EXAMINING THE CAUSAL RELATIONSHIP BETWEEN PRIVATE SECTOR CREDIT EXTENDED AND ECONOMIC GROWTH IN NAMIBIA

A THESIS

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Abstract

This study examined the causal relationship between Private Sector Credit Extension (PSCE) and Economic growth in Namibia. The study used the quarterly data covering the period from 2000:Q1-2017:Q4. The variables employed were Gross Domestic Product (GDP) growth, Private Sector Credit Extended, Broad Money Supply (M2) and lending rates. The study employed co-integration tests on different sets of variables used to examine long run relationship. Granger causality tests established the direction of the relationships between the variables. The results revealed a stable long run relationship between economic growth, and credit extension, with economic growth being the dependent variable. The Granger causality test results showed evidence of unidirectional causal relationship running from PSCE to economic growth and from M2 to economic growth. The findings of this study provide opportunities for further research in this area, given the limited body of empirical literature in existence at present. Further studies to assess the responsiveness of Private Sector Credit Extended to Monetary policy in Namibia are recommended.

Table of contents

Abstract ii

Acronyms v

Acknowledgement vi

Dedication vii

Declaration viii

CHAPTER ONE: INTRODUCTION 1

1.1 Background to the study 1

1.2 Statement of the Problem 2

1.3 Objectives of the Study 2

1.4 Research Hypotheses 2

1.5 Significance for the study 3

1.6 Limitation of the study 3

1.7 Delimitations of the study 3

1.8 Structure of the study 3

CHAPTER TWO: AN OVERVIEW OF THE TREND ANALYSIS OF THE VARIABLES 4

2.1. Introduction 4

2.2. An overview of Gross Domestic Product growth, Private Sector Credit Extended, lending rates and Broad money supply 4

2.2.1. Gross Domestic Product growth 4

2.2.2. Private Sector Credit Extended 5

2.2.3. Lending rates (L) 7

2.2.4. Broad Money supply (M2) 8

2.3. Conclusion 9

CHAPTER THREE: LITERATURE REVIEW 10

3.1. Introduction 10

3. 2. Theoretical Literature 10

3.2.1. Economic growth 10

Solow growth model 12

Endogenous growth theory 12

3.2.2. Private Sector Credit extended 14

The Fisher's theory of demand for bank credit 15

The Post-Keynesian theory of Demand for Bank Credit 15

3.3. Empirical studies 16

Lessons learnt 22

3.4. Conclusion 23
CHAPTER FOUR: RESEARCH METHODOLOGY 24
4.1 Introduction 24
4.2 Econometric Framework and Model Specification 24
4.2.1 Unit Roots tests 25
4.2.2. Testing for Cointegration 26
4.2.3. Testing for VAR Stability 27
4.2.4. Determination for Optimal Lag Length 28
4.2.5. Causality Tests 28
4.3. Data measurements and Data sources 29
4.4. Conclusion 29
CHAPTER FIVE: EMPIRICAL RESULTS AND FINDINGS 30
5.1. Introduction 30
5.2.1. Unit Root Test 30
5.2.2. Cointegration test 32
5.2.3. VAR Stability 33
5.2.4. Determination for Optimal Lag Length 34
5.2.5. Diogonastics tests 35
5.2.6. Granger causality 37
Conclusion 39
CHAPTER SIX: GENERAL CONCLUSIONS AND POLICY RECOMMENDATIONS 40
6.1. Introduction 40
6.2. General Conclusions 40
6.2. General Conclusions 40
6.3. Policy Recommendation 41
References 42
Appendices 47

Acronyms

ADF	Augmented Dickey-Fuller
BON	Bank of Namibia
CBS	Central Bureau of Statistics
ECM	Error Correction Model
GDP	Gross Domestic Product
IMF	International Monetary Fund
M2	Broad money supply
MFSM	Monetary and Financial Statistics Manual
MMUs	Money Market Unit trusts
NSA	Namibia Statistics Agency
ODCs	Other Depository Corporations
PP	Phillips- Perron
PSCE	Private Sector Credit Extended
TFP	Total Factor Productivity
VECM	Vector Error Correction Model

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All opinions and conclusions are the responsibility of the author only and should not be attributed to any of the above stated individuals. Any errors are also the responsibility of the author only.

Dedication

To my uncle Mr. Augustinus and Grandma Sylvia Ankama

This study is the outcome of your strength and success of your patience, perseverance, which could not have been realized without your support and sincere commitment. This study is dedicated to you all for believing and always trusting my instinct and encouraging me in all spheres of life.

Finally, my uncle and Grandma may God bless you all. I wish you happiness and long life.

Declaration

I, Abiatar Andreas, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution.

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Name of student	**Signature**	**Date**

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

The capacity of the economy to grow is one of the norms that one can use to measure the performance of the economy. Gerber (2009) defines economic growth as an increase in a country's real Gross Domestic Product (GDP). This means that the country has increased its stock of capital and is able to produce more goods and services within the country for a given period. Economic growth is caused by an increase in inputs such as labour, capital and technology that businesses use in the production process (Ashipala and Haimbodi, 2003). Since 1990, Namibia's economy has experienced a positive growth annually, except in 1993. This was due to some negative growth experienced when diamond production was cut dramatically in response to De Beers stockpiling (Sherbourne, 2010).

Namibia has constant economic growth for total production in real GDP terms ever since 1990. The annual growth rates experienced between 1996 and 2000 were between 3.2 and 4.2, (Central Bureau of Statistics, 2000).

Private Sector Credit Extended (PSCE) in Namibia on the other hand has been growing at a fast pace for the past few years. The growth in PSCE accelerated at the end of 2006 reaching its highest growth rate of 18.0 % on average since independence and PSCE growth continue to grow at the fast pace and remained in the double digit (Bank of Namibia, 2015).

High PSCE growth reflects a rise in borrowing by both the business and household sectors for the past few years. In 2014, Bank of Namibia increased the repo rate two times within four months and another increase early 2015. These decisions were taken to contain the persistently high growth in household credit, particularly overdraft and instalments credit (Bank of Namibia, 2014). One puzzling question however, is whether by increasing the policy rate to control credit might not hamper economic growth. It is against this background

that the study aims to examine the causal relationship between PSCE and GDP growth (i.e. economic growth) to establish whether there is a unidirectional relationship or if the relations come from both sides.

1.2 Statement of the Problem

The mechanism of private sector credit has an important role in economic growth for financial development. As such, countries with better functioning bank and financial markets grow faster. This is because better financial systems alleviate external financing constraints that may otherwise hinder businesses and industrial growth and expansion (Mishkin, 2007). However, high GDP growth may also increase credit demand thus leading to more credit supply (Martynova, 2015). As such, it raises a causality question between private sector credit and economic growth.

1.3 Objectives of the study

The objective of the study was to examine the causal relationship between private sector credits extended (PSCE) growth and economic growth.

1.4 Research hypotheses

H_0: Private Sector Credit Extended does not Granger cause Economic growth in Namibia.

H_1: Private Sector Credit Extended does Granger cause Economic growth in Namibia.

H_0: Economic Growth does not Granger cause Private Sector Credit Extended in Namibia.

H_1: Economic Growth does Granger cause Private Sector Credit Extended in Namibia.

1.5 Significance for the study

This study is very important knowing the implications for the operations of the central bank and as well as other agents in the monetary sector. For the Bank of Namibia, the focal point being, the rate of growth in Private Sector Credit Extended is one of the operative variables used to inform monetary policy decision and subsequently monetary policy conduct.

1.6 Limitation of the study

Due to data limitations, the study is restricted to the period 2000:Q1 - 2017:Q4. This entails a short sample size, which might affect the robustness of the study in explaining the long run relationship between PSCE and GDP growth.

1.7 Delimitations of the study

This study is restricted solely to the Private Sector Credit Extended to household and businesses in Namibia and does not include credit extended to non-resident sector neither include the microlending sector.

1.8 Structure of the study

This study is organised into six chapters. Chapter one gives an analysis of the research problem, Chapter two provides some economic background information for Gross Domestic Product growth (Y), Private Sector Credit Extended (DC), Lending rates (L) and Broad money supply (M2) on the Namibian Economy. Chapter three reviews the relevant literature on PSCE and economic growth. The data sources and the methodology are discussed in chapter four. The empirical analysis and presentation of results are undertaken in chapter five. Chapter six presents the conclusions.

CHAPTER TWO: AN OVERVIEW OF THE TREND ANALYSIS OF THE VARIABLES

2.1. Introduction

This chapter presents the overview of GDP growth, PSCE, Lending rates and Broad money supply in Namibia. In addition, the chapter focuses on the trend analysis of the variables that were used in the estimation chapter. These variables are: PSCE growth, GDP growth, Lending rates and Broad money supply growth. The chapter is divided into two sections: Section 2.2 presents the overview of Gross Domestic Product growth, Private Sector Credit Extended growth, Lending rates and Broad money supply growth. Section 2.3 concludes the chapter.

