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The Relationship between Household Debt and Consumption Spending in South Africa

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Abstract: Consumption has been and remains the main contributor to gross domestic product (GDP) growth in South Africa. Household debt on the other side has remained high over the years. These two economic indicators are a reflection of the well-being of an economy. This study thus examined the relationship between household debt and consumption spending, for the period between 1994 and 2013. The Johansen cointegration technique and the Vector error correction model (VECM) were utilised to test the long run and short run relationships between the variables. The Granger causality test was also employed to test the direction of causality between the variables. Results from this study have revealed that a relationship exists between household debt and consumption spending in South Africa and they have also showed that this relationship flows from household debt to consumption spending. The implications of these results are that consumption spending may be increased through other measures rather than through increasing debt. The study therefore recommends that policy makers avail more investment opportunities for households and to also create employment in a bid to increase the income of households which can then be used to increase household consumption rather than the use of debt.

Keywords: *Household debt, household consumption, Vector Error Correction Model, Granger Causality*

1. Introduction

Many countries both developed and developing have had phases and experiences of high household indebtedness (Barba & Pivetti, 2009). South African households' indebtedness has been trending upwards from the beginning of the new political dispensation to date where the country has seen household debt rising significantly over the years. This is demonstrated by the significant rise in household debt as a percentage of household income, from as low as below 55% in 2001 to an approximated 80% in the year 2009 and 79% in 2013 (StatsSA, 2010). Household consumption spending has been and remains a main contributor to GDP growth post-apartheid (Prinsloo, 2002; Hlala, 2014). Consumption spending was said to have contributed 59% to GDP growth on average from 1994 until 2012. This implies that a link between household debt and consumption spending would ultimately affect GDP growth (Hlala, 2014). Borrowing by South Africans has been unrelenting notwithstanding the National Credit Act of 2006 as well as the credit amendment bill of 2014, set forth as measures against reckless lending. New credit contracted increased by 6.77% as of the third quarter up till the fourth quarter in 2014 (National Credit Regulator, 2014). Factors that are foremost in increasing household debt consist of the structure of the credit policies in the country, such as the relaxation of lending conditions, growing credit facilities and low borrowing rates (Crawford & Faruqui, 2012). Bateman (2014) advocates that lending by microcredit institutions has also steered high household indebtedness in South Africa by raising credit accessibility. Moreover, anybody can have access to such credit even if they lack collateral and households are repeatedly enticed into resorting to such credit amenities to fund their consumption.

Regrettably, with high household debt emanates the debt servicing burden, thus highly indebted households will then be obliged to spend a share of their after tax income in reimbursing their debt plus the interest payments allied to it. Households would therefore cut on their consumption as they now have less disposable income. High indebtedness also unfits households for further credit and given that a sizeable number of them borrow for consumption, they will therefore be mandated to minimize their consumption. Some households have a tendency to borrow so as to be able to consume beyond their low income levels and consequently consumption spending is higher than the income levels for such households. As the disparity is financed through credit, household indebtedness has risen considerably (Keeton, 2013). Thus the requisite for spending on consumption drives the increased household debt. Concurrently, intensified credit accessibility which facilitates borrowing in the country fuels consumption spending (Prinsloo, 2002). The connection between these variables thus needs to be clarified. To that end, this paper aims to study and empirically establish whether a relationship exists between household debt and consumption spending in South Africa

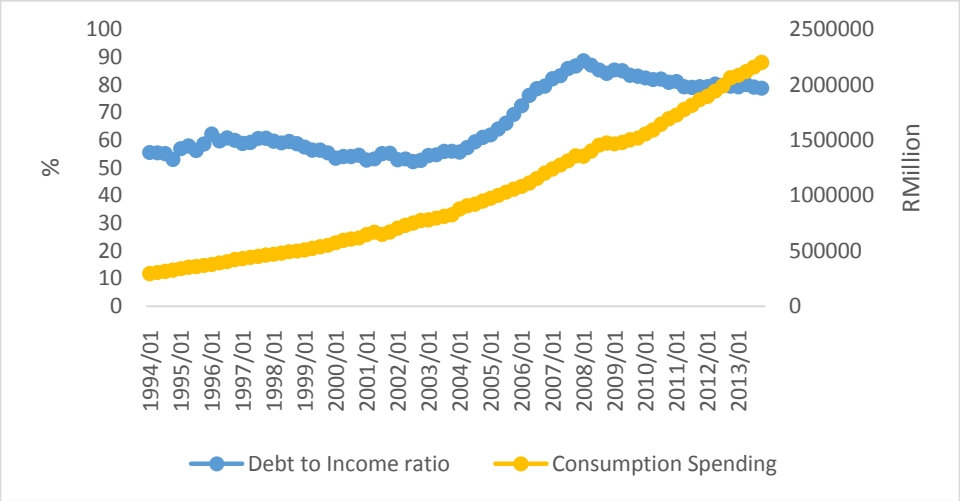
and the nature thereof. The rest of the paper is organised into a brief overview of South African household debt and consumption spending in the second section, literature review in the third section, methodology in the fourth section, presentation and interpretation of empirical findings in the fifth section, then conclusions and policy recommendations in the sixth and final section.

Overview of Household debt and Consumption spending: Household debt generally took an upward trend in South Africa from the beginning of the new political dispensation period in 1994 to date (Dykes, 2007). However, the country's household debt trends compare favourably with those of a number of developed countries such as the US, Canada and Australia which recorded high household debt levels especially in 2007 where the rate was 145% for Canada, 199% for Australia and 145% for the US while South Africa recorded a rate of 85% during this period This is despite the poor performance of South African households in terms of servicing their debt (Dykes, 2007). A comparison with other emerging economies indicates that household debt as a fraction of income in South Africa is similar although slightly higher than most of the countries with comparable per capita income levels and financial market sophistication (International Monetary Fund, 2004). Reasons for the slightly higher debt ratio for South Africa included the increase in unsecured lending which was an upshot of tighter lending conditions, a reduction in mortgage profitability, the declaration of the 2007 Credit Act, as well as the promotion of financial inclusion put in place to reduce borrowing after the financial crisis.

