



Relationship between consumer credit and consumption spending in South Africa.

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Abstract

This paper verifies the positive relationship between consumer credit and the four categories of consumption spending in South Africa. The study utilised data sourced from the South African Reserve Bank for the period 1975-2011. The study was conducted via regression analysis to determine the relationship between the dependent and independent variables. A significant positive relationship was found between the independent variable household debt and the four categories of consumption. The results are statistically significant for non-durable and durable goods and although significant for services and semi-durable goods, the relationship is less strong in these two instances.

Keywords: Household debt, consumption spending, consumer credit

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before any degree for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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Chapter 1: Introduction to the research problem

1.1 Background

In a recent address to an audience at the Gordon Institute of Business Science University, the Governor of the South African Reserve Bank (SARB), Ms. Gill Marcus, raised her concern regarding the unwarranted levels of household debt in proportion to the disposable income ratio (Marcus, 2012a). This has been a topical issue in South Africa for many years. Most recently, the central bank has cut the repurchase (repo) rate, following what was termed “an accommodative monetary policy stance” (Marcus, 2012b, para. 26). In her Monetary Policy Speech on 19 July 2012, the Governor stated that consumer spending has been an important driver of economic growth over the past few years, with the latest retail sales figures and consumer confidence surveys showing that spending is currently under pressure and that those undertaking the spending are increasingly pessimistic (Marcus, 2012b). The policy approach taken by the central bank was explained as being a means of assisting in the reduction of debt rather than as being a process to initiate further consumer spending.

Analysis of data from the South African Reserve Bank (Historical macroeconomic time series information, 2012), reveals that the debt to disposable income ratio of South African households peaked in 2008, prior to the downward trajectory which characterised the crisis period. The ratio of household debt to disposable income reached levels of 82,0 per cent in the second quarter of 2008 just prior to the recession. It then slowed down to 74,6 per cent in the final quarter of 2011.

Loos (as cited in Isa, 2012) was quoted in the *Business Day* on 4 July 2012, stating that households are still carrying a heavy debt burden. In his opinion, households in South Africa in 2012 are more vulnerable to the upward movement in the interest rate cycle than they were previously. It was pointed out by Loos (as cited in Isa, 2012) that the debt service ratio as a percentage of disposable income has declined somewhat, a pattern which to him suggests that debt was being paid off while lower interest rates applied. In investigating this further it is evident that some confusion exists regarding the definition of the debt to disposable income, the debt service cost ratio and the debt-to-GDP ratio.

In clarifying the former, the term “debt to disposable income ratio” refers to the ratio of households aggregated debt levels in relation to their levels of disposable income. In this instance disposable income is defined as income available after income taxes have been accounted for (OECD Economic Outlook, 2012). Disposable income is represented below as follows:

Disposable income = Personal income - Personal income tax payments

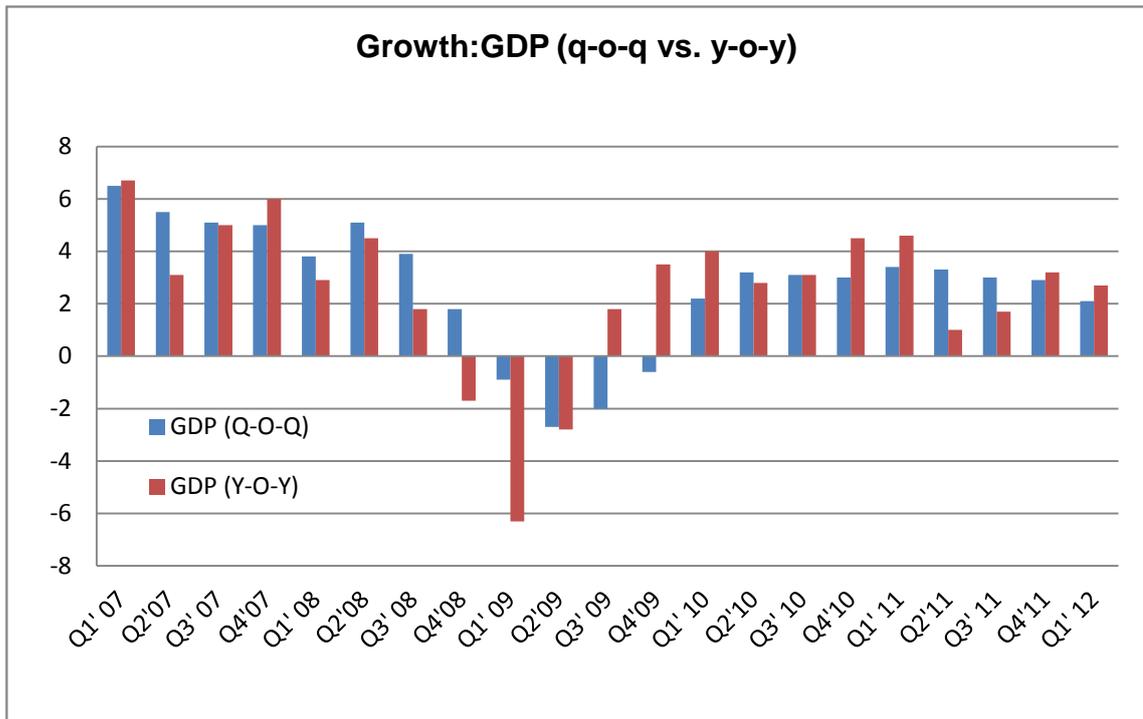
The purpose of this ratio is to provide an indication of the indebtedness of households. In South Africa, as an example, the rising ratio of household debt to disposable income between 2003 and 2008 indicates that households are accumulating more debt, compared to the growth in their disposable income.

The debt service cost ratio is defined by the Federal Reserve Board (2012) as an estimation of the ratio between debt payments and personal disposable income, where debt is actually an estimate of the combined payments on mortgage and consumer debt.

The latter concept of debt-to-GDP ratio is defined by Natrass (1995) as the ratio of government debt to GDP. This ratio is described by her as an “estimate of the solvency of government” (p.190). Natrass’s premise rests on seeing this as “an indication of government’s long run ability to service and repay its debt” (p.190). For the purposes of this research, the focus is on household debt, with specific emphasis on consumer credit. This will draw on the use of the household debt to disposable income as well as on debt service cost ratios to understand the underpinnings of household debt in depth. Government debt is outside the scope of this study.

Since the recession in the third quarter of 2008, economic data has emphasised the delicacy of the South African economy, highlighting its susceptibility to the contagion effects of international markets. Graph 1 reflects the annualised and quarterly growth in gross domestic product as published by Statistics South Africa (2012). Statistics South Africa (StatsSA) compiles GDP data from the production side. The SARB is responsible for the compilation of GDP from the expenditure side. At Numsa’s 9th Gala dinner on 7 June 2012, the Governor emphasised that economic growth was slower than had been anticipated. The Governor made reference to households curtailing spending and focusing on the repayment of debt to improve their financial status (Marcus, 2012b).

Graph 1: Growth in gross domestic product



Source: Adapted from “Gross domestic product (GDP), 2nd Quarter 2012,” by Statistics South Africa, 2012, Statistical Release No. P0441, p. 3.

GDP can be defined as the production of goods and services in an economy for the purpose of both local and international consumption. There are three ways in which GDP can be calculated as explained by Viet (2012):

1. The production approach;
2. The income approach; and
3. The expenditure approach.

Economic theory states that demand equals supply. From this, it can be deduced that both the supply and demand estimates of GDP should be equal. Viet (2012) explains these equations in the terms which follow:

Total supply of goods and services (S) = Output of goods and services at basic prices (O) + taxes less subsidies on products (T) + imports of goods (M). Therefore, equation one can be represented as follows:

Equation: $S = O + T + M$

Total demand of goods and services (D) = Intermediate consumption at purchaser's prices (ID) + Final consumption expenditure of households and general government at purchaser's prices (C) + Gross capital formation at purchaser's price of all residents (I) + Exports c.i.f (E). It follows that equation 2 can be written as:

Equation: $D = ID + C + I + E$

1.2 The historical perspective

Over recent years, South Africa has experienced what might be perceived as substantial economic growth, linked to a financial climate in which relaxed extension of credit was the norm while interest rates remained low. Under these conditions certain sectors flourished, a case in point being the retail sector.

The retail sector plays a pivotal role in the South African economy and together with the wholesale, motor, catering and accommodation sectors, provides the third largest contribution (14,6 per cent in 2012) of all industries to total GDP from a production perspective (Statistics South Africa, 2012). Detail of this is displayed in Table 1. Aligned to this, consumer spending which may be described as final household consumption expenditure by households (FHCE) can be seen as the crux of the South African economy, given its contribution of approximately 67 per cent to total domestic demand (Trading Economics, 2012).

Similar to most industries in the services sector of the economy, retail trade is dependent on the "financial health" of the consumer, thus it is governed by the economic effects of interest rates and other determinants of FHCE, including factors such as social needs and standards of living.

Table 1: Structure of the economy (per cent)

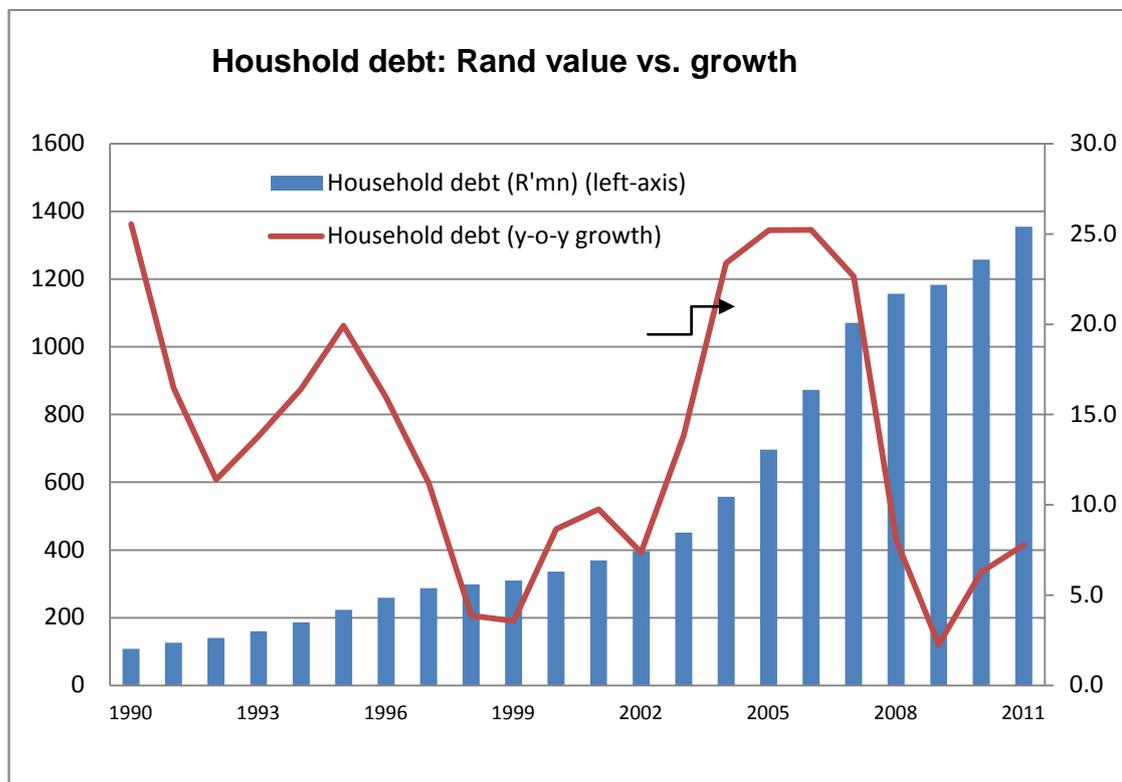
Finance, real estate and business services	21,6
General government services	16,3
Wholesale, retail, motor trade and catering and accommodation industry	14,6

Source: Adapted from "Gross domestic product (GDP), 2nd Quarter 2012," by Statistics South Africa, 2012, Statistical Release No. P0441, p. 4.

In taking cognisance of both the current and historical patterns pertaining to household debt, it is relevant to allude to the ethical aspects involved in the practice of credit extension in South Africa. Clayton (2008) raised the issue of the lack of ethics and control exercised in granting consumer credit prior to the introduction of the National Credit Act, which was passed in June 2007. He pointed out that for many years no protective mechanism existed in order to safeguard lower-income earning households or to educate them in terms of sound financial behaviour. Aggressive money lenders took advantage of this and preyed on willing clients. Clayton (2008) takes this point further, linking the lack of controls to the resultant increase in credit lending over a period of time.

Evidence exists that household debt increased over a number of years, reaching alarming proportions prior to the introduction of the National Credit Act in June 2007. This is illustrated in Graph 2 (Historical macroeconomic time series information, 2012). The year-on-year growth in household debt began to slow from 2007 as evident in the graph.

Graph 2: Growth in household debt



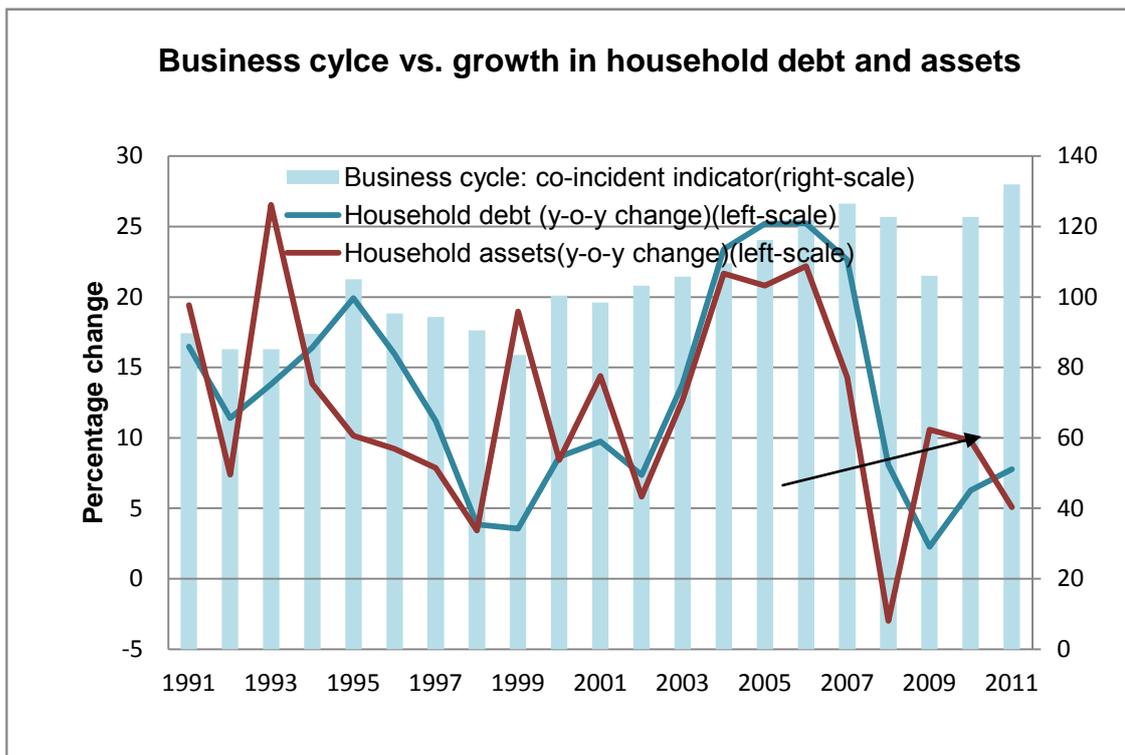
Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

The overall aim of the Act was to curtail the access to easy credit in South Africa with some of the key deliverables being the following:

- To ensure that credit lenders exercise responsibility in money lending practice;
- To check that consumers' monthly debt payments are within individual affordability ratios; and
- To make provision for credit counseling services for consumers who are heavily indebted and cannot afford to make payments (Motshegare, 2011).

Against this backdrop, it is relevant to ask questions regarding the general financial health of South African households. It would appear that evidence exists that there is cause for concern.

Graph 3: Business cycle vs. debt and asset growth



Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

Graph 3 (Historical macroeconomic time series information, 2012) displays the business cycle co-incident indicator which highlights boom and busts cycles in the South African economy. During boom periods, it is evident that households tend to overspend and incur additional debt, thus raising fears of an economy overheating.

Conversely, during times of a recession, the ability of households to pay off their current debt becomes a concern. As is evident from the graph above, annual growth in household debt has picked up pace, while annual growth in assets continue to decline.

1.3 Research problem

This study aims at providing a broader understanding of the relationship between household debt, (more specifically the consumer credit portion) and consumption spending patterns in South Africa, with the pivotal issue being to ascertain to what extent household debt impacts on consumption spending in South Africa.

Household debt remains a topical issue. The Governor, of the South African Reserve Bank, Ms. G. Marcus, stated in her address at the Gordon Institute of Business Science (alluded to earlier) that “(a)lthough the ratio of household debt to disposable income is still high, it has been declining” (Marcus, 2012a, para. 43). The Governor further stated that although the levels of household debt have tapered off, the key concern is that some households are over-leveraged in terms of debt.

Schmitt (2000) pointed out that in general, policymakers, legislators and economists expressed concern over heightened consumption levels following the 1990 and 1991 recession. Similar concerns have been voiced since the 2008 global financial crisis. The International Monetary Fund (2012) revealed that some studies suggested that the household debt levels of many economies were excessively high and needed to be curtailed. This point is supported by research conducted by Roxborough and McKinsey Global Institute (2010; see also Roxborough, Lund, Daruvala, Manyika, Dobbs, Forn, & McKinsey Global Institute, 2012), indicating that in order for economies to grow efficiently, the high levels of gross debt, including those of household debt, needed to be decreased.

Schmitt (2000) concludes that the results of her research provide no evidence for the hypothesis that a relationship exists between household debt and consumption expenditure, In contrast, Maki (2000) and Mishkin (1976) clearly state that a relationship between these two variables does exist. In researching this topic it is evident that a wide range of literature has been generated, representing conflicting views on the topic, due partially to the variety of measures used to represent household debt.

This study analyses the relationship between these two variables with the objective of ascertaining whether an economic relationship does in fact exist.

1.4 Research aim

Over the past few decades many have attempted to explore the relationship between household debt and consumption expenditure. Varying methods of analysis have yielded differing results. Some of the literature studies have utilised the debt service ratio as a representative of household debt, whilst others have focused on household debt levels or growth in household debt to ascertain a relationship.

Consistent with the co-incident business cycle, household debt levels tend to rise during upswings while they drop during downswings in economic activity. This type of volatility generally results in challenges for policy makers, since the net wealth of households is impacted by these two variables. In the South African Reserve Bank's *Quarterly Bulletin* (December 2011), research indicates that an increase in the net wealth position of an average household could have the subsequent effect of improving an individual's ability to sustain economic shocks.

With net wealth being a function of household debt, the relationship between household debt and consumption is relevant to South African policy makers, because of the fact that consumption expenditure accounts for about 60 per cent of expenditure on GDP in South Africa (Trading Economics, 2012).

Studies for South Africa include that of Muellbauer and Aron (2011) which focuses on investigating the relationship between net wealth and consumption spending. Their study emphasises the impact of credit liberalisation on wealth, highlighting a situation in which credit conditions are treated not as a dormant variable, but rather as a relative force representing the drivers for both consumption and debt.

Given that household consumption expenditure accounts for 60 per cent 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.

This research analyses the impact of household debt on consumption in South Africa. This will assist South African policy makers in rational decision making to either curb or stimulate economic activity.

1.5 Stakeholders

Stakeholders such as the Monetary Policy Committee (MPC) of the central bank, researchers and the general public may be impacted by research of this nature. More importantly, if a relationship exists, the probability arises of using the independent variable household debt to forecast household consumption expenditure. This provides a platform for future research in this area. Other stakeholders may include the National Credit Regulator (NCR) and StatsSA.

1.6 Purpose of this study

The research aims to understand the following:

- 1.6.1 The nature of the relationship between household debt and consumption spending;
- 1.6.2 The impact of a change in household debt on consumption spending patterns; and
- 1.6.3 The existence or non-existence of an econometric relationship between these variables.

1.7 Structure of the report

Chapter 2 reviews the three main schools of thought surrounding the literature relevant for the purpose of this research, while Chapter 3 identifies the two research questions to be clarified and addresses the research objectives.

Chapter 4 describes the quantitative research method used to determine the existence or non-existence of a relationship. This chapter includes details regarding the unit of analysis, population, sample size, the research instrument as well as the process of the data analysis.

In Chapter 5 the relevant descriptive and analytical results including the data tables and analytical methods used are presented.

Chapter 6 analyses the results presented in the previous chapter, aligning the output of the data analysis with the literature presented in Chapter 2. Finally it is in Chapter 7 that a conclusion is drawn, research limitations are highlighted and concomitant areas for possible further research are identified.

Chapter 2: Literature review

2.1 Introduction

The intention of the literature review is to explore the theories involved in relation to the research problem. The purpose of this chapter is to define and analyse household debt and its related counterpart: personal consumption expenditure. The initial section seeks to review the relative importance of the former in its relationship to the latter. This is followed by an analysis of the definition of consumption expenditure and of its various components, which will constitute the central focus of this chapter.

In the next section the importance of household debt with specific relevance to the life-cycle income model as an explanatory factor for household debt behaviour is explained. As a contrasting view to the explanation of debt incurrence, social exchange theory will then be explored as a supporting reason to incur debt. The next section encompassed a discussion on the structural developments of household debt as related to developments in Brazil as a means of comparison to South Africa. Reasons for this comparison will be presented later in the chapter. Finally, the chapter will conclude with an analysis of the difference between public and household debt.

2.2 Household debt and its importance

Since the advent of the financial crisis in 2008, concern over the levels of household debt and its possible impact on economic growth via the consumption spending mechanism has increased. Traditionally, levels of debt were of little concern and in general, credit terms were simply viewed as a means by which consumers funded their consumption needs (Martínez-Carrascal & del Río, 2004).

Martínez-Carrascal and del Río (2004) state that a higher level of debt may entail risks for a country thus highlighting reasons for possible concern in the wake of the global financial crisis. Research detail emanating from ISI emerging markets researchers carried out by the Europe CEIC Database Team (2011) indicates that high levels of household debt could result in a country being more prone to a slow recovery in the period subsequent to any financial crisis. These authors also mention that high levels of debt increases the risk exposure of consumers and thus impact on their ability to gain additional funding. This could ultimately decrease the ability to make adjustments

to external shocks to the economy, which in consequence may place strain on consumption expenditure.

Cecchetti, Mohanty, and Zampolli (2011) affirm that “rising debt levels hinder the probability of a borrower being able to repay debt” (p. 9). The main point made by them is that when lenders stop lending, consumption and investment decline. Since household consumption expenditure accounts for about 60 per cent of GDP in South Africa, the relationship between household debt and consumption is of particular importance for policy makers. The South African Reserve Bank *Quarterly Bulletin* (December 2002) states that “aggregate consumption expenditure growing at a slow pace may have a negative impact on economic growth” (p. 3).

2.2.1 Definition of household debt

The South African Reserve Bank, currently the official custodian of household balance sheet data in South Africa, compiles data in accordance with the System of National Accounts, 1993 (Commission of the European Communities, International Monetary Fund, Organisation for Economic Cooperation and Development, United Nations, & World Bank, 1993). In contrast with this the National Credit Regulator (NCR) collects household debit data. The sole mandate of the NCR is to regulate credit extension to the public.