2.2. An overview of Gross Domestic Product growth, Private Sector Credit Extended, lending rates and Broad money supply

2.2.1. Gross Domestic Product growth

This section provides an overview of the economic growth rate of Namibia since 2000. Since 2000, the performance of Namibia s' economy fluctuated considerably.

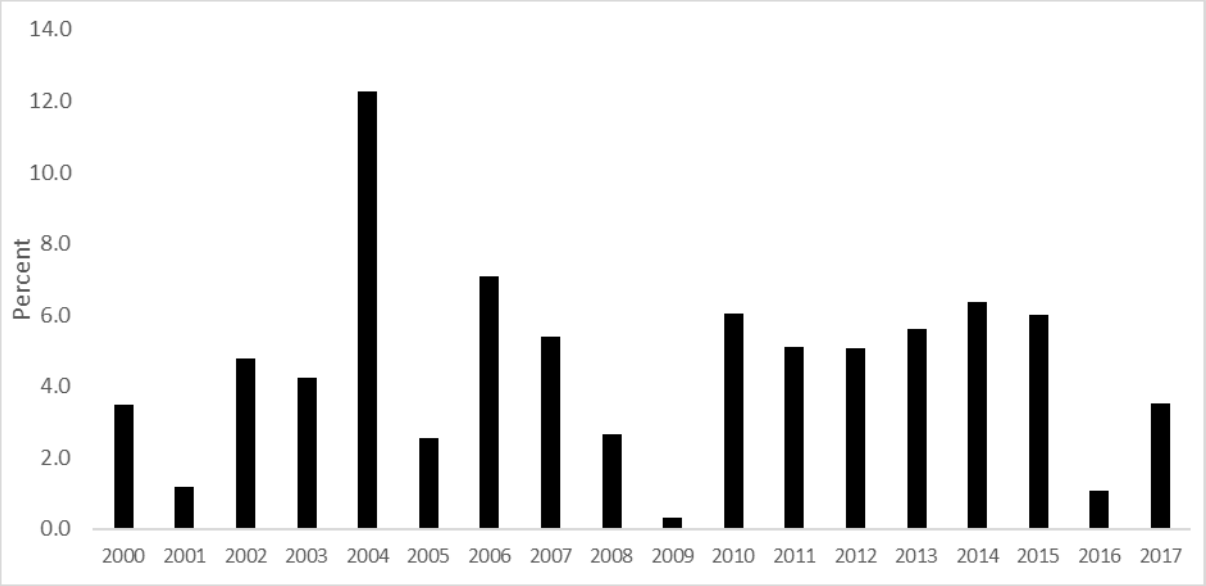


Figure 2.1: Gross Domestic Products growth rates

Source: (NSA, 2018).

Figure 2.1 illustrates the Namibian economic growth rate for the past 18 years with positive economic growth rates equal to a 5% average figure. In 2004 and 2006, the Namibian economy recorded the highest growth rate of 12.3% and 7.1%, respectively. According to the National Accounts (2000-2007), the high growth rates for the year 2004 and 2006 was mainly driven by the diamond-mining sub-sector. In contrast, the years 2001, 2009 and 2016 recorded the lowest growth rates of 1.2%, 0.3%, and 1.1%, respectively. This can be attributed to primary industries which registered a negative growth in 2001 and 2009. Conversely, the main driver of a slow growth in 2016 was the secondary and tertiary industries that both recorded a contraction growth.

2.2.2. Private Sector Credit Extended

Private Sector Credit Extended in Namibia is credit extended to both businesses and household sectors. There are six types of credit categories, which can be either extended to

businesses and household sectors namely: Mortgage loans, Overdraft, Instalment credit, other loans and advances, Leasing and others (Bank of Namibia Annual report, 2015).

Figure 2.2 below depicts the movement trends in respect of Private Sector Credit Extended for Namibia, bearing in mind the driving objective of the study. The average growth in total loans and advances extended to the private sector is about 13.1 percent.

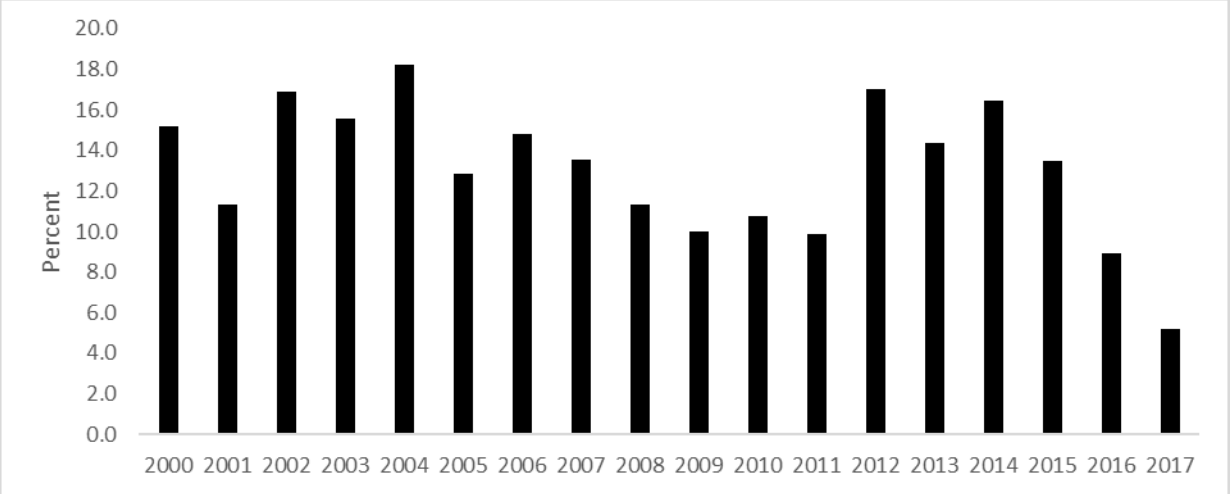


Figure: 2.2: Growths in Private Sector Credit Extended

Source: (BON, 2018)

PSCE recorded the highest growth of 18.3% in 2004. The high growth in PSCE reflects higher demand for credit by both the corporate sector and household sector (Figure 2). In 2005, the growth rate for PSCE declined from 18.3% to 12.8%. There the average growth rate from 2005 to 2011 was about 11.9%, whilst the average growth rate for the last five years (2013-2017) slowed to 11.7%.

The Bank of Namibia pursued a more accommodative monetary policy stance during 2009 as the global economic crisis continued to intensify and spread. Thus, the key policy rate was reduced from 10% in December 2008 to 7% in December 2009. This was mainly informed by subdued domestic demand, reflected in indicators such as the slowing of credit extension by

the banking sector to the private sector as well as a reduction in motor vehicle sales. Although interest rates were reduced during 2009, credit extension to the household sector continued to be depressed (Bank of Namibia Annual report, 2009).

2.2.3. Lending rates (L)

The lending rates are defined as the weighted average of the rates charged by Others Depository Corporations (ODCs) to borrowers. ODCs includes First National Bank of Namibia, Standard Bank of Namibia, Nedbank Namibia, Bank Windhoek, Agribank of Namibia, National Housing Enterprise, Namibia Post Office Savings Bank, and Trustco Bank (Bank of Namibia Annual Report, 2016). Lending rate means the cost of borrowing to households and businesses when they borrowed funds from the commercial banks. Movements in the lending rates depend on the official rate (repo rate), any changes in the repo rate will cause a movement in the lending rate in Namibia.

Figure 3 below illustrates the movement trend in respect of lending rate for Namibia for the period of 18 years.