In terms of consumption spending, South Africa is ranked among the highest in Africa. In 2012, the country was ranked second after Egypt. Countries with the highest consumption expenditure are also the ones with highest GDP growth in Africa as consumption expenditure is the chief contributor to GDP for African countries. An analysis of South African consumption and GDP also confirms this. Consumption spending in South Africa has continued to grow since 1994. However, from the time of the global financial crisis, it started growing at a decreasing rate through to 2014 with a growth rate of 2.6% in 2013 and 2.1% in 2014 from 3.5% in 2012 (Loo & Swanepoel, 2015). This was as a result of the substantial and further weakening of the rand, coupled with higher interest rate levels and higher price inflation. A resultant of the increase in the repurchase rate by 50 basis points in January 2014 was household financial distress amid the high level of household indebtedness as this led to an increase in the amount that households allocated to the servicing of debt (Loo & Swanepoel, 2015). Thus, the combined forces of slow household disposable income growth, slower credit uptake, high interest rates and high inflation led to further declines in the growth rate of consumption expenditure (Bishop, 2014).

A look at the household debt (represented by the debt to income ratio in figure 1 below) and consumption spending trends in South Africa shows that although household debt generally fluctuates more than consumption spending, periods with significant fluctuations in household debt also have noticeable fluctuations in consumption spending. For example, during the periods 2001-2002 and 2007-2009, these variables would fluctuate in a similar pattern. Although consumption spending shows a continued upward trend, during periods of a fall in household debt, consumption spending would increase at a decreasing rate and during periods of a rise in household debt, the increase in consumption spending would be sharper. The two variables thus have a similar trend as the unfavourable conditions such as the global financial crisis that dampened household borrowing also had the effect of reducing spending. Factors that increased household debt such as relatively low inflation and interest rates, ease of access to credit, increases in real income, increases in asset and house prices and the creation of new employment opportunities also increased consumption spending. However households have a tendency to cut back on consumption when household debt has reached high levels as a debt management tool (Loo & Swanepoel, 2015).

Figure 1: Household debt and Consumption Spending Trends



Source: Author's Computation based on SARB Data

2. Literature Review

There exist a body of theories and models that have been put forward to explain household debt and consumption spending. Among the theories, there is the absolute income theory which suggests that only income determines consumption (Sloman, Wride, & Garratt, 2012). It thus leaves no room for borrowing to fund consumption. There is also the relative income theory which assumes that when higher consumption spending levels are attained, it is difficult for households to reduce them despite the economic conditions (Lipsey & Chrystal, 1995). It thus promotes the idea that households could actually opt for borrowing in order to sustain higher consumption spending. The permanent income and the life cycle theories give the impression that household debt will only affect consumption in so far as it affects permanent income and lifetime resources respectively. The intertemporal choice suggests that consumption is largely affected by interest rates which encourage people to either consume less and save more or consume more and save less (Lipsey & Chrystal, 1995). This model therefore suggests that people borrow for the purposes of consumption which would mean that high household indebtedness should be associated with high consumption spending. From a theoretical perspective, it is clear that the relationship between household debt and household consumption is influenced by such factors as income (defined either in terms of absolute income, relative income, permanent income or life time income) and interest rates.

Several empirical studies, such as Ogawa & Wan (2007), Gan (2010), Jauch & Watzka, (2012), Estrada et al. (2014), and Bunn and Rostom (2014), were conducted to analyse the relationship between household debt and consumption spending for a number of countries employing different time periods and different techniques. These studies all empirically established that it is household debt that affects consumption. Starting with the earlier study by Ogawa & Wan (2007), this study examined the influence of household debt on consumption in Japan during and after the bubble period. The study then found that the expenditure on non-durable, semi-durable and luxury goods was negatively affected by the debt to asset ratio. Gan (2010), also conducted a study to find out how housing wealth and credit card spending affects consumption using a panel of households in Hong Kong. From this study it was observed that households with numerous houses had higher consumption sensitivity. The study revealed that consumption sensitivity increased with a relaxation of credit constraints. It was also observed that most of these households relied on mortgage refinancing for increased consumption (Gan, 2010). This implied that for Hong Kong, there was a flow from household debt to consumption, thus in line with the finding for Japan.

Jauch and Watzka (2012) employed a cross country study of 18 countries in Europe as a basis in order to determine the effects of household debt on the aggregate demand level in Spain. The study also found that high household debt pressurized households to adjust their balance sheets thus forcing them to reduce their consumption expenditure. A similar study was carried out by Estrada et al. (2014) to investigate how

developments in household debt affected private consumption in a sample of OECD countries. After holding constant the effects of interest rates, income and wealth, the researchers found that household debt accumulation led to increases in consumption and deleveraging led to decreases in aggregate consumption. On the other hand, a study by Bunn and Rostom (2014) used micro data to investigate the role of debt levels in the determination of the spending patterns of UK households over the 2008 recession. This study also found that highly indebted households cut their spending during the financial crisis and thus reducing aggregate private consumption and deepening the recession. Thus, the findings of the above stated studies are contrary to theories such as the relative income theory, the intertemporal choice model and the expectations view which suggest a flow from consumption to household debt. Such empirical evidence could mean a paradigm shift from the views of household debt-consumption theories most of which are primeval.

