

# International Journal of **Finance** (IJF)

**ANALYSIS OF THE LONG-RUN RELATIONSHIP BETWEEN  
ECONOMIC GROWTH AND BANK CREDIT AVAILABILITY  
IN SOUTH AFRICA**

**GOODMAN CHAKANYUKA**



**CARI  
Journals**

# ANALYSIS OF THE LONG-RUN RELATIONSHIP BETWEEN ECONOMIC GROWTH AND BANK CREDIT AVAILABILITY IN SOUTH AFRICA

<sup>1\*</sup> Dr. Goodman Chakanyuka  
University of South Africa

\*Corresponding Author's Email: [goodmanchaks@gmail.com](mailto:goodmanchaks@gmail.com)

## Abstract

**Purpose:** The purpose of this study was to analyze the relationship between business cycles and bank credit extension using evidence from South Africa. The study sought to establish the long-run relationship between economic growth and bank credit availability in South Africa.

**Methodology:** This study adopted quantitative research methodology where a structured survey questionnaire was used. The ANOVA and Pearman's product correlation analysis techniques were used to assess relationship between variables. The study employed cointegration and vector error correction model (VECM) techniques in order to test for existence of long-run relationship between the selected variables.

**Results:** Results revealed that there was a negative relationship between credit growth and bank capital and lending rates. Overall, the quantitative findings show that bank lending in South Africa is procyclical. The survey results indicate that the case for demand-following hypothesis is stronger than supply-leading hypothesis in South Africa. The econometric test results show that there is a significant long-run relationship between economic growth and bank credit extension. Overall, the results show that there is a stable long-run relationship between macro-economic business cycles and real credit growth in South Africa. The results show that economic growth significantly causes and stimulates bank credit.

**Unique contribution to theory, practice and policy:** It proposes practical policy prescriptions to address challenges currently facing South Africa. The other major contribution of this study is that it shall open new avenues for further research on finding the long-run relationship between economic growth and bank credit availability in South Africa

**Keywords:** *Bank Credit, Business Cycles, Credit Extension, Cointegration*

## 1.0 INTRODUCTION

The lending activity of commercial banks has long received considerable attention as an important contributor to the performance of the economy. This attention has perhaps, become sharper in the wake of the difficulties experienced by the banking industry in the 1980s and since 2008 (Berlin, 2009). According to Weinberg (1995), the public perception of bank lending seems to continuously have changed from one extreme to the other, that is, the credit markets either experiencing a credit boom or credit crunch. In the early 1990s, the predominant and prevailing view was that the bank loan market was 'short' experiencing a credit crunch in which banks set 'unreasonably' high credit standards denying credit to qualified borrowers (Owens & Schreff, 1995). With growth in bank loans picking up geometrically by late 2008, some expressed

concerns that banks were possibly becoming ‘too loose’ in their standards for acceptable credit risk (The American Banker, 2009; SARB, 2010, FinWeek, 2008). Is there any good reason why “banks are at times too stringent and at other times too lax in their lending” asked Berlin (2009: 1)?

There is vast and wide literature on the relationship between credit and economic growth. However, although many studies have found an association between both variables, the direction of causality remains an issue of debate (Gantman & Dabos, 2012). As cited in Calderon and Liu (2003), the theoretical foundation of this relationship can be traced as far back to the work of Schumpeter (1911) and later McKinnon (1973) and Shaw (1973). Does financial development promote economic growth, or does economic growth propel financial development? Patrick (1966) labeled the possible directions of causality between economic growth and financial development as the supply-leading and demand-following hypotheses.

The ‘supply-leading’ hypothesis posits a causal relationship from financial development to economic growth, through efficient allocation of financial resources to more productive sectors. Cited in Unalmis (2002: 2), Patrick explains the functions of the supply-leading phenomenon as follows: “to transfer resources from the traditional, low-growth sectors to the modern, and high-growth sectors and stimulates an entrepreneurial response in these modern sectors.” Many recent research works support the view that credit spurs economic growth (Evans, 2013; Lahura, 2011; Odhiambo, 2007; Habibullah & Eng, 2006; Ghirmay, 2004). In the second pattern suggested by Patrick (1966), called ‘demand-following’ hypothesis, economic growth creates demand for financial institutions and services and the financial system simply responds to these demands. According to this strand of literature, financial development follows economic growth or “where enterprise leads, finance follows” (Esso, 2010: 36). In other words, the demand for financial services increases in tandem with the expansion of the real sector of the economy. Empirical support for this view can also be found in recent studies (Murty, Sailaja, & Demissie, 2012; Pradhan, 2009; Sindano, 2009). According to this view, the lack of financial institutions in some less developed countries is simply a testimony of the lack of demand for their products and financial services, in particular credit demand (Calderon & Liu, 2003).

### **1.1 Problem Statement**

The speed, severity and geographic reach of the credit crisis of 2007-2009 have renewed the prominence of credit in the rhythm of business cycles (BIS, 2011; Fourie et al., 2011; Rose & Spiegel, 2009). Before the credit crisis, the role of credit had largely been neglected in monetary policy making (Xu, 2012; Rannenberg, 2012). But crises also offer opportunities. According to Rannenberg (2012), it is now well understood that the interactions between the financial system and the real economy are a weak spot of modern macroeconomics. The ultimate outcome from empirical literature on bank credit channel is clearly articulated in a recent study of the Basel Committee on Bank Supervision. After reviewing the literature, the Committee concluded as follows: A key gap in our knowledge is on the influence of lending on real economic activity [and vice versa]. Specifically, while there is a sizeable body of research on the question of how bank balance sheet positions influence lending, there is significantly less research on the question of how lending affects real activity (BIS, 2011: 39).