With the introduction of The System of National Accounts, 2008 (European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, & World Bank, 2009), many countries including South Africa have been encouraged to migrate to the new system. The System of National Accounts (SNA) is to provide countries with proper guidelines to compile accounts that can be used efficiently for the purposes of policymaking, analysis of economic variables, ratios and research.

The SNA has been revised five times since 1947. During the benchmarking process a transition will be made to the 2008 version. The System of National Accounts 2008 (European Commission et al., 2009) was prepared by the Inter-Secretariat Working Group on National Accounts (ISWGNA).

This group as stated in The 2008 SNA (European Commission et al., 2009) consists of the following organisations:

2.2.1.1 The Statistical Office of the European Committees (Eurostat);

- 2.2.1.2 The International Monetary Fund (IMF);
- 2.2.1.3 The Organisation for Economic Co-operation and Development (OECD);
- 2.2.1.4 The United Nations Statistics division; and
- 2.2.1.5 Regional Commissions of the United Nations Secretariat and World Bank.

In accordance with The 2008 SNA, debt is defined as encompassing all liabilities including either interest or principal payments from the debtor to the creditor at a future specified date (European Commission et al., 2009). In line with this definition, Prinsloo (2002) defines household debt as “an obligation or liability arising from borrowing money or taking goods or services on credit, against an obligation to pay at a later stage” (p. 63). It is further stated that a contract of debt should state the principal payments in conjunction with the interest rate payments to be paid at a specified date in the future.

Betti, Dourmashkin, Rossi, Verma, and Yin (2001) concurs that debt is defined as “financial liabilities”, regardless of how this is incurred. It is seen as incorporating all forms of commitment, which include hire purchase agreements and leasing finance, amongst others. Betti et al. (2001) distinguished further between the definition of credit and a financial liability as referred to above – with credit defined as money lent for the purpose of being repaid. Adopting a different stance, Lea (2002) claims that credit and debt are two sides of the same coin. Acknowledging that these terms may cause confusion, Lea (2002) clarifies credit as involving an arrangement for payment whilst debt might be perceived as something deferred for later without any formal arrangement in place.

While he believed that debt would form an integral part of many lives, Thornley (2008) perceived consumer indebtedness as a phenomenon experienced by many households who tended to adopt the behaviour pattern of shifting expenditure away from future consumption towards the current. Similarly, Barba, and Pivetti (2009) concluded that other research confirmed that household debt was a rational response of “forward looking agents to hump-shaped time earning profiles or to temporary deviations of income from its long-run trend” (p.114). It is further suggested that in the welfare state, a rise in household debt could be attributed to stagnant real wages coupled with retrenchments. Betti et al. (2001) suggested that it was in the earlier stages of their lives that households were most prone to indebtedness.

Further analysis reveals that household debt has various categories. Bertola and Hochguertel (2005) identifies the general categories of household debt as follows:

1. Revolving credit and credit card balances - this may be described as a type of credit which sets a credit limit to the borrower of the funds but which does not specify the total amount that the user is liable for;
2. Personal loans - these may be defined as a specific amount to be lent which entails a fixed interest rate over a fixed time period; and
3. Mortgages and other collateralised debt - a category of credit which can be categorised as secured credit and which includes mortgages on households.

Thornley (2008) alludes to a further distinction in household debt, stating that for a financial institution, debt can be divided into both secured and unsecured debt. Secured debt, such as mortgages, is characterised by an agreement in which the assets are held in part by the financial institutions. Unsecured debt might include amongst other items, credit cards, personal loans and bank overdrafts. Thornley (2008) further elaborates that unsecured debt attracts a higher rate of interest than that of secured debt and in most instances is confined to the segment of a population falling within a lower living standard of measure.

The *Quarterly Bulletin* (South African Reserve Bank, September 2010) presents a different viewpoint and perceives household debt to be divided into the following categories:

- Open accounts;
- Personal loans at banks;
- Other personal loans;
- Credit cards;
- Installment sale and lease agreements; and
- Mortgage advances.

Table 2 represents a clear distinction between the various categories of debt. It is important to note that household debt consists of both consumer credit and mortgage advances. The *Quarterly Bulletin* (South African Reserve Bank, September 2010) shows that total household debt consists of the seven categories of debt included in Table 2, whereas consumer credit excludes credit extended to non-profit seeking institutions and mortgage advances. Household debt in the South African context is calculated using creditor information.

Table 2 : Categories of household debt for the South African Reserve Bank

Open accounts	These amounts include outstanding debits to dealers including amounts payable by buy-aid associations. Open accounts are generally used for the purchase of durable and semi-durable goods.
Personal loans at banks	These accounts consist of overdraft facilities and other advances which are granted to individuals. Only the portion of the overdraft facility utilised by the individual is included in the total consumer credit.
Other personal loans	Loans granted to insurers with the surrender value of the policy serving as the loan security.
Credit cards	Credit facilities are extended to consumers via credit cards. The outstanding credit balance at the end of the month is recorded as debt and not the total credit available to the consumer.
Instalment sale and lease agreements	Instalment sale agreements consist of goods in which the purchase price is paid over instalments. Such agreements are almost exclusively used for the purpose of durable consumer goods financing. Whereas, lease agreements make reference to goods that are obtained purely by utilising lease agreements.
Non-profit seeking institutions	In line with international best practice these institutions which include churches, clubs etc form part of the household sector and are therefore part of consumer credit.
Mortgage advances	A mortgage advance is characterised as a contract in which a household enters into a loan to purchase homes and fixed property for which the property is offered as security for the loan.

Source: Adapted from “*Quarterly Bulletin*,” by South African Reserve Bank, December 2002, No. 226, p. 63-66.

Table 3 provides a detailed breakdown of data as captured by the South African Reserve Bank together with the sources of each category.

Table 3 : Sources of data for the South African Reserve Bank

Data sources for the calculation of household debt	Sources and notes
Mortgage advances	
Bank's regular mortgage advances	Banks' monthly balance sheets
Other mortgage advances	Data on securitisation obtained from banks, the Bond exchange and non-bank financial institutions; data on regular mortgage advances obtained from non-bank financial institutions
Other advances	
Bank's regular instalment sale and leasing finance	Bank's monthly balance sheets
Other instalment sale and leasing finance	Data on securitisation obtained from banks, the Bond Exchange and non-bank financial institutions ; data obtained from vehicle finance companies; data obtained from Statistics South Africa and extrapolated using sales data and industry sources
Banks: Overdrafts	Banks' monthly balance sheets
Banks: Credit card advances	Banks' monthly balance sheets
Banks: General advances	Banks' monthly balance sheets
Non-bank microlending	Data from National Credit Regulator/Micro-Finance Regulatory Council
Other financial sector advances	Data from insurers and pension funds
Non-financial sector advances	Data obtained from Statistics South Africa and extrapolated using sales data and industry and other sources

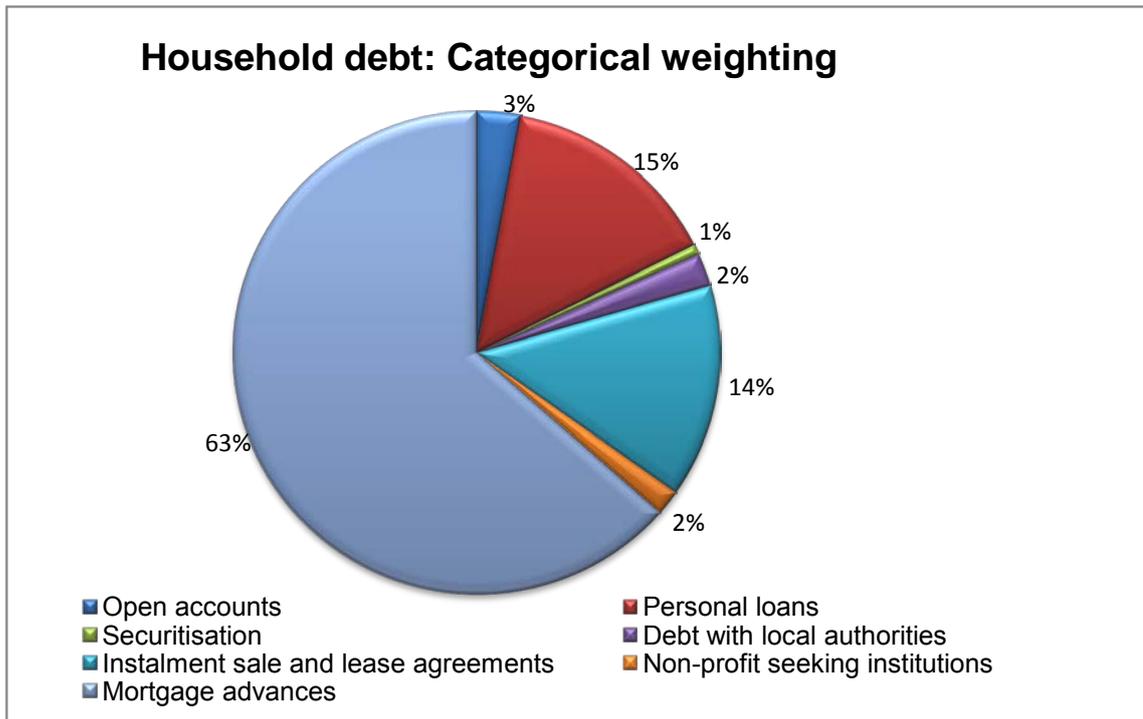
Note: Household debt includes debt of unincorporated business.

Source: Adapted from "Household debt, interest rates and insolvencies in South Africa "by Van den Heever, 2007, IFC Bulletins, 26, p 60.

Graph 4 (Historical macroeconomic time series information, 2012) displays the categorical weighting of debt. For the purpose of this graphic and in line with the *Quarterly Bulletin* (South African Reserve Bank, September 2010), debt with local authorities previously included in open accounts has been represented separately. Personal loans have been combined to include personal loans from other institutions as well as those from banks.

As per standard national accounts practice in terms of the SNA rulings, these categories of household debt are representative of expenditure on behalf of South African households.

Graph 4: Categories of household debt (2010)



Source: Adapted from “Quarterly Bulletin,” by South African Reserve Bank, September 2010, No. 257, p. 69.

2.2.2 Household debt ratios and the link to household debt

Apart from actual data on household debt, household debt ratios are instruments which serve as a sound indication of the actual level of households’ indebtedness at a national level. Studies done by Tu (2008) confirm that ratios were also used by central banks in order to ascertain the debt comfort levels of households. Tu (2008) also states that ratios should be regarded as a good measure of indebtedness, particularly when performing cross-country analysis. The reason given for this was that these allow for the changing economic climate, population and demographics within different nations, thus providing comparability across the board.

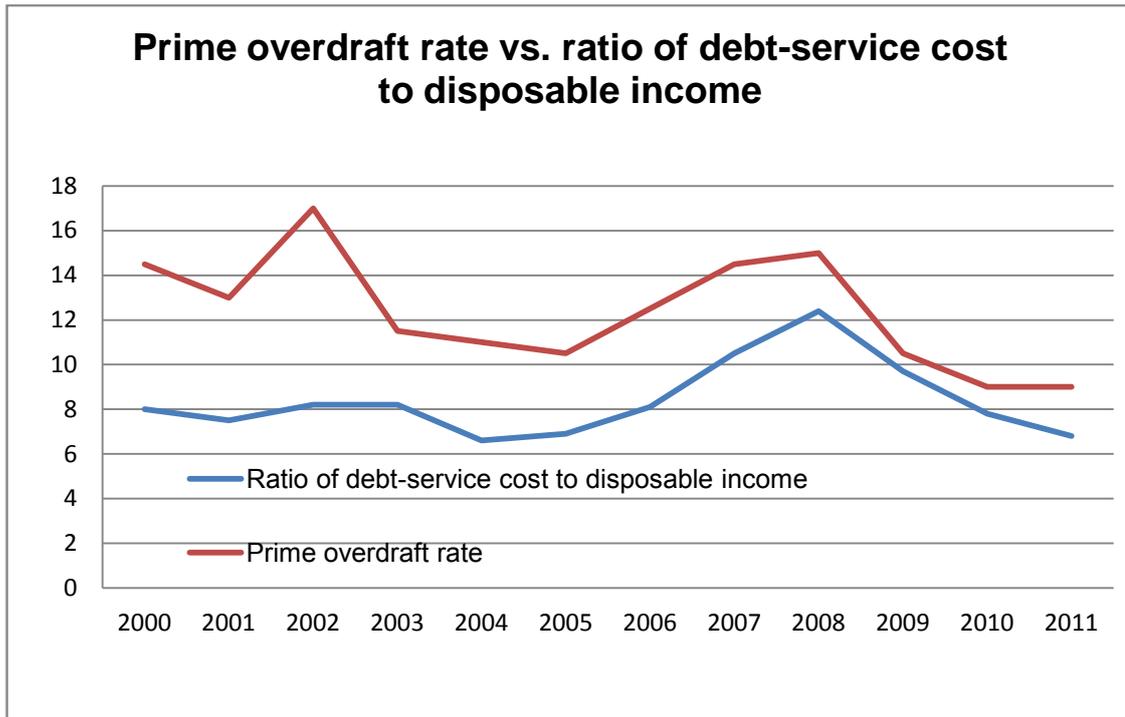
According to the Federal Reserve Board (2012), the household debt service ratio refers to the estimate of the ratio of debt payments relative to disposable income. Given a scenario in which debt payments consist of the estimated outstanding payment on total household debt, Tu (2008) concurs with the view that the debt service cost to disposable income ratio indicates the average amount of a household’s disposable income which could be allocated to servicing debt. While Tu (2008) states that the debt servicing was a function of the outstanding principle and interest payment on the mortgage and consumer debt, a different approach is utilised by the SARB who

propagate the use of the interest portion of debt. According to Mokoena (2008) there are two measures by which this ratio could be obtained. The first involves the conventional measure used by the SARB, which assumes interest payments on debt as the only cost to a household for servicing debt. The second, which is more closely aligned to that of Tu (2008), emphasised consideration of both interest and principle payments.

Mokoena (2008) explained that the conventional measure takes into account the ease of credit lending and modern credit packages. In addition, flexibility on credit products coupled with innovation on credit packaging might overstate the actual cash-flow that households was left with. It is for this reason that Mokoena issued a caution against the use of the capital-and-interest measure of the debt service cost ratio of households. Research done by Girouard, Kennedy, and Andre (2006), states that rising debt-service burdens may result in less credit access for households which will ultimately impact on their ability to smooth consumption. The report further concluded - in contradiction to Mokoena (2008) - that the interest-and-principal measure provided a more comprehensive indication of the financial health of households.

The debt service cost ratio as calculated by Loos (as cited in Isa, 2012) in the *Business Day* on 4 July 2012 is much higher than that of the SARB, due to the inclusion of the estimated cost of capital as well as the cost of interest. It is within this context that Loos (as cited in Isa, 2012) understandably expresses concerns over the future possibility of rising interest rates in South Africa and its impact on households' ability to repay debt. He felt that this was also likely to impact on consumption spending patterns as a scenario unfolded where households' might attempt to split earnings between de-leveraging and consumption spending.

Graph 5: Debt-service cost to disposable income ratio

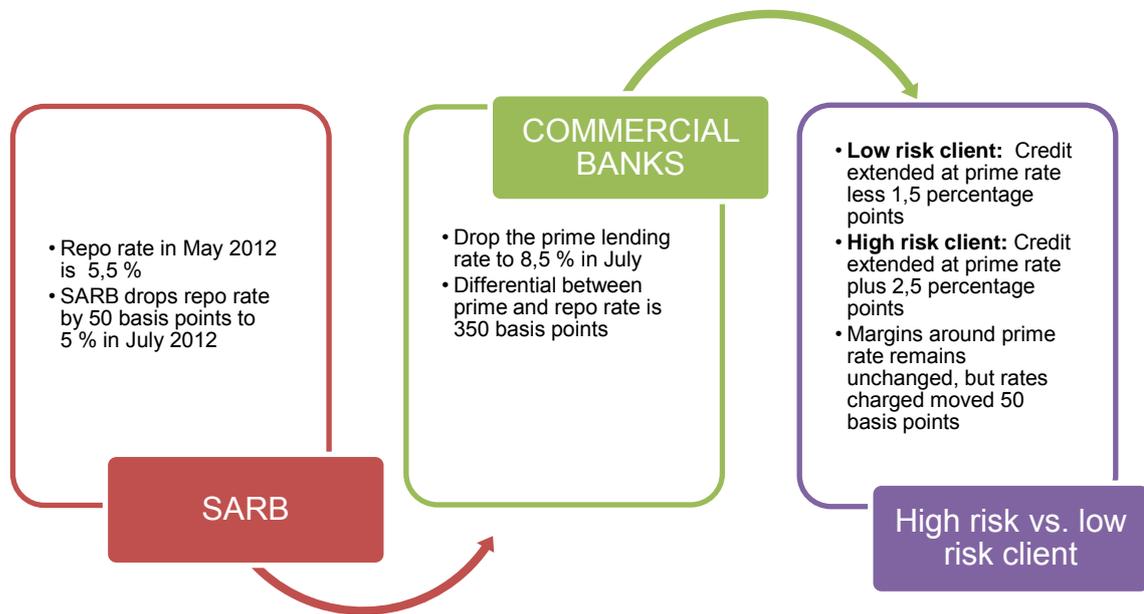


Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

If applying the conventional method as described by Mokoena (2008), it can be estimated that the ratio of debt-service cost to disposable income declined in the period since 2008. Since it is a function of the prime lending rate, the ratio followed the same trajectory as the prime lending rate in South Africa. It should be noted that the prime overdraft rate is the "benchmark" rate for all borrowing in South Africa. The prime rate is 3,5 percentage points above the central bank's policy (i.e. repo) rate, and all borrowing rates are linked to the prime rate.

Figure 1 displays the relationship between the repurchase rate and the prime lending rate. If for instance the South African Reserve Bank adjusts the repo rate by 0,5 basis points downwards, commercial banks will reduce their prime lending rate by 0,5 basis points. Commercial banks however are exposed to various levels of risk which include high and low risk clientele. As displayed in Figure 1, this impacts on borrowers in relation to their risk profile. As an illustration, a low risk client is extended credit at prime minus 1,5 percentage points. In contrast, a student (who fits the profile of a high risk client) will be exposed to credit at prime plus some percentage point margin to compensate the lender for the added risk.

Figure 1: Relationship between the repurchase rate and the prime lending rate



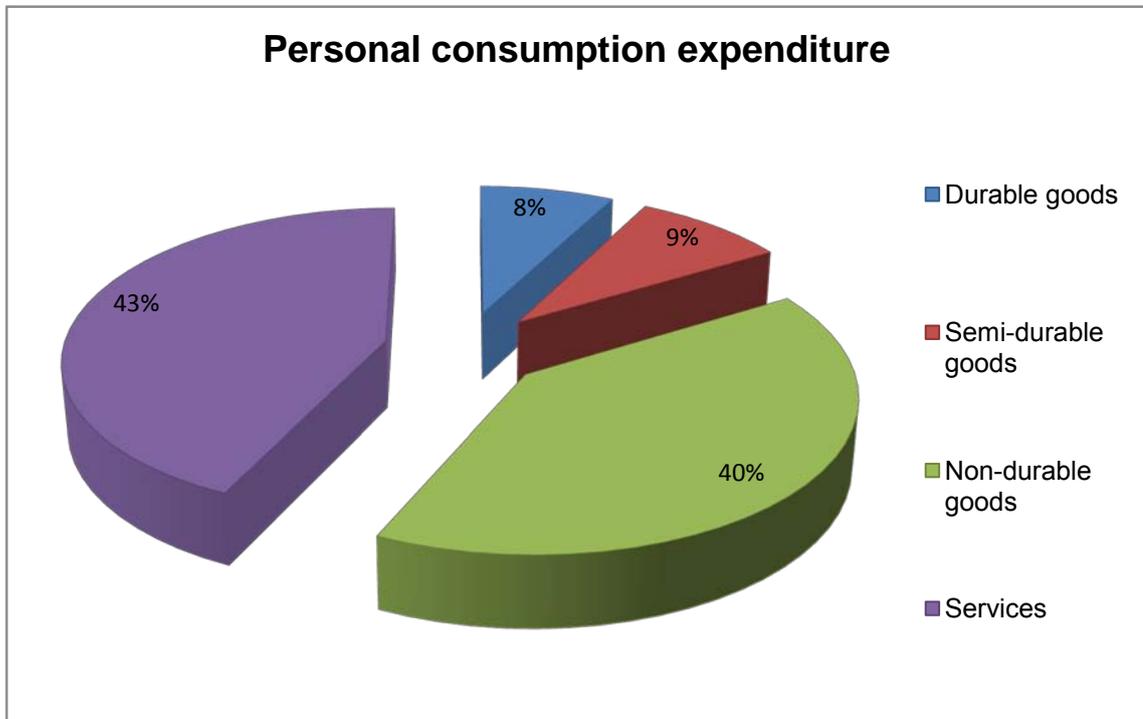
Source: author's figure

2.3 Personal consumption expenditure

The 2008 SNA (2009), (European Commission et al., 2009) defined household consumption expenditure as “an expenditure entered upon by a resident household upon the consumption of goods and services” (p.193). The term “household” is defined in The 2008 SNA (2009), (European Commission et al., 2009) as “a collection of individuals pooling resources together in a joined communal living area” (p. 462). In principle, each member of a household should have some claim over the household ornaments or towards the house itself in order to be deemed part of the household.

Personal consumption expenditure can be classified into four different categories namely durable goods, non-durable goods, semi-durable goods and services. Graph 6 (Historical macroeconomic time series information, 2012) displays the breakdown of personal consumption expenditure in South Africa together with its relevant weightings.

Graph 6: Categories of Personal consumption expenditure (2011)



Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

The categories for services and non-durable goods form the bulk of the weight, followed by semi-durable and durable goods. Durable goods refer to big ticket items such as vehicles, televisions, and refrigerators, while non-durables refer to items such as food, clothing etc. (Pindyck & Rubinfeld, 1992).

2.3.1 Personal consumption expenditure and inflation

Statistics South Africa (2009) state that consumer price inflation (CPI) provides the measure of the monthly change in prices for basket of consumer products. During the 2005/2006 income expenditure survey carried out by StatsSA, South Africa was experiencing unprecedented levels of economic growth. In line with income growth of around 30 percent per annum in 2009 (Statistics South Africa, 2009) households experienced a shift towards the consumption of durables and services.

Although changes in the weightings do not necessarily imply that households spend less on that item, they might be seen as reflective of higher income levels being spent

on big-ticket items due to a situation where households have more disposable income available.

In the ensuing section a focus on the current inflation basket relative to South African households' current consumption patterns is provided.

SARB data classifies personal consumption expenditure according to the 1993 SNA (Commission of the European Communities et al., 1993). StatsSA compiled the CPI with 2008 as the base year according to the income and expenditure survey of 2005/2006 (Statistics South Africa, 2009). In order to compare the consumption spending patterns of South African households with the inflation basket weighting, used for the CPI, personal consumption expenditure data was re-arranged and categorised according to SARB classification, to allow for comparability. It is to be noted that the SARB does not publish data on communication, while data on health from StatsSA is not comparable to SARB published data. As a result, for purposes of this analysis, these two categories are not separated.

The results of the exercise are tabled below. The difference in the weightings are represented in the final column in Table 4 (Historical macroeconomic time series information, 2012) in red and blue, from a SARB perspective, representing under and overweight categories respectively.