However, a few studies such as Bailliu et al. (2011-2012) and Mutezo (2014) have shown a significant negative relationship between consumption and household debt. These studies also came up with findings which implied a flow from consumption to household debt, thus negating the results of the earlier studies. Looking at the results by Bailliu et al. (2011-2012), the study observed a relationship between household debt accumulation and consumption spending and also spending on home renovation in Canada. It was found that home secured debt increases were the largest contributors to total household debt in Canada between 1999 and 2010. Furthermore, a significant portion of the home secured debt was used for consumption and home renovation by Canadian households. Similarly, Mutezo (2014) investigated the interaction between household debt and consumption spending in South Africa using an ARDL bounds modelling, and found that consumption spending drives high household debt through relaxed credit policies, higher disposable income and low interest rates. However, this study used household debt as a measure of consumption spending and the debt service ratio as a proxy for household debt. No justification was provided for such a variable specification. It is evident from the above review that the relationship between household debt and consumption spending has not been firmly established and thus justifies the need to further examine it in the South African context.

3. Methodology

This study adopted a Vector Auto Regression (VAR) model to establish the relationship between household debt and consumption spending. This is because the variables under study were thought to be simultaneously related and VARs are useful in summarizing dynamic relationships among variables (Kapingura & Ikhide, 2015). It therefore makes no theoretical sense to employ a single equation model when investigating the relationship between variables that are thought to have a simultaneous relationship. Disparate to the Ordinary Least Squares (OLS) method which takes a single exogenous variable to be explained by various explanatory or endogenous variables, the VAR technique allows all of its variables to be treated as explained variables and therefore every individual variable can be expressed in a linear function form. This study made use of a multivariate time series investigation to examine the presence of long run equilibrium and dynamic relations among the indices was employed. Hence, VAR is the most suitable model for this study. Assuming X_t is the n x 1 vector of variables, the intra-impulse transmission process to be captured by this study, the dimension of X_t {that is n} is 6, given the 6 variables of analysis. Using matrix algebra notations, a 6 variable structural dynamic economic model for this study can then be stated as:

$BX_t = \mu + \pi X_{t-1} + \varepsilon_t$ …… (4.1)

Where B is the matrix of variable coefficients

X_t is the 7 x 1 vector of observation at time t of the variables of the study, that is, vector X is defined as $X_t = (C_t, Y_t, D/Y_t, Dsr_t, W_t, RIR_t, Dummy)$ ……..(4.2)

Also, μ is the vector of constants

π is a matrix polynomial of appropriate dimension

ε_t is a diagonal matrix of structural innovations that has zero means, constant variance and are individually serially uncorrelated, i.e.

$$\varepsilon_t \sim (0, \Sigma)$$

Where:

C_t is consumption spending;

Y_t is income;

D/Y_t is the debt to income ratio;

Dsr_t is the debt service ratio;
W_t is wealth;
RIR_t real interest rates;
Du_t is the dummy variable which is equal to 1 for the financial crisis period (2007-2009) and 0 for the non-financial crisis period (1994-2006 and 2010-2013).

Definition of terms and apriori expectations:

- C_t is the amount spent by households, be it on durable or non-durable goods. This variable is expected to be positively related to household debt to income and the debt service ratio as the need to consume causes people to borrow.
- Y_t refers to the income available to households after tax and price change adjustment. This is expected to have a positive relationship with C_t since an increase in income results in an increase in consumption according to the absolute income theory (Alimi, 2013). Y_t is expected to be negatively related to household debt since households with lower incomes are likely to borrow more.
- D/Y_t is the fraction of the consumer's income that is debt. This ratio is expected to be either negatively related to C_t or positively related to C_t. A higher debt to income ratio could mean more debt than income is used to fund consumption or higher debt than income could mean less income is available for consumption (Baker, 2014).
- Dsr_t refers to the percentage of the consumer's income that is required for debt payment. This rate is also expected to be negatively related to C_t since a high debt service ratio means that more of the income is required for debt payments (Baker, 2014).
- W_t refers to the assets owned by a household after all liability adjustments (Sloman et al., 2012). Wealth is expected to have a positive relationship with consumption as suggested by the life cycle hypothesis. It is also expected to be positively related to household debt since households with more assets have greater access to credit as they have collateral.
- RIR_t is real interest rate which is given by nominal interest rate divided by consumer price index. Real interest rate is expected to be negatively related to household debt because a higher rate discourages people from borrowing. It is also expected to be negatively related to consumption spending because higher rates encourage saving rather than spending as suggested by the intertemporal choice theory (Estrin et al., 2008).

The dummy variable captures the impact of the 2007-2009 global financial crises on household debt and consumption spending in South Africa. It is expected to have a negative effect on these variables.

Estimation Techniques: The study used time series data, therefore, formal tests for stationarity were carried out first to overcome the problem of spurious regressions resulting from non-stationary data. The formal tests were carried out using the Augmented Dickey Fuller (ADF) unit root test as well as the Phillips Perron (PP) test for each variable in the equation. The Phillips Perron test augments the ADF test hence results are more reliable with both tests used. To test the series for cointegration, the Johansen technique was employed as it allows for testing the hypotheses around the equilibrium relationships existing between the variables. This also helped determine the number of co-integrating vectors (Brooks, 2008). As the variables were found to be cointegrated, the Vector Error Correction Model was used for determining the short run and long run dynamics between the variables and to correct for disequilibrium. The Granger causality test was also being carried out to establish the direction of the causality. The stochastic properties of the model were tested through the diagnostic checks that were conducted and these include the residual normality, the autocorrelation and the heteroscedasticity tests. Quarterly time series data from 1994 to 2013 was used. This is because South African households were better able to make their borrowing and consumption decisions after the new political dispensation and also important policy changes affecting household borrowing and consumption such as credit acts were put in place post-apartheid.