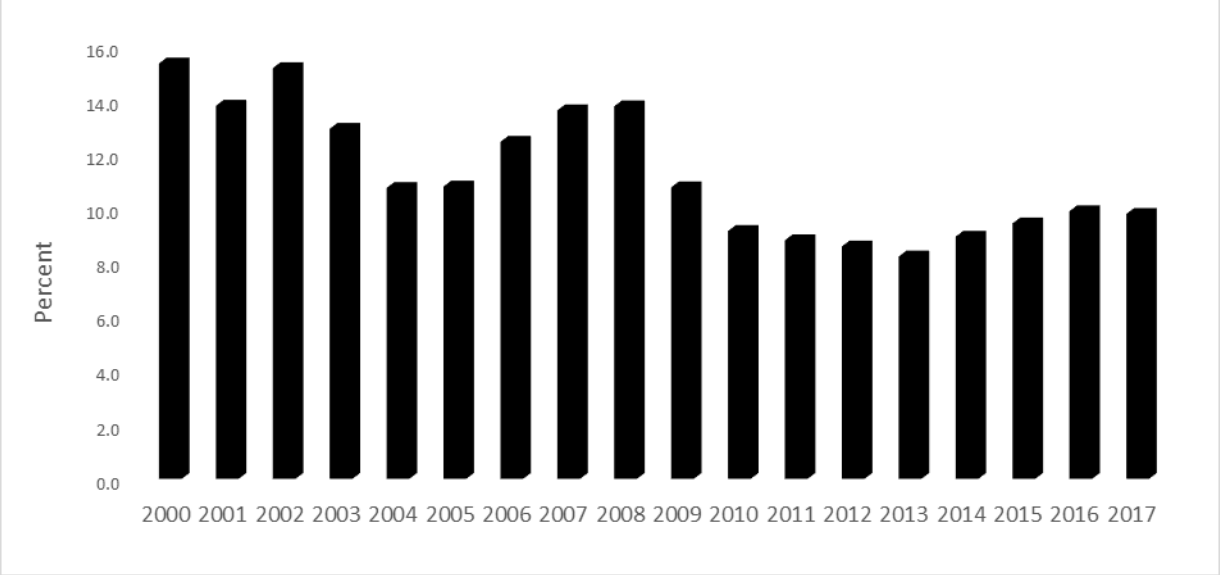


Figure: 2.3: Lending rate

Source: (BON, 2018)

The average lending rate over the 18 years was 11.2%. The highest lending rate was recorded in 2000 and 2002, at 15.3% and 15.2%, respectively. This is in line with the changes in the official rate.

2.2.4. Broad Money Supply (M2)

Broad Money Supply (M2) is defined to include currency outside depository corporations, transferable and other deposits in national currency of the resident sectors, excluding deposits of the Central Government and those of the depository corporations (Bank of Namibia, annual report 2016). The determinants of money supply are the net foreign assets and domestic claims. Domestic claims consist of Private Sector Credit Extended and claims on the central government.Therefore, when domestic claims increased, PSCE is likely to increase.

Figure 2.4 below illustrates the movement trend in respect of Broad Money Supply for Namibia for the period of 18 years.

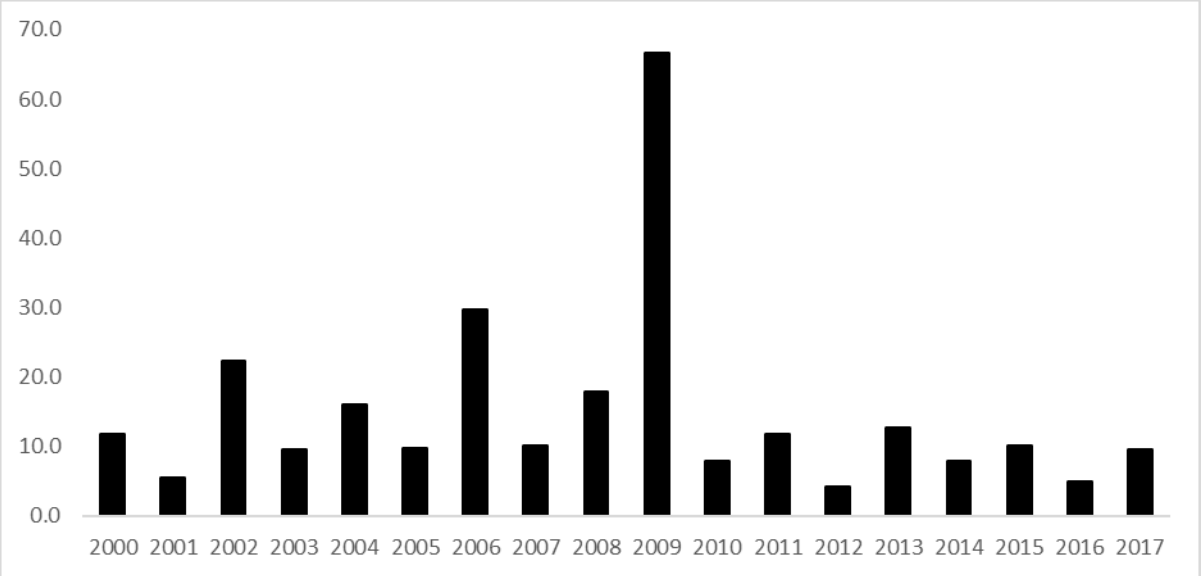


Figure: 2.4: Growth in Broad Money Supply

Source: (BON, 2018).

The average growth in broad money supply over the 18 years was 14.9% on average. The highest growth was recorded in 2009 following the introduction of the money market unit trust. Before 2009, Namibia's definition of Broad money (M2) comprised of narrow money plus other deposits. After careful assessment of money market funds, it was concluded that these instruments possess properties similar to those instruments currently included in the definition of M2. The inclusion was also in line with the IMF Monetary and Financial Statistics Manual (MFSM), which required Money Market Unit trust (MMUs)'s liabilities to be included in M2 because, they were highly liquid, and their value remains stable over a long period of time. The inclusion of money market funds was from 2009, and thus, analysis below was based on two (2) years. Following the inclusion of MMUs, M2 reached a level of N$48.5 billion at the end of 2009, resulting in a growth of 66.0%. As at the end of 2017, the broad money supply registered growth rate of 9.5%. After 2009 the M2 growth was lower on average relative to periods before 2009 and this was in line with global phenomenon, the economy did not perform well after 2009.

2.3. Conclusion

The aim of this chapter was to review the evolution in the growth of the variables to be used in the estimation chapter. The trend analysis indicated that both variables responded to the 2008/9 financial crisis, with the GDP growth and PSCE recording slower growths during this period. Similarly, the lending rate was low during the crisis period. The analysis in this chapter, however, does not show the causal relationship between the variables. Nonetheless, this will be the focus of the fifth chapter of the study.

CHAPTER THREE: LITERATURE REVIEW

3.1. Introduction

This chapter reviews both the theoretical framework and literature on Private Sector Credit Extended (PSCE) and economic growth. It is divided into three sections. Section 3.2 presents the theoretical literature related to the study. Section 3.3 explores the empirical evidence on the subject matter. Section 3.4 provides the summary of this chapter.

3. 2. Theoretical Literature

3.2.1. Economic growth

Richard and Paul (2007) state that economic growth occurs whenever people take natural resources and rearrange them in other behaviours that are more valuable. Truu and Contogiannis (1987) posit that economic growth is concerned with the conditions of achieving the greater productive capacity, which is, expanding the stock of productive factors in the course time. And that the steady growth should mean the rising in the production of goods and services for each head of population in the long term and that means labour and capital are variable rather than fixed. In agreement with the preceding argument is Sherbourne (2010) who strongly agree that sustained economic growth is the most important force for enhancing living standards over the long term in no way implies the unimportance of policies designed to increase economic efficiency or to redistribute income in the pursuit of greater equity. Furthermore, they argued that economic growth reduces inefficiencies that mean that national income could be increased by removing certain inefficiency in the economy and such a gain would be valuable. Economic growth has made the poor better off, this mean that economic growth improves equity.

Fourie and Borgaerde (1991) define economic growth as the rate of increase in gross national product and the real national income. There will be economic growth if there is full employment level of the GDP, growth will come on its own only if employment is utilised to the full. As argued by Richard and Paul (1990), economic growth is the single most powerful engine for generating long-term increases in living standards. What happens to the material living standards over time depends mainly on the growth in real GDP in relation to the growth in population that depend on the growth of real per capita GDP.

The importance of the economic growth as a measure of the economic performance of the country is that an increase in economic growth will leads to economic development. Economic development will not exist without economic growth thus economic development will occur if there is an increase in the GDP per capita, which means an improvement in the position of the average person's living standard in a country. Economic growth improves the standard of living, this means that the basic needs of the people are satisfied, and the citizens of a country may feel higher self-esteem (Ahmad, 2004).

Richard and Paul (2007) strongly agree that sustained economic growth is the most important force for enhancing living standards over the long term in no way implies the unimportance of policies designed to increase economic efficiency or to redistribute income in the pursuit of greater equity. Furthermore, they argued that economic growth reduces inefficiencies that mean that national income could be increased by removing certain inefficiency in the economy and such a gain would be valuable. Economic growth has made the poor better off, this mean that economic growth improves equity.