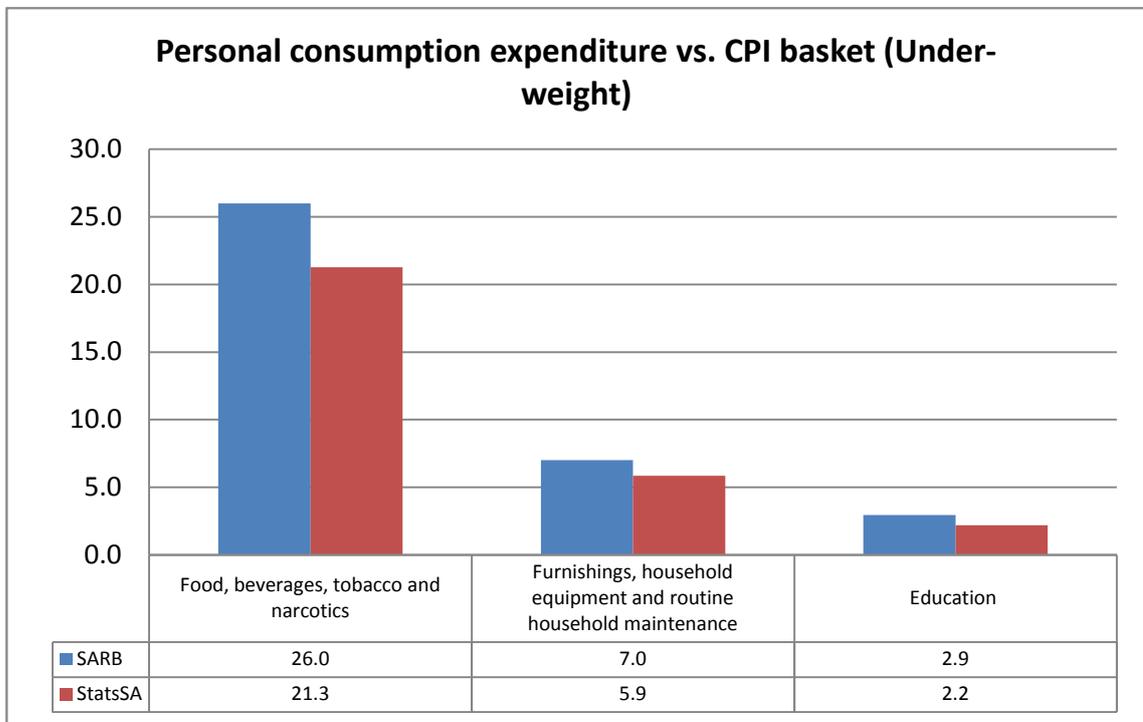
Table 4: Comparison of SARB weight against StatsSA CPI weight

Categories according to SARB Table Kb635 compared against StatsSA CPI weight	SARB	StatsSA	Difference
Food, beverages, tobacco and narcotics	26.0	21.3	-4.7
Clothing and footwear	5.1	5.6	0.5
Housing, water, electricity, gas and other fuels	15.9	22.6	6.6
Furnishings, household equipment and routine household maintenance	7.0	5.9	-1.2
Transport	15.7	18.8	3.1
Communication	Uncomparable due to unpublished data	3.2	
Recreation and culture	4.0	4.2	0.2
Education	2.9	2.2	-0.8
Restaurants and hotels	2.5	2.8	0.2
Miscellaneous goods and services	12.0	13.6	1.6
Health	8.9	Uncomparable due to unpublished data	
Total	100.0	100.0	

Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

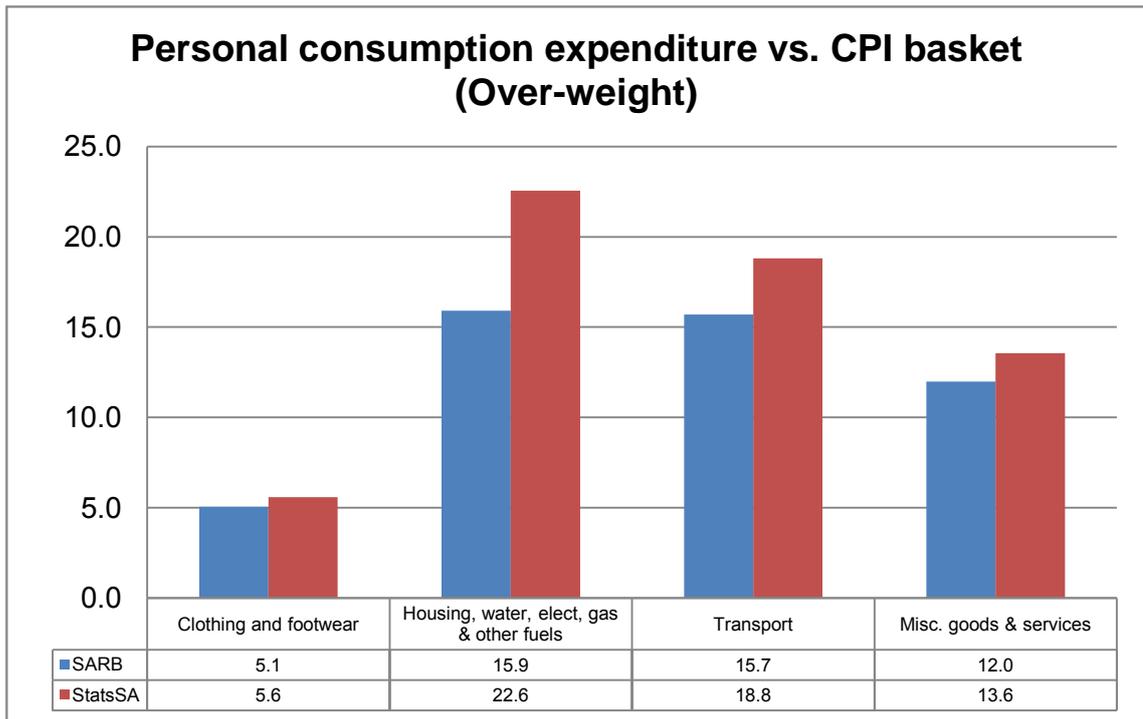
The exercise involved measuring the current weight of StatsSA’s basket of goods at the end of 2011 against consumption spending patterns at the end of the same period. Graph 7 (Historical macroeconomic time series information, 2012) represents the three categories which are under-estimated categories in the consumer price index basket when compared to spending patterns by South African households. Due to the differences in classification between the SARB and StatsSA the category for food, beverages tobacco and narcotics includes both non-alcoholic and alcoholic drinks. This category is 4,7 percentage points lower in terms of the CPI basket, followed by furnishings, household equipment and routine household maintenance at 1,2 percentage points. The category for education is also 0,8 percentage points lower.

Graph 7: Underweight categories in terms of CPI basket



Source: Author’s own calculations adapted from “*Historical macroeconomic time series information*,” [Online Software] by South African Reserve Bank, 2012.

Graph 8: Overweight categories in terms of CPI basket



Source: Author’s own calculations adapted from “*Historical macroeconomic time series information*,” [Online Software] by South African Reserve Bank, 2012.

Graph 8 (Historical macroeconomic time series information, 2012) displays those categories in the CPI basket which are weighted more heavily in relation to actual spending patterns. The category of housing, water, electricity, gas and other fuels has a 6,6 percentage point weighting above South African households’ spending patterns. This is followed by transport and miscellaneous goods and services representing a 3,1 and 1,6 percentage point difference respectively.

Further analysis reveals that subsequent to 2009, in a comparison with SARB data, these categories appear to have been underestimated by the CPI in terms of consumption spending patterns in South Africa. Repeated incorrect measurement of inflation could lead to a wrong signal for the Monetary Policy Committee (MPC) of the SARB. Smaghi (2011) agrees agree with this view, stating that if the price level incorrectly reflects spending patterns, policy makers might be faced with downward inflation expectations pressure, which could result in a pro-cyclical monetary policy response from the MPC committee.

Every five years StatsSA rebases the CPI basket in line with the income and expenditure survey conducted. This includes industry surveys together with national

accounts data (Kafe & Masia, 2012). Kafe and Masia (2012) confirm that given the constant change in spending patterns and the effect on weights, the five year re-weighting period should change to a three year cycle in order to ensure a more accurate spending weighting. Patrick Kelly was quoted in the *Financial Mail* article written by Bisseker (2012) as saying that David Fenwick, former Head of Price Statistics of the UK's office for National Statistics, had found South Africa's CPI to be of good quality. Nevertheless it is to be noted that Fenwick subsequently made 26 recommendations to improve the measurement of price levels in terms of the CPI. 13 of the recommendations pertained to the methodology, while the remaining 13 referred to the improvement and editing of the information received.

The 2009 basket was formulated on the back of the COICOP (Classification of Individual Consumption by Purpose), which is in line with international standards for goods measured in the inflation basket (Statistics South Africa, 2009). A key concern to be highlighted is that the current CPI basket implemented in 2009 was formulated on the back of the 2005/2006 income and expenditure survey (IES). Statistics South Africa (2011) clarifies that a new basket is to be introduced in 2013, with the subsequent lag between completion of the IES survey and implementation dropping to 1,5 years in comparison to the previous 2,5 year lag.

2.4 The theory of consumption

As is the case in many other economies, consumption may be positioned as the epicenter of aggregate demand and therefore might play an important role in the art of economic analysis. Saad (2011) states that modern consumption research revolves solely around three models namely:

- Keynes's (1936) absolute income hypothesis;
- Modigliani's (1975) life-cycle hypothesis; and
- Friedman's (1957) permanent income hypothesis.

Saad (2011) cites that according to Keynesian theory, current household consumption patterns are a function of the current disposable income in a household. The greatest criticism of the Keynesian theory relates to the use of current as opposed to future potential income. According to Keynesian theory in Dwivedi (2010), consumption was based on a "fundamental psychological law", which states that people would on average be likely to increase their consumption as income increases. Nevertheless, the

increase is not anticipated to match the increase in income. In summary, Keynes (1936) postulates that consumption patterns at the time were based on current income.

The life-cycle hypothesis developed by Modigliani (1975) in the late 1940's supports the view that consumption by a rational consumer depends on available resources in conjunction with the allocation of income over a longer period of time (Diwedi, 2010). According to the author this enhances the principle of the maximisation of utility (Dwivedi, 2010). Saad (2011) states that Modigliani's (1975) contribution to the life-cycle income hypothesis revolves around the fact that consumption depends on two factors: these being current income and net wealth. Modigliani asserts that households consider their entire life-span when making decisions on how to spend (Saad, 2011).

Other theory's such as Duesenberry's (1948) concurs with Friedman's (1957) permanent income hypothesis, which can be surmised that the level of consumption is dependent on the income received, but explains that this would be in relation to households with which it identified itself with. Duesenberry (1948) further postulates that consumption in relation to income earnings 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 converse happens. He refers to this as the "ratchet effect".

In addition, 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). These purchases might be made from transitory cash such as a bonus or winnings from lottery ticket purchases. Saad (2011) states that Friedman's (1957) permanent income hypothesis manifests itself in the combination of both permanent, as well as transitory income.

Households in which expenditure exceeds income levels often resort to incurring debt in order to finance current expenditure requirements. Betti et al. (2001) explains that individuals engage in excessive spending yet tend to become more precautionary in their old age; hence debt in its broadest form might be seen as a normal occurrence rather than as a cause for concern. Bertola et al. (2005) offers the explanation that easy access to credit supports consumption expenditure, since consumers are given access to funds that they may not have had under normal circumstances. Bertola et al. (2005) states that households utilised credit facilities to subsidise shortfalls in income.

Similarly, Mote and Nolle (2005) concur that the life-cycle model works in tandem towards a "preference to time" philosophy, in the sense that consumers tend to

consume more in the present period than their income allows them to. Thornley (2008) makes a valid point in stating that although consumers increase current expenditure with the view to potentially higher future income, external exogenous forces which might negatively impact the consumer are ignored.

Apart from the above three models, the social exchange theory (SET) as stated by Cropanzano and Mitchell (2005) could explain other factors causing individuals to incur debt. This is based on the premise that consumers are influenced by their social status, which also acts as a factor when making financial decisions.

The literature on the relationship between household debt and consumption spending is diverse and varied. There are differences in the economic variables used by some researchers to aggregate total household debt. Bacchetta and Gerlach (1997) allude to the positive correlation between growth in household debt and growth in non-durable goods and services expenditure in the United States. A non-durable good can be defined as a good which has a lifespan of three years or less, or which is used immediately by a consumer (Fauvel & Samson, 1991). These goods often include food and clothing. Findings by Ekici and Dunn (2010) confirm the positive relationship between growth in credit card debt, which is considered to be part of household debt, and household consumption expenditure growth. Their study conducted in the United States also proves empirically that a 1 per cent decrease in household debt would in all probability lead to a 2 per cent decline in consumption growth. This is consistent with the findings of Ludvigson (1999), namely correlation between growth in household consumption and credit growth was positively correlated with a 0,1 percentage point impact.

McCarthy (1997) did not succeed in finding a link between household credit and non-durable goods and service expenditures, focusing instead on an existing relationship between credit and spending on durable goods. Similarly, Johnson and Li (2007) examines the relationship between credit card debt and total household expenditure, concluding that a relationship between these two variables does exist. No direct relationship was found between total aggregated household debt and consumption expenditure.

Other studies adopt a top-down approach to these variables focusing rather on debt payments as opposed to household debt levels. Thornley (2008) states that tests concur that debt payments influence expenditure on durable consumption, yet have no impact on final consumption expenditure.

Further work in this area was conducted by Schmitt (2000), who disaggregates debt into installment credit and consumer delinquency rate information in order to determine the behaviour of durable goods expenditure in relation to household debt.

The Working Paper Series written by Ekici and Dunn (2010) noted that there were empirical studies that link the relationship between household debt and household consumption. However, they further asserted that basic theoretical models such as the life-cycle model and the permanent income hypothesis concluded that consumption growth should not be impacted by variables such as household debt.

Johnson and Li (2007) confirmed that due to the various ways in which debt levels could affect payments, the literature on household debt and consumption should not be taken at face value. Johnson and Li (2007) cited the following reasons:

- Interest rates are a determining factor of both household debt and consumption expenditure patterns. When interest rates fall, more money is borrowed by households since it is now more cost effective to do so;
- Rising expectations of future income entice consumer spending, resulting in higher debt levels. For this reason there may be a correlation between debt repayments and household consumption expenditure; and
- Most importantly, there may be some correlation since some households are constrained in terms of borrowing due to lack of assets for collateral.

In conclusion Johnson and Li (2007) summarised five channels by which debt payments and hence household debt could influence consumption. This is depicted in Table 5.

Table 5: Factors impacting on household debt

	Channel		Implied relationship
1	Interest rates	1	Positive
2	Expectations of future income growth	2	Positive
	Durable goods through the following:		
3	Potential financial distress	3	Negative
4	Infrequent purchases	4	Negative
5	Liquidity constraints	5	Positive or negative

Source: "Do high debt payments hinder household consumption smoothing?," by K. W. Johnson., & G. Li., 2007, FEDS Working Paper No. 2007-52, p.8.

Other studies have focused not on the household debt levels, but rather on the payment of debt. Ekici and Dunn (2010) state that previous studies in this area focus on Federal Reserve Data from the Board of Governors of the Federal Reserve System (the Fed), which includes making use of the debt service ratio as opposed to the level of debt. Similarly, Murphy (2000) argued that the debt-service to income ratio should result in a positive influence against the growth in consumption spending. Murphy (2000) further concurred that the relationship between household debt and consumption was not a surprising one.

McCarthy (1997) on the other hand confirmed that there might be a causal relationship between the debt service burden and consumption. Put more simply, McCarthy (1997) postulated that an increasing debt service burden might result in an increase in loan repayment defaults. As credit lenders decreased the supply of money due to precautionary measures, the ultimate impact on consumption would be a negative one. To this end, Carrol, Dunn, and National Bureau of Economic Research (1997) found in their studies that a positive relationship between household debt and consumption expenditure existed. Ludvigson (1999) affirmed the principle that changes in total household debt were positively related to changes in the sub-categories of non-durable and service consumption growth. Similarly, Antzoulatos (1996) confirmed that according to his investigation, expanding consumer credit results had an impact on consumption growth. A key factor driving consumption spending might also be supported by de-regulation of interest rates plus capital flight in and out of a country according to Antzoulatos (1996). This view was supported by the findings of Boone, Girouard, and Wanner (2001). In addition, Antzoulatos (1996) also indicated that rising debt might set off a spending spree when it was accompanied by a higher increase in future wage expectations.

Murphy (2000) asserted that not only did a relationship exist between the debt service cost and consumption spending, but that the debt service to income ratio was a useful predictor of growth in consumption expenditure. He further stated that the debt-service ratio remained a statistically significant variable when other independent variables were included in the regression model. Murphy (2000) provided evidence that the debt service ratio to disposable income was likely to be a better indicator of consumption expenditure for the following reasons:

- The ratio encompasses the demand on current income caused by the principal portion of the debt and the proposed interest rates; and

- It is more likely to estimate a real link from an aggregated level when compared to other possible variables such as delinquency rates, bankruptcy rates or debt-to income ratios as proposed by other research.

Offering a different viewpoint, Maki (2000) stated that the debt service ratio could not explain consumption growth. In his research, the author alluded to the fact that the debt service ratio might not capture the debt burden of households in the lower categories of wealth.

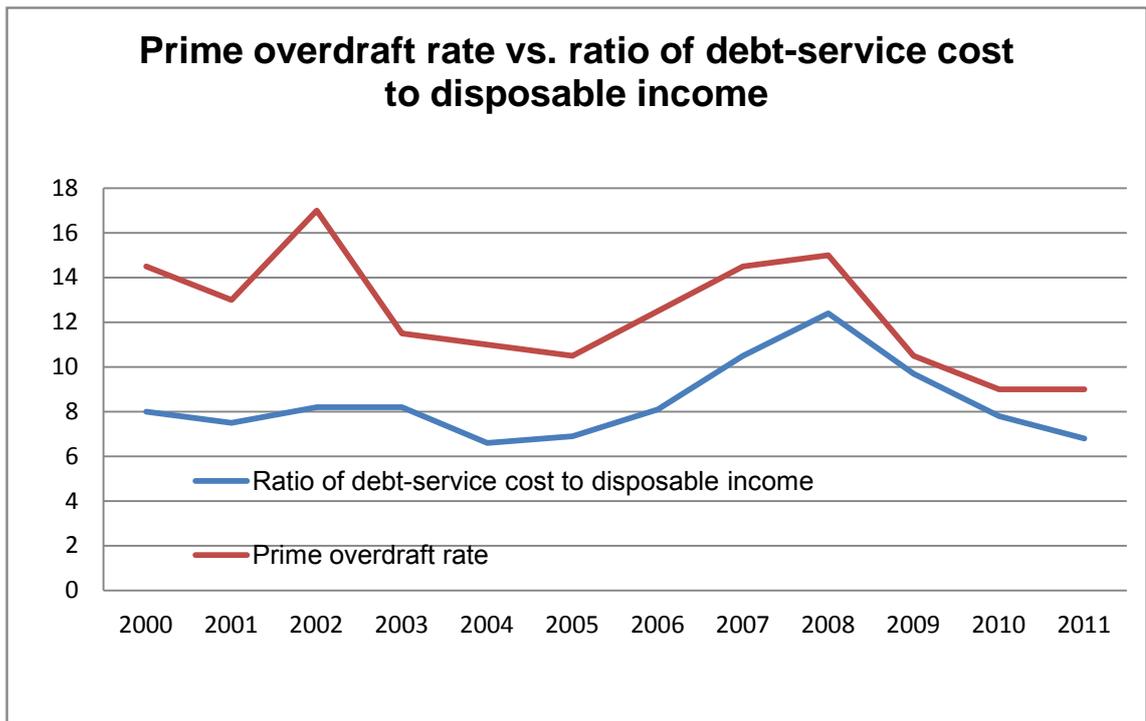
Although the research has focused on countries such as the United States and Canada, no research of this nature has been conducted in South Africa. Past studies in South Africa include studies done by Van den Heever (2007, July) with specific reference to insolvencies and interest rates in South Africa. While a study by Muellbauer and Aron (2011), incorporates research between household debt and wealth in South Africa. This paper aims to fill the gap.

2.5 The financing cost of household debt

Given that some of the studies covered included testing the financing cost of household debt relative to consumption spending, it is important to focus on a brief overview of the debt service ratio.

According to Aron, Muellbauer, and Prinsloo (2007), the debt service ratio of households is a measure of the portion of debt aimed at de-leveraging household debt. In South Africa, debt service costs, represented as a portion of disposable income which is a function of the prime rate of interest, increased from an average of 5 per cent in the early 1970's to an all-time high of 13 per cent by the end of 1998. Exposure to the global financial crisis led to a more lenient monetary policy stance which in turn resulted in a decline of the financing cost of household debt when expressed as a ratio to disposable income. More recently, a further easing of monetary policy in light of the global financial crises culminated in the further decline in the debt service cost ratio of households. This ratio registered 6,8 per cent as at the end of the first quarter of 2012. The respective data is represented graphically in Graph 9 (Historical macroeconomic time series information, 2012).

Graph 9: Prime rate versus the debt-service cost to disposable income ratio



Source: Author's own calculations adapted from "Historical macroeconomic time series information," [Online Software] by South African Reserve Bank, 2012.

According to Girouard et al. (2006), several factors may be responsible for the impact of trends in the debt-service cost ratio. These include, but are not limited to the following four factors:

The first factor is that the increase or decrease in the number of mortgage owners adds to the pool of debt, thus impacting the level of debt-service costs. This was very evident in South Africa prior to the financial crisis, where the lenient lending criteria policy of banking institutions allowed many new homeowners to gain entry into the market.

The second factor is flexibility in the home loan repayment time. Traditionally South African home owners have been subject to a 20 year bond period. More recently creative marketing and product packaging has led to home loans stretching over a period of 30 years. The impact of this is that amortisation levels have dropped.

Thirdly, the household debt service burden is affected by the withdrawal of housing equity and by a policy of re-financing. In times of lower interest rates, re-financing allows households to retrieve some of the equity in their home-loans. Lower interest rates reduce the debt-service costs of households and may impact on household consumption.

Fourthly, the level of interest rates impacts on the monthly debt service costs. Lower interest rates culminate in lower cash outflow towards debt commitment.