4. Results

Unit Root Test results: For formal unit root checks, this study employed the Augmented Dickey Fuller (ADF) and the Phillips Perron tests (PP). These tests were carried out to find the variables' integration order.

Table 1: Augmented Dickey Fuller and Phillips Perron test results at level series

Variables	ADF			PP		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
LC1	-1.967403	-1.905136	17.40651***	-2.110459	-1.905136	16.91576***
LY	-2.224018	-2.073717	7.388128***	-2.348047	-3.123809	12.41546***
LD_Y	-0.705437	-1.176580	1.305031	-0.795255	-1.423103	1.136430
LDSR	-2.436167	-2.457498	-0.169802	-2.019911	-2.039892	-0.143371
LRIR	-0.354829	-3.069026	-1.132311	-0.626111	-2.780036	-1.022695
LW_Y	-1.209444	-2.815504	0.436399	-1.276407	-2.883202	0.417281

Source: Author's Computations.
* Stationary at 10% level of significance
** Stationary at 5% level of significance
*** Stationary at 1% level of significance

Table 2: Augmented Dickey Fuller and Phillips Perron test results at First Difference

Variables	ADF			PP		
	Intercept	Trend and Intercept	None	Intercept	Trend and Intercept	None
D_LC1	-7.269820***	-7.663637***	-1.442713	-7.945176***	-8.217859***	-2.600992***
D_LY	-8.731196***	-9.184427***	-2.298000**	-9.720239***	-10.42630***	-4.229613***
D_LD_Y	-7.054769***	-7.006994***	-6.891411***	-7.438834***	-7.398773***	-7.310666***
D_LDSR	-5.025126***	-5.009288***	-5.057832***	-5.042330***	-5.028001***	-5.074764***
D_LRIR	-6.998364***	-7.026619***	-6.957045***	-7.028759***	-7.058759***	-6.943174***
D_LW_Y	-7.989463***	-8.040689***	-8.018526***	-7.989463***	-8.040689***	-8.023585***

Source: Author's Computation

The unit root test outcomes from the ADF and also from the PP tests indicate that all individual variables are not stationary in their level form as shown in table 1 above. Two variables, logged consumption (LC1) and logged income (LY), are an exception as they have unit roots at level series but only under a model which has neither trend nor intercept. However, after first differencing, all individual variables show stationarity at 1 percent level of significance using both tests as shown in table 2 above. LCI is non-stationary under the model with no trend and no intercept when using the ADF test, it is however stationary under the intercept and also trend and intercept model. It is also stationary under all models when the Phillips Perron Test is employed, thus the researcher concludes that, like all the others, this variable is first difference stationary. Since all the variables are integrated of order one *I* (1), cointegration tests are then carried out to investigate and conclude as to the presence of a long-term association between household debt and consumption spending.

Cointegration-Optimal Lag Length Selection: From the outcomes of different selection criteria shown by Table 3, there seems to be conflicting lag length results as Schwarz Information Criterion (SC) and Hannan-Quinn criterion (HQ) suggest an optimal lag length of 1 while FPE and LR suggest 2 and AIC suggests 8. This study utilizes a lag length of 1 as per the Schwarz Information Criterion (SC) and Hannan-Quinn criterion (HQ). This is because these criteria have chosen the lag length that minimise their values and are generally preferred to the other criteria. Brooks (2008), also suggests that adding more lags results in an increased penalty for the degrees of freedom lost. The Johansen co-integration technique therefore makes use of 1 lag for the purposes of this study.

Choosing the appropriate specification of the deterministic term: The Pantula principle was used to decide on the model suitable for this study. As pointed out in the previous chapter, the Pantula principle estimates all three models and the outcomes are outlaid beginning with the most restrictive hypothesis all the

way to least restraining premise, only stopping when our null is not rejected. Results are given in table 4 below.

Table 3: VAR Lag Order Selection Criteria Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	507.3795	NA	2.17e-15	-13.89943	-13.67809	-13.81131
1	1112.095	1075.051	4.32e-22	-29.33599	-27.56525*	-28.63105*
2	1169.954	91.60866*	3.50e-22*	-29.58204	-26.26191	-28.26029
3	1212.605	59.23741	4.61e-22	-29.40568	-24.53615	-27.46710
4	1249.666	44.26733	7.82e-22	-29.07404	-22.65511	-26.51865
5	1290.616	40.95066	1.39e-21	-28.85045	-20.88212	-25.67823
6	1354.817	51.71769	1.65e-21	-29.27271	-19.75498	-25.48367
7	1425.858	43.41394	2.39e-21	-29.88496	-18.81783	-25.47910
8	1576.129	62.61283	7.95e-22	-32.69804*	-20.08151	-27.67536

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion
Source: Author's Computation

Table 4: Pantula principle results

R	n-r	Model 2 Trace statistic	Critical value	Model 3 Trace statistic	Critical value	Model 4 Trace statistic	Critical value
0	6	249.1067	145.3981	201.2000	135.9732	295.3287	161.7185
1	5	217.4544	145.3981	172.2457	135.9732	248.9387	161.7185
2	4	176.9802	145.3981	151.1680	135.9732	224.8273	161.7185
3	3	171.6222	145.3981	143.1932	135.9732	194.1729	161.7185
4	2	174.4490	145.3981	134.6379	135.9732*		

* Null is not rejected
According to the Pantula Principle, model 3 was chosen as shown in table 4 above. The study therefore utilized model 3.

