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Impact of