Solow growth model

The Solow-Swan model was named after Robert (Bob) Solow and Trevor Swan in 1956 and is also referred to as the Solow model. Before the Solow growth model, the most common approach to economic growth was built on the Harrod-Domar model. Harrod-Domar model emphasized potential dysfunctional aspects of growth: e.g., how growth could go together with increasing unemployment. Solow model demonstrated why the Harrod-Domar model was not an attractive place to start (Acemoglu, 2011)

According to Mushendami (2007), the Solow growth model concentrates on explaining the behaviour of potential output, that is output achieved with a given technology and full employment of other factors. The focus is on the effect, over time, of the changes in labour, capital and technology. Changes in labour can be induced by changes in the population or proportion of the people available for work, while changes in capital depend on net investment (gross investment minus depreciation of existing capital). As long as net investment is positive, capital grows, and production growth follows suit. Technology combines the other inputs, labour and capital, to produce output. Therefore, in the absence of changes in one of the two inputs, growth is assumed to come from change in technology. Better technology will thus increase the total factor productivity.

Endogenous growth theory

Endogenous growth theory explains long-run growth as emanating from economic activities that create new technological knowledge. Endogenous growth is long-run economic growth at a rate determined by forces that are internal to the economic system, particularly those forces governing the opportunities and incentives to create technological knowledge. In the long run the rate of economic growth, as measured by the growth rate of output per person, depends on the growth rate of total factor productivity (TFP), which is determined in turn by

the rate of technological progress. The endogenous growth theories relax the exogeneity assumption of the determinants of growth. Endogenous growth models are based on two broad approaches, the first one sees all inputs as reproducible, and the second one is based on externalities (Romer, 2012).

The first version of endogenous growth theory was AK theory, which did not make an explicit distinction between capital accumulation and technological progress. In effect, it lumped together the physical and human capital whose accumulation is studied by neoclassical theory with the intellectual capital that is accumulated when innovations occur (Romer, 2012).

The AK theory was followed by a second wave of endogenous growth theory, generally known as 'innovation-based' growth theory, which recognizes that intellectual capital, the source of technological progress, is distinct from physical and human capital. Physical and human capitals are accumulated through saving and schooling, but intellectual capital grows through innovation. One version of innovation-based theory was initiated by Romer (1990), who assumed that aggregate productivity is an increasing function of the degree of product variety. In this theory, innovation causes productivity growth by creating new, but not necessarily improved, varieties of products.

3.2.2. Private Sector Credit extended

Credit is an important aspect of financial intermediation that provides funds to those economic entities that can put them to the most productive use. Theoretical studies have established the relationship that exists between financial intermediation and economic growth (Yakubu and Affoi, 2013).

According to Central bank of Malta (2017), economic development was considered to be influenced by credit activity and the capacity of firms to access finance. This influence can be easily seen on the financial crisis which highlighted the need to understand and monitor macro-financial linkages. Considering the role that the banking sector had in propagating the initial shock to macroeconomic activity in several countries, the provision of funding to the non-financial private sector was impaired by the need of banks to reinforce their capital and liquidity. Furthermore, a higher credit level would have also elevated government consumption.

Gerber (2009) defined credit as the money from the lender to the borrower. Spencer (1977) noted that credit implies a promise by one party to pay another for money borrowed or goods and services received. Credit cannot be divorced from the banking sector as banks serve as a conduit for funds to be received in form of deposits from the surplus spending unit of the economy and passed on to the deficit spending units who need funds for productive purposes. Banks are therefore debtors to the depositors of funds and creditors to the borrowers of funds. Bank credit is the borrowing capacity provided to an individual, government, firm or organization by the banking system in the form of loans. Credit channels savings into productive investment thereby encouraging economic growth. Thus, the availability of credit allows the role of intermediation to be carried out, which is important for the growth of the economy.

Innes (1914) stated that the Credit Theory of a sale and purchase is the exchange of a product/service for credit. From this main theory springs the sub-theory which states that, the value of credit does not depend on the value of any metal or metals, but on the right which the creditor acquires to "payment," that is to say, to satisfaction for the credit, and on the obligation of the debtor to "pay" his debt and conversely on the right of the debtor to release himself from his debt by the tender of an equivalent debt owed by the creditor, and the obligation of the creditor to accept this tender in satisfaction of his credit.

The Fisher's theory of demand for bank credit

Fischer's theory as cited in Ssebatta (2015) majorly concentrates on household behaviour and suggests that the demand for credit by individuals originates from the initiative to maximize utility. The theory assumes that an individual's permanent income as a reward to labour hours is given and can be influenced only by borrowing and lending. In addition, Fischer claims that an individual will attempt to maximize utility by choosing a higher indifference curve. As such, an individual will combine the present income with a higher future income and on other hand, future income with a higher present income.

The Post-Keynesian theory of Demand for Bank Credit

Post Keynesian Economics was established by an economist from Cambridge, who attempted to cover Keynes economic ideas and philosophy around 1980s. Post-Keynesians assumes that the central banks act as lenders of last resort by providing funds to commercial banks for onward lending at a given interest rate which is usually lower than the prevailing market rate. Post-Keynesian theory further notes that when central banks predict a healthier economy, they will reduce the policy rate and in turn, commercial banks reduce the prime lending rate as a result stimulating borrowing (Gedeon, 1986).

The positive link between credit and economic growth is clear and it is evident by these theories.

3.3. Empirical studies

Numerous studies have empirically looked at the relationship between credit and economic growth. Mushendami (2007) analysed the relationship between financial development and economic growth in Namibia. Quarterly data was used covering the period quarter 1, 1993 to quarter 4, 2005 or a total of 53 time series variables. The study employed the method of cointegration test and the error correction modelling (ECM). The results indicated that the direction of causality runs from the financial development variables to economic growth. This implies that the development of the financial sector in Namibia has a positive effect on economic growth as the theory suggests.

Mishra and Pradhan (2009) examined the direction of causality between credit market development and the economic growth in India from 1980 to 2008. The study employed a VAR framework to determine the direction of causality between credit market development and the economic growth. The ADF unit root test revealed that the variables used in the study were stationary in their second differences. The Johansen test suggested the long-run equilibrium relationship between the variables of credit market development and economic growth. Furthermore, Granger causality test evident that credit market development spurs economic growth. The study further indicated that there was a positive effect of economic growth on credit market development in India.

Sindano (2009) determined the causal relationship between financial development and economic growth in Namibia. Quarterly data was used from 1993 to 2007. The study employed a cointegration and vector error correction model (VECM) technique to test for existence of long run relationship between the variables. Granger causality test was applied to

the variables to test for the direction of causation between variables. The result showed that there was a stable long-run relationship between financial development and economic growth. The Granger causality test indicated that the causality runs from economic growth to financial development. The results also suggested that the real sector of the economy should be developed further to stimulate development in the economy through policy interventions like industrial development to diversify the economic base, enhance the performance of small and medium enterprises, and, enhance the performance of the tourism sector which has a great potential in promoting growth.

Omar (2011) examined the determinants of domestic credit to private sector (DCPS) in Pakistan over the period from 1980 to 2009. The relationship was determined using Johansen and Juselius's framework and NLS and ARM based error correction model to complete the long run and short run relationship analysis. It showed that DCPS has no relationship with economic growth in Pakistan.

Akpansung and Babalola (2011) investigated the relationship between banking sector credit and economic growth in Nigeria over the period 1970-2008. The causal links between the pairs of variables of interest were established using Granger causality test while a Two-Stage Least Squares (TSLS) estimation technique was used for the regression. The results of the analysis indicate that private sector credit impacts positively on economic growth over the period of coverage in this study. However, lending rate impedes growth.

Yakubu and Affoi (2013) examined the impact of the commercial banks credit on economic growth in Nigeria from 1992 to 2012. Simple regression model was used in the study for data analysis. Based on the findings of the study, it was observed that bank credit has impacted significantly on the growth of the Nigerian economy. Bank should continue to give credit to

the private sector of the economic as it is contributing significantly for the growth of GDP in Nigeria.

Haruna et al., (2013) analysed the relationship between private sector credit and economic growth in Nigeria, using time series data for the period of 37 years (1974-2010). The study used Autoregressive Distributed Lag (ARLD) bound F-test for cointegration. The results indicated that a long run equilibrium relationship exists between private sector credit and economic growth, when private sector credit was used as dependent variable. However, causality results indicated that there is no causal relationship between private sector and economic growth in Nigeria.

Shijaku (2013) focused on identifying and evaluating the long run determinants of bank credit to the private sector in the case of Albania using a Vector Error Correction Mechanism (VECM) approach based on demand and supply indicators. The study used quarterly data from 2001 Q1 to 2011 Q4. Estimations indicated that an adjustment mechanism existed, bringing bank credit back to equilibrium. The results implied that lending is positively linked to economic growth.

Ogbokor (2014) investigated the determinants of commercial banks credit by the Business Sector in Namibia. The study relied upon co-integration and error correction procedures in carrying out the investigation. Annual time series data for the period running from 1993 to 2010 was used in the study. The key findings arising from the study were: firstly, the demand for bank credit in Namibia responds more to factors other than real interest rate; Secondly, the neoclassical theory, which postulates that real interest rates have significant dampening impact on credit decisions, does not hold water in the case of Namibia.