Researchers and policymakers alike have been left searching for clearer insights (Jorda et al., 2011). In its Global Financial Stability Report, the International Monetary Fund (IMF) argues

that the losses incurred by banks caused a contraction in credit supply which in turn contributed to the economic downturn in the United States and beyond (IMF, 2010). These developments have revitalized investigations into the possibility that changes in the supply of credit can amplify the macroeconomic cycle and potentially increases systemic risk. In response to the global crisis, there have been worldwide calls for appropriate policy interventions (Aikman, Haldane & Nelson, 2011). Evaluating advantages and justifications of these proposals requires full comprehension of causes of and the link between business cycles and credit cycles, which as yet, appear not to having been thoroughly investigated, especially in the developing world. The question of the direction of causality between economic growth and credit extension “has not been adequately addressed” (Basurto, Goodhurt, & Hofman, 2006: 476).

Several studies have examined the linkages between bank credit and economic growth (for example Rannenber, 2012; Fourie et al., 2011; Armistead, 2009; Dell’ Ariccia, Igan, & Laeven, 2009, Bordo & Haubrich, 2009; Kiyotaki & Moore, 1997; Bernanke & Lown, 1991). The results have been mixed and conflicting. Moreover, most of these studies have been done in developed countries such as the United States, Canada and Australia. Studies on developing countries like South Africa are limited and fragmented (Fourie et al., 2011; Akinboade & Makina, 2009; Dlamini, 2008; Khomo & Aziakpono, 2007). Researches carried out by Fourie et al., (2011) and Odhiambo (2004) suggest further research is required on this topical issue and further to compare South African situation to global business cycles.

Clearly, there is theoretical and empirical curiosity in terms of finding the exact nature of the relationship between the financial sector and real economy. Based on the abovementioned, the problem statement of this study was given in the form of a research question as follows: “What is the nature and causal relationship between business cycles and bank credit extension?” In other words, the crucial question, therefore, is whether bank credit market development precedes or follows economic growth in both good and crisis times? In order to answer this question, responses to the following sub-question was required; Is there a long-run relationship between economic growth and bank credit availability in South Africa?

## **1.2 Research Objective**

To determine the long-term relationship between business cycles and bank credit extension in South Africa

## **2.0 LITERATURE REVIEW**

### **2.1 Theoretical Review**

#### **2.1.1 Marshall’s Model**

According to Semerak (2001), Marshall’s model is based on psychology. Fluctuations in economic activity and changes in bank lending behavior are driven by psychology. Occurrence of positive impulse is related to the seed stage of a business cycle. For example, discovery of new minerals and resources creates new business opportunities and contributes to increase of general confidence and also set in motion increased demand for credit facilities by both households and businesses. This will be followed by execution of new contracts and issuance of new orders in response to increased business opportunities for mining companies and downstream industries. The production and manufacturing industries will start hiring labor force

and increase wages in response to the increase of demand of their goods. Marshall's model assumes that confidence levels will remain at elevated levels and spreading throughout the society. If not interrupted due to unforeseen circumstances, the process will continue to cover significant portion of the society. Semerak (2001) brand this attractive and conducive business environment as 'growth phase of the cycle.'

Like any other bubble, the growth of economy based on confidence alone will not continue forever. Lenders and creditors will at some time identify new emerging risks and will naturally reduce supply of credit as a way of mitigating the risks. Credit supply will contract in an era of increased credit demand. In an efficient market, interest rates will increase significantly. General confidence will be replaced by skepticism and wariness. Prudent lenders will respond by curtailing and rationing credit. Borrowers and debtors will be faced with no option but to sell their properties to raise money to repay their debts. This development will result in undesired outcome, that is, the flooding of property market will push property prices further down. Poor performance of the property market will make creditors and lenders even more circumspect and unwilling to take further risks. Some of the creditors will go bankrupt and borrowers falling in debt trap in the process. In the end, some of the otherwise 'healthy' creditors may go out of business and close shop. This is characteristic of the contraction phase of the business cycle. Again, this continuous and gradual decline will not continue forever as ground will be prepared for a kick-start of a new cycle (Semerak, 2001).

### **2.1.2 Austrian Business Cycle Theory**

Hayek (1999) asserts that disequilibrium development in the economy is caused by money in general and bank credit in specific. In addition, Tempelman (2010) stresses that for an economic expansion to be sustainable, it has to be supported by savings, and since economic boom driven credit alone is considered short-term. When credit creation by monetary authorities exceeds a society's structural saving rate, financial intermediaries end up lending money at interest rates that are below the rate where supply and demand clears in the market for loanable funds (Hayek, 1999). It common for market participants, in particular entrepreneurs and businessmen, to miscalculate this trend and judge the decline in interest rate as a relative decrease in dearth of capital.

However, Templeman (2010) argues that such improvement in scarcity of capital is unsustainable since the improvement is not supported by economic fundamentals such as increased savings but by 'false' moderation and easing of interest rates. The disharmony between development of wages and growth of prices of consumption goods will evidently result in forced savings. Relative to the ultimate consumer tastes and liking, the market end up producing excessive capital goods and inadequate consumer goods and eventually as the lack of underlying demand for these capital goods becomes apparent, production capacity is idled and the boom that was fed by credit expansion turns to bust (Tempelman, 2010).

