_HD does not Granger Cause H_SAV	1.15687	0.3761	≠ >
13	CPI does not Granger Cause LNTOT_HD	0.46314	0.8477	≠ >
14	LNTOT_HD does not Granger Cause CPI	2.89379	0.0348	→

The analysis contained in Table 4 suggests that household debt does influence economic growth and inflation while net wealth and savings influence household debt at the 1% level of significance. These results are largely as expected and consistent with the view that household debt influences economic growth (Barba and Pivetti, 2009; Aregbeshola, 2014; Kim, Setterfield and Mei, 2014). As household debt increases, consumers continue to borrow so as to purchase goods and services produced by local industry and this indirectly affects GDP as industry grows in an effort to satisfy demand. The relatively low interest rates have supported the growth of household consumption as families are left with more disposable income to spend on goods and services. However, it must be noted that the results in Table 4 also indicate that net wealth and household savings do influence household debt. Household savings reached a peak negative low during the global financial crisis after which it picked up again. During this time households used their savings to pay off their debt.

5 Discussion and conclusion

The evidence emerging is that the indebtedness of South African households has risen sharply in recent

years. This paper examines the causal relationship between household debt and macro-economic variables in South Africa as understanding the link will be critical to policy makers in their quest to curb the increasing household indebtedness. The increase in household debt has helped to sustain the growth of consumption and residential investment and, probably, the resilience of the South African economy to the 2008/2009 global financial crisis. The empirical results suggest that there is a long-run relationship between economic growth and total household debt.

Total household debt is indeed a function of household consumption expenditure, disposable income and net wealth. The increase in household debt over the years is partly a process of a structural nature. A combination of such factors as credit liberalisation, higher disposable income, low net wealth and periods of low interest rates explain the rising levels of household debt. At the same time, household wealth is negligibly low indicating very little investment in assets and low savings. The implication of the study is that the increase in household debt has supported household consumption expenditure in South Africa at the expense household net wealth.

The sharp increase in household debt and consumption warrants much attention owing to its macroeconomic and financial implications. The concern is two-fold. Higher debt levels lead to higher consumption spending in South Africa. The concern arises during a recessionary period in the economy, when households struggle to contain these high debt levels. Concern is also expressed over consumer behaviour, which in the case of South Africa makes a significant contribution to GDP. South African households/consumers are therefore encouraged to spend less and save more. With interest rates being cleverly controlled by the reserve bank in the event of inflation going up, South African households will be burdened by debts that they will not be able to pay, a situation similar to Greece's experience. Rising levels of household consumption expenditure generally stimulate the economy, whereas slower growth or decline in aggregate consumption expenditure has a dampening effect on economic growth.

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