Sassi (2014) studied the Credit Markets Development and Economic Growth: Theory and Evidence. GMM dynamic panel data estimation was used of 27 European's countries over

the period 1995-2012 using a second-order Taylor expansion method. Empirical results produced evidence that supported the predictions: Credit market promotes economic growth by lending to productive enterprises whereas consumer credit has a significant negative effect on real-economy performance. The findings provided a missing piece of the credit-growth puzzle. The positive effect of investment credit market is dampening by the reverse relationship between consumer credit market and economic growth.

Shifotoka (2014) analysed the macroeconomic determinants of banking sector development in Namibia. The study used quarterly data for Namibia covering the period of 2000: I to 2011: IV. The indicator that was used to represent banking sector development was the ratio of credit extended to the private sector by the banks to gross domestic product (GDP). The study used the autoregressive distributed lag model (ARDL) for the analysis. The main result from the study was that a long run relationship exists between the variables.

Emecheta and Ibe (2014) investigated the impact of bank credit on economic growth in Nigeria and applied the reduced form of vector autoregressive (VAR) technique using time series data from 1960 to 2011. The gross domestic product (GDP) was used as the dependent variable and proxy for economic growth while bank credit to the private sector (CPS) to GDP ratio and broad money (M2) to GDP ratio were proxies for financial indicator and financial depth respectively. They tested the Stationarity of the variables using the Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests. Variables were all integrated of order one i.e., I (1). The study found that there was a significant positive relationship between bank credit to the private sector, broad money and economic growth.

Ssebatta (2015) investigated the determinants of commercial banks' credit to private sector in Uganda. The study used a times series data covering the third quarter of 1997 to the fourth quarter of 2013. Private sector credit was used as a dependent variable, whilst the real

economic growth, credit to government, foreign liabilities and domestic deposits were identified as the potential explanatory variables. The Engle and Granger two-step estimator technique was used and found the long run relationship to exist between private sector credit and independent variables.

Belinga and Doumbe (2016) examined the causal relationship between bank credit and economic growth in Cameroon by considering the domestic credit to the private sector by banks and bank deposit (BD) as proxies for bank credit development and gross domestic product per capita for economic growth. The study used time series data running from 1969 - 2013 using various econometric techniques such as Stationarity test Augmented Dickey Fuller (ADF) and Johansen Multivariate Co-Integration Test. To analyze the relationship between bank credit and economic growth, Vector Error Correction Model (VECM) technique was employed. The outcome of VECM indicated that there is a unidirectional causal relationship flowing from domestic credit to the private sector and Bank deposits to economic growth.

Eddien (2016) analysed the relationship between bank credit and economic growth in Jordan from 1993 to 2014. The study used two different methods Vector Error Correction Model (VECM) and Granger causality Test. The results reported for a long run relationship that inferred between Real GDP, and its independent variables of Total Bank Credit (TBC); Bank Credit to Agriculture sector (CFA); Bank Credit to Industry sector (CFI); Bank Credit aimed at Construction sector (CFC); Bank Credit to Tourism sector(CFT). The study suggested that TBC, CFA, CFI, CFC, and CFT were in the long-term relationship with the development of Jordanian economy. Granger causality test concluded for a causal relationship going from economic growth to bank credit at agriculture and construction sectors in Jordan economy. Moreover, the bi-directional causality was witnessed between economic development and bank credit. In addition, the findings pointed out that the efficiency of the bank credit

facilities in major economic sectors has an important role in the Jordanian economic growth and indicated the needs to enhance the role of financial sector for different economic sectors by adopting more appropriate macroeconomic policies.

Okafor, Chijindu and Ugochukwu (2016) assessed the causal relationship between bank credit and economic growth in Nigeria from 1981-2014. The technique of analysis employed was the Vector autoregressive (VAR) Granger causality test. The proxied variables, real gross domestic product (RGDP), private sector credit (PSC) and broad money supply (M2) were subjected to preliminary tests while a validity test of serial autocorrelation was also conducted on the residuals of the variables. A unidirectional causality was found running from private sector credit and broad money supply to economic growth as measured by real gross domestic product (RGDP), whilst there was no feedback system from RGDP to either PSC or M2. In other words, RGDP was neither Granger causal for PSC nor M 2. This findings confirmed the significance of financial development to economic growth. In addition, banking system credit is therefore critical for the growth of the economy.

Puryan (2017) investigated the causal relationship between economic growth, banking sector development, and stock market development (SMD) in selected Middle-East and North African (MENA) countries for the period 1988-2012. The study used four indexes for each sector using decomposition method for principle components to measure development of banking and stock market sectors. Granger causality was used to test causal relationship between economic growths, banking sector and SMD, based on vector auto regression of error correction. The results of the study indicated that there is a one-way causal relationship from banking sector development toward economic growth, a mutual causal relationship between SMD and economic growth, and a one-way causal relationship from banking sector development toward stock market. Furthermore, there was a long run positive effect between SMD and economic growth.

Mushongo and Sheefeni (2017) examined the determinants of commercial banks' credit extension to the private sector in Namibia using monthly data running from 2005:M1 to 2015:M12. The study employed the Engle-Granger two step procedures to conduct an econometric analysis on the identified macroeconomics determinants of bank credit to the private sector. It found that a positive, however statistically insignificant relationship between prime lending rate and private sector credit extended. In addition, inflation was found to have a positive, but was statistically insignificant between PSCE. On the other hand, the study found the exchange rate to be negative but statistically significant relationship with bank credit both in the short-run and long-run.

Lessons learnt

There are lessons to be learnt from these studies, even though there were differences in terms of the techniques used. The techniques used in these studies are as follow: Simple regression, Two-Stage Least Squares, Error Correction Model, Vector Error Correction Model and Autoregressive Distributed Lag Model. Most studies used the time series data with the exceptional of the study by Sassi (2014) that used the panel data. There seem to be no study on Namibia that has specifically looked at causality but rather looked more on the determinants of PSCE. Hence, this study is the first of its kind to fill the literature gap. To summarise, the studies by Mishra and Pradhan (2009), Belinda and Doumbe (2016), Okafor, Chijindu and Ugochukwu (2016), and Puryan (2017) both support unidirectional causality from PSCE to economic growth. Whilst a study by Eddien (2016) was the only one that found causality from economic growth to PSCE. On the other hand, Omar (2011) and Haruna et al (2013) found no causality between economic growth and Private Sector Credit Extended.

3.4. Conclusion

This chapter presented information on the literature. The literature reviews on economic growth and PSCE were collected and relevant information's were obtained. In the case of Namibia, the literature on the relationship between the PSCE and Economic growth rate is very limited. The studies that come close to this topic are those by Mushendami (2007), Sindano (2012), and Mushongo and Sheefeni (2017). Although these studies did not directly study the relationship between the two variables, they give an insight into the factors that play a role in widening or narrowing the gap between these two variables.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents a discussion of the methodology used in the study in separate sections. Section 4.2 outlines the econometric framework and model specification. Section 4.3 presents the data measurements and data source, and Section 4.4 concludes the chapter.

4.2 Econometric Framework and Model Specification

In examining the causal relationship between Private Sector Credit Extended and Economic growth in Namibia, the study followed Akpansung and Babalola (2011) in testing the causal relationship between PSCE and Economic growth. The existence of such a relationship were explored by executing the following three-step procedure:

The study used the time series data that will be subject to non-stationary, unit roots test was employed to test for stationary of the variables by employing tests developed by Augmented Dickey-Fuller (ADF) and Philips and Peron (PP). The study engaged a cointegration test on the different variables used to examine a long run and short run relationships. Variables were cointegrated thus the VECM model was used. Given that the results, Granger causality test was performed lastly to establish the direction of the relationship between variables used. That is if there is cointegration there must be Granger causality in at least one direction.

The variables employed in the study were: GDP growth (Y), PSCE growth (Dc), lending rate (L) and Broad money supply. Thus, the VECM model was specified as follows:

$$Y_t = \beta_{10} + \sum_{i=1}^{k} \beta_{11,i} Y_{t-i} + \sum_{i=1}^{k} \beta_{12,i} Dc_{t-i} + \sum_{i=1}^{k} \beta_{13,i} L_{t-i} + \sum_{i=1}^{k} \beta_{14,i} M2_{t-i} + \theta W_t + \xi_{1t} \quad \dots (4.1)$$

$$Dc_t = \beta_{20} + \sum_{i=1}^{k} \beta_{21,i} Y_{t-i} + \sum_{i=1}^{k} \beta_{22,i} Dc_{t-i} + \sum_{i=1}^{k} \beta_{23,i} L_{t-i} + \sum_{i=1}^{k} \beta_{24,i} M2_{t-i} + fW_t + \xi_{2t} \dots (4.2)$$

4.2.1 Unit Roots tests

Unit root tests can be used to determine; if trending data should be first differenced or regressed on deterministic functions of time to render the data stationary. A time series data is considered to be stationary if the mean and variance are constant over time and the value of the covariance between the two time periods depends only on the distance or lag between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2013). However, if the mean and variance change in samples for different time spans then, this type of variable is known as non-stationary variables.