Hayek (1999) claims that changes in the temporal structure of production, if not controlled, will result in the growth of prices of consumption goods. The resultant disequilibrium structure of capital can only be corrected during economic downturns. Consequently, credit expansion during recession will not help bring about a sustainable economic growth. This will merely postpone it, as it causes a delay in the structural adjustments such as business closures and other eliminations

of unproductive use of capital, that need to be made to bring about a sustainable economic expansion (Templeman, 2010; Hayek, 1999).

## **2.2 Empirical Review**

A study by Mishra et al., (2009) used a VAR framework to investigate the nature of the causal relationship between economic growth and bank credit in India for the period 1980 to 2008. The Granger causality test provided evidence in support of the supply-leading view, that is, bank credit extension propels economic growth. A Granger causality test designed by Eita and Jordan (2007) to test financial development and economic development revealed that the direction of causality runs from finance to growth in Botswana for the period 1977 to 2008. These specific results indicate that the direction and speed of economic development of Botswana is heavily influenced by the availability and suitability of financial services offered by the banking sector. Employing Autoregressive Distributed Lags (ARDL) techniques, Iqbal et al., (2012), found that Pakistan's economic growth is strongly impacted by credit to the private sector and national savings. The results of the study suggest that economic development in Pakistan is very sensitive to credit extension with sensitivity ratio estimated at 5.59: 1, that is, for every one percentage increase in credit to the private sector, real GDP increases by 5.59 percent. Iqbal et al., (2012) concluded that not only in the long run, but also in the short-run, the credit to the private sector has significant ramifications on business cycles.

Similarly, Ibrahim (2009) provide evidence that there is a positive causal connection between economic growth and bank activity because increase in GDP will raise both supply and demand for bank credit. As GDP increases, banks will have more funds to make loans due to increase in deposits. Dell'Ariccia and Marques (2006), as cited in Kelly et al., (2013), predicted that the default cases increase after credit has been expanded rapidly. They found that rapid credit growth is more likely to occur in the upswing of a business cycle due to over-exuberant lending. In a similar study, Sindano (2009) employing the Cointegration and VECM techniques, examined the causal link between economic growth and credit cycles. The study provides evidence that causality flows from economic growth to bank credit. The study recommended that the real sector of the economy should be developed further in order to stimulate further development in the economy through appropriate policy interventions. The study by Odhiambo (2004) on South Africa further lends credence on the demand-following argument. The investigation revealed strong evidence in support of the demand following view for South Africa.

## **3.0 RESEARCH METHODOLOGY**

This study adopted quantitative research. The qualitative results are used to formulate questions of the structured survey questionnaire. The ANOVA and Pearman's product correlation analysis techniques are used to assess relationship between variables. The study employs cointegration and vector error correction model (VECM) techniques in order to test for existence of long-run relationship between the selected variables. The study uses quarterly data for the period of 1980: Q1 to 2013: Q4. Business cycles are determined and measured by Gross Domestic Product at market prices while bank-granted credit is proxied by credit extension to the private sector.

## 4.0 RESULTS AND DISCUSSIONS

### 4.1 Response Rate

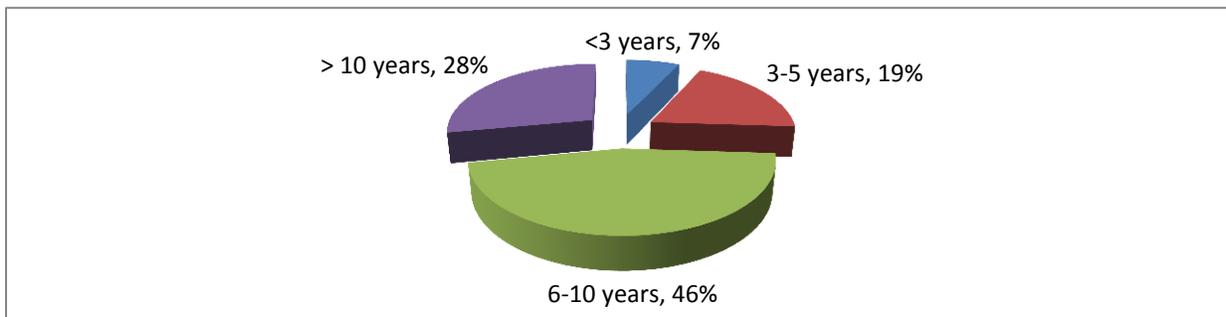
The targeted sample was 300 in size. Questionnaires were successfully circulated to 240 respondents. The respondents were drawn from top four banks in terms of loan market share, 163 returned and usable questionnaires out of 240. This response rate was considered adequate

**Table 1: Response Rate**

|              | Frequency  | Percentage |
|--------------|------------|------------|
| Response     | 163        | 67.92      |
| Non-Response | 77         | 32.08      |
| <b>Total</b> | <b>240</b> | <b>100</b> |

### 4.2 Demographic Information of the Respondents

The study sought to establish the respondents' experience in the credit and risk management field. Figure 1 overleaf shows that 7% of the respondents indicated that they had less than 3 years' experience in the credit and risk management field, 19% indicated that they had 3 to 5 years' relevant experience, 46% for 6 to 10 years while 28% stated they had worked in the credit and risk space for more than 10 years. This illustrates that majority of the respondents (74%) had worked in the credit and risk management field for more than 5 years which suggests that they had been in the field long enough and could therefore offer reliable information as sought by the study.