2.6 Brazil versus South Africa

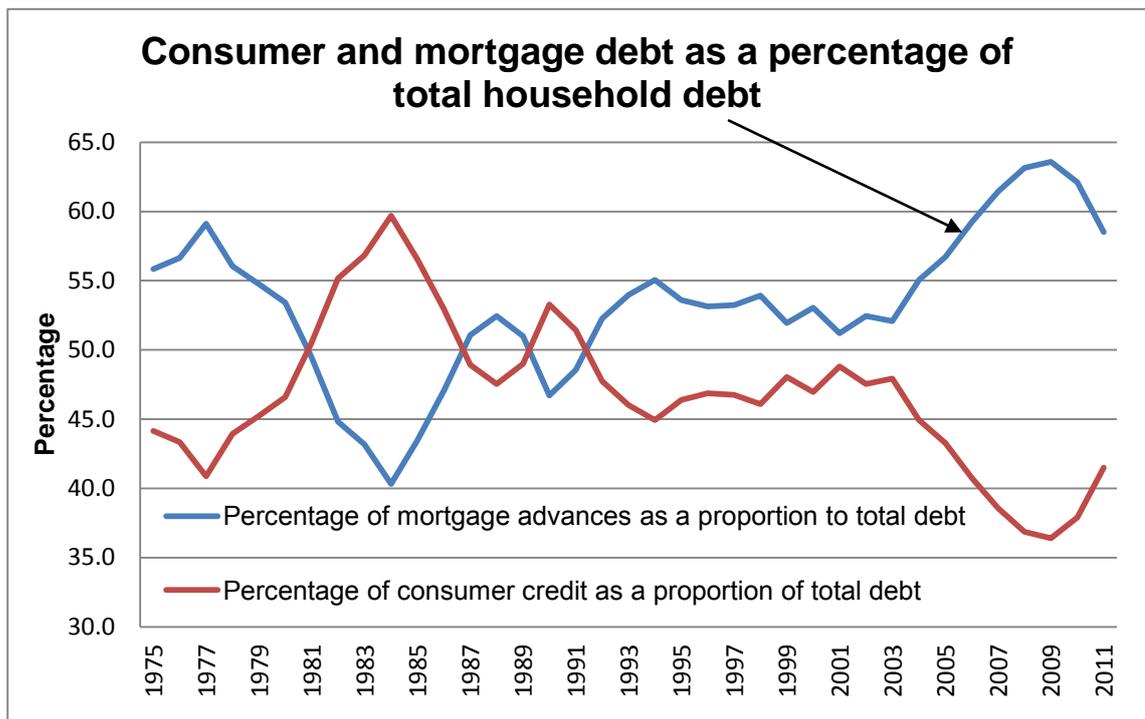
This part of the research compares the structural development of household debt and debt service costs between South Africa and Brazil. The analysis is limited to these two countries, given the difficulty in obtaining data. Brazil has been selected as a comparison owing to, *inter alia* the following social and economic aspects:

- Both Brazil and South Africa can be classified as upper-middle income countries (Maia, Mondli, & Roberts, 2005);
- These countries reveal great disparity both in terms of racial classifications and in relation to distribution of income; (Lieberman, 2003);
- The formulation of social policies is an area in which similarities can be drawn. Barrientos, Lloyd-Sherlock, Saboia, Moller, Mase, and Walker-Bourne (2011) states in research, conducted at the University of East Anglia, that Brazil and South Africa are both leading countries in their regions. Furthermore, both these countries boast innovative social policies which are directed at alleviating poverty and vulnerability. It is pointed out that child disability benefits, low interest loans for the elderly and non-contributory pension schemes form other reasons for positive comparative purposes;
- There are similarities between the rising middle class in Brazil and the ascendancy of South Africa's "black diamonds" into the pool of middle class income earners. Maia et al. (2005) state that although the greatest difference between these two countries is the apartheid regime, military regimes in Brazil led to the implementation of policies which carried the same impact as did the apartheid regime in South Africa;
- Both Brazil and South Africa have populations whose lives have been impacted by political, cultural and economic forces (Kubow & Fossum, 2007); and
- Brazil and South Africa share developmental challenges and (Maia et al. 2005) states that both economies have travelled through liberalisation, undergoing opening up of the economic environment in relation to external trade.

2.6.1 Structural developments in South Africa compared to Brazil

The total exposure of households in relation to financial institutions (including banks and non-banks) continues to increase, yet linked to the global financial crisis the quarterly growth rate in South African household debt has slowed down since 2008. Although quarterly data on household debt has not been published, this can be indirectly calculated from the disposable income and debt to disposable income figures which are produced. The year-on-year percentage change in household debt averaged 14,4 percent at the end of the 10 year period to 2010 in comparison to the 13,3 percent average in the previous 10 years. Prior to the financial crisis, South Africa’s household sector experienced annual growth rates of around 25 per cent in household debt before dropping to annual single digit growth in the following years. Prinsloo (2002) states that a household’s appetite for risk is borne by attractive low rates and that prudent monetary policy in times of economic distress might result in reduced levels of household debt.

Graph 10: South African household debt (consumer versus mortgage debt)

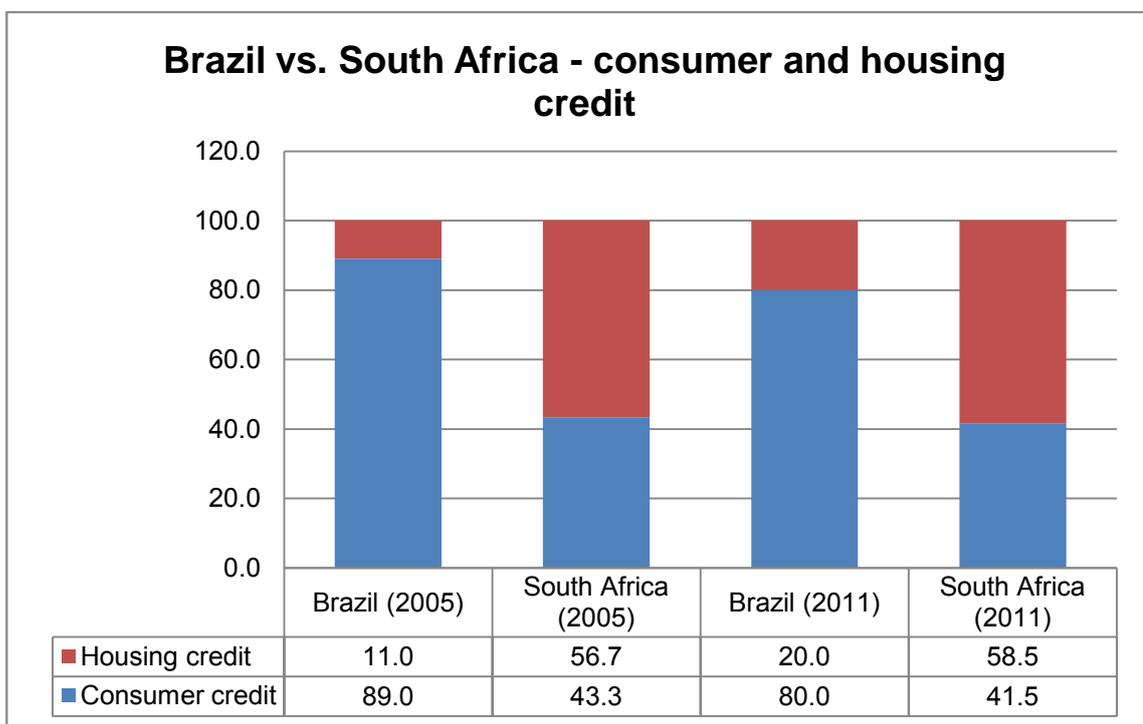


Source: Author’s own calculations adapted from “*Historical macroeconomic time series information*,” [Online Software] by South African Reserve Bank, 2012.

South Africa’s household debt can be broadly categorised into mortgage advances and consumer credit. In the 1970s mortgage advances accounted for a higher proportion of

total household debt when compared to consumer credit. This trend began to reverse in 1981 with consumer credit increasing at a faster pace. This era was impacted by the recession in 1984-1986. Since the early 1990s mortgage advances as a proportion of household debt have superseded consumer credit when contrasted against total household debt. In 2008, mortgage advances accounted for 61,4 per cent of total household debt compared to the 38,6 per cent consumer credit. In subsequent years the proportion dropped to 58,5 per cent accompanied by an increase in consumer credit to 41,5 per cent.

Graph 11: South African vs. Brazilian household debt (consumer vs. mortgage credit)



Source: “Brazil: Selected issues paper,” by M. García-Escribano, J. Pereira, K. Dilts, M. M. Badía, A. Segura-Ubiergo & J. Park, J., 2012, IMF Country Report, No. 12/192, p. 56-71.

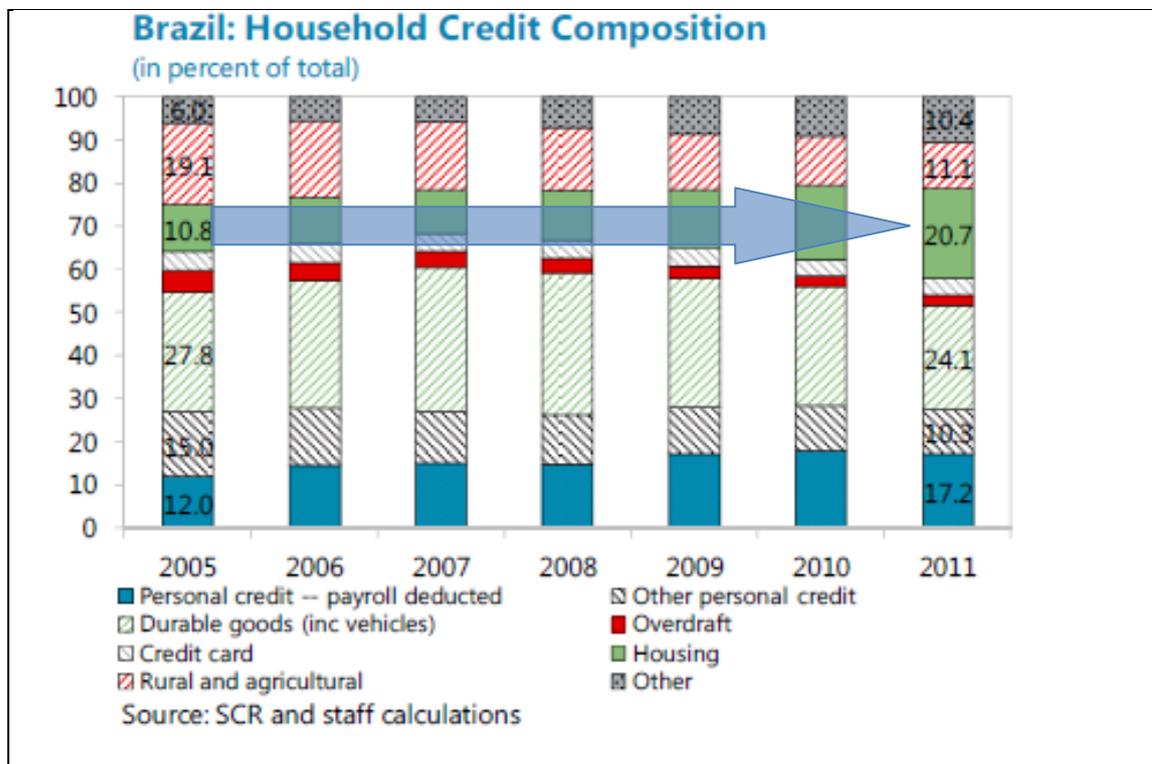
In contrast to South Africa’s borrowing patterns as displayed in Graph 10 (Historical macroeconomic time series information, 2012), Brazil’s consumer loans when compared to South Africa’s in Graph 11, appear to have expanded rapidly. Since 2005, mortgages in Brazil have increased as a proportion of total household debt. The International Monetary Fund (2012) states that during 2010-2011 housing credit in Brazil increased by 50 per cent per year, and indicates that this now accounts for about 20 per cent of total household debt compared to the 11 per cent in 2005. Given that according to Brazil Bahia Property (2011), seven million Brazilians have entered the middle class economy in the last decade, parallels can be drawn with South Africa.

Although South Africa's ratio remains almost in line with the 2005 ratio, housing credit forms the bulk of total household debt.

According to García-Escribano, Pereira, Dilts, Badía, Segura-Ubiergo, & Park (2012) consumer credit in Brazil has accelerated since 2005. In the decade before this total credit to GDP increased by close to 25 percentage points to about 49 per cent of total GDP. As in the case of South Africa, all credit categories have experienced strong growth.

The growth in consumer credit in Brazil slowed down to 20,7 per cent in comparison to the 22,4 per cent registered in 2010. Research from García-Escribano et al. (2012) highlights the fact that the structural transformation in the Brazilian economy has facilitated the growth in household debt. It is further stated that capital inflows into the economy which provide the economy with liquidity have fuelled the demand and supply for credit. In support of this García-Escribano et al. (2012), also states that economic environment has been classified by strengthening labour markets, while social mobility as a factor, has further contributed to the need for credit by Brazilian consumers.

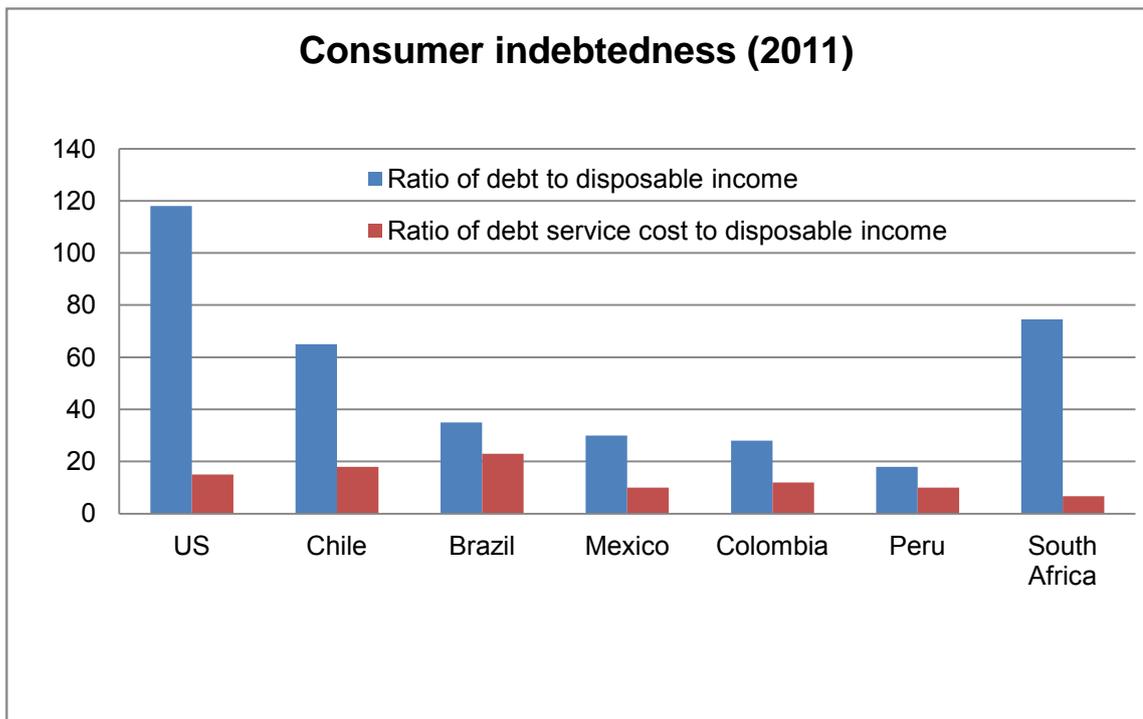
Graph 12: the split of consumption spending in Brazil



Source: "Dealing with household debt," by International Monetary Fund, 2012, World economic outlook: Growth resuming, dangers remain, April 2012, p. 59.

Lack of data availability on the part of the SARB and from the Banco de Brazil, requires some inferences to be made. In the case of Brazil Graph 12, sourced from the International Monetary Fund research (García-Escribano et al., 2012) shows the composition of credit to consumers from 2005 to the end of 2011. It is clear that by the end of 2011, housing took over as the second major form of credit extended to households. In the South African context, mortgages account for a significant percentage of total household debt. The same trend seems to be emerging in Brazil.

Graph 13: Debt service cost of Brazilian households



Source: “*Dealing with household debt*,” by International Monetary Fund, 2012, World economic outlook: Growth resuming, dangers remain, April 2012, p.59.

The credit boom in Brazil resulted in debt accumulation, thus impacting on the debt service ratio of Brazil’s housing sector. The consumer debt service ratio of Brazil at the end of 2011 is relatively higher at 23 per cent in comparison to its Latin American counterparts, as is shown in Graph 13. In contrast South Africa’s debt service ratio at the end of 2011 was 6,7 per cent. García-Escribano et al. (2012) cites the following reasons for the higher debt service cost ratio in Brazil:

- The interest rates charged on loans are substantially high and average around 50 per cent; and
- Interest rates charges range from 30 per cent for loans on durable goods to 175 per cent for overdrafts.

Given that both Brazil and South Africa pursue similar macro-economic policies with specific reference to inflation targeting, it is interesting to note the structural differences between both economies. Although Brazil's household debt patterns (Graph 12) seem to be moving towards South Africa's structure, the gap between the ratio of mortgage advances and total household debt is still relatively large between both economies. In South Africa the ratio of mortgage advances as a percentage of household debt has moderated to around 58 per cent at the end of 2011, compared to higher ratios in the previous years as shown in Graph 10. This may be on account of the global financial crisis. As stated earlier, high interest rates on loans may be a deterrent to attracting investors into the property market, which may explain the lower levels of mortgage debt as a percentage of total household debt.

2.7 Household debt versus public debt and its sustainability

An awareness of the difference between household debt, also referred to as private debt in comparison to public debt, is relevant to the analysis being undertaken. While private debt in this sense refers strictly to households in South Africa, public debt can be applied in a broader sense to debt incurred by government. Public debt will hereafter be referred to as government debt. Public debt according to Natrass (1995) is defined as "the stock of the total amount of debt owed to the public" (p.191). Although Barba and Pivetti (2009) conclusively cite the differences between household debt and government debt, Natrass (1995) suggests that government debt should be recorded in the same manner as that of debt extended to a company. Barba and Pivetti (2009) conclude that the greatest difference is the "sustainability of recourse" against these two variables. Accordingly it can be concluded that growth in public debt and output cannot be thought of as exogenous.

The authors further perceive the differences between these two levels of debt as follows:

- In the case of private debt, lenders are not responsible for the cost of servicing debt. As a result the responsibility remains with the borrower of the funds i.e. the households themselves;
- When trying to compare sustainability between household debt and government debt, the rate of interest rate and growth of income is greater for household debt than it is for public debt; and

- The support for public debt relative to household debt is further supported if one considers the probability of government intervention in the public debt arena.

The common link between the two types of debt is provided by interest rates. The primary debt as a percentage of GDP can be curtailed in terms of monetary policy. In conclusion, Barba and Pivetti (2009), comment that from a long run perspective, the remedy for high public debt is easier to mediate when compared to rising household debt. Likewise, debts of businesses (companies etc.) are also excluded from the analysis. The focus in the research is on the link between household debt and consumption spending.

In contemplating household debt, the question of the long run sustainability of debt is a pertinent one. Barba and Pivetti (2009) state that in attempting to answer this question one should think about the link between government debt and GDP. Natrass (1995) raises the concern that in considering the debt-to-GDP ratio, the greatest danger of public borrowing is the “debt-trap” itself. Natrass (1995) sees a debt trap as linking to a sustained rapid increase in the debt-to-GDP ratio which might no longer be prevented by the use of fiscal policies.

Barba and Pivetti (2009) further states that aside from the debt-to-GDP ratio, crucial factors in the analysis are the rate of interest and the rate of growth in income. In a household which is heavily indebted, if the decision was made to keep the growth in consumption in line with the growth in disposable income, the debt to income ratio would continuously rise if interest rates rose steadily above the rate of growth in income. In contrast, the debt to disposable income would not keep on rising if the rate of increase in income surpassed that of household debt. Households would be required to reduce their level of consumption expenditure. A further point worthy of note is that in the case of public debt characterised by a rate of growth, the situation is not exogenous when perceived in terms of the debt constituents. Therefore when considering the position of a household, the source of income needs to be viewed as a separate avenue of household debt.

Barba and Pivetti (2009) concluded that in the debt to income ratios, the income should be considered to be an independent factor in respect to the debt due predominantly to sticky wages and to the changes of income distribution that accompanied wage growth.

In conclusion, in Chapter 2 an overview of the background framework of literature has been presented for further exploration. The next chapter will provide a statement of the precise purpose of the research together with the hypothesis to be tested in Chapter 5.

Chapter 3: Research questions

3.1 Introduction

The central focus of this chapter is to discuss the research objectives based on the literature in Chapter 2. The first step involves determining whether a relationship exists between these two variables. The next step involves the determination of the mathematical impact between the stated variables.

The econometric analysis seeks to determine whether the relationship between these two variables is negative or positive. Furthermore, it will be interesting to determine the existence of such a relationship between the various sub-categories of consumption spending. This will result in a deeper understanding from a macro-economic view with regard to the financial health of the South African economy.

3.2 Research objective

The fundamental question that the research intends to answer might be stated as follows:

1. Is there a relationship between household debt and the four individual categories of consumption spending in South Africa?
 - Durable goods
 - Non-durable goods
 - Semi-durable goods
 - Services

2. If so, to what extent does one variable impact on the other?

In aiming to answer the above question, the following can be identified as the main objectives of the research:

Objective 1: To determine the exact relationship between household debt and consumption expenditure in South Africa; and

Objective 2: To ascertain the exact impact of a change in household debt on consumption spending patterns

Since single regression analysis cannot be econometrically relied upon, the regression analysis will take the form of a multiple regression. These variables are discussed in the next chapter.

In conclusion, in this chapter an overview of the research questions to be explored is presented. In the next chapter there is a more specific focus on an analysis of the research methodology designed to test the relationship between household debt and consumption in South Africa.

Chapter 4: Research methodology

4.1 Introduction

The purpose of this chapter is to describe the methodology to be used in the process of estimating the regression equation. The first part describes the research methodology followed by the research design while the next part of this chapter seeks to draw on econometric methodology as specified by Gujarati (1995). In conclusion, the potential research limitations will be presented.

4.2 Research methodology

The study encompassed an empirical research study of the relationship between consumer credit and consumption spending patterns in South Africa. This is the first South African study of this nature that looked specifically at the relationship between these two variables. Others have included research on wealth, credit conditions and consumption (Muellbauer & Aron, 2011). Since previous studies on interlinked and related topics have implied a causal relationship between the two variables under scrutiny, a causal research study is conducted. Causal research is one which is used to identify a cause-and-effect relationship between two or more variables (Zikmund, 2003).

The dependent or endogenous variable is consumption, while the independent or exogenous variables included consumer credit, and gross domestic product per capita. Analysis was done on constant prices with an evaluation period of 1975 to 2011.

4.3 Research design

Based on the literature review, the study took the form of a desktop econometric study. It encompassed the deduction approach. Saunders and Lewis (2012) explain that deduction involves utilisation of a research strategy which is specifically designed to perform a test. This design also requires an explanation of the causal relationship between variables.

The research data was sourced from archival data, in which the researcher made use of secondary data. Secondary data as described by Saunders and Lewis (2012) is

seen as data that has already been collected from other sources and is thus readily available for use. Since data is constantly collected from participants over a period of time, the data is of a longitudinal nature with a time frame ranging for the period 1975 to 2011.

The data was sourced from the SARB's website. Data was statistically analysed, using time series data analysis on E-views version 7 (Startz, 1997). E-Views is a data software program which is designed to provide a sophisticated manner to conduct data and regression analysis. E-views allow the user to develop a statistical relationship from the data utilised in the equation. Startz (1997) comments that E-views is suitable for scientific data analysis and evaluation, financial analysis, macroeconomic forecasting, simulation, sales forecasting and cost analysis. This is in line with the current economic data to be used for the purpose of the regression equation.

For the purpose of establishing the existence of the relationship between these variables, econometric analysis was conducted. The objective of this analysis was aligned with the viewpoint of Gujarati (1995), who stated that econometrics should be used to verify theory. He further stated that theory did not give a precise mathematical indication of the impact of one variable over the other. Econometrics provides this skill.

4.4 Econometrics methodology

Gujarati (1995) confirmed the method of carrying out an econometric analysis via the traditional or classical methodology. These hinged on dominant methods used in econometric and economic studies. According to Gujarati (1995) this methodology encompasses the following steps:

- Statement of theory or hypothesis;
- Specification of the mathematical model of the theory;
- Specification of the econometric model of the theory;
- Obtaining the data;
- Hypothesis testing;
- Forecasting or prediction; and
- Using the model for control or policy purposes.

This method of econometric analysis will prove to be meaningful for the following reasons:

- A quantitative econometric model will allow for the running of a simple regression in order to determine whether the independent variable is statistically significant;
- The time period analysis extending from 1975 to 2011 will allow for analyses over a period of time in order to provide conclusive evidence of an existing relationship; and
- There is no need to generate or collect data from other sources, since data of this nature currently exists.