Since most financial data are non-stationary and use of non-stationary data may generate spurious or nonsensical results and poor forecasts, prior to estimation, the researcher subjected the data to numerous tests to establish their adequacy with regard to stationarity. Although there are number of tests for stationary, the study used the most popular unit root test. The Augmented Dicker-Fuller (ADF) and Philips Peron (PP) statistics was applied to test the stationary or non-stationary of the variables and their order of integration.

The purpose for unit root test is to examine for data generating process specifically:

1) Pure random walk

$$\Delta y_t = \delta y_{t-1} + \sum_{t-1}^{p} \alpha_t \Delta y_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4.3$$

In this equation there is no intercept and no time trend times.

2) Random walk model with drift

$$\Delta y_t = \propto + \delta y_{t-1} + \sum_{t-1}^{p} \alpha_t \Delta y_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4.4$$

Random walk with drift meaning intercept and no time trend. The significance of the random walk model is that many economic time series follow a pattern that resembles a trend model. In addition, if two time series are independent random walk processes then the relationship between the two does not have an economic meaning.

3) Random walk with drift and time trend

$$\Delta y_t = \propto + \gamma t + \delta y_{t-1} + \sum_{t-1}^{p} \alpha_t \Delta y_{t-1} + \varepsilon_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4.5$$

The number of lagged difference terms to include is often determined empirically, the idea being to include enough terms so that the error term is serially uncorrelated (Gujarati, 2013).

The study conducted the PP test which is very comparable to the ADF test. The main reason the study conducted a PP test was because the ADF test loses power for sufficiently large values of p, the number of lags. The PP test comprised of an automatic correction to the Dickey-Fuller process for auto-correlated residual. The PP test is a more complete theory of unit root non-stationarity (Skerman and Maggiora, 2009). The regression is as follows where u_t is serially correlated:

$$Y_t = b_0 + b_1 y_{t-1} + u_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots 4.6$$

4.2.2. Testing for Cointegration

Co-integration deals with the relationship among a group of variables, where, unconditionally each has a unit root. Two variables will be co-integration if they have a long-term, or equilibrium, relationship between them. If two variables are co-integrated, any linear combination of them will be non-stationary and therefore, the εt will also be stationary. A test for co-integration can be thought of as a pre-test to avoid spurious regression situations, (Gujarati, 2013). If there is co-integration among variables, Vector Error Correction Model

(VECM) is used because it deals with long run relationship among variables and if there is no co-integration then the Vector Autoregressive (VAR) model is used as it has to do with the short run relationship among variables. To test for cointegration, this study used the Johansen procedure, which was based on a vector auto regression (VAR) framework.

4.2.3. Testing for VAR Stability

According to Pfaff (2008) one important characteristic of a VAR (p)-process is its stability. This means that it generates stationary time series with time invariant means, variances and covariance structure, given sufficient starting values. One can check this by evaluating the characteristic polynomial:

$$det(I_K - A1z - \ldots - A_p z^p) \neq 0 \ for \ |z| \leq 1 .$$

The characteristic polynomial is defined as:

$$\Pi(z) = (I_n - A_1 z - A_2 z^2 - \ldots.)$$

If the solution of the above equation has a root for z = 1, then either some or all variables in the VAR (p)-process are integrated of order one, i.e., I (1). It might be the case, that cointegration between the variables does exist.

For a set of n time series variables $y_t = (y_{1t}, y_{2t,} \ldots, y_{nt})'$, a VAR model of order p (VAR(p)) can be written as:(1) $y_t = A_1 y_{t-1} + A_2 y_{t-2} + \ldots + A_p y_{t-p} + u_t$ where the A_i's are (nxn) coefficient matrices and $u_t = (u_{1t}, u_{2t}, \ldots, u_{nt})'$ is an unobservable i.i.d. zero mean error term. The necessary and sufficient condition for stability is that all characteristic roots lie outside the unit circle. Then Π is of full rank and all variables are stationary.

4.2.4. Determination for Optimal Lag Length

The lag length for the VAR (p) model may be determined using model selection criteria. The general approach is to fit VAR (p) models with orders p = 0, pmax and choose the value of p which minimizes some model selection criteria. Model selection criteria for VAR(p) models have the form IC(p) = ln |Σ˜(p)| + cT · ϕ(n, p) where Σ˜(p) = T −1 PT t=1 ˆεtˆε0 t is the residual covariance matrix without a degrees of freedom correction from a VAR(p) model, cT is a sequence indexed by the sample size T, and ϕ(n, p) is a penalty function which penalizes large VAR(p) models (Fossati:2004).

4.2.5. Causality Tests

Testing causality among variables is one of the most significant and, yet, one of the most challenging issues in economics. Granger (1969) stated that it is difficult to decide the direction of causality between related variables. Granger causality test is considered a useful technique for defining whether one time series is good for forecasting the other variable. Granger causality test can be applied in different situation and these comprise of;

1) A simple bivariate Granger causality where there are two variables and their lags.
2) A multivariate Granger causality where more than two variables are considered and it is most applicable where more than one variable can influence the results.
3) Granger causality can also be tested in a Vector Autoregressive (VAR) framework where a multivariate model is extended to test for simultaneity of all included variables.

One of the main uses of VAR models is forecasting. The structure of the VAR model provides information about a variable's or a group of variables' forecasting ability for other variables. If a variable, or group of variables, Y_1 is found to be helpful for predicting another

variable, or group of variables, Y_2 then Y_1 is said to Granger-cause Y_2 (Emecheta and Ibe, 2014).

4.3. Data measurements and Data sources

The study utilizes quarterly time series data, which cover the period 2000:Q1-2017:Q4. The variables are: Gross Domestic Product growth rate (Y), Private Sector Credit Extended growth rate (Dc), Lending rate (L) and Broad money supply (M2). The data is obtained from the annual and quarterly reports of the Bank of Namibia and national Accounts from Namibia Statistics Agency.

4.4. Conclusion

To conclude, this chapter considered the data issues and the methodological aspect to carry out the investigation of the causal relationship between Private Sector Credit Extended and Economic Growth in Namibia. The tests that were conducted are as follows: Unit roots (ADF and PP test), VAR stability, autocorrelation test, determination for optimal Lag Length, cointegration test (Johansen test based on the trace and Maximum Eigen Values) and finally the Granger causality test was conducted to determine the causal relationship between variables.

CHAPTER FIVE: EMPIRICAL RESULTS AND FINDINGS

5.1. Introduction

This chapter presents the empirical analysis of the study and the results in two separate sections. Section 5.2 present the empirical analysis and section 5.3 provide the summary of the chapter.

5.2.1. Unit Root Test

Examining the causal relationship between Private Sector Credit Extended and Economic growth in Namibia is estimated using the Vector Autoregressive (VAR) framework. The initial step in employing the Johansen Cointegration technique is to establish the order of integration of the series by conducting unit root test to determine the existence, or not, of unit roots in the series. The Augmented Dicker-Fuller (ADF) and Philips Peron (PP) statistics was applied to test the stationary or non-stationary of the variables and their order of integration. Both trend and intercept were included in the test equations for all the variables using the two test types. The table below summarized the results and all estimations were carried out following the instructions required to use E-views 7.

Table 5.1: Unit root tests: ADF and PP in levels and first differences

Variable	Model specification	ADF Levels	PP Levels	ADF First difference	PP	Order of integration
Y	Intercept and Trend	-6.565**	-6.688**	-7.116**	-20.736**	0
	Intercept	-6.545**	-6.667**	-7.128**	-20.752**	0
DC	Intercept and Trend	-2.069	-5.013**	-7.034**	-13.053**	1
	Intercept	-1.338	-4.378**	-6.966**	-13.026**	1
L	Intercept and Trend	-1.730	-1.896	-7.312**	-7.314**	1
	Intercept	-1.726	-1.726	-7.265**	-7.275**	1
M2	Intercept and Trend	-3.526**	-3.660**	-8.439**	-8.455**	0
	Intercept	-3.486**	-3.619**	-8.501**	-8.519**	0

Source: Author's computation and values obtained from E-views

*Note: ** represent stationary at 5 percent level*

Table 5.1 indicates that the series were found to be non-stationary in level form, except for economic growth (Y) and money supply whose results were found to be stationary in level form. After differencing data, the unit roots show that the series became stationary and integrated of order 1. The concept of being stationary or not containing unit root implies that the variables has zero mean, constant variance and the residuals uncorrelated over time.