**Figure 1: Years of Experience in Credit and Risk Field**

### 4.3 Causality Runs from Business Cycles to Bank Credit Extension

Table 2 presents data on the level of agreement from respondents on statements suggesting that causality runs from business cycle to bank credit extension. Firstly, respondents were asked to give the extent to which lending standards change in response to variations in the quality of the borrowers over the business cycle. As indicated by a mean score of 4.09, a majority of the respondents agreed with the statement, while a standard deviation of 0.97 indicates that the responses were closer to the mean thus they were similar. In addition, most of the respondents agreed that bank lending is procyclical, that is, it moves in tandem with business cycles as indicated by a mean score of 3.78. The standard deviation of 1.12 ( $\sigma > 1$ ) indicates that the answers received were not closer to the mean thus they were dissimilar.

**Table 2: Causality from Business Cycles to Bank Credit Extension**

| Statement   | Mean | Std. Dev |
|---|------|----------|
| Lending standards change in response to variations in the quality of the borrowers in the business cycle. | 4.09 | 0.97     |
| Bank lending is pro-cyclical i.e. it moves in tandem with business cycle.                                 | 3.78 | 1.12     |

#### 4.4 Causality Runs from Bank Credit Extension to Business Cycles

Most of the respondents agreed that availability of bank credit to fund activities of businesses exacerbate the magnitude of business cycles as shown by a mean score of 3.93. Further, respondents strongly agreed with the statement that fluctuations in bank credit may have significant, indeed critical, effects on macro-economic activity and may amplify swings in the macro-economy as shown by a mean score of 4.51. As shown in Table 3 the standard deviations of the responses on both statements were below 1 ( $\sigma < 1$ ) indicating that the answers received were closer to the respective means thus they were similar.

**Table 3: Causality from Bank Credit Extension to Business Cycles**

| Statement  | Mean | Std. Dev |
|--|------|----------|
| Availability of bank funds to fund activities of business exacerbates the magnitude of business cycle.   | 3.93 | 0.69     |
| Fluctuations in bank credit may have significant, indeed critical, effects on macro-economic activity and may amplify swings in the macro-economy. | 4.51 | 0.50     |

#### 4.5 Changes of Credit Standards as Applied to Approval of Loans and Advances

Respondents were asked to give the extent to which bank credit standards as applied to approval of household and business loans changed during the peak of the 2007-2009 financial crisis. To start with, in the case of households a majority of the respondents indicated that bank standards were tightened somewhat as indicated by a mean score of 2.39. Secondly, in the case of businesses, a majority of the respondents also indicated that bank standards were tightened somewhat as indicated by a mean score of 2.30. Thirdly, majority of the respondents indicated that overall, banks somewhat tightened credit standards in regard to approval of loans and advances to households and businesses. The standard deviations of the responses on the three statements were 1.46, 1.02 and 1.46 respectively ( $\sigma > 1$ ), indicating that that the answers received were not closer to the respective means thus they were dissimilar. The data findings are presented in Table 4.

**Table 4: Changes of Bank Credit Standards**

| Statement  | Mean | Std. Dev |
|--|------|----------|
| My bank changed credit standards in regard to approval of loans and advances to households                         | 2.39 | 1.46     |
| My bank changed credit standards in regard to approval of loans and advances to businesses                         | 2.30 | 1.02     |
| Overall, my bank changed credit standards in regard to approval of loans and advances to households and businesses | 2.42 | 1.46     |

#### 4.6 Demand for Loans during Bottom of Business Cycles

Respondents were asked to give the extent to which demand for bank credit changed during the peak of the 2007-2009 financial crisis. Respondents were asked to give the extent to which demand for loans and advances have changed in both households and businesses. To start with, in the case of households, a majority of the respondents indicated that household demand for loans and advances decreased somewhat (mean score =2.10). Secondly, in the case of businesses, majority of respondents indicated that demand for loans and advances decreased somewhat (mean score =2.41). Thirdly, in the case of the overall change in credit demand, majority of respondents indicated that demand for loans and advances decreased somewhat (mean score =2.36). As shown in Table 5 the standard deviations were 1.05, 1.37, 1.17 levels respectively, indicating that the answers received on the three statements were not closer to the respective means thus they were dissimilar.

**Table 5 Change in Demand for Loans and Advances during the Financial Crisis**

| Statement   | Mean | Standard Deviation |
|---|------|--------------------|
| Households demand for loans and advances changed in my bank   | 2.10 | 1.05               |
| Businesses demand for loans and advances changed in my bank   | 2.41 | 1.37               |
| Overall, the demand for loans and advances changed in my bank | 2.36 | 1.17               |

#### 4.7 Econometric Test Results

As previously stated in Chapter One, the purpose of this study was to establish the nature and causal relationship between business cycles and bank credit extension. In this study, a change in Gross Domestic Product (GDP) at current market rate was used as a proxy for business cycle indicator. The credit extended to the Private (PSCR) in South Africa was modelled against several variables namely; Gross Domestic Product (GDP), Deposit Liabilities (DEP), Money supply (M3), Prime Lending Rate (LR), Inflation (CPI) and Nominal Effective Exchange Rate (NEER).