The steps which follow delineate the above in further detail:

4.4.1 Hypothesis

The null hypothesis states that the independent variables (consumer credit and gross domestic product per capita in South Africa) do not affect the dependent variable (consumption spending), while the alternative hypothesis states that the independent variables do affect the dependent variable.

$$H_0: \beta = 0$$

$$H_a: \beta \neq 0$$

4.4.2 Specification of the mathematical model

The regression model is estimated by Ordinary Least Squares (OLS) for a sample of observations ranging from the time period between 1975 and 2011. The dependent variable is personal consumption expenditure (seasonally-adjusted), separated into the four categories. These included durable goods, non-durable goods, semi-durable goods and services. The independent variables were consumer credit and gross domestic product per capita. The theory indicates a positive relationship between household debt and consumption spending. In other words rising household debt is likely to result in increased consumption spending patterns.

4.4.3 Specification of the econometric model

The estimated econometric equation is as follows:

Consumption spending = β + C1 (consumer credit) + C2 (gross domestic product per capita)

This relationship was tested on a categorical basis in the form of the four categories of consumption expenditure:

- Non-durable goods;
- Semi-durable goods;
- Durable goods; and
- Services

The model contains a sample of observations of consumption expenditure, household debt, consumer credit and gross domestic product per capita. All data was seasonally adjusted. A regression model was built based on the real annual seasonally adjusted levels of each variable.

A polynomial distribution lag (PDL) was tested in the multiple regression equation relating to consumer credit. A polynomial distribution lag allows for the inclusion of an explanatory variable not only in one period, but also in multiple periods with different weightings. The chosen lag structure forces the coefficients of a distributed lag to lie on a polynomial line. In essence, it allows for the inclusion of a variable over more than one period with varying weights applied to each period (Startz, 1997).

Since mortgage advances in South Africa consists of 58 per cent of total debt, for the purpose of the regression analysis, only the consumer credit portion of household debt was analysed. The purpose is to evaluate the impact of actual credit on consumption and not the housing portion of the credit.

4.4.4 Obtaining the data

Data was collected from databases of the SARB containing household balance sheet information. The sample is free of sample selection bias as well as convenience sampling (Saunders & Lewis, 2012) since the data will be secondary data.

Hypothesis testing is described in Chapter 5. Forecasting and using the model for policy purposes represent stages beyond the scope of this research.

4.4.5 Universe

The universe of the study is limited to South African household data from the SARB. The universe has been determined by the criteria as defined by the SARB regarding household surveys. The limitation of the universe is the fact that the data sets cannot be divided into the various Living Standards Measure (LSM) categories, which could prove to be more useful. Living Standards Measures separate the population into ten LSM categories, where LSM 1 represents the lowest income and LSM 10 represents the group of highest income earners (South African Audience Research Foundation, 2011).

4.4.6 Unit of analysis

The unit of analysis is data collected on household balance sheets from the SARB since 1975. Real values of each variable were used. Consumption expenditure was available in real terms, whereas consumer credit was deflated using the historical CPI index as a deflator.

4.4.7 Population

The population of the study includes all household data from the SARB. These data points have been recorded since the first quarter of 1975.

4.4.8 Research limitations

The following have been identified as research limitations:

- The study is conducted in the South African context and may not be applicable to or imposed on other countries;
- The lack of data within the various Living Standards Measure categories prevents research from being carried out within these groupings;

- Re-classification of South African National Accounts Systems from The System of National Accounts, 1993 (Commission of the European Communities et al., 1993) method to The System of National Accounts, 2008 (European Commission et al., 2009) may result in aggregate data changes which could impact on the study, however a significant impact is not anticipated;
- Periods of global financial crises, which include the 1997/1998 global financial crises and the most recent global financial crises in 2008 may impact on the regression analyses;
- The SARB revises time series data each year, however the impact of these revisions are expected to be minimal since the revision process allows for adjustments to data points in instances where better sources of data have been obtained.

Due to the fact that research of this nature is lacking in South Africa, an advantage of the study is that the results might over time be compared to similar studies in other countries. Such comparisons are nevertheless outside the scope of this research.

Chapter 5: Results

The aim of this chapter is to mathematically evaluate the relationship between personal consumption expenditure and consumer credit in the South African economy. The first part of this chapter explains the variables that were tested in the equation. The second part provides data analysis in relation to each variable used, including trend analysis. Finally, the regression equation is presented.

5.1 Econometric overview

5.1.1 Economic drivers of consumption spending

This section endeavours to estimate the sensitivity of consumption spending (constant prices) to certain economic variables, more specifically consumer credit and at the same time, to determine the response of consumption spending when regressed against a combination of economic factors that drive consumption spending in South Africa. Mortgage advances account for 58 per cent of household debt, and for the purposes of this research, mortgage debt has been stripped out of total household debt. Since mortgage debt is most likely to have an effect on consumption spending due to its high weighting in total household debt, the focus of this research is the to determine the direct link between consumer credit and consumption spending in isolation. Therefore the regressions are based upon the link between consumer credit and consumption spending.

Even though the purpose of the model is to test the relationship between consumer credit and consumption spending in South Africa, a single regression model cannot be estimated. Single regression analysis creates distorted results by artificially inflating the R-squared. The R-squared is an indication of the “goodness of fit” in a model. For this reason, a multiple regression model is used.

In approaching the econometric study variables listed below were tested as possible regressors in the equation:

- Durable consumption;
- Semi-durable consumption;
- Non-durable consumption;

- Services;
- Consumer credit ; and
- Gross domestic product per capita.

Only the consumer credit portion of household debt was used for analytical purposes as alluded to earlier. In addition, gross domestic product per capita was used as a proxy for wealth.

5.1.2 Specification and estimation of the model

The theoretical and a priori relationship between the dependent and independent variables suggest that an econometric model should accommodate the direct impact of the independent variables with each of the equations presented below. For the purpose of the regression process, each variable mentioned above will be tested against the dependent variable in order to analyse and interpret the regression results and to find a model with “best-fit”. In other words, a model in which the chosen independent variables best explain the variation in the dependent variable. Data used in the analysis is published by the SARB on an annual basis and was retrieved from the SARB’s website.

5.2 Data utilised for the regression

Table 6: Description of data together with source code from SARB and E-views code

SARB code	Description	E-views code
KBP6050Y	Final consumption expenditure by household: Durable goods (PCE)	CD1
KBP6055Y	Final consumption expenditure by households: Semi-durable goods (PCE)	CSD1
KBP6061Y	Final consumption expenditure by households: Non-durable goods (PCE)	CND1
KBP6068Y	Final consumption expenditure by households: Services	CS1
KBP6928J	Balance sheet: Total liabilities: Households and non profit institutions serving household	HDEBT1
KBP6929J	Balance sheet: Mortgages: Households and non profit institutions serving households	MORTG1
KBP6930J	Balance sheet: Other debt: Households and non profit institutions serving households	Ccrt1
KBP6270Y	Gross domestic product per capita	Gdppc1

Source: Author’s own table adapted from “*Historical macroeconomic time series information,*” [Online Software] by South African Reserve Bank, 2012.

Table 6 (Historical macroeconomic time series information, 2012) lists the various data sets that were used for the estimation process together with the source code as

published by the SARB. The final column lists the E-views description code for each of the variables. Household debt as well as savings data is published in current data format. Economic data may consist of both nominal and real values. The nominal value is referred to and expressed as data at current prices. The changes in nominal values have two components – the first one being the changes in the real size of the variable and secondly the changes in the general price level i.e. inflation. Conversely, the real value is a reflection of only the real changes in the economic variable. The real value is more valuable in comparing the data at various points in time. For the purposes of the regression analysis household debt data and the savings of households were deflated using the CPI as a deflator.

In addition, all other variables with the exception of household debt data is published on a seasonally adjusted basis. Seasonal adjustments refer to the process of removing any cyclical and extracting the underlying trend components of the time series data. In the absence of seasonally adjusted data, the E-views programme makes use of the census X11 (historical) multiplicative method for purposes of seasonal adjustment. The multiplicative method is a method used when the standard deviation of data is constant. This method is generally the superior method and used when all data points are positive. In contrast the additive method is used for data in which a varying standard deviation is present. Household debt data was seasonally adjusted using the X11 multiplicative method.

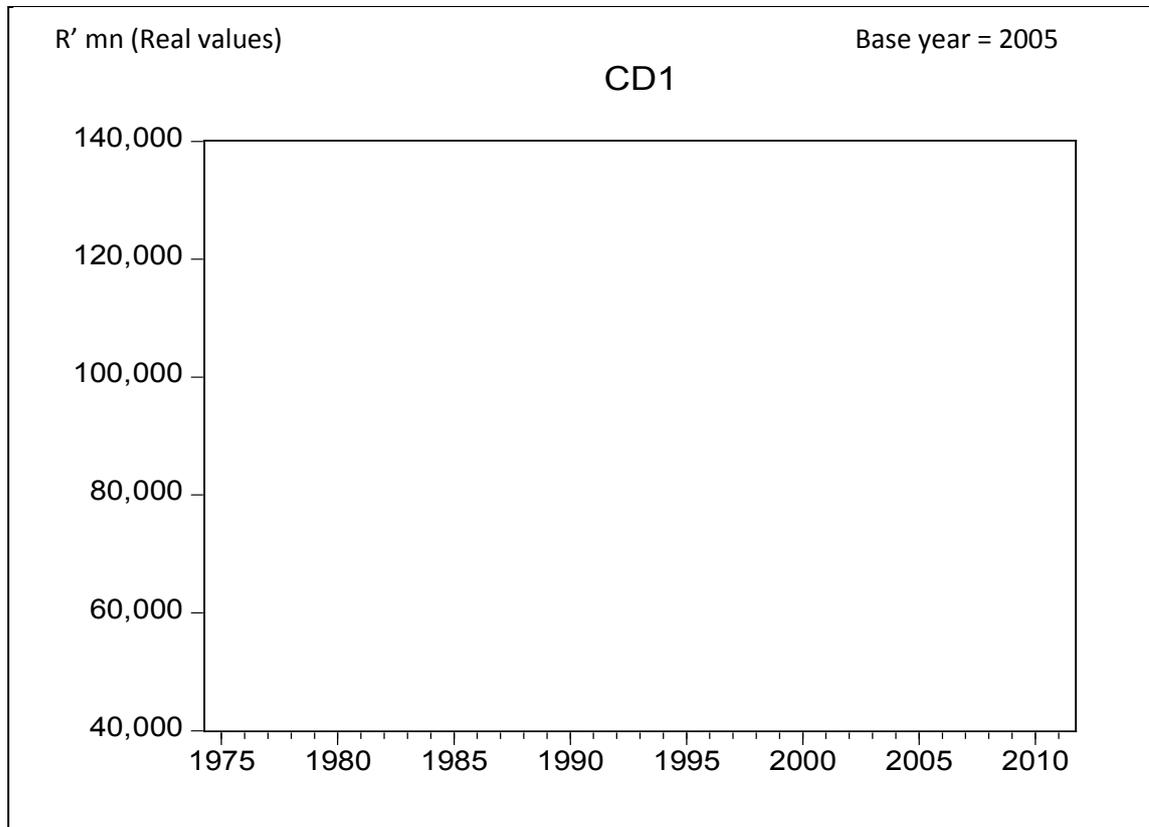
5.3 The economic variables

This section describes and displays the trends and descriptive statistics of each of the independent and dependent variables used. Codes used for each variable in the graphs are set out in Table 6 represented earlier.

Prior to utilising the data, descriptive statistical analysis was carried out on each variable. Descriptive statistics in this chapter include graphical representations of the mean and the median. These statistics provide the researcher with a quick overview of the data used and is an important initial step in familiarising oneself with the data.

5.3.1 Durable consumption expenditure (CD1)

Graph 14: Durable consumption expenditure



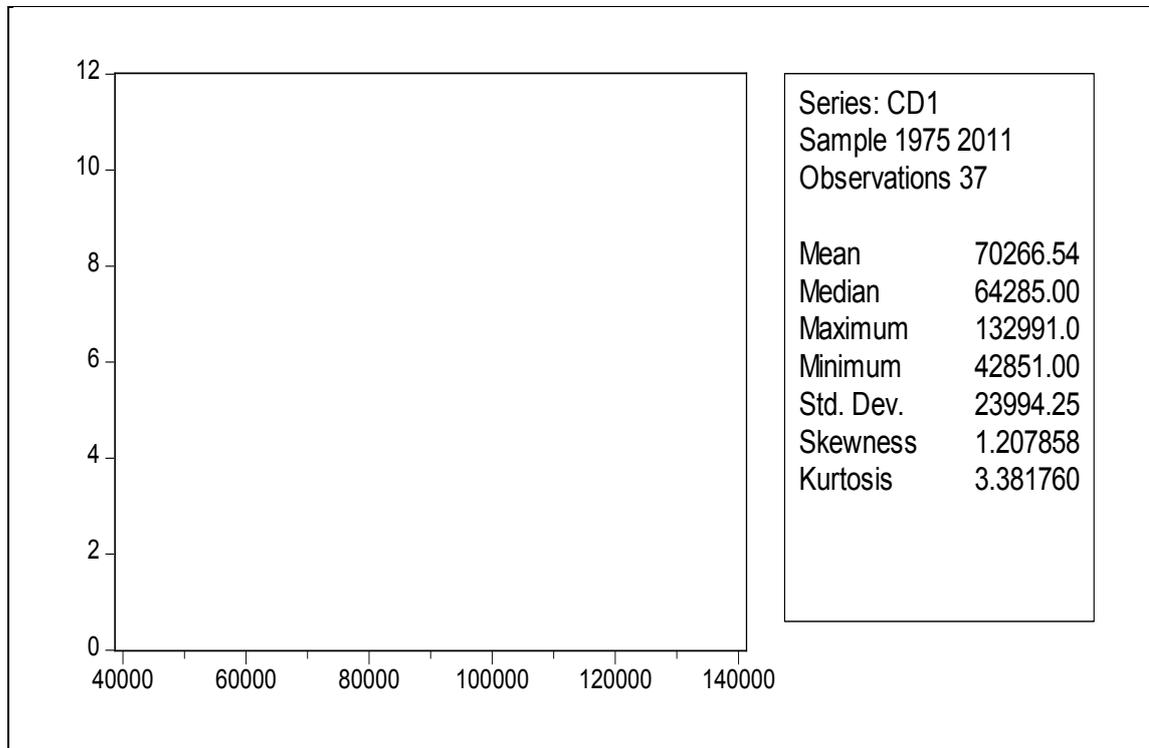
Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 14 (E-views, Version 7) represents the levels of durable consumption expenditure incurred by households since 1975. Durable consumption clearly picked up pace since the 1990's, but was negatively impacted by the most recent global financial crisis in 2008/2009. Since then, the 2010 and 2011 annual figures display recovery in this area of consumption spending.

Durable goods according to the SARB *Quarterly Bulletin* (September 2012), consist of furniture, household appliances, personal transport equipment, computers and related equipment, recreational and entertainment goods and other durable goods. The category for personal transport equipment forms the greatest portion of expenditure of 56,6 per cent of total durable goods followed by spending on furniture and household appliances of 18 per cent. An increase in spending on durable goods should result in increased debt. Therefore one would expect a positive relationship between household debt and durable goods.

5.3.1.1 Histogram of durable consumption expenditure

Graph 15: Histogram of durable consumption expenditure



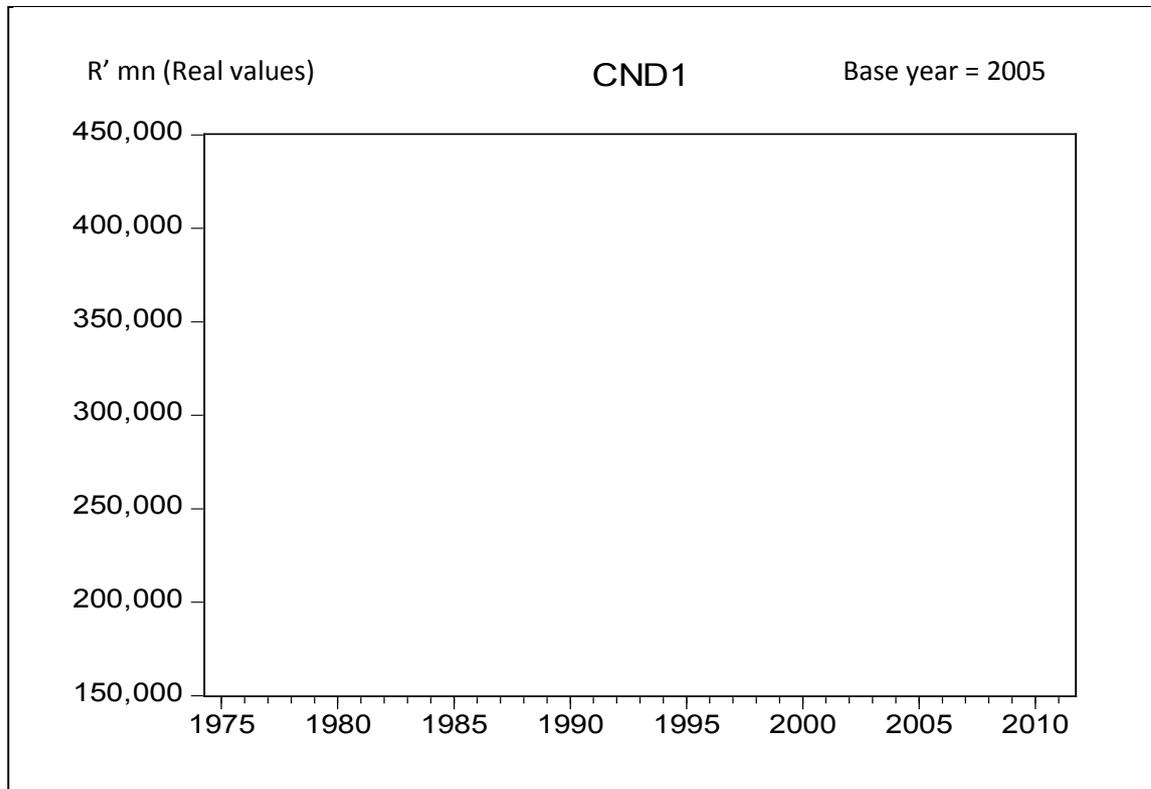
Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Descriptive statistics are used to display data in a meaningful way. Raw data is difficult to visualise and a graphic representation allows for a quick overview of the nature of the data according to Albright, Winston, and Zappe (2006).

Graph 15 (E-views, Version 7) represents the mean and median for durable consumption expenditure. The mean of R 70 266 million, indicates that much of the distribution in the data falls within that region. Therefore, the typical level of durable consumption expenditure per annum is around R 70 266 million expressed in real terms. This representation is consistent with South Africa's Gini-coefficient of 63,1 (World Bank, 2012) at the end of 2009. The Gini-coefficient according to the OECD (2002) is a measure of the deviation of income and in some instance consumption expenditure from a perfectly equal distribution. Data shows that consumption on durable goods in excess of the mean is fairly limited.

5.3.2. Non-durable consumption expenditure (CND1)

Graph 16: Non-durable consumption



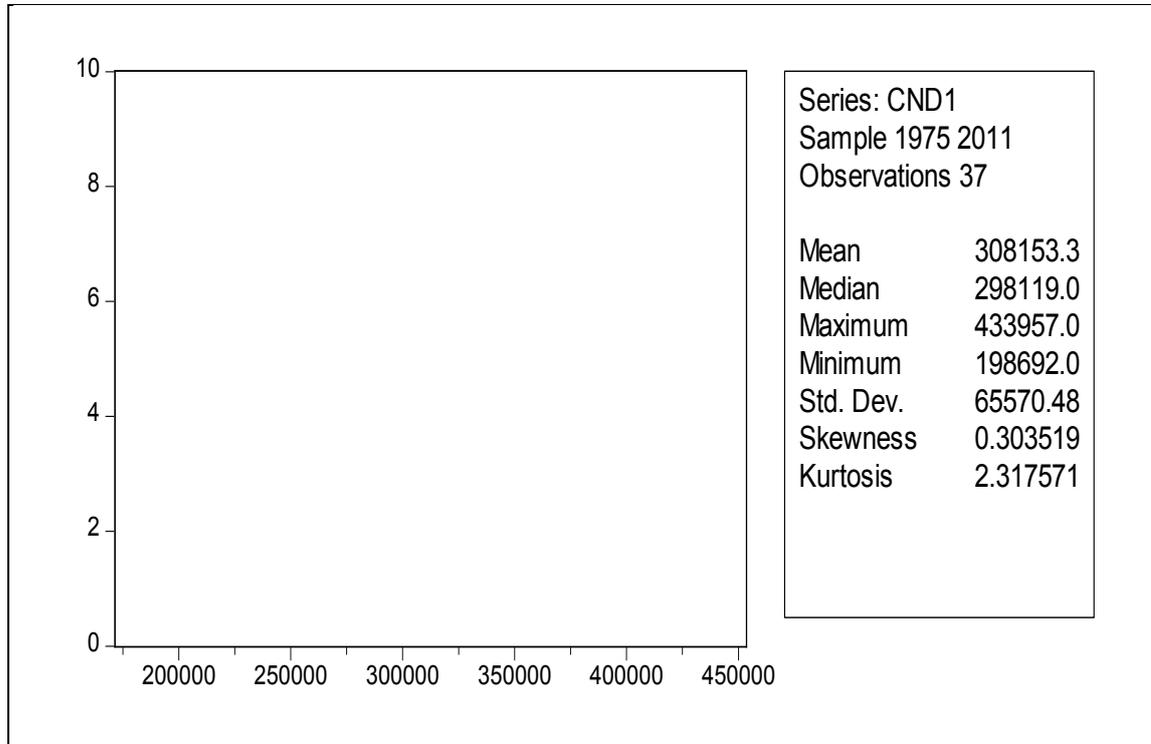
Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph16 (E-views, Version 7) displays the levels of non-durable consumption expenditure expressed in real values since 1975. Although following the same overall trend as durable consumption, this category of expenditure was not severely impacted by the global financial crisis, dropping by 1 percentage point in 2009. This makes economic sense since consumption of non-durables will not really change during a crisis as consumers may switch to cheaper substitutes.

Non-durable goods include a host of goods such as food, beverages and tobacco, household fuel, power and water, household consumer goods, medical and pharmaceutical products, petroleum products and recreational and entertainment goods. Recreational and entertainment goods include newspapers, magazines, stationary and recording media and at the end of 2011 contributed 64,1 per cent to total spend on non-durable goods. This is followed by household fuel, power and water with a 10 per cent weighting.