According to Enders (2010) variables are only differentiated if they are not cointegrated so that they can be deemed fit to enter the VAR. Since all the variables in this study are cointegrated it is not necessary to differentiate them, they can enter the unrestricted VAR.

5.2.2. Cointegration test

Table 5.2: Johansen Cointegration Test Based on Trace and Maximum Eigen Values

Trace Test				**Maximum Eigen Test**			
Ho: rank=r	Ha: rank=r	Statistic	95% critical value	Ho: rank=r	Ha: rank=r	Statistic	95% critical value
r=0	r=0	52.84942	47.85613	r=0	r=0	23.49176	27.58434
r<=1	r<=1	29.35767	29.79707	r<=1	r<=1	19.87389	21.13162
r<=2	r<=2	9.483773	15.49471	r<=2	r<=2	6.252884	14.26460
r<=3	r<=3	3.230889	3.841466	r<=3	r<=3	3.230889	3.841466

Note: Trace test indicate one (1) integrating equations at 5% level whilst Max-eigenvalue test indicates no cointegration at the 0.05 level.

Source: Author's computation and values obtained from E-views

Note: If Trace values are less than Critical values – No Cointegration. Accept Null Hypothesis.

If Max-Eigen values are less than Critical values – No Cointegration. Accept Null Hypothesis

Table 5.4 presents the results for the Johansen Cointegration test based on trace and maximum eigen value statistics. Trace test shows that there is one integrating equation while

Max-eigenvalue test shows no cointegration at the 0.05 level. Given the conflict between the two tests, the study considered the trace test because it is measured to be more powerful. The trace test statistics are greater than the critical values hence, rejecting the null hypothesis of no cointegration of variables at 5% and concluding that there is cointegration. Thus, the study used the VECM model.

5.2.3. VAR Stability

Testing for stability in levels indicated that the VAR is stable in levels, (as can be seen in the graph and table) all the dots lie inside the unit circle. This indicates the VAR in level form satisfies the stability condition.

Table 5.2.1: VAR Stability

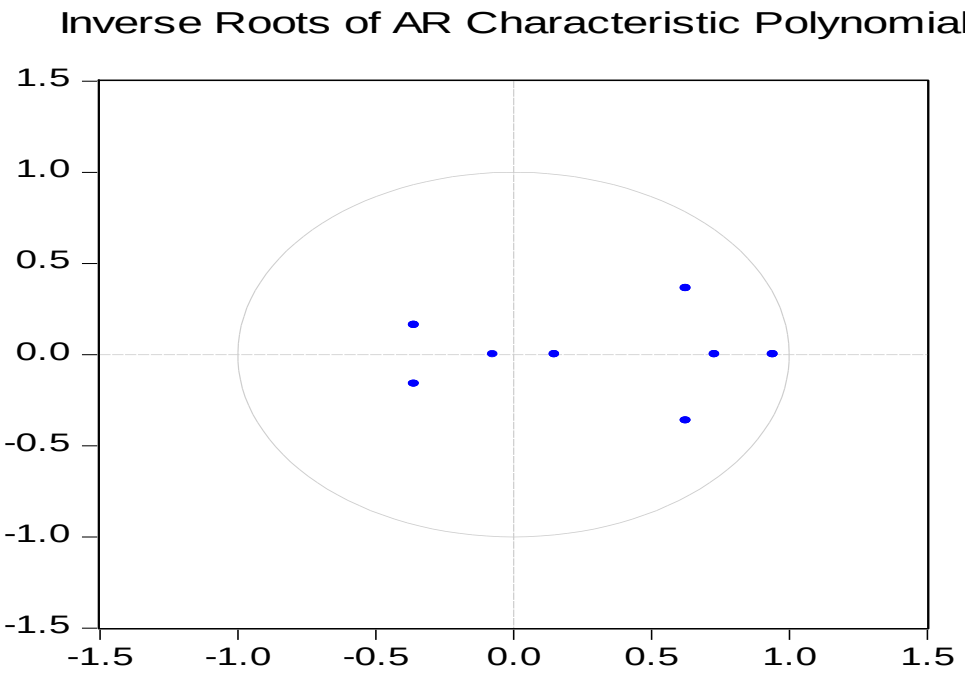
Root	Modulus
0.942982	0.942982
0.731189	0.731189
0.626062 - 0.363505i	0.723940
0.626062 + 0.363505i	0.723940
-0.359277 - 0.161669i	0.393976
-0.359277 + 0.161669i	0.393976
0.151587	0.151587
-0.072956	0.072956

No root lies outside the unit circle.

VAR satisfies the stability condition.

Source: Author's computation and values obtained from E-views

Figure 5.3.2: Inverse Roots of AR Characteristic Polynomial



Source: Author's computation and values obtained from E-views

5.2.4. Determination for Optimal Lag Length

The optimal number of lag to be included in the VAR was also determined from the level form VAR and the results are presented in Table 5.3 below.

Table 5.4: Lag Length Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-787.2629	NA	304420.7	23.97766	24.11037	24.03010
1	-665.5166	225.0463	**12368.22***	**20.77323***	**21.43676***	**21.03542***
2	-652.0457	23.26786	13429.39	20.84987	22.04423	21.32182
3	-642.4531	15.40633	16537.60	21.04403	22.76922	21.72574
4	-622.3467	**29.85497***	14996.38	20.91960	23.17561	21.81105
5	-608.1387	19.37450	16546.36	20.97390	23.76073	22.07511
6	-594.4098	17.05719	18959.48	21.04272	24.36038	22.35369

*Note: * implies selection of optimal lag length.*

Source: Author's computation and values obtained from E-views

Table 5.3 shows the results for lag length structure and the convergence lag length suggested by the lag length criterion is one. This is because the Granger causality is sensitive to the lags to be included.

5.2.5. Diogonastics tests

Autocorrelation tests

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 06/26/18 Time: 13:10
Sample: 2000Q1 2017Q4
Included observations: 69

Lags	LM-Stat	Prob
1	21.30567	0.1671
2	17.99325	0.3243

Probs from chi-square with 16 df.

It is evident from the results presented below for autocorrelation test that the study failed to reject the null hypothesis and concluded that there is no serial correlation at lag order h..

Heteroscedasticity test

Null Hypothesis: No Heteroskedasticity

VEC Residual Heteroskedasticity Tests: No Cross Terms (only levels and squares)

Date: 07/20/18 Time: 20:30

Sample: 2000Q1 2017Q4

Included observations: 69

Joint test:

Chi-sq	df	Prob.
185.5598	180	0.3725

Individual components:

Dependent	R-squared	F(18,50)	Prob.	Chi-sq(18)	Prob.
res1*res1	0.302205	1.203018	0.2948	20.85218	0.2869
res2*res2	0.183731	0.625238	0.8623	12.67741	0.8104
res3*res3	0.352397	1.511541	0.1256	24.31536	0.1450
res4*res4	0.142442	0.461396	0.9629	9.828528	0.9374
res2*res1	0.270409	1.029530	0.4460	18.65822	0.4131
res3*res1	0.166270	0.553971	0.9150	11.47265	0.8732
res3*res2	0.262879	0.990640	0.4851	18.13869	0.4466
res4*res1	0.191000	0.655816	0.8360	13.17900	0.7808
res4*res2	0.327538	1.352983	0.1977	22.60015	0.2064
res4*res3	0.329347	1.364125	0.1916	22.72497	0.2014

Based on the result presented above, the study fail to reject the null hypothesis and concluded that there is no heteroskedasticity.

Normality test

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 07/20/18 Time: 20:00
Sample: 2000Q1 2017Q4
Included observations: 69

Component	Skewness	Chi-sq	df	Prob.
1	0.012144	0.001696	1	0.9672
2	-0.279397	0.897723	1	0.3434
3	-1.209397	16.82036	1	0.0000
4	1.587245	28.97247	1	0.0000
Joint		46.69226	4	0.0000

Component	Kurtosis	Chi-sq	df	Prob.
1	3.936289	2.520333	1	0.1124
2	11.42003	203.8285	1	0.0000
3	5.016650	11.69227	1	0.0006
4	9.104343	107.1311	1	0.0000
Joint		325.1722	4	0.0000

Component	Jarque-Bera	df	Prob.
1	2.522029	2	0.2834
2	204.7262	2	0.0000
3	28.51263	2	0.0000
4	136.1036	2	0.0000
Joint	371.8645	8	0.0000

Since the P-value is greater the level of significance (0.05), the study fail to reject the null hypothesis and concluded that residuals are multivariate normal.

The study tested for stability of the model and no roots lies outside the unit cicrle. Therefore, a model which passes the residual test, and is stable, can be used in analyses and forecasting.