##### 4.4.1 Preliminary Analysis

###### a) Descriptive Analysis

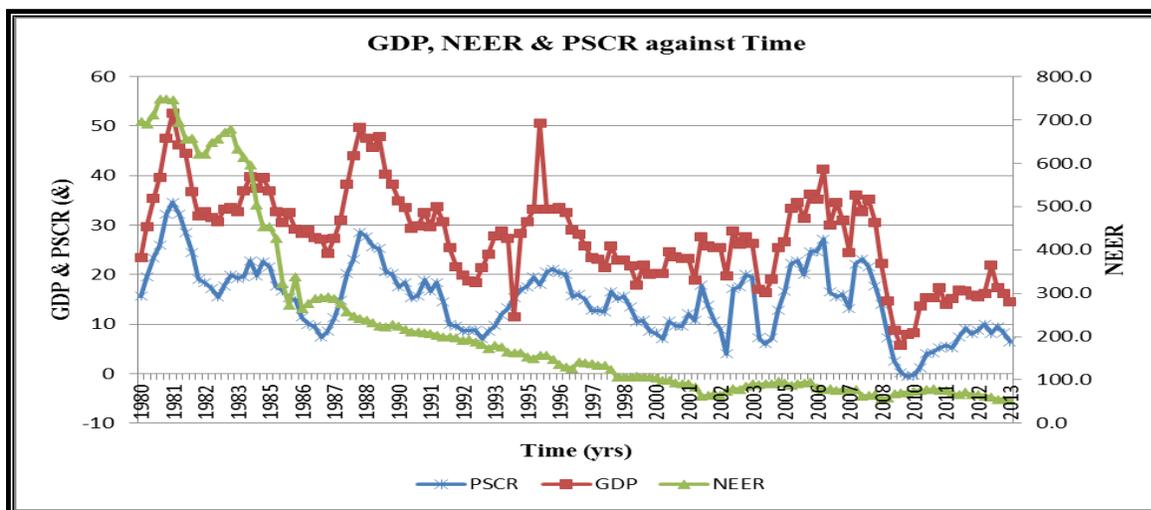
**Table 6 Descriptive Statistics**

|              | GDP     | CPI   | DEP   | LR    | M3    | NEER   | PSCR    |
|--------------|---------|-------|-------|-------|-------|--------|---------|
| Mean         | 12.92   | 9.63  | 15.44 | 15.41 | 15.04 | 216.70 | 14.96   |
| Median       | 15.43   | 9.25  | 12.13 | 15.38 | 12.45 | 136.10 | 15.40   |
| Maximum      | 22.60   | 19.70 | 37.14 | 25.50 | 39.90 | 747.58 | 34.60   |
| Minimum      | (-3.74) | 0.30  | 1.79  | 8.50  | 1.55  | 52.74  | (-0.60) |
| Std. Dev.    | 4.23    | 4.69  | 7.64  | 4.32  | 7.17  | 198.21 | 6.97    |
| Observations | 136     | 136   | 136   | 136   | 136   | 136    | 136     |

Table 6 provides the descriptive statistics of the variables namely, Gross Domestic Product (GDP), Inflation (CPI), Deposits (DEP), Prime lending Rate (LR), Money supply (M3), Nominal Effective Exchange Rate (NEER) and Credit extended to the private sector (PSCR) for the period 1980: Q1 to 2013: Q4. During the period under review, GDP growth averaged 12.92% with a low of -3.74% and a high of 22.60%. Bank credit extended to the private sector averaged 14.96% recording a maximum of 34.60% and minimum of -0.60% during the same period.

**b) Trend Analysis**

This section provides graphical representation of the movement and changes of the variables under study over the years 1980: Q1 to 2013: Q4.

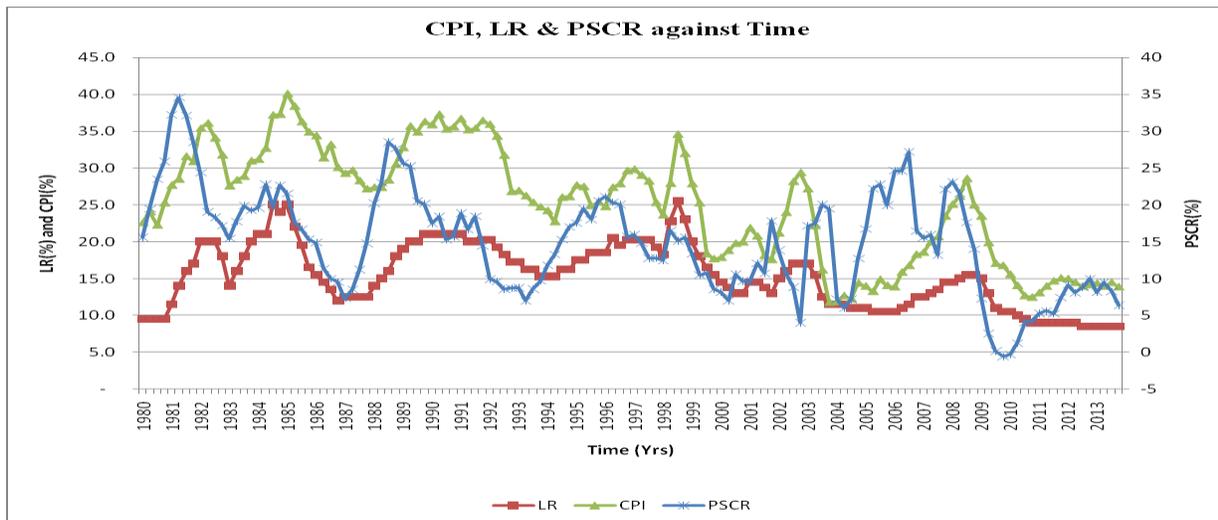


**Figure 2: Trend of PSCR, GDP and NEER**

A trend analysis of credit to the private sector (PSCR), business cycle indicator (GDP) and exchange rate (NEER) was conducted and results shown in Figure 2. The graph shows an insightful trend between business cycle indicator and the supply of bank credit extended to the private sector over the years. The trend indicates that for the period of study the nominal effective exchange rate was generally downward trending whereas GDP and PSCR were cyclical