Johansen Cointegration: After choosing the suitable number of lags, the Johansen test for cointegration can be carried out. The model chosen for this study according to the Pantula principle is the linear deterministic trend model (intercept and trend in cointegrating equation plus no intercept in VAR). The test statistic of the Johansen cointegration technique tests the null hypothesis of r co-integrating equations against the alternative of n co-integrating vectors. Based on the results of the trace statistic as shown in Table 5 below, the null of no co-integrating relations is rejected because the test statistic of 181.384 is greater than the 5% critical value of 125.615. The same goes for the null hypotheses of at most 1 co-integrating equation as its test statistics of 111.817 is greater than the 5% critical values of 95.754. However, the null hypothesis of at most 2 co-integrating vectors cannot be rejected as the test statistic of 65.869 is less than the 5% critical value of 69.819. It can therefore be concluded that according to the trace statistic, there are 2 co-integrating equations.

The maximum eigenvalue statistic tests the view that there are r co-integrating equations against the alternate of r+1 co-integrating vectors. According to the outcomes from the maximum eigenvalue statistic, as shown in Table 6 below, the null hypotheses of no co-integrating relations and that of a maximum of 1 co-integrating equation are rejected because the test statistics of 69.567 and 45.948 are bigger than the 5% critical values of 46.231 and 40.078 respectively. However, the null hypothesis of at most 2 co-integrating vectors cannot be rejected as the test statistic of 27.185 is less than the 5% critical value of 33.877. It can

therefore be concluded that according to the maximum eigenvalue statistic, there are 2 co-integrating equations.

Table 5: Johansen Cointegration Trace Results

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.590117	181.3843	125.6154	0.0000
At most 1 *	0.445163	111.8174	95.75366	0.0025
At most 2	0.294277	65.86916	69.81889	0.0992
At most 3	0.262610	38.68367	47.85613	0.2731
At most 4	0.101947	14.92191	29.79707	0.7851
At most 5	0.057988	6.534895	15.49471	0.6323
At most 6	0.023756	1.875350	3.841466	0.1709
Trace 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				

Source: Author's Computation

Table 6: Johansen Cointegration Maximum Eigen Values Results

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.590117	69.56687	46.23142	0.0000
At most 1 *	0.445163	45.94828	40.07757	0.0098
At most 2	0.294277	27.18549	33.87687	0.2536
At most 3	0.262610	23.76176cluden	27.58434	0.1433
At most 4	0.101947	8.387016	21.13162	0.8785
At most 5	0.057988	4.659545	14.26460	0.7840
At most 6	0.023756	1.875350	3.841466	0.1709

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

Source: Author's Computation

According to Uddin (2009), where trace statistic and maximum eigenvalue statistic give conflicting outcomes, trace statistic results have to be prioritised. This is because it is said to hold more power than the maximum eigenvalue statistic since it takes into consideration all the smallest eigenvalues. Johansen and Juselius (1990) also advised that where the two statistics give contradictory results, the trace statistic results should be used. However, since both statistics give the same results, this study concludes that the model has 2 co-integrating equations and as such, a VECM is then estimated to examine variable relations.

Vector Error Correction Model-Long Run Relationship Analysis: The vector error correction model allows for the differentiation of the long run and short run dynamics between household debt and consumptions spending. Making use of the number of lags, the intercept and trend assumption as well as the number of co-integrating equations from the previous sections, a VECM is estimated and specified. Table 7 below gives the long run VECM results, with debt to income ratio (LD_Y) as the representative dependant variable. According to Ali (2013), when interpreting VECM results, the coefficient signs are reversed. Table 7 below gives the long run VECM results, with debt to income ratio (LD_Y) as the representative dependent variable and with the signs reversed. The long run cointegrating equation is therefore given by:

LD_Yt = -2.630236 - 3.615695LC1t + 0.083209LDSRt - 0.031172LRIRt + 3.716620LYt + 0.449650LW_Yt+ 0.018874Du+μt…… (5.1)

From the results, the debt service ratio (LDSR), income (LY), wealth (LW_Y) and the dummy variable are positively interrelated with the debt to income ratio (LD_Y) while consumption (LC1) and real interest rate (LRIR) are negatively related to the debt to income ratio. Apart from LRIR and DU, all variables are important in explaining LD_Y in the long run.

The positive relationship between LD_Y and DSR is in line with a priori expectations as a growth in the debt service ratio suggests that more of the resources of the household are required for servicing debt, and thus increasing the debt. The negative relationship between LD_Yt and LRIR is in line with initial expectations which suggested that an increase in interest rates discourages borrowing thus reducing debt or it increases the income of savers which thus reduces their debt to income ratio. The negative influence of LC1 on LD_Y is not in line with a priori expectations which suggested that the need to increase consumption leads to an increase in borrowing. These results imply that South African households do not borrow for the purposes of funding consumption. The positive relationship between LD_Y and LY makes economic sense since a growth in income means an improvement in the creditworthiness of a household which increases their chances of borrowing. This also explains the positive relationship between LD_Y and LW_Y, since a growth in wealth implies an increment in collateral which then increases the borrowing opportunities.

Table 7: Long Run VECM Results with LD_Y as the representative dependant variable

Variable	Coefficient	Standard error	t-statistic
Constant	- 2.630236	-	-
LC1 (-1)	-3.615695	0.35657	-10.1403
LDSR (-1)	0.083209	0.02837	2.93341
LRIR (-1)	-0.031172	0.03150	-0.98943
LY(-1)	3.716620	0.36655	10.1395
LW_Y(-1)	0.449650	0.07492	6.00198
DU(-1)	0.018874	0.01319	1.43066

Table 8 below gives the long run VECM results, with consumption (LC1) as the representative dependent variable and with reversed signs. In this instance, the long run co-integrating equation would be given by:

LC1t= 1.472132 + 0.022699LD_Yt - 0.008410LDSRt + 0.005306LW_Yt + 0.078863LYt + 0.008800LRIR - 0.000351DU + μt…….. (5.2)

From the results, the debt to income ratio (LD_Y), income (LY), wealth (LW_Y) and real interest rate (LRIR) are positively related to consumption (LC1) while the debt service ratio (LDSR) and the dummy variable (DU) are negatively interrelated with consumption (LC1). With the exception of LD_Y and DU, all variables are significant in explaining LC1 in the long run.