5.3.2.1 Histogram of non-durable consumption expenditure

Graph 17: Histogram of non-durable consumption expenditure

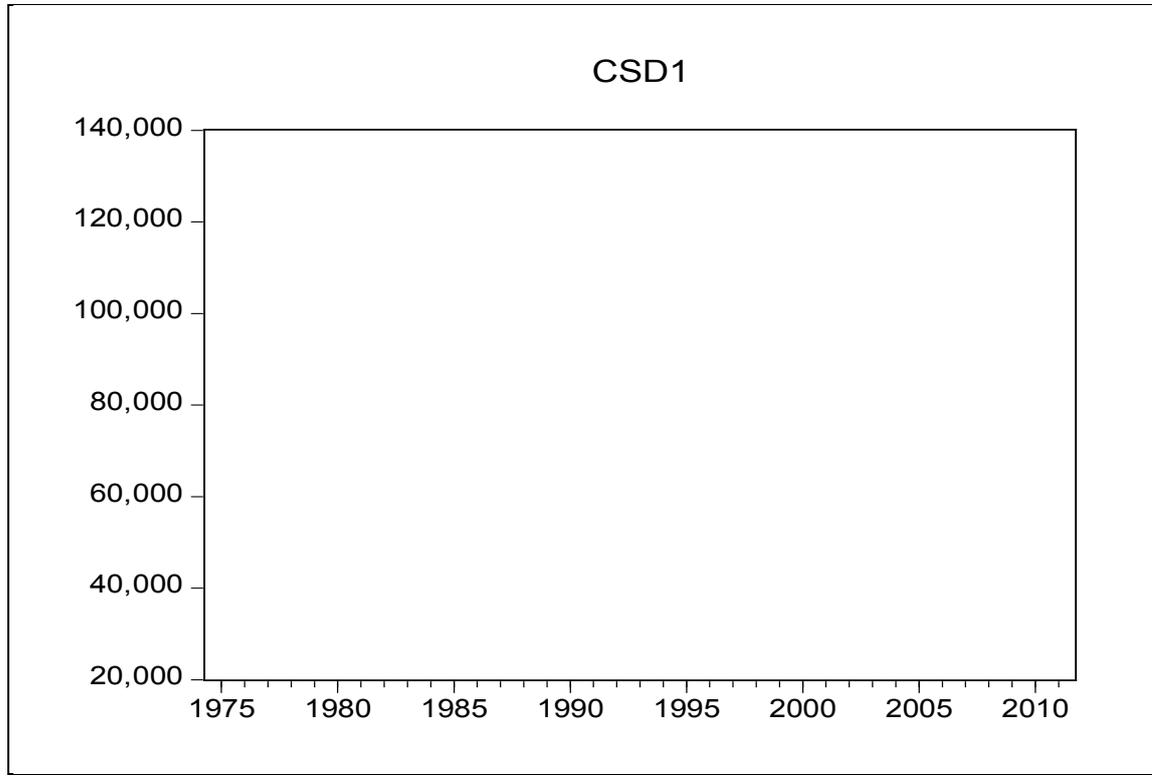


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 17 (E-views, Version 7), displays the mean of non-durable consumption expenditure is R 308 153 million. Spending patterns on durable goods seems to have a much more equal distribution. This can be expected given the tangible nature of non-durable goods when compared to durable goods.

5.3.3 Semi-durable consumption expenditure (CSD1)

Graph 18: Semi-durable consumption expenditure

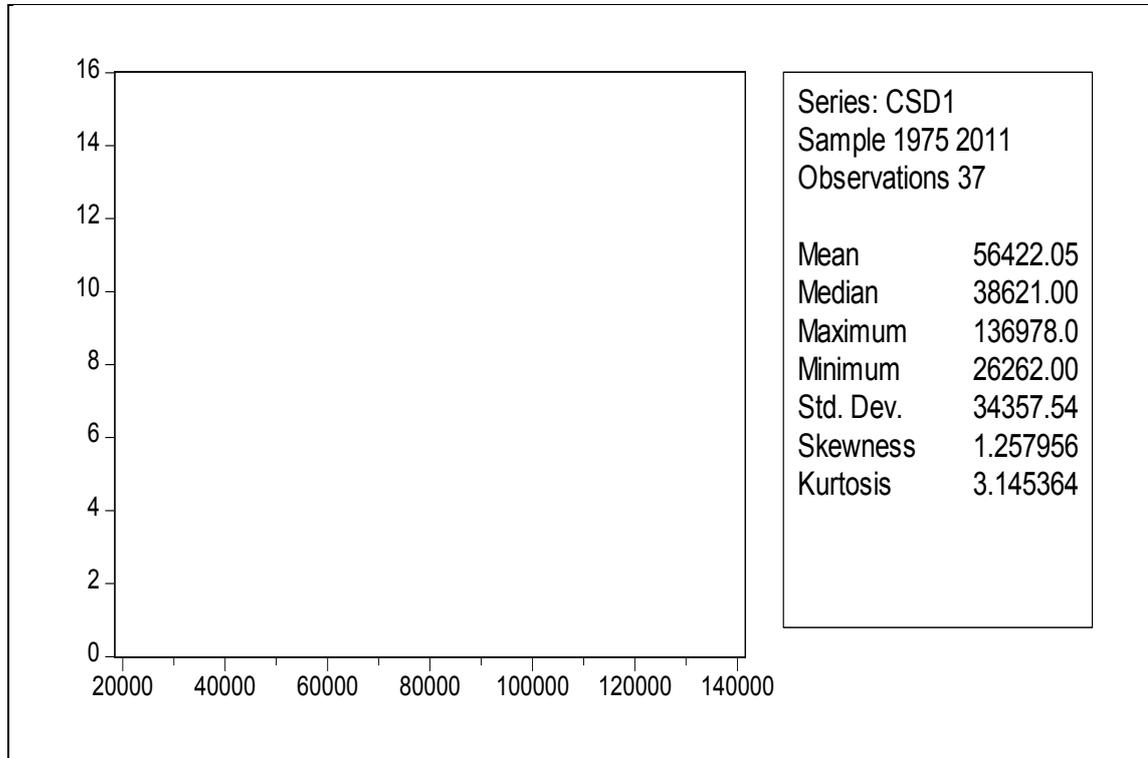


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Semi-durable consumption continued to increase since 1990 with the maximum level peaking at R433 957 million at the end of 2011. Graph 18 (E-views, Version 7) shows the semi-durable expenditure expressed in real values over the period 1975 to 2011. The September 2010 *Quarterly Bulletin* classifies these categories into clothing and footwear, household textiles, furnishings, glass wear, motor car tyres, parts and accessories, recreational and entertainment goods and other miscellaneous goods which include travel goods, umbrellas etc. The largest sub-category under this category is spending on clothing and footwear which constitutes 57,2 per cent of total semi-durable goods followed by motor car parts and accessories of 15,4 per cent at the end of 2011. One would expect a positive relationship between semi-durable goods and household debt.

5.3.3.1 Histogram of semi-durable consumption expenditure

Graph 19: Histogram on semi-durable consumption expenditure

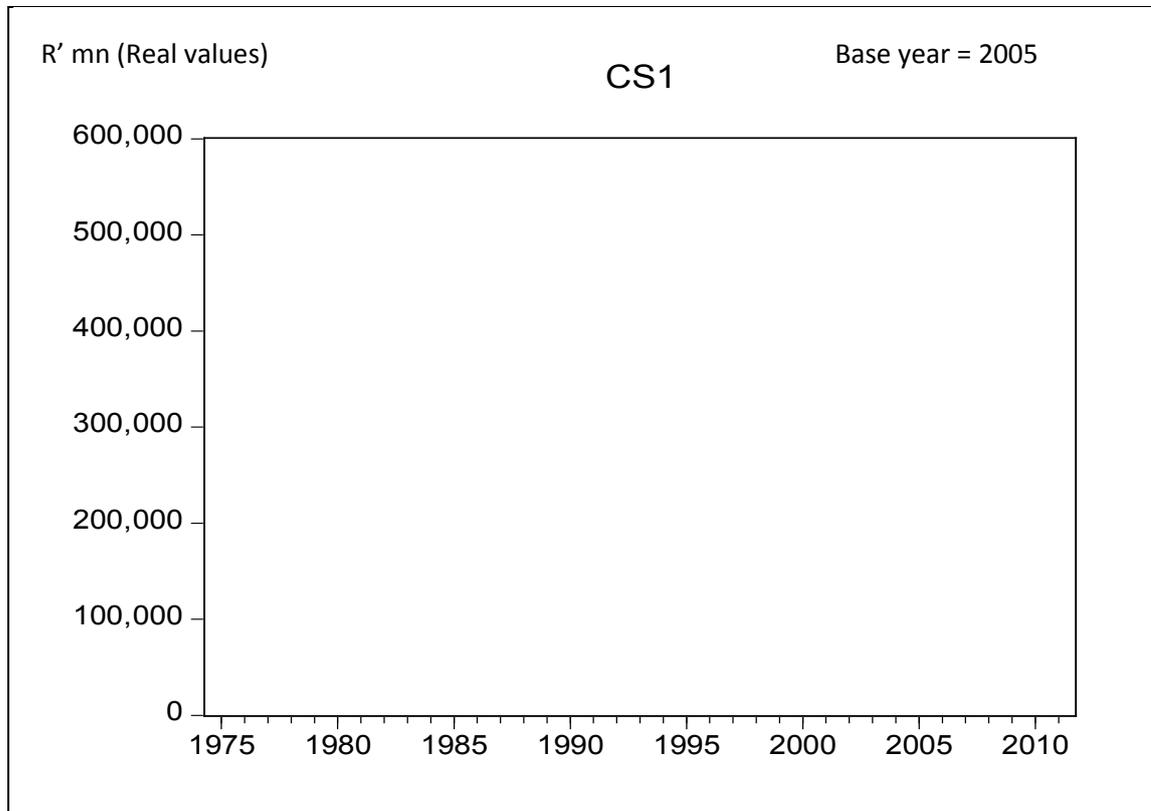


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 19 shows that the mean of semi-durable consumption is R 56 422 million. The distribution of semi-durable consumption also has a similar distribution pattern to non-durable consumption expenditure. This makes sense given that semi-durable goods are more affordable by the less affluent when compared to durable goods.

5.3.4 Expenditure on services (CS1)

Graph 20: Services

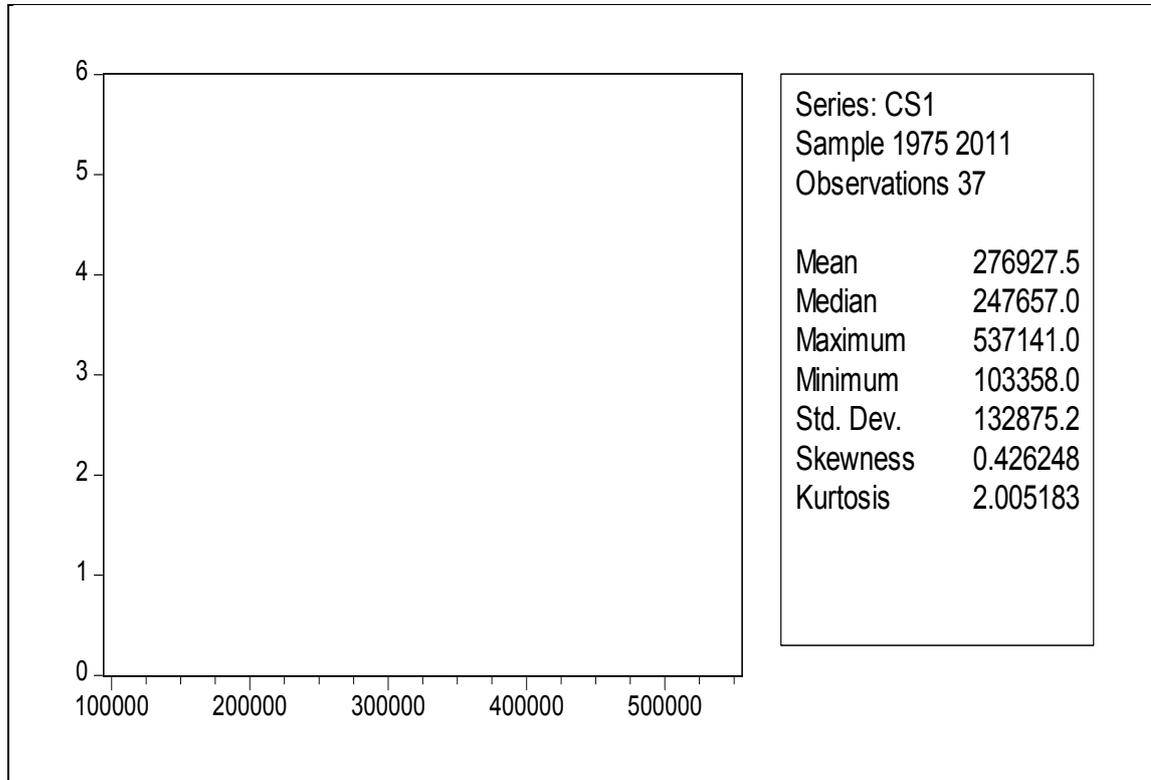


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 20 (E-views, Version 7) shows household expenditure on services in the economy expressed in real values. Spending on services still grew in 2009, albeit at a much slower pace than before. In 2009, annual growth in the services sector grew at 0,49 per cent in comparison to the 5 per cent growth in 2007. The services sector constitutes rent, household services, including domestic servants, medical services, transport and communication services, recreational, entertainment, educational services and miscellaneous services which include security services. The category for miscellaneous services and rent at the end of 2011 contributed 20 per cent and 15 per cent to total services consumption respectively.

5.3.4.1 Histogram on expenditure on services

Graph 21: Histogram on expenditure on services

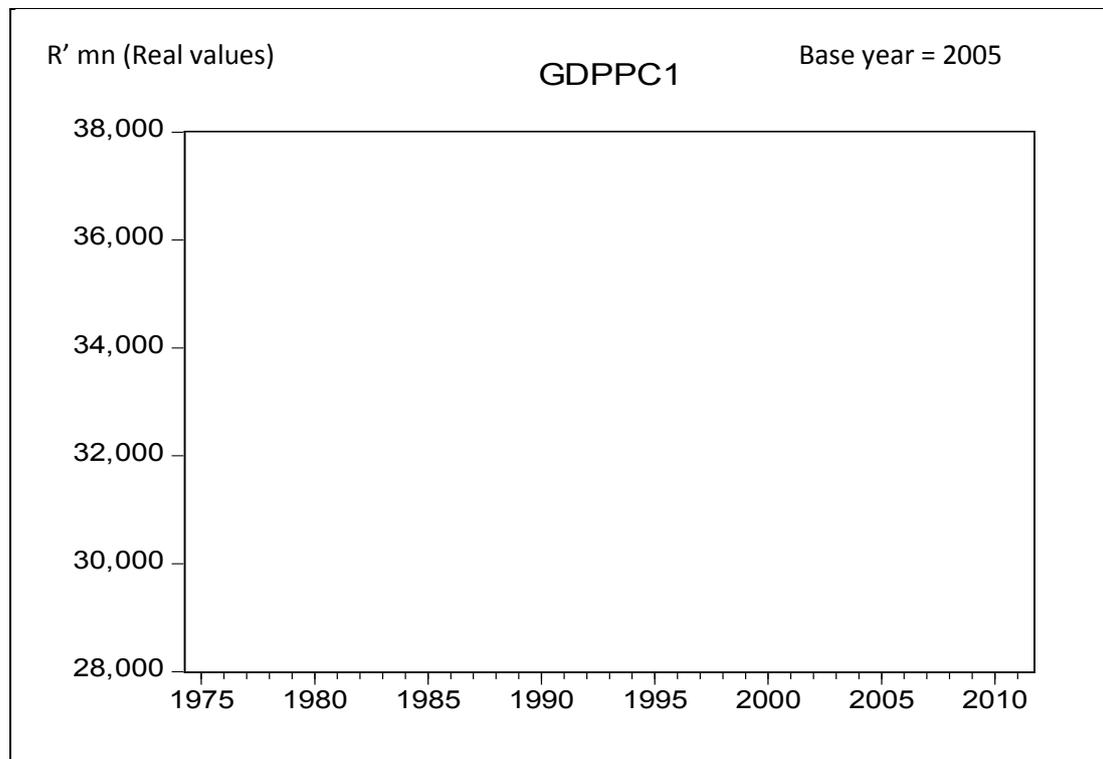


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 21 (E-views, Version 7) exhibits a fairly equal distribution of data. The services sector in South Africa consists of medical services, recreational entertainment and education amongst others. The distribution of the data makes economic sense since many of the categories are necessities and not luxury spend. For instance, consumers are likely to spend more on education and recreational facilities compared to spend on durable goods.

5.3.5 Gross domestic product per capita (GDPPC1)

Graph 22: Gross domestic product per capita

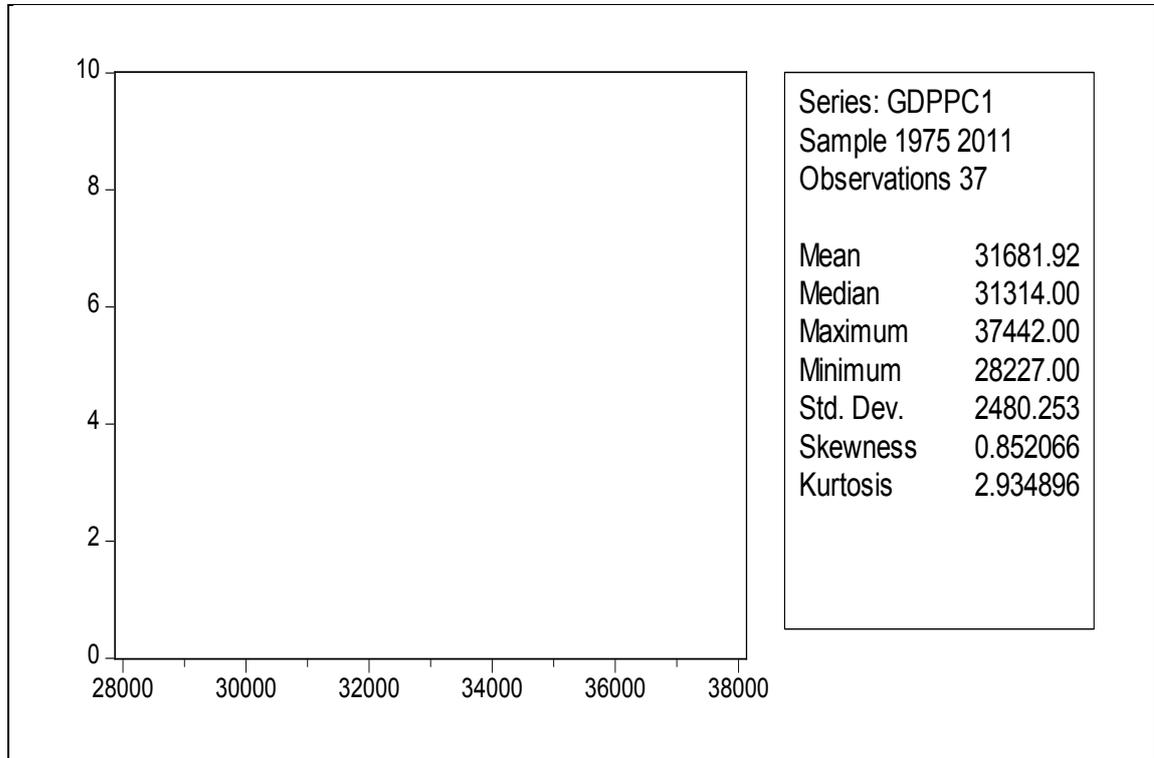


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 22 (E-views, Version 7) shows real levels of domestic product per capita exhibiting similar growth trends to that of GDP. Gross domestic product per capita is used as a proxy for wealth and has recovered in 2011, growing at an annual rate of 2,11 per cent. This growth rate was similar to the growth last seen in 2008.

5.3.5.1 Histogram of gross domestic product per capita

Graph 23: Histogram of gross domestic product per capita

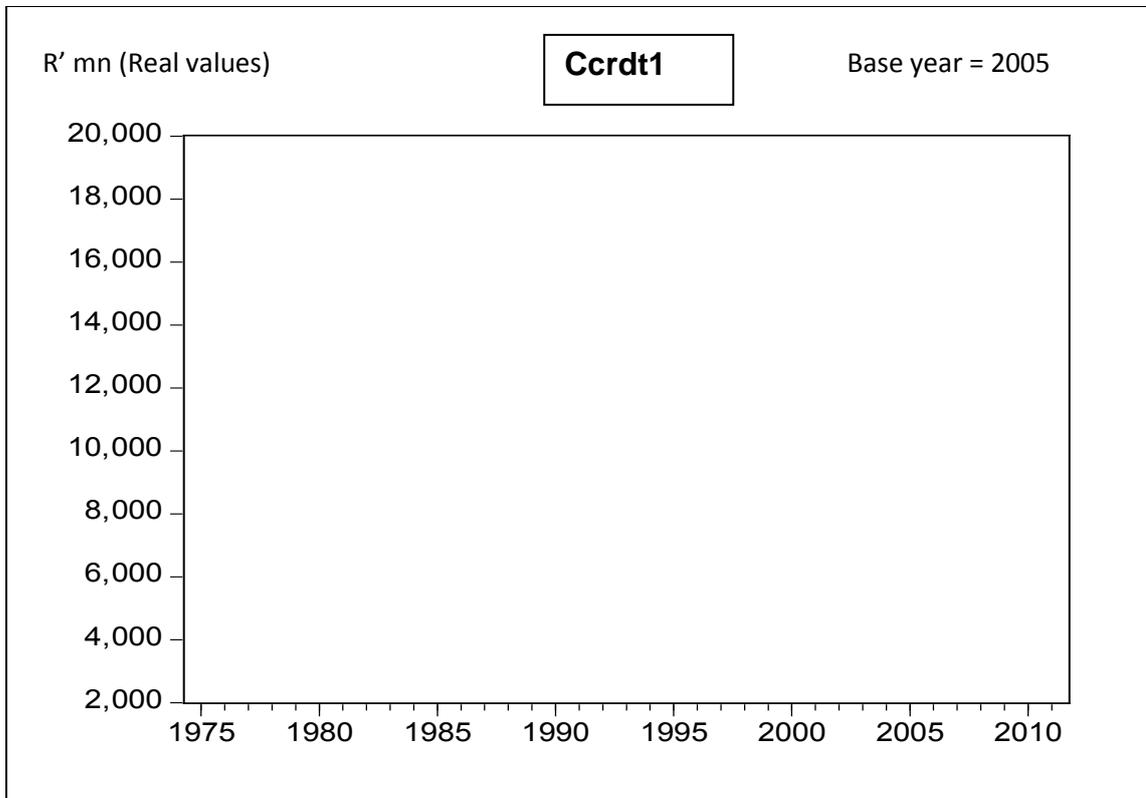


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 23 (E-views, Version 7) shows the distribution of gross domestic product per capita with much of the data concentrated around the mean value of R 31 681 thousand. The distribution of gross domestic product is in line with the Gini-coefficient mentioned earlier and follows a similar distribution curve to that of durable consumption expenditure. This re-emphasises the unequal distribution of South Africa's income.