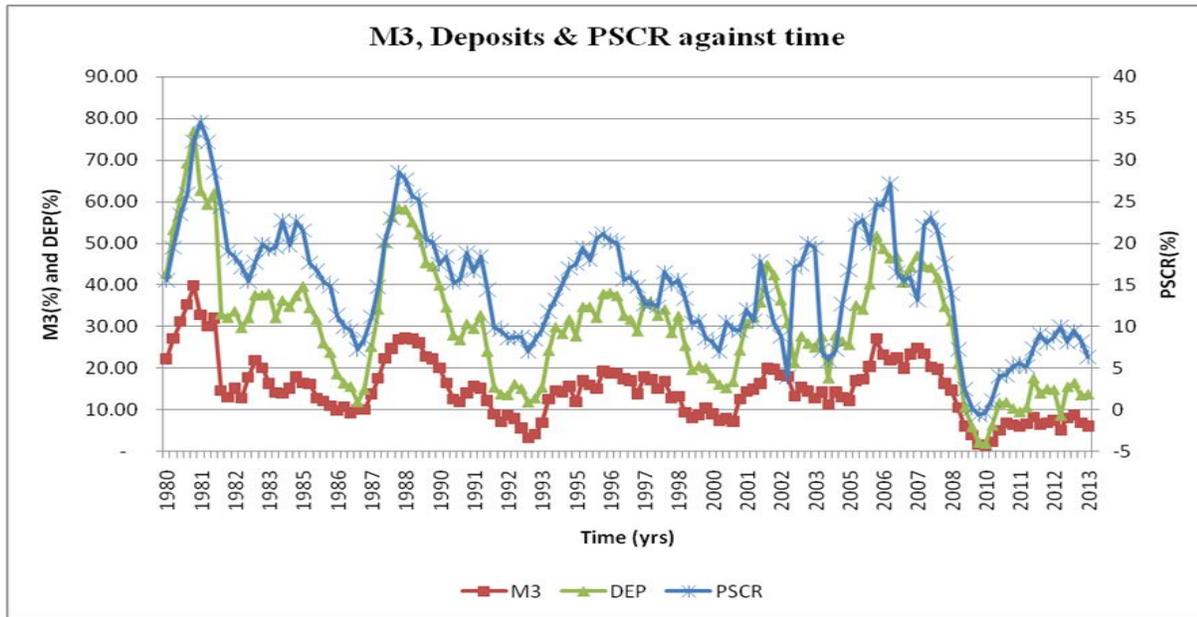
in nature. When the GDP rose there was a rise in credit to the private sector also implying that there was a positive and pronounced association between the two variables.

Figure 3 depicts the trend analysis of prime lending rate, inflation and credit to the private sector over the period of study. This trend shows that when inflation rose then there was an accompanying rise in the prime lending rate so was the credit to the private sector. However, from about 2003 to 2010, the pattern changed. Low levels of interest rate and inflation were associated with high increases in credit extended to the private sector. In this case an increase in CPI or prime lending rate also led to the decrease of credit to the private sector and a decline in them led to an increase in the credit to the private sector.



**Figure 3 Trend of PSCR, LR and CPI over years**

The figure 4 shows the trend analysis of Money Supply (M3) and PSCR over the entire period of study (1980:Q1- 2013:Q4). From the graphical presentation, the money supply (M3) and PSCR have been fluctuating in tandem since 1980. The rate of growth in money supply however, has been much greater than the change in credit to the private sector. Nonetheless, there is a positive correlation between the two variables. A positive relation is also observed between deposit liabilities (DEP) and credit extended to the private sector.



**Figure 4: Trend of PSCR, DEP and M3**

#### 4.8 Vector Error Correction Model Test Results

##### 4.8.1 Short Run Results

The researcher proceeded to estimate the short run error correction model after having reached conclusion regarding the inherent long run relationships. The estimates of the error-correction model are given in table 7. As shown in Table 7, in the short run, the impact of economic growth on credit extended to the private sector is mixed. The current (DLNGDP) impacts positively while the first lag (DLNLAGGDP) impacts negatively. From the short-supply elasticity of DLNGDP, a short-run increase in economic growth by 1% induces an increase in credit extended by about 0.11% in South Africa. However, in the long-run, the magnitude of GDP coefficient is quite small and insignificant ( $p\text{-value} > 0.5$ ) indicating that business cycles partially determine the magnitude of bank credit extended in the short run. In this case, the null hypothesis of no short-run relationship between the two variables DLNPSCR and DLNGDP is not rejected given that the reported  $p\text{-value}$  ( $p=0.1192$ ) in the short run model is above the 5% critical value thus leading to the adoption of the null hypothesis of non-existence a short-run relationship.

Similarly, the impact of changes of the current and first lag of inflation (CPI) and prime lending rate (LR), on credit extended to the private sector (PSCR) is mixed. Current lending rates (DLNLR) impact negatively while first lag (DLNLAGLR) impacts positively. Both results are highly significant ( $p < 0.05$ ). The impact of DLNCPI (negative) and DLNLAGCPI (positive) is significant ( $p\text{-value} = 0.0276$  and  $0.004$  respectively). Money supply variables DLNM3 and DLNLAGM3 have positive coefficients and both are considered significant ( $p\text{-values} < 0.5$ ). This suggests that bank lending is strongly dependent on demand as indicated by cyclical factors such as economic growth and money supply.