The positive influence of LD_Y on LC1 is not in sync with a priori expectation which stated that less income is available for consumption as households are forced to cut on consumption as a debt management tool when high debt levels are reached which then implies that as much as households do not borrow to finance consumption, portions of debt are still used for consumption. The negative influence of LDSR on LC1 is in line with a priori expectations as it implies that a debt service ratio increment increases the amount owed by households and thus reducing the amount available for consumption. These results could therefore imply that with an increase in the debt service ratio, households refrain from increasing their borrowing as they fear the increased cost of servicing and they also reduce their consumption. The positive effect of LRIR on LC1 is not

in line with a priori expectations which suggested that there would be a negative relationship as increased interest rates encouraged saving rather than consumption. This implies that for South African households, the income effect is greater than the substitution effect hence higher interest rates are associated with increased income and thereby increased consumption as given by the intertemporal choice theory. The positive influence of LY and LW_Y on LC1 is in line with economic theory as consumption increases with increases in income and increases in wealth.

Table 8: Long Run VECM Results with LC1 as the representative dependant variable

Variable	Coefficient	Standard error	t-statistic
Constant	1.472132	-	-
LD_Y (-1)	0.022699	0.01391	1.63180
LDSR (-1)	-0.008410	0.00199	4.22521
LRIR (-1)	0.008800	0.00127	6.91308
LW_Y(-1)	0.005306	0.00221	2.39786
LY(-1)	0.078863	0.00043	181.644
DU(-1)	-0.000351	0.00037	-0.95545

Short Run Association Analysis: Short run VECM outcomes as shown in Tables 9 and 10 below reveal whether variables converge to their long run equilibrium (indicated by a negative coefficient), or any disequilibrium in the variable continues to grow (indicated by a positive coefficient). The results show that with the exception of LY, LW_Y and DU that have positive coefficients, all the variables have self-correcting mechanism, thus deviations from equilibrium in one quarter are corrected in the next quarter for these variables. However, for LY, LW_Y AND DU, any disequilibrium will continue to grow.

Table 9: Short Run Vector Error Correction Model Results with LD_Y as the representative dependant variable

Variable	Coefficient	Standard error	t-statistic
D(LD_Y) (-1)	-0.054746	0.01991	-2.74976
D(LDSR) (-1)	-0.533088	0.18869	-2.82523
D(LC1) (-1)	-0.091109	0.04745	-1.91991
D(LRIR)(-1)	-0.795824	0.33690	-2.36217
D(LY)(-1)	0.236590	0.06132	3.85843
D(LW_Y)(-1)	0.218170	0.14761	1.47801
D(DU)(-1)	1.270881	0.62907	2.02026

Source: Author's Computation

Table 10: Short Run Vector Error Correction Model Results with LC1 as the representative dependant variable

Variable	Coefficient	Standard error	t-statistic
D(LC1) (-1)	-0.171155	0.17276	-0.99070
D(LD_Y) (-1)	-2.552813	0.94958	-2.68837
D(LDSR) (-1)	-21.45370	9.12742	-2.35047
D(LRIR) (-1)	-13.51447	16.5769	-0.81526
D(LY)(-1)	12.27635	2.85081	4.30627
D(LW_Y)(-1)	6.543988	7.08203	0.92403
D(DU)(-1)	18.39756	30.7658	0.59799

Source: Author's Computation

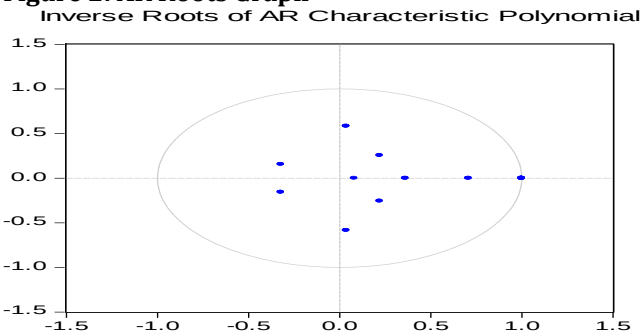
Table 11: Diagnostic Checks results

Test	Test statistic	p-Value	Conclusion
Jarque-Bera	16.06536	0.0245	Normality of residuals is observed at 1%
Breusch-Godfrey	55.88952	0.2320	There is no serial correlation
ARCH LM	496.4982	0.5857	Homoscedasticity is observed

Diagnostic Checks: Diagnostic checks were done to authenticate the efficiency of the Vector Error Correction Model (VECM) and to test the behaviour of the residuals since residuals that are not well behaved lead to biased parameter estimates. Diagnostic checks for the residuals included checks for normality, serial correlation and heteroscedasticity.

AR Roots Test: The AR roots test was carried out for the purposes of testing the strength of the Vector Autoregression (VAR) and the outcome is shown in Figure 2 below. If the VAR has instability, the impulse response standard error results are invalidated. According to the AR roots test, a VAR is seen as stationary if the modulus does not go beyond 1 for all its roots and thus lie within the unit circle. It therefore follows that the VAR model used in this study shows stability as all the roots are found in the unit circle as shown by Figure 2.