5.3.6 Consumer credit (Ccrdt1)

Graph 24: Consumer credit

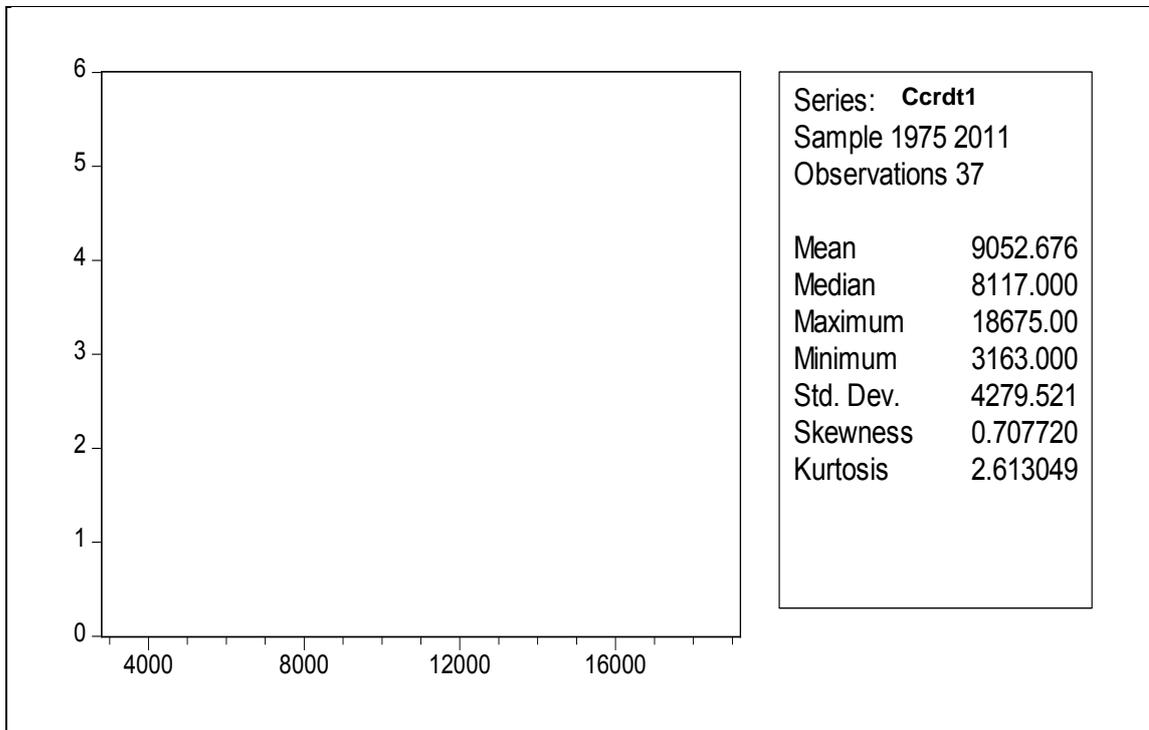


Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 24 (E-views, Version 7) shows that consumer credit in real values has dropped since the global financial crisis. And by the end of 2011, levels have recovered to above the 2008 peak. In South Africa household debt consists of mortgage advances and consumer credit. Consumer credit consists of credit card debt and personal loans and advances.

5.3.6.1 Histogram of consumer credit

Graph 25: Histogram of consumer credit



Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Graph 25 (E-views, Version 7) represents consumer credit data with skewness to the left. As stated earlier such a distribution is indicative of the unequal distribution of income in South Africa which explains the concentration of consumer credit data to the left of the distribution graph.

5.4 Polynomial distribution lag of consumer credit

Table 7: Polynomial distribution lag

Lag Distribution of		i	Coefficient	Std. Error	t-Statistic
Ccrrdt 1					
*	.	0	-0.52290	0.21605	-2.42028
*	.	1	-1.04579	0.43209	-2.42028
*	.	2	-1.56869	0.64814	-2.42028
*	.	3	-2.09158	0.86419	-2.42028
Sum of Lags			-5.22896	2.16047	-2.42028

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Table 7 (E-views, Version 7) shows the polynomial distribution lag mentioned in chapter 4 which is used to represent the impact of consumer credit on consumption over more than one period.

5.5 The regression results

The chosen variables in the multiple regression models have been combined and are represented below. Each regression equation takes the form of the following specification:

$$Y = \beta_1 X + \beta_2 X + \epsilon_i$$

Where Y = dependent variable and X = independent variables, with β_1 and β_2 , the parameters of the specified model, respectively, representing the intercept and the slope coefficients in the model. The slope coefficients β_1 and β_2 measure the impact of the independent variable on the dependent variable (Gujarati, 1995).

Gujarati (1995) states that the ϵ_i is known as the error term in the regression equation. It is also known as the disturbance term. He further cites the error term as a random stochastic variable. The purpose of the error term is to mathematically represent all those factors which may affect the dependent variable, in this case consumption but that are not included in openly expressed in the model.

5.5.1 Durable consumption (CD1)

The estimated equation for durable consumption is stated below as:

$$CD1 = \beta_0 + \beta_1 GDP_{PC1} + \beta_2 PDL01(Ccrdt1) + \epsilon_i$$

Where:

- β_0 represents the regression constant;
- β_1 represents the coefficient of gross domestic product per capita in constant values;
- β_2 represents consumer credit of households in constant values.

A polynomial distribution lag has been applied to consumer credit. This indicates that consumer credit has an impact on consumption expenditure, not only over one period but over three periods with the greatest weighting placed on the first period.

The variables have been combined in a multiple regression model (estimated by the Ordinary Least Squares method - OLS), and estimation results are reflected in Table 8. (E-views, Version 7).

Although the original sample size was specified between 1975 and 2011, Table 8 (E-views, version 7) displays the time period 1978 to 2011. A third degree polynomial distribution lag was fitted to the data. This reduces the number of degrees of freedom for each observation. Degrees of freedom according to Gujarati (1995) refer to the total number of observations in the sample minus the number of independent constraints or restrictions placed on the regression. As a result the period of analysis is 1978 to 2011.

Table 8: Regression results: Durable consumption

Dependent Variable: CD1

Method: Least Squares

Sample (adjusted): 1978 to 2011

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-104630.4	22819.92	-4.585046	0.0001
GDPPC1	4.639814	0.796893	5.822382	0.0000
PDL01	0.340887	0.054728	6.228790	0.0000
R-squared	0.851670	Mean dependent var		72236.24
Adjusted R-squared	0.842101	S.D. dependent var		24023.36
S.E. of regression	9546.056	Akaike info criterion		21.24974
Sum squared resid	2.82E+09	Schwarz criterion		21.38442
Log likelihood	-358.2456	Hannan-Quinn criter.		21.29567
F-statistic	88.99692	Durbin-Watson stat		0.630035

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

5.5.2 Non-durable consumption (CND1)

The chosen variables in the multiple regression models for non-durable consumption have been combined and are represented below:

The estimated equation for non-durable consumption is stated below as:

$$\mathbf{CND1} = -\beta_0 + \beta_1\mathbf{Ccrdt1} + \beta_2\mathbf{CND1} (-1) + \epsilon_i$$

Where:

- β_0 represents the regression constant;
- β_1 represents the coefficient of Ccrdt1 (consumer credit) in constant values; and
- β_2 represents the coefficient of CND1 (Non- durable consumption lagged by 1 period) in constant values

The variables have been combined in a multiple regression model (estimated by the Ordinary Least Squares method - OLS), and estimation results are reflected in Table 9 (E-views, Version 7).

Although the original sample size was specified between 1975 and 2011, Table 9 displays the time period 1976 to 2011. Adding a lag dependent variable to the equation

results in the loss of degrees of freedom. In other words, for every independent variable added to the regression the sample size reflects a loss of an observation.

Table 9: Regression results: Non-durable consumption expenditure

Dependent Variable: CND1

Method: Least Squares

Sample (adjusted): 1976 to 2011

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	60767.13	9559.170	6.356946	0.0000
Ccrdt1	5.293768	0.803316	6.589895	0.0000
CND1(-1)	0.662056	0.054119	12.23338	0.0000
R-squared	0.993966	Mean dependent var		311193.9
Adjusted R-squared	0.993600	S.D. dependent var		63800.35
S.E. of regression	5103.889	Akaike info criterion		19.99305
Sum squared resid	8.60E+08	Schwarz criterion		20.12501
Log likelihood	-356.8749	Hannan-Quinn criter.		20.03911
F-statistic	2718.023	Durbin-Watson stat		1.341411

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

5.5.3 Semi-durable consumption

The chosen variables in the multiple regression models for semi-durable consumption have been combined and are represented below:

The estimated equation for semi-durable consumption expenditure is stated below as:

$$\mathbf{CSD1} = -\beta_0 + \beta_1\mathbf{Ccrdt1} + \beta_2\mathbf{GDPPC1} + \varepsilon_i$$

Where:

- β_0 represents the regression constant;
- β_1 represents the coefficient of Ccrdt1 (consumer credit) in constant values; and
- β_2 represents the coefficient of GDPPC1 (gross domestic product per capita) in constant values.

The variables have been combined in a multiple regression model (estimated by the Ordinary Least Squares method - OLS), and estimation results are reflected in Table 10 (E-views, Version 7).

Table 10 represents a regression with no lagged dependent variables or polynomial distribution lags. Therefore the number of observations remains at 37 with no adjustments in comparison to Table 8 and 9 where a polynomial distribution lag and lagged dependent variable present in the model respectively.

Table 10: Regression results: Semi-durable consumption expenditure

Dependent Variable: CSD1

Method: Least Squares

Sample: 1975 to 2011

Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-114509.5	17176.71	-6.666555	0.0000
Ccrdt1	6.451808	0.344604	18.72239	0.0000
GDPPC1	3.551724	0.594592	5.973377	0.0000
R-squared	0.960155	Mean dependent var		56422.05
Adjusted R-squared	0.957811	S.D. dependent var		34357.54
S.E. of regression	7057.053	Akaike info criterion		20.63905
Sum squared resid	1.69E+09	Schwarz criterion		20.76966
Log likelihood	-378.8224	Hannan-Quinn criter.		20.68510
F-statistic	409.6481	Durbin-Watson stat		0.592740

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

5.5.4 Expenditure on services

The chosen variables in the multiple regression models for services have been combined and are represented below:

The estimated equation for semi-durable consumption expenditure is stated below as:

$$CS1 = -\beta_0 + \beta_1 Ccrdt1 + \beta_2 CS1(-1) + \epsilon_i$$

Where:

- β_0 represents the regression constant;

- β_1 represents the coefficient of Ccrdt1 (consumer credit) in constant values; and
- β_2 represents the coefficient of CS1(-1) (represents the lag of expenditure on services) in constant values.

The variables have been combined in a multiple regression model (estimated by the Ordinary Least Squares method - OLS), and estimation results are reflected in Table 11 (E-views, Version 7). Table 11 represents a regression with expenditure on services as a lagged dependent variable. Table 11 indicates that the number of observations is 36, since it caters for a loss in degrees of freedom due to presence of a lagged dependent variable.

Table 11: Regression results: Expenditure on services

Dependent Variable: CS1

Method: Least Squares

Sample (adjusted): 1976 2011

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2047.196	2375.627	0.861749	0.3950
Ccrdt1	2.258822	0.853627	2.646147	0.0124
CS1(-1)	0.959997	0.028449	33.74478	0.0000
R-squared	0.998110	Mean dependent var		281748.9
Adjusted R-squared	0.997995	S.D. dependent var		131436.7
S.E. of regression	5885.170	Akaike info criterion		20.27791
Sum squared resid	1.14E+09	Schwarz criterion		20.40987
Log likelihood	-362.0025	Hannan-Quinn criter.		20.32397
F-statistic	8712.278	Durbin-Watson stat		2.009173

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

This chapter displayed the variables utilised in the multiple regression analysis for each of the four categories of consumption and consumer credit. The ensuing chapter will discuss and interpret the results.

Chapter 6: Discussion of the results

The aim of this chapter is to explain the results of the regression analyses presented in Chapter 5. The dependent variable was personal consumption expenditure broken down independently into the four categories and the independent variables were the prime interest rate, personal disposable income and household debt, otherwise referred to as consumer credit.

The first part of this chapter discusses the relevant statistical tests that will be used to analyse the data. This is followed by the regression results for each of the four categories of household consumption expenditure; non-durable consumption, durable consumption, semi-durable consumption and services against the chosen independent variables.

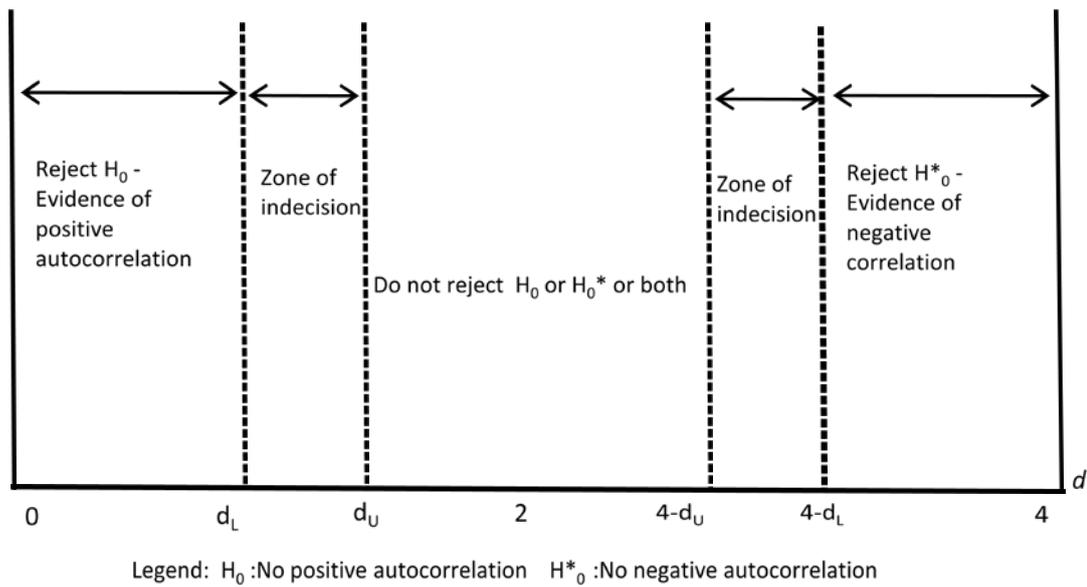
6.1 The test- of-significance: t-statistic

The purpose of a t-test according to Gujarati (1995) is a procedure that is conducted to verify the null hypothesis. The decision to reject or accept the null hypothesis is based on the value of the test statistic. This test statistic was developed by R. A. Fisher and Neyman and Pearson (Gujarati, 1995). Gujarati further states that the purpose of the t-test is to verify validity of the null hypothesis. When a value is statistically significant, according to Gujarati (1995) the value should lie in the critical region, where critical t- values are obtained from the t- distribution table.

6.2 The Durbin Watson d-statistic

Autocorrelation in a regression model refers to a situation in which the standard deviation follows a systematic pattern. This can take the form of a negative or positive relationship. The Durbin-Watson statistic is used to test for autocorrelation in a model. Although the rule of thumb for the Durbin Watson is a range between 1,5 and 2,5 in the presence of a lagged dependent variable – the Durbin-Watson h statistic will be utilised to test for autocorrelation. The Durbin-Watson statistic was developed by Durbin and Watson (as cited in Gujarati, 1995). The actual procedure is explained below and is used to interpret the chosen regression equation.

Figure 2: The Durbin Watson d -statistic



Source: “*Basic Econometrics*,” by D. N. Gujarati, 1995, 3rd ed, (p. 422)

Durbin and Watson according to Gujarati (1995) were instrumental in the derivation of an upper and a lower limit in that if the computed value of d lies outside the critical values, one can make decisions to detect the existence of autocorrelation in a regression model. The limits are dependent on the number of observations in the model represented by n and the number of explanatory variables represented by k . The limits do not depend on the values attached by the explanatory variables.

In the presence of a lagged dependent variable (the behaviour of the dependent variable depends on its behaviour from the previous period), the Durbin-Watson h statistic cannot be relied upon. In this case, the Durbin-Watson d stat should be used as a method of interpretation.

6.3 The F-statistic

The purpose of the F-statistic is to test the joint significance of the chosen regressors in a regression model. The hypothesis is represented mathematically as follows:

Equation one: $H_0: \beta_2 = \beta_3 = 0$

$H_a: \beta_2 \neq \beta_3 \neq 0$

Where the null hypothesis states that β_2 and β_3 are equal to zero. The alternative hypothesis states that β_2 and β_3 are not equal to zero. The purpose of the test is to determine whether the independent variables are jointly significant. The t-statistic determines the linear significance of the independent variable. In contrast the F-statistic determines the joint significance of all independent variables.

If $F > F_{\alpha}(k-1, n-k)$, reject the null hypothesis, where:

- α represents the level of significance;
- $k-1$ represents the degrees of freedom (numerator); and
- $n-k$ represents the degrees of freedom (denominator).

The conclusion therefore would be that the calculated F-value is greater than the critical F-value; therefore the independent variables are jointly significant.

6.4 The R-squared

The R-squared is used as a measure of “goodness of fit” and compares the validity of the regression equation results under alternative specifications of the independent variables in the model. In other words it provides an indication of how much of the variation in the dependent variable is explained by the independent variables. The R-squared is sensitive to the number of independent variables included in a regression model. The inclusion of additional independent variables, mathematically results in a higher R-squared. The interpretation and use of the R-squared then loses its effectiveness. It is for this reason that in the presence of more than one explanatory variable the adjusted R-squared should be used as a measure of fit. The use of the adjusted R-squared presents a more accurate picture of the actual relationship between the dependent and independent variables.

The reliability of the R-squared will be enhanced when other economic variables are tested in combination with other independent variables. When additional variables are added to the regression model, the adjusted R-squared needs to be analysed instead of the R-squared. The reason for this is that the adjusted R-squared caters for degrees of freedom. Degrees of freedom refer to the number of variables used in the regression. As the number of independent variables increase in a regression model the R-squared is artificially inflated purely due to its mathematical nature of calculation. It is for this reason the adjusted R-squared should be utilised as a means of analysis.

6.5 Durable consumption

Regression results for durable consumption against consumer credit yielded the following:

6.5.1 Hypothesis

$H_0: \beta=0$; and

$H_a: \beta \neq 0$

The following model is estimated by OLS for a sample of 36 observations. The dependent variable is CD1 and the independent variables are GDPPC1 and PDL01. GDPPC1 as explained earlier is used as a proxy for households' wealth. The PDL01 represents the polynomial distribution lag variables that was fitted to the regression to show the impact of consumer credit on consumption over more than one period. The estimation period from 1975 to 2011 yielded the following results:

$$CD1 = -104630,4 \beta_1 + 3,86GDPPC1 + 0,34PDL01$$

6.5.2 The interpretation

In combination, gross domestic product per capita and consumer credit were found to be strong explanatory variables in the regression. As a single variable, consumer credit explains 86 per cent of the variation in durable consumption spending. Consumer credit is represented as a polynomial distribution lag variable. As discussed earlier this is utilised to show that household debt has an impact on durable consumption expenditure in more than one period. The PDL was used to show the impact over a three year period with the greatest weighting placed on the first period. However, due to the presence of autocorrelation in the regression, the PDL variable had to be replaced by an additional independent variable. Therefore the equation can be restated as (Table12):

$$CD1 = -86311\beta_1 + 4,639GDPPC1 + 3,7Ccrdt + 0.80(MA1)$$

6.5.3 T- tests

The critical t-value at a 5 per cent level of significance equates to critical t-value at (5 %, 37) = 2,021. The null hypothesis (H_0) is rejected on the following basis:

- Calculated t-values of Gdppc1 and Ccrt1 = 6,16 and 9,8 respectively;
- Since the calculated t-values are $> 2,021$, this implies that GDPPC1 and Ccrt1 are statistically significant variables at 5 per cent.

6.5.4 Coefficients

A positive slope of the coefficient for GDPPC1 implies that a positive relationship exists between gross domestic product per capita and consumption spending. If gross domestic product per capita (seen to be a proxy for wealth) increases by 1 per cent, this results in an approximate 3,8 per cent increase in durable consumption expenditure as shown in Table 12. This makes economic sense, as households have additional funds to spend when gross domestic product per capita increases. This results in increased consumption.

The positive slope of the coefficient for consumer credit, represented by the Ccrt1 variable, indicates a positive relationship between consumer credit and durable consumption expenditure. Results show that a 1 percent increase in consumer credit results in an approximate 3,7 per cent increase in durable consumption expenditure. This makes economic sense, as durable goods which represent cars, furniture and appliances investment will increase as consumer credit increases. These are big ticket items in the economy, which consumers prefer to purchase on credit and instalment sales and leasing finance. These categories of finance have been referred to in the literature in Chapter 2.

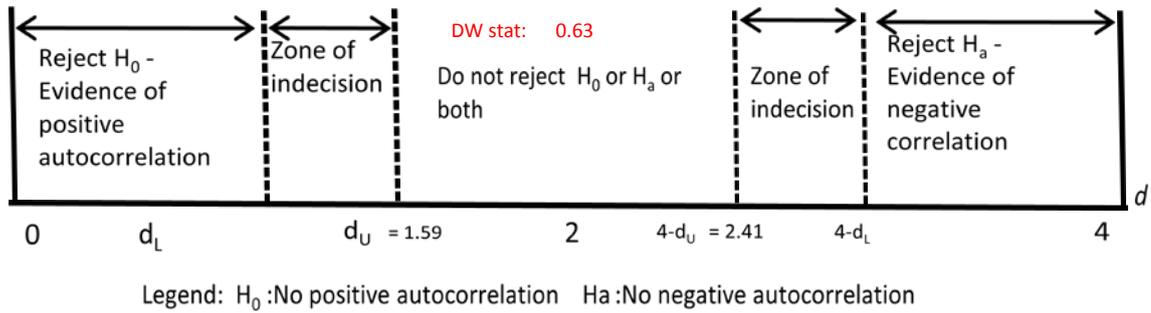
6.5.5 Adjusted R-squared

The adjusted R-squared value of 96 per cent, suggests that there is a high correlation between the two independent variables and durable consumption expenditure. In combination the two independent variables help explain 85 per cent of the variation in durable consumption expenditure.

6.5.6 Durbin Watson d-statistic

Since there is no lagged dependent variable in the regression, the use of the Durbin-Watson d statistic is permissible.

Figure 3: The Durbin Watson d- statistic



Source: “*Basic Econometrics*,” by D. N. Gujarati, 1995, 3rd ed, p. 422 and author’s calculations.

From the diagram above, calculations show that the Durbin-Watson d statistic of 0,63 does not lie between 1,59 and 2,41. As indicated above that autocorrelation is present in the regression model. To correct for auto-correlation, an auto-regressive term referred to as the MA (1) (commonly referred to as the moving average function) is added to the regression original regression equation. The results are represented in Table 12.

6.5.7 Autocorrelation correction

Table 12: Regression corrected for autocorrelation

Dependent Variable: CD1

Method: Least Squares

Sample: 1975 to 2011

Included observations: 37

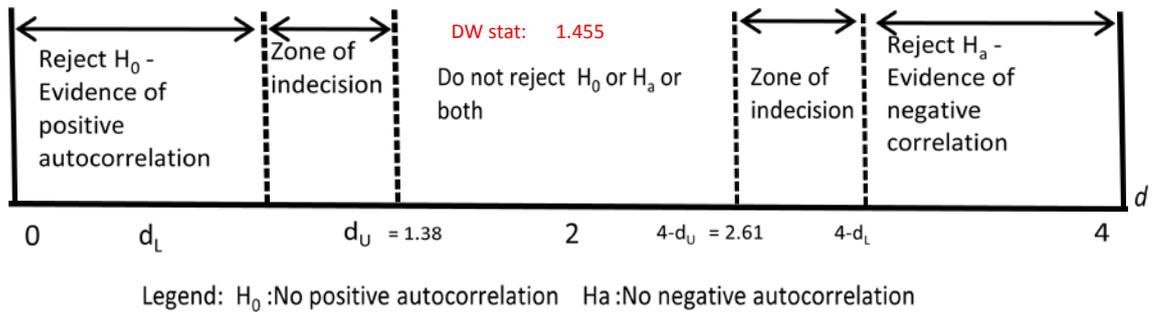
Convergence achieved after 29 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-86311.40	18007.40	-4.793107	0.0000
GDPPC1	3.864887	0.627333	6.160822	0.0000
Ccrrt1	3.765401	0.380531	9.895135	0.0000
MA(1)	0.806067	0.136126	5.921477	0.0000
R-squared	0.969922	Mean dependent var		70266.54
Adjusted R-squared	0.967188	S.D. dependent var		23994.25
S.E. of regression	4346.370	Akaike info criterion		19.69388
Sum squared resid	6.23E+08	Schwarz criterion		19.86803
Log likelihood	-360.3367	Hannan-Quinn criter.		19.75527
F-statistic	354.7145	Durbin-Watson stat		1.455554

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Retesting the regression for the presence of autocorrelation yielded the above results. In fact, the adjusted R-squared improved. The resulting equation accounts for 96 per cent of the variation in durable consumption. The Durbin-Watson d statistic when recalculated shows no signs of autocorrelation present in the model. This is represented in Figure 4 (E-views, version 7).

6.5.8 Figure 4: Retesting for autocorrelation



Source: “Basic Econometrics,” by D. N. Gujarati, 1995, 3rd ed, p.422. and author’s calculations.

The Durbin-Watson of 1,455 lies between the region of 1,38 and 2,61. Therefore, there is no presence of autocorrelation in the regression model.

6.5.9 F-statistic

H_0 : $\beta_1 = \beta_2 = 0$

H_a : $\beta_1 \neq \beta_2 \neq 0$

The critical F-value for 37 observations is calculated as follows:

Critical F- value at (5%, 2, 34) = 3,32

Since the calculated F-value of 354 > critical F-value of 3,32 the null hypothesis is rejected. Therefore the independent variables are considered to be jointly significant.

6.6 Non-durable consumption

Regression results for non-durable consumption against consumer credit yielded the following:

6.6.1 Hypothesis

$H_0: \beta=0$; and

$H_a: \beta \neq 0$

The following model is estimated by OLS for a sample of 36 observations. The dependent variable is $CND1$ and the independent variables are $Ccrdt1$ and $CND1(-1)$. Consumer credit represents that portion of total household debt excluding debt on mortgages. The dependent variable non-durable consumption was also found to have a significant lagged impact in the regression. The estimation period from 1975 to 2011 yielded the following results:

$$CND1 = 6076,7 \beta + 5,2Ccrdt1 + 0,66CND1(-1)$$

6.6.2 The interpretation

In combination, consumer credit and non-durable consumption expenditure lagged by one period were found to be strong explanatory variables in the regression (Table9). As a single variable, consumer credit explains 96 per cent of the variation in non-durable consumption spending. Non-durable consumption expenditure from the previous period was found to be a good predictor of current non-durable consumption expenditure. This makes economic sense as during times of recession, consumers still need to consume the necessities. This results in the substitution of cheaper food products for branded consumer goods. The result is that consumption on non-durables remains more or less the same.

6.6.3 T- tests

The critical t-value at a 5 per cent level of significance equates to critical t-value at (5%, 36) = 2,021. The null hypothesis (H_0) is rejected on the following basis:

- Calculated t-values of Ccrdt1 and CND1(-1) = 6,5 and 12,2 respectively;
- Since the calculated t-values are $> 2,021$, this implies that Ccrdt1 and CND1(-1) are statistically significant variables at 5 per cent.

6.6.4 Coefficients

A positive slope of the coefficient for consumer credit implies that a positive relationship exists with non-durable consumption expenditure and consumer credit. If consumer credit increases by 1 per cent, this result in an approximate 5,2 per cent increase in non-durable consumption expenditure.

The positive slope of the coefficient for non-durable consumption expenditure indicates a positive relationship between the dependent variable and its lagged version. Results show that an increase in non-durable consumption expenditure in the previous period has an impact on non-durable consumption in the prevailing period. An increase of 1 per cent in non-durable consumption in the previous period results in a 0,66 per cent increase in the next period.

6.6.5 Adjusted R-squared

The adjusted R-squared value of 99 per cent, suggests that there is a high correlation between the two independent variables and non-durable consumption expenditure. In combination the two independent variables explains 99 per cent of the variation in durable consumption expenditure.

6.6.6 Durbin-Watson statistic

In the presence of a lagged dependent variable, the Durbin-Watson d statistic cannot be relied upon. For this purpose, to determine the presence of auto-correlation in the model, the Durbin- Watson h statistic needs to be calculated. This is represented below:

$$h = \frac{1}{2} \left(1 - \frac{d}{2} \right)$$

$$= \frac{\dots}{\dots}$$

= 2,09

Since the calculated Durbin-Watson d statistic does not lie between -1,96 and 1,96, autocorrelation exists in the model. In order to correct for this, a moving average referred to as an MA (1) term is added to the equation. The resultant Durbin-Watson h statistic is represented below:

$$= \frac{\dots}{\dots}$$

= 0,506

Since the value lies between -1,96 and 1,96 autocorrelation no longer exists in the regression equation.

6.6.7 F-statistic

H_o: $\beta_1 = \beta_2 = 0$

H_a: $\beta_1 \neq \beta_2 \neq 0$

The critical F-value for 36 observations is calculated as follows:

Critical F- value at (5%, 1, 34) = 3,32

Since the calculated F-value of 2718 > critical F-value of 4,17 the null hypothesis is rejected. Therefore the independent variables are considered to be jointly significant.

6.7 Semi-durable consumption

Regression results for semi-durable consumption against consumer credit yielded the following:

6.7.1 Hypothesis

Ho: $\beta=0$; and

Ha: $\beta\neq 0$

The following model is estimated by OLS for a sample of 36 observations. The dependent variable is CSD1 and the independent variables are Ccrdt1 and GDPPC1. Ccrdt1 represents consumer credit of households. GDPPC1 represents gross domestic product per capita of households. GDPPC1 is used as a proxy for wealth. The estimation period from 1975 to 2011 yielded the following results:

$$\text{CSD1} = -114509\beta + 6,45\text{Ccrdt1} + 3,5\text{GDPPC1}$$

6.7.2 The interpretation

In combination, the consumer credit and gross domestic consumption expenditure were found to be strong explanatory variables in the regression. As a single variable, consumer credit explains 91 per cent of the variation in semi-durable consumption spending. Spending on semi-durable goods reflect consumption of smaller ticket items such as clothing and motor car accessories etc. Due to the presence of autocorrelation in the model, the regression was respecified as follows (Table 13):

$$\text{CSD1} = -75829\beta + 1,2\text{Ccrdt1} + 2,6\text{GDPPC1} + 1,05(\text{AR1})$$

6.7.3 T- tests

The critical t-value at a 5 per cent level of significance equates to critical t-value at (5%, 37) = 2,021. The null hypothesis (H_0) is rejected on the following basis:

- Calculated t-values of Ccrdt1 and Gdppc1 = 2,08 and 3,9 respectively; and

- Since the calculated t-values are $> 2,021$, this implies that Ccrdt1 and Gdppc1 are statistically significant variables at 5 per cent.

6.7.4 Coefficients

A positive slope of the coefficient for consumer credit implies that a positive relationship exists with semi-durable consumption expenditure and consumer credit. If consumer credit increases by 1 per cent, the result is an approximate 1,2 per cent increase in semi-durable consumption expenditure as shown in Table 13.

The positive slope of the coefficient for gross domestic product per capita indicates a positive relationship exists between gross domestic product per capita and semi-durable consumption spending. Results show that a 1 percent increase in gross domestic product per capita results in an approximate 2,6 per cent increase in semi-durable consumption.

In addition, personal disposable income was tested in combination with consumer credit as a predictor of durable consumption expenditure. The result was an insignificant t-statistic for personal disposable income. This indicates that in combination with consumer credit, personal disposable income does not impact on semi-durable consumption.

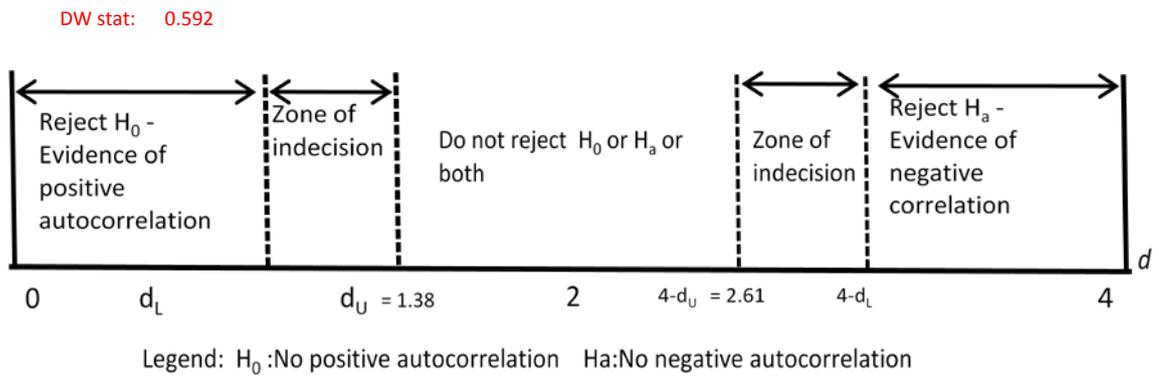
6.7.5 Adjusted R-squared

The adjusted R-squared value of 95 per cent, suggests that there is a high correlation between the two independent variables and semi-durable consumption expenditure. In combination the two independent variables explains 95 per cent of the variation in semi-durable consumption expenditure.

6.7.6 Durbin-Watson d-statistic

In the absence of a lagged dependent variable we make use of the Durbin-Watson *d* stat to determine the presence of autocorrelation in the regression. The results are displayed in Figure 5.

Figure 5: Testing for autocorrelation



Source: “*Basic Econometrics*,” by D. N. Gujarati, 1995, 3rd ed, p. 422 and author’s calculations

Figure 5 displays the evidence of autocorrelation in the regression equation. To correct for autocorrelation, an auto regression function referred to as the AR (1) is used in the equation. The regression results are presented in Table 13 followed by an additional test for autocorrelation.

Table 13: Regression corrected for autocorrelation

Dependent Variable: CSD1

Method: Least Squares

Sample (adjusted): 1976 2011

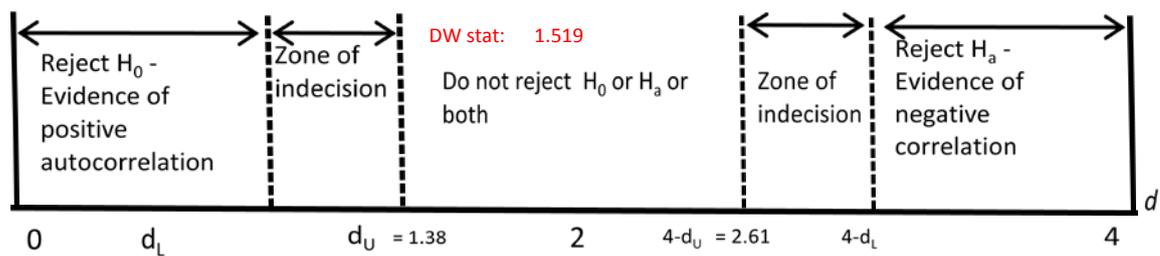
Included observations: 36 after adjustments

Convergence achieved after 13 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-75829.86	27583.22	-2.749130	0.0097
Ccdrt1	1.211522	0.582059	2.081442	0.0455
GDPPC1	2.619526	0.669105	3.914972	0.0004
AR(1)	1.057115	0.020292	52.09546	0.0000
R-squared	0.994688	Mean dependent var		57208.92
Adjusted R-squared	0.994191	S.D. dependent var		34505.14
S.E. of regression	2629.978	Akaike info criterion		18.69178
Sum squared resid	2.21E+08	Schwarz criterion		18.86772
Log likelihood	-332.4520	Hannan-Quinn criter.		18.75319
F-statistic	1997.548	Durbin-Watson stat		1.519412

Source: Author's own calculations adapted from "E-views," (Version 7) [Online Software] by IHS Inc, 2012.

Figure 6: Retesting for autocorrelation



Legend: H_0 :No positive autocorrelation H_a :No negative autocorrelation

Source: "Basic Econometrics," by D. N. Gujarati, 1995, 3rd ed, p. 442 and author's calculations

The Durbin-Watson d statistic calculated falls within the region of 1,38 and 2,61 indicating no presence of autocorrelation in the model.

6.7.7 F-statistic (F-stat)

$$H_0: \beta_1 = \beta_2 = 0$$

$$H_a: \beta_1 \neq \beta_2 \neq 0$$

The critical F-value for 36 observations is calculated as follows:

$$\text{Critical F-value at } (5\%, 2, 34) = 3,32$$

Since the calculated F-value of 1997 > critical F-value of 3,32 the null hypothesis is rejected. Therefore the independent variables are considered to be jointly significant.

6.8 Expenditure on services

6.8.1 Hypothesis

The following model is estimated by OLS for a sample of 36 observations. The dependent variable is CND1 and the independent variables are Ccrdt1 and Cs1 (-1). The estimation period from 1975 to 2011 yielded the following results:

$$CS1 = 2047\beta + 2,25 Ccrdt1 + 0.95Cs1(-1)$$

6.8.2 The interpretation

In combination, consumer credit and expenditure on services from the previous period were found to be strong explanatory variables in the regression analysis. As a single variable, consumer credit explains 93 per cent of the variation in services consumption expenditure. Spending on services reflect consumption on items such as medical and transport services.

6.8.3 T- tests

The critical t-value at a 5 per cent level of significance equates to critical t-value at (5%, 36) = 2,021. The null hypothesis (H_0) is rejected on the following basis:

- Calculated t-values of Ccrdt1 and CS1(-1) = 2,6 and 33,7 respectively; and
- Since the calculated t-values are $> 2,021$, this implies that Ccrdt1 and CS1(-1) are statistically significant variables at 5 per cent.

6.8.4 Coefficients

A positive slope of the coefficient for consumer credit implies that a positive relationship exists with services consumption expenditure and consumer credit. If consumer credit increases by 1 per cent, the result is an approximate 2,2 per cent increase in services consumption expenditure.

Results show that a 1 percent increase in services in the previous period results in an approximate increase of 0,95 percent in services consumption in the current period. In other words spending on services in the previous period affects expenditure on consumption in the current period.

6.8.5 Adjusted R-squared

The adjusted R-squared value of 99 per cent, suggests that there is a high correlation between the two independent variables and services expenditure. In combination the two independent variables explains 93 per cent of the variation in services consumption expenditure.

6.8.6 Durbin-Watson statistic

In the absence of a lagged dependent variable we make use of the Durbin-Watson d statistic to determine the presence of autocorrelation in the regression. The results are displayed in the table below:

— —

$$= \frac{\dots}{\dots}$$

= -0.0274

Since the calculated Durbin-Watson d statistic lies between -1,96 and 1,96 there is no presence of autocorrelation in the regression equation.

6.8.7 F-statistic (F-stat)

$$H_0: \beta_1 = \beta_2 = 0$$

$$H_a: \beta_1 \neq \beta_2 \neq 0$$

The critical F-value for 36 observations is calculated as follows:

$$\text{Critical F-value at (5\%, 1, 34)} = 4,17$$

Since the calculated F-value of 8712 > critical F-value of 4,17 the null hypothesis is rejected. Therefore the independent variables are considered to be jointly significant.

6.9 Comparison with literature

The purpose of the regression analysis was to determine the relationship between consumption spending and household debt. Results showed that household debt, consumer credit levels in isolation explained greater than 70 per cent of the change in each of the categories of consumption expenditure. Household debt in South Africa is a predictor of the future growth of consumption expenditure.

Although McCarthy (1997) found no link between either non-durable goods and household debt or a link between services and household debt, a link was found between household debt and durable consumption expenditure. Analysis conducted for South Africa shows a relationship between durable consumption expenditure and consumer credit. The regression results conducted on household debt in South Africa are consistent with majority of the literature discussed in Chapter 2, more specifically in line with the findings of Bacchetta and Gerlach, (1997) and Ekici and Dunn (2010), who found a positive relationship between credit card debt and consumption expenditure. Although Ludvigson (1999) found a positive link between household debt and consumption, the impact is of a greater magnitude in the South African context.

Consumer credit was successful as a predictor of consumption spending on a larger scale when regressed against non-durable goods. This was then followed by durable goods. The smallest impact was on semi-durable goods.

For South African policy makers this is a key finding and can be used to predict consumption spending in the South African economy. Given the recent comments regarding household consumption as alluded to in Chapter 1, the outcome of this study may be utilised as a predictive tool in forecasting household consumption expenditure. This is particularly useful given the forward-looking nature of monetary policy.

6.10 Conclusion

This chapter showed that the main research question namely:

“Is there a relationship between household debt and consumption spending in South Africa?” is answered.

In addition, the second research question namely:

“If so, how much of the variation in the dependent variable (consumption) can be explained by the independent variables (household debt), as measured by the consumer credit portion of total South African household debt?” is also answered.

It also confirmed that household debt is helpful in forecasting future consumption spending. Total consumer credit was not only a statistically significant predictor of consumption spending in isolation, but in combination with other economic variables. Based on this research it is confirmed that there is a positive relationship between consumer credit and consumption spending in South Africa.

This chapter is followed by Chapter 7 which discusses and summarises the findings of this research paper.

Chapter 7: Conclusions

7.1 Introduction

The previous chapter discussed and displayed the relationship between the four categories of consumption when regressed against household debt. This chapter discusses the rationale as well as the objectives of the study. The chapter then follows the main findings of the report together with recommendations. Limitations of the study are then identified, followed by acknowledgement of the possibility for future research. Finally the chapter ends with a conclusion.

7.2 Research background and objectives

Consumption spending in South Africa and in many other countries account for the greatest proportion of GDP. With the global financial crisis affecting many economies, central banks (including the South African Reserve Bank) have had to reconsider their macroeconomic policies. This has led to what the Governor of the South African Reserve Bank termed “the changing mandate of central banks” (Marcus, 2012a). Given the attention afforded to not just inflation but also economic growth, consumption spending which is an important component of the South African GDP, is of paramount importance for policy decisions.

Based on this, if policy makers can understand the relationship between the economic drivers of consumption spending, a broader understanding is forged towards understanding its contribution to economic growth.

The study set out to explore the relationship between household debt and consumption spending patterns in South Africa, and has successfully identified the relationship between the four categories of consumption and household debt.

The study also set out to understand the literature supporting the existence or non-existence of such a relationship. While some studies found a relationship between household debt and consumption others found no conclusive evidence of such a relationship existing. There is no previous research of this nature on South Africa, consequently motivating the reasons for this study. The objectives were answered in a two phase approach. The first phase formed the basis of the study in the form of a literature review. This phase defined the relationship in other countries, whilst in other

studies this relationship was found to be inconclusive. The second phase involved regression analysis to determine the relationship.

7.3 Main findings

The finding of this research is conclusive on the two research questions that this paper set out to answer:

Is there a relationship between household debt and consumption spending in South Africa?

If so, to what extent does one variable affect the other?

The main empirical findings were summarised in Chapter 6. This section synthesises the empirical output based on the above two questions.

Is there a relationship between household debt and consumption spending in South Africa?

- Non-durable spending
Yes, a positive relationship exists.
- Durable spending
Yes, a positive relationship exists.
- Services
Yes, a positive relationship exists.
- Semi durable spending
Yes, a positive relationship exists.

The above relationships are summarised in Table 13:

Table 14: Summary of results

Variables	Impact	negative/positive relationship
Durable consumption	3,7 per cent	Positive
Semi-durable consumption	1,2 per cent	Positive
Non-durable consumption	5,2 per cent	Positive
Expenditure on services	2,2 per cent	Positive

Source: Author's own research

A positive relationship was found between these variable and consumer credit. A 1 per cent increase in consumer credit led to an increase in each of the four consumption categories. However, the impact varied between the four categories. A 1 per cent increase consumer credit resulted in a 3,7 per cent increase in durable consumption expenditure. A similar relationship was found with semi-durable goods; however the impact of the increase was not as pronounced as when compared to durable goods. Semi-durable goods displayed a 1,2 per cent increase when consumer credit increased by 1 per cent. In contrast to semi-durable consumption, non-durable consumption displayed an increase of 5,2 per cent when compared to consumer credit increasing by 1 per cent. Services expenditure increased by 2,2 per cent when consumer credit increased by 1 per cent.

In summary a sustained 1 per cent increase in household debt had the greatest impact on non-durable consumption expenditure followed by durable consumption. This was then followed by semi-durable and then services.

7.4 Recommendations to stakeholders

Given that consumption spending is the main driver of the South African economy, using household debt to forecast consumption spending may provide the Monetary Policy Committee with an early indication of the financial health of the South African economy. Taking into account the forward looking nature of monetary policy, an indication of the future direction of consumption spending will prove to be useful.

StatsSA utilises the income and expenditure survey to determine the CPI weight that is used to measure inflation. As mentioned in the study, the CPI inflation basket currently higher and lower weightings when compared to spending patterns of household data used by the SARB. StatsSA and the SARB should consider using a combination of the SARB's consumption weight and the income and expenditure survey weight when composing the CPI basket. This method should include results from the income and expenditure survey as well as the actual spending patterns as measured by the SARB and published in the quarterly bulletin.

Finally, the purpose of the NCR as mentioned in the research is to regulate debt in South Africa. The NCR can consider the impact of rising debt on non-durable and durable expenditure, given that these are the two categories with the greatest increase owing to consumer credit.

7.5 Limitations of the research

Since this study was carried out through quantitative analysis, with no income categories available (the living standards measure), the results of this study cannot be considered as the behaviour pattern of the typical South African consumer. However, the study was aimed at testing the existence of such a relationship in general and not within the various LSM categories.

Finally, literature reviewed indicated that a relationship exists between the debt service ratio and consumption spending. The debt service ratio used in these studies utilise the alternative approach in formulating the data. As stated earlier this method uses both the interest and capital repayment portion of debt relative to disposable income. This ratio indirectly captures that portion of current income that is allocated to the interest and repayment portions of loans. For this reason it is an indirect indication of the “space” allocated for debt. In contrast, South Africa’s debt service ratio is calculated according to the conventional approach mentioned earlier in the literature review. This only takes into account the interest portion of the debt-service cost. For this reason, the debt service ratio could not be used as a proxy for household debt, since the repayment portion is not included in the ratio. This will distort the indication of portion of income available, thus distorting the potential to take on additional debt.

7.6 Implications of future research

The regression analysis carried out in this study has limitations as mentioned above. Future research may entail categorising South African household debt into various LSM categories. This will add insight for economic policymakers during times of recession. More specifically, it is useful to determine which LSM categories are more exposed to household debt and consumption.

Future work can also focus on a deeper understanding of why South Africa utilises the conventional approach in the calculating of the debt service cost ratio. It was determined by Murphy (2000) that a negative relationship exists between the debt-service cost and consumption spending. Apart from determining the existence of this relationship in South Africa, it will be enlightening to determine if this relationship is due to the impact of the National Credit Act, or if this relationship existed prior to the introduction of this Act.

Finally, there is scope to measure the impact of a recovery post recession. In other words, it should be ascertained whether high household indebtedness impacts on the recovery process post-recessionary periods.

7.7 Conclusion

Household debt of South African households has risen sharply over the years, as is displayed in Chapter 5 of this research report. Credit liberalisation, higher income expectations of employees, inflexible labour markets and periods of low interest rates in combination explains the rising levels of household debt. The implication of the study is that the increase in household debt has supported consumption spending in South Africa.

This sharp rise in household debt warrants much attention owing to its important 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. At the same time, concern is also expressed over consumer behavior, which in the case of South Africa makes a significant contribution to GDP.

Despite many research studies alluded to in this paper verifying the relationship between household debt and consumption expenditure in other countries, some studies were found to be inconclusive. No such study has been conducted in South Africa, and this research report verified the existence of this relationship. In addition, it verified the impact of the increased household debt on consumption expenditure through econometric modeling. The qualification of this relationship is beneficial to the Monetary Policy Committee of the South African Reserve Bank and to credit regulators such as the National Credit Regulator in South Africa.

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