Going through the results in Table 7 as shown, the variables appeared with the expected signs except for exchange rate (DLNNEER) which was expected to be negative. The result is contrary to major beliefs that exchange rate impacts negatively on the amount of loans that can be

extended by commercial banks in South Africa. However, it is important to note that the results of the model suggest that the impact of both DLNNEER and DLNLAGNEER is minimal and insignificant as confirmed by p-values of more than 0.05. By and large, the results indicate that the economic criterion for the model estimation was satisfactory

**Table 7: Short-run Relationship**

| Dependent Variable: <b>DLNPSCR</b>                   |             |                       |             |         |
|--|-------------|-----------------------|-------------|---------|
| Method: Least Squares                                |             |                       |             |         |
| Sample(adjusted): 1980:3 2013:4                      |             |                       |             |         |
| Included observations: 133 after adjusting endpoints |             |                       |             |         |
| Variable   | Coefficient | Std. Error            | t-Statistic | Prob.   |
| DLNCPI   | -0.116015   | 0.218212              | -0.531663   | 0.0276  |
| DLNGDP   | 0.106130    | 0.067620              | 1.569520    | 0.1192  |
| DLNLR  | -0.074561   | 0.016197              | -4.603528   | 0.0000  |
| DLNM3  | 0.275292    | 0.08815               | 3.124247    | 0.0022  |
| DLNNEER  | 0.005472    | 0.011003              | 0.497263    | 0.6199  |
| DLNLAGCPI  | 0.012335    | 0.003398              | 3.630207    | 0.0004  |
| DLNLAGGDP  | -0.072628   | 0.130048              | -0.450622   | 0.0065  |
| DLNLAGLR   | 0.050877    | 0.016589              | 3.066906    | 0.0027  |
| DLNLAGM3   | 0.171539    | 0.078770              | 2.177714    | 0.0314  |
| DLNLAGNEER   | 0.017750    | 0.014714              | 1.206325    | 0.2301  |
| DLNLAGPSCR   | 0.011688    | 0.086710              | 0.134797    | 0.00894 |
| LAGRESID   | -0.105563   | 0.188433              | 0.560215    | 0.00576 |
| C  | -0.004369   | 0.002735              | -1.597456   | 0.1128  |
| R-squared  | 0.785547    | Mean dependent var    | 0.033946    |         |
| Adjusted R-squared                                   | 0.760317    | S.D. dependent var    | 0.022754    |         |
| S.E. of regression                                   | 0.011140    | Akaike info criterion | 5.200182    |         |
| Sum squared resid                                    | 0.014768    | Schwarz criterion     | 5.482697    |         |
| Log likelihood                                       | 420.4436    | F-statistic           | 2.048523    |         |
| Durbin-Watson stat                                   | 2.044543    | Prob(F-statistic)     | 0.00000     |         |

Source: Eviews Computations

The coefficient of determination (R-squared) which gives 0.785547 indicates that the model explains 79% of the variations in the dependent variable DLNPSCR. This result remains robust even after adjusting for degrees of freedom (df) as indicated by the value of adjusted R-squared, which is 0.760317. Thus, the regression has a good fit as only 24% variation in credit extended to the private sector is left unaccounted for by the model. The F-statistic, a measure of overall significance of the regression is 2.048523. This value is significant at 1%, 5% and 10% because the calculated Prob (F-statistic) is equal to zero. This is supported by low standard error of regression equation signifying minimized sum of squared error. With this, the hypothesis that all the explanatory variables introduced in the model are not jointly significant in explaining the variations in DLNPSCR was rejected and concluded that they are simultaneously significant, that is, the independent variables have good explanatory power.

The most important parameter when estimating the VECM is the speed of adjustment. The results in Table 7 reveal that the error correction term (ECM-1) is negative and statistically significant at 5% (p-value = 0.00576), which implies that DLNPSCR and measures of DLNPSCR are adjusting to their long run relationship. In other words, this confirms that there is not any problem in the long run equilibrium relationship between the independent and dependent variables at 5% level of significance. The error correction term relative value (-0.105563) for South Africa shows a satisfactory rate of convergence to the equilibrium state per period. This result implies that there is a negative gradual adjustment (convergence) to the long run equilibrium. The coefficient of (0.105563) indicates that 10.56% of the disequilibria in the short run PSCR achieved in one period are corrected in the subsequent period. This was buttressed by the first differenced lagged values of the dependent variable DLNLAGPSCR (-1) that is significant at 5% level. This implies that bank's lending performance of the previous quarter significantly and positively affects the current quarter's performance. The Durbin-Watson statistic of 2.044543 shows that the autocorrelation is inconclusive.

The results of the vector error correction model (VECM) indicate how long it will take for a variable to return to equilibrium in the short run when confronted with a shock. The VECM results indicate a significant short-run equilibrium relationship in the cointegrating equation between credit and the variables in the model. This supports the theory of pro-cyclicality that credit is a "unifying variable which will respond to shocks emanating from the dynamic interaction between macroeconomic variables" (Fourie *et al.*, 2011: 13079).

## 5.0 DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Findings

The objective of the study was To determine the long-term relationship between business cycles and bank credit extension in South Africa. The results of the qualitative research suggest that there is a direct positive relationship between economic growth and credit extension in South Africa. The quantitative results showed that there is direct and positive relationship between credit and credit aggregates namely economic growth, collateral value, bank completion and money supply. On the other hand, the results show that there is a negative relationship between credit and bank capital and lending rates. The quantitative findings show that the selected credit aggregates behave differently during alternate business cycles. The empirical results from the Johansen cointegration test suggest the existence of a stable long-run relationship between bank-granted credit and business cycles. Moreover, economic growth has a significant positive impact

on credit growth in the long-run. However, the estimated coefficients are small in magnitude in the short-run, suggesting that the relationship between bank credit and business cycles is rather weak in the short run.