Figure 2: AR Roots Graph

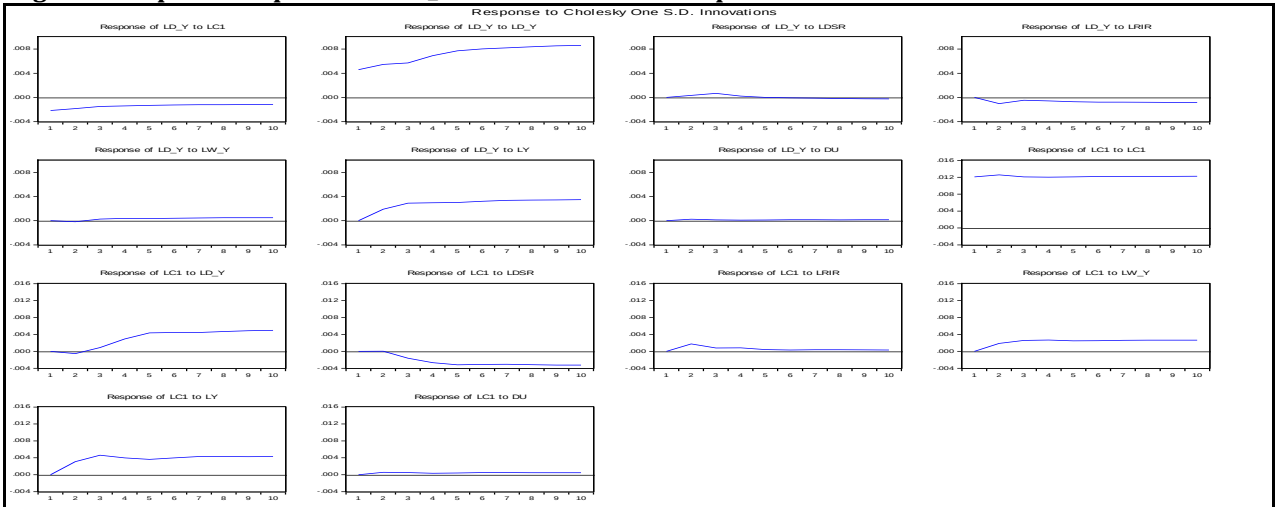


Source: Author's Computation

Since the diagnostic checks indicate that the residuals are well behaved, the results of the study are therefore reliable. Since it has been established that the VECM results are from an efficient model and that the residuals are well behaved, impulse response and variance decompositions are then carried out.

Impulse Response Analysis: The impulse response function traces the consequences of a standard deviation shock in a single variable to one of the advances on current and future values of the other variables. An estimation of impulse response functions for the variables of interest to innovation in each one of the other variables was made. Figure 3 is an extract of results showing the two variables of interest, household debt (LD_Y) and household consumption (LC1). The graphs show the impulse response of individual variables to shock waves in every one of the rest of the variables.

Figure 3: Impulse Responses of LD_Y and LC1 to their independent variables



Source: Author's Computation

According to the results, a standard deviation shock to LD_Y positively impacts on LD_Y. In like manner, standard deviation shocks to LY and LW_Y all have a positive impact on LD_Y. However, a shock experienced by LC1, LDSR, LRIR and DU indicate a negative but almost insignificant influence on LD_Y. A standard deviation shock to LC1, LD_Y, LRIR, LY and LW_Y impacts positively on LC1 while there is no significant impact on LC1 that is observed when the shock is applied to LDSR and DU.

Variance Decomposition: The relative significance of every single shock or innovation in influencing the changes of the variables in the VAR is deduced through variance decomposition. The deviation of each endogenous variable is thus separated into component shocks to the VAR. Table 12 below gives variance decomposition results for household debt (LD_Y) and household consumption (LC1) as these are the focal point of the study.

Table 12: Variance Decomposition Results

Variance decomposition: LD_Y

Period	S.E.	LD_Y	LC1	LDSR	LRIR	LW_Y	LY	DU
1	0.005119	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.007950	92.29425	0.117060	0.104141	1.307454	5.709458	0.448454	0.019185
3	0.010137	87.99611	0.103369	0.080695	1.064133	6.097532	1.564337	0.093825
4	0.012354	86.98812	0.170921	0.341126	1.055285	6.830126	2.453272	0.161146
5	0.014661	86.31499	0.318805	0.881050	1.091188	5.888013	3.305917	0.200042
6	0.016971	85.31564	0.454629	1.503607	1.167331	5.221341	4.116224	0.221224
7	0.019237	84.36688	0.576647	2.067330	1.247853	4.716172	4.793129	0.231993
8	0.021453	83.60767	0.696429	2.560044	1.331037	4.273557	5.296433	0.234831
9	0.023600	82.98468	0.808039	2.980545	1.409701	3.909871	5.673583	0.233577
10	0.025659	82.45815	0.904450	3.330792	1.479238	2.628087	5.968376	0.230904

Variance decomposition: LC1

Period	S.E.	LD_Y	LC1	LDSR	LRIR	LW_Y	LY	DU
1	0.000860	18.84016	81.15984	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.001216	23.77119	70.46731	1.213571	1.506018	9.89E-06	1.952083	0.089818
3	0.001505	21.00352	64.74825	2.858988	1.257208	0.039764	5.789406	0.302864
4	0.001777	16.15245	62.25428	6.03559	0.992543	0.195172	8.997278	0.372681
5	0.002049	12.21375	60.54312	10.70213	0.746840	0.282339	11.13615	0.375677
6	0.002313	9.589658	59.08093	15.37500	0.596402	0.281203	12.71340	0.363411
7	0.002566	7.862638	57.83499	18.32528	0.510462	0.259592	13.85798	0.349058
8	0.002809	6.707408	56.80224	19.77497	0.461939	0.241166	14.67707	0.335206
9	0.003040	5.915137	55.93460	21.88707	0.435586	0.225453	15.27947	0.322690
10	0.003261	5.352401	55.20079	22.75598	0.421439	0.211011	15.74629	0.312089

Source: Author's Computation

Brooks (2008) purports that almost all of the variation in a variable in the first quarter is explained by its own shocks and this trend is observed from the results with LD_Y having 100% of its variation from shocks within and LC1 having about 81% of its variations due to its own shocks in the first quarter. For the 10 periods under observation, it can be deduced that in total, the major variations in the two variables LD_Y and LC1 were due to their own shocks. Shocks to the debt service ratio (LDSR) contributed approximately 14% in total to the variations in LD_Y, a contribution higher than that of shocks to LC1 which accounted for only about 4% meaning changes in the rate of servicing debt have a greater influence on how people borrow than does changes in consumption. Interestingly, shocks to income had a greater contribution of about 32% to the variation in LD_Y than did both LC1 and LDSR. This implies that income changes have a notable influence in the borrowing behaviour of individuals.