5.2.6. Granger causality

One of the main uses of VAR models is forecasting. The structure of the VAR model provides information about a variable's or a group of variables' forecasting ability for other variables. If a variable, or group of variables, Y_1 is found to be helpful for predicting another

variable, or group of variables, Y_2 then Y_1 is said to Granger-cause Y_2 (Emecheta and Ibe: 2014).

Table 5.6: Granger Causality test

Regressor	Dependent Variable in Regression			
	Y	**DC**	**L**	**M2**
Y	-	0.3557	0.6754	0.4127
DC	0.0012**	-	0.7242	0.9249
L	0.6499	0.9506	-	0.0455
M2	0.0010**	0.0735	0.0997	-

Source: Author's computation and values obtained from E-views

*Note: ** represent 5 percent level of significance*

Table 5.5 summarizes the Granger causality results for the three variables. The results show that PSCE can help to predict the GDP. Similarly, M2 can help to predict GDP.

PSCE and Economic growth: This means that Private Sector Credit Extended can help to predict economic growth in Namibia. The possible explanation could be that when PSCE increased, this an indication of high spending in the economy and thus contributing positively to the economy. Although high demand for Private Sector Credit extended has positive impact on the economic growth, it is a concern in Namibia because this high demand for PSCE emanated from the household sector and these can become a problem. These results are similar to the findings of the study by Emechata and Ibe (2014), that there is an un-directional causal relationship between the PSCE and GDP.

M2 and Economic growth: The result indicated that Broad Money Supply could help to predict the economic growth. As it was stated earlier in the chapter that the determinant one of the determinant of money supply is domestic claims, domestic claims include the claims on the sectors (this include PSCE) and claims on central government. Therefore, any movement in the broad money can only be caused by; either changes in domestic claims or net foreign assets. This means that for instance if M2 growth increases in due to domestic claims this is an indication that economic growth increases too and vice versa.

The results revealed that there is no causality between Economic growths and lending rates and vice versa as well as between Lending rates and PSCE.

Conclusion

The aim of the chapter was to establish the relationship between Economic growth (Y), PSCE lending rates and M2. The results indicate that variables have a stable long run relationship, with GDP being the dependent variable and the rest, the Regressors. The results further indicate that there is un-directional relationship between Private Sector Credit Extended and Money supply with the economic growth.

CHAPTER SIX: GENERAL CONCLUSIONS AND POLICY RECOMMENDATIONS

6.1. Introduction

This chapter present the general conclusions and policy recommendation of the study in two separate sections. Section 6.2 provide some conclusions and discuss the implications of the findings of the study. Section 6.3 gives policy recommendations and proposed further studies following the research findings.

6.2. General Conclusions

This study examined the causal relationship that exists between Private Sector Credit Extension and Economic growth in Namibia using quarterly data from 2000-2017 in a Vector Auto Regressive (VAR) model. Data analysis techniques tend to give complex results and as such to avoid incidence of spurious regression results, the basic steps involved in analyzing time series data in E-views is implemented. The study employed a cointegration on the different variables used to examine a long run and short run relationships. Granger causality test was the last test to establish the direction of the relationship between variables used.

The results indicate a stable long run relationship between the variables, with GDP being the dependent variable and the rest, the repressors. The results further indicate that there is un-directional running from credit growth to economic growth, as well as from broad money supply to economic growth.

6.3. Policy Recommendation

The study tries to enlighten authorities that PSCE growth is good for the economy but needs to be monitored and as such it is of utmost importance that regulatory authorities constantly monitor developments in credit aggregates on a regular basis as its not only movements in credit instruments that influence the direction but developments in broad money supply as well.

The findings of the study have implications for the operations of the central bank and as well as other agents in the monetary sector. For the Bank of Namibia the rate of growth in Private Sector Credit Extended is one of the operative variables used to inform monetary policy decision. Against that background, the findings of this study therefore have bearing on the ability of the Bank of Namibia to attain its primary objective maintaining price stability through monetary policy conduct

In addition, the findings and limitations of this study provide opportunities for further research in this area, given the limited body of empirical literature in existence at present. In this regard, the study suggests further studies to assess the responsiveness of Private Sector Credit Extended to Monetary Policy. That is, given the recent focus of Bank of Namibia policy rate on curbing credit extension for non-productive activities, it would be interesting to measure the results and reaction of PSCE thereof.

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Appendices

Cointegration results

Date: 06/25/18 Time: 16:43
Sample (adjusted): 2000Q4 2017Q4
Included observations: 69 after adjustments
Trend assumption: Linear deterministic trend
Series: Y M2 L DC
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.288557	52.84942	47.85613	0.0158
At most 1	0.250259	29.35767	29.79707	0.0561
At most 2	0.086637	9.483773	15.49471	0.3225
At most 3	0.045745	3.230889	3.841466	0.0723

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None	0.288557	23.49176	27.58434	0.1535
At most 1	0.250259	19.87389	21.13162	0.0742
At most 2	0.086637	6.252884	14.26460	0.5810
At most 3	0.045745	3.230889	3.841466	0.0723

Max-eigenvalue test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

Y	M2	L	DC
-0.378606	0.028324	-0.128713	0.258079
-0.120180	-0.090161	0.192789	-0.018131
0.012839	-0.003557	-0.287397	0.278855
0.053014	0.024275	0.309486	0.151939

Unrestricted Adjustment Coefficients (alpha):

D(Y)	2.326907	-0.182523	-0.138694	-0.188671
D(M2)	0.536904	4.740507	0.634606	0.276254
D(L)	0.009821	-0.032381	0.087874	-0.115141
D(DC)	-0.015665	0.454484	-0.804467	-0.296095

1 Cointegrating Equation(s): Log likelihood -685.7247

Normalized cointegrating coefficients (standard error in parentheses)

Y	M2	L	DC

1.000000	-0.074812	0.339967	-0.681656
	(0.05269)	(0.25497)	(0.19013)

Adjustment coefficients (standard error in parentheses)

D(Y)	-0.880981		
	(0.18758)		
D(M2)	-0.203275		
	(0.48501)		
D(L)	-0.003718		
	(0.03052)		
D(DC)	0.005931		
	(0.15752)		

2 Cointegrating Equation(s): Log likelihood -675.7877

Normalized cointegrating coefficients (standard error in parentheses)

Y	M2	L	DC
1.000000	0.000000	0.163676	-0.606165
		(0.23568)	(0.17074)
0.000000	1.000000	-2.356443	1.009081
		(1.07276)	(0.77717)

Adjustment coefficients (standard error in parentheses)

D(Y)	-0.859045	0.082365	
	(0.19658)	(0.04677)	
D(M2)	-0.772990	-0.412201	
	(0.44592)	(0.10609)	
D(L)	0.000173	0.003198	
	(0.03198)	(0.00761)	
D(DC)	-0.048689	-0.041420	
	(0.16358)	(0.03892)	

3 Cointegrating Equation(s): Log likelihood -672.6613

Normalized cointegrating coefficients (standard error in parentheses)

Y	M2	L	DC
1.000000	0.000000	0.000000	-0.446694
			(0.18132)
0.000000	1.000000	0.000000	-1.286817
			(1.30045)
0.000000	0.000000	1.000000	-0.974306
			(0.45472)

Adjustment coefficients (standard error in parentheses)

D(Y)	-0.860826	0.082858	-0.294832
	(0.19655)	(0.04677)	(0.18260)
D(M2)	-0.764842	-0.414458	0.662425
	(0.44494)	(0.10588)	(0.41337)
D(L)	0.001301	0.002885	-0.032761
	(0.03167)	(0.00754)	(0.02942)
D(DC)	-0.059018	-0.038559	0.320837
	(0.15829)	(0.03767)	(0.14706)

Granger causality test

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 06/26/18 Time: 13:57
Sample: 2000Q1 2017Q4
Included observations: 69

Dependent variable: D(Y)

Excluded	Chi-sq	df	Prob.
D(M2)	13.81228	2	0.0010
D(L)	0.861861	2	0.6499
D(DC)	2.357323	2	0.0012
All	17.49575	6	0.0076

Dependent variable: D(M2)

Excluded	Chi-sq	df	Prob.
D(Y)	1.769872	2	0.4127
D(L)	6.179618	2	0.0455
D(DC)	0.156069	2	0.9249
All	7.337537	6	0.2908

Dependent variable: D(L)

Excluded	Chi-sq	df	Prob.
D(Y)	0.784905	2	0.6754
D(M2)	4.612103	2	0.0997
D(DC)	0.645356	2	0.7242
All	6.945035	6	0.3260

Dependent variable: D(DC)

Excluded	Chi-sq	df	Prob.
D(Y)	2.067270	2	0.3557
D(M2)	5.224622	2	0.0734

D(L)	0.101299	2	0.9506
All	7.375857	6	0.2875