Overall, the results of the study provide evidence that there is long-term positive relationship between business cycles and bank credit extension in South Africa.

### 5.3 Areas of Further Study

Further research in this area may use a different econometric model, such as the Sim's test, and compare the results with the current study. Moreover, to test robustness of the study's findings, future research may employ variance decomposition for relative importance of explanatory variables and impulse-response function for impact analysis.

### REFERENCES

- Aikman, D., Haldane, A.G., & Nelson, B. (2011). Curbing the credit cycle. *Columbia Centre on Capitalism and Society Annual Conference*, March 2011
- Akinboade, O.A., & Makina, D. (2009). Bank lending and business cycle: South African evidence. *African Development Review*, 21(3), 476-498.
- Akinboade, O.A., & Makina, D. (2010). Econometric analysis of bank lending and business cycles in South Africa. *Journal of Applied Economics*, 42(29), 3803-3811.
- Bordo, M. D., & Haubrich, J. G. (2009). Credit market turmoil, monetary policy and business cycles: A historical view. Federal Reserve Bank of Cleveland, Working Paper 15389, available on <http://www.nber.org/papers/w15389>
- Calderon, C., & Liu, L. (2003). The direction of causality between financial development and economic growth," *Journal of Development Economics*, 72, 321-34.
- Dell'Ariccia, G., Igan, D., & Laeven, L. (2009). Credit booms and lending standards: Evidence from the subprime mortgage market. *European Banking Centre Discussion Paper No. 2009-145*.
- Dlamini, S. N. (2008). *Bank credit extension to the private sector and inflation in South Africa*. (Unpublished Master's Thesis, Rhodes University).

FinWeek (2008). SA affected by sub-prime crisis despite theories of decoupling.

Fourie, L., Botha, I., & Mears, R. (2011). Credit extension in South Africa: A business cycle perspective for the period 1985 to 2009. *African Journal of Business Management*, 5(34), 13074-13083.

Gantman, E. R., & Dabos, M. (2012): A fragile link? A new empirical analysis of the relationship between financial development and economic growth. *Oxford Development Studies, iFirst*, 1-6.

Ghirmay, T. (2004). Financial growth and economic growth in sub-Saharan countries: Evidence from time series analysis. *Africa Development Review*, 16, 41-432.

Hayek, F. (1929). *Monetary theory and the trade cycle*. Jonathan Cape, London.

Jorda, O., Schularic, M. H. P., & Taylor, A. M. (2011). When credit bites back: Leverage, business cycles and crises. *NBER Working Paper 17621*.

Khomo, M. M., & Aziakpono, M. J. (2007). Forecasting recession in South Africa: A Comparison of the yield curve and other economic indicators. *South African Journal of Economics*, 75(2), 194-211.

Kiyotaki, N., & Moore, J. (1997). Credit cycles. *Journal of Political Economy*, 105 (2), 211-48.

Lahura, E. (2011). An empirical analysis of the credit-output relationship: Evidence from Peru. *Central Bank of Peru, Working Paper Series*, 2011- 018.

Marcus, G. (2011). Statement of the Monetary Policy Committee” SARB, MPC 21 July 2011.

Marcus, G. (2013): “Statement of the Monetary Policy Committee” SARB, MPC 20 March 2013.

- McKinnon, R.1. (1973). *Money and capital in economic development*. Brookings Institution Washington, DC.
- Murty, K. S., Sailaja, K., & Demissie, W. M. (2012). Does bank credit cause economic growth in the long run? Time series evidence from Ethiopia. *International Journal of Research in Commerce, Economics and Management*, 2(10), 49-56.
- Odhiambo, N. M. (2004). Is financial development still a spur to economic growth? A causal evidence from South Africa. *Savings and Development*, 28(1), 47-62.
- Owens, R. E., & Schreft, S. L. (1993). Identifying credit crunches. *Federal Reserve Bank, Richmond Economic Review, Working Paper*, 93-2.
- Patrick, T. H. (1966). Financial development and economic growth in undeveloped countries. *Economic Development and Cultural Change*, 14, 174-189.
- Pradhan, R. P. (2009). The nexus between financial development and economic growth in India: Evidence from multivariate VAR Model. *International Journal of Research and Reviews in Applied Sciences*, 1(2), 14-1151.
- Rannenberg, A. (2012). Asymmetric information in credit markets, bank leverage cycles and macroeconomic dynamics. *Working Paper Research No. 224 April 2012, National Bank of Belgium*.
- Rannenberg, A. (2012). Asymmetric information in credit markets, bank leverage cycles and macroeconomic dynamics. *Working Paper Research No. 224 April 2012, National Bank of Belgium*.
- Schumpeter, J. A. (1911). *The theory of economic development: An inquiry into profits, capital, credit, interest rate and business cycle*. Translated and Reprinted 1961, New York: Oxford University Press.

- Sindano, A. N. (2009). *The direction of causal relationship between financial development and economic growth in Namibia*. (A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics: University of Namibia).
- Tempelman, J. H. (2010). Austrian business cycle and the global financial crisis: Confessions of a mainstream economist. *The Quarterly Journal of Austria Economics*, 13(1), 3-15.
- Unalmis, D. (2002). The causality between financial development and economic growth: The case of Turkey. *Research Department Working Paper No.3*, June 2002. The Central Bank of Republic of Turkey.
- Xu, T. (2010). The role of credit in international business cycles. *Bank of Canada Working Paper 212-36*, November 2012.