Shocks to LD_Y accounted for approximately 128% to the variations in LC1 over the 10 quarter period. It is also fascinating to observe that shocks to the debt service ratio (LDSR), contributed the third largest percentage of 119% after LC1 and LD_Y in the variation of LC1 over the 10 periods, a contribution which is more than that of shocks to income and wealth that each accounted for approximately 100% and 10% of the

variations in LC1 respectively. This shows that the manner in which South African households consume is notably affected by changes to their borrowing behaviour denoted by LD_Y, as well as changes to the cost of debt represented by LDSR. Results also reveal that shocks to the dummy variable contributed more to the variation in LC1 than they did to the variation in LD_Y as the contribution to LC1 was 3% compared to the 1% contribution to LD_Y. This suggests that the global financial crisis affected more the way households consume than it did their borrowing behaviour.

Granger Causality Test: The focal point of this research is the association of household debt and consumption spending, it is thus important to find the causality amongst the two variables. The VAR Granger Causality/Block Exogeneity test was thus employed and summarized results are given in table 13 below. The initial hypothesis purports that the excluded endogenous variable does not "granger cause" the dependant variable. According to the findings, D(LD_Y), D(LDSR) and D(LRIR) granger cause D(LC1) as their p-values of 0.02, 0.04 and 0.03 respectively are less that the 5% p-value of 0.05, while D(LW_Y), D(LY) and DU do not granger cause D(LC1) as their p-values are greater than 0.05. The results also show that individually, D(LC1), D (LDSR), D(LRIR), D(LY), D (LW_Y) and D (DU) do not granger cause D(LD_Y), however, they collectively granger cause D(LD_Y) as the p-value of 0.04 is less than 0.05.

Table 13: VEC Granger Causality Test Results

Dependent variable: D(LC1)			
Excluded	**Chi-sq**	**Df**	**Prob.**
D(LD_Y)	5.111529	1	0.0238
D(LDSR)	4.218915	1	0.0400
D(LRIR)	4.576433	1	0.0324
D(LW_Y)	1.546233	1	0.2137
D(LY)	0.506394	1	0.4767
D(DU)	0.054390	1	0.8156
All	11.09501	6	0.0855
Dependent variable: D(LD_Y)			
Excluded	**Chi-sq**	**Df**	**Prob.**
D(LC1)	2.066827	1	0.1505
D(LDSR)	1.588947	1	0.2075
D(LRIR)	2.221119	1	0.1361
D(LW_Y)	0.161459	1sert	0.6878
D(LY)	1.281603	1	0.2576
D(DU)	0.027428	1	0.8685
All	12.72263	6	0.0477

Source: Author's Computation

These results indicate that for South African household, there is a flow from debt to consumption. The findings of this research contradict theories such as the relative income theory, the intertemporal choice model and the expectations view and also the findings of Mutezo (2010) which propose a direction from consumption to household debt. They are however similar to results obtained from studies such as that of Agarwal & Qian (2014) for Singapore a developing country, which found that people consume more as they are able to borrow. They are also in line with finding from a number of studies for developed countries, namely, a study by Jauch & Watzka, (2012), for Spain, which found that the level of household debt matters for individual and aggregate consumption. This was also the implication of the results from a study by Baker (2014) for the USA, which found that tightened borrowing constraints had the effect of reducing consumption. This could imply a paradigm shift from the views held by most theories. Results from this section are utilised for policy recommendations that are provided in the next section.

5. Conclusion and Policy Recommendations

According to the results of this study, South African households do not borrow to finance consumption but their consumption is positively affected by borrowing. However, debt induced consumption is not ideal for the South African economy which is still an emerging economy as debt induced consumption can only act as a bubble that would have adverse effects upon bursting. Since consumption remains the main contributor to GDP growth in South Africa, it therefore becomes important to engage in policies that will encourage consumption without increasing household debt. This implies that policies that discourage debt and encourage saving are thus recommended. Policy makers can use measures that eventually increase consumption without having to increase debt such as increasing the debt service ratio and increasing the interest rate level in general as this will make borrowing more expensive and less favourable while savings will then be more attractive. This would reduce the amount of income going towards debt payment as households engage in less borrowing and thus more income would be available for consumption. Concurrently, increased saving will increase household wealth which was found to positively impact on consumption.

It is also recommended for policy makers to devise policies that will reduce the different components of household debt. For example, instalment sales, open accounts and credit card sales could be reduced through setting an amount that will act as a ceiling for such forms of credit, and this amount can be controlled by policy makers as they see fit. This will limit household engagement in these forms of credit only to the set amount. Households that previously enjoyed buying on accounts and instalments will be forced to refrain from over-indulging in such activities at the discretion of the policy makers. Another option would be to encourage the buying of assets such as cars for cash rather than through credit. Households could be encouraged to open asset savings accounts that earn interest so that they would eventually buy their assets using these savings and avoid engaging in other forms of finance that will increase their debt. It would also be useful for policy makers to avail more investment opportunities for households and to also create employment in a bid to increase the income of households which can then be used to increase household consumption rather than the use of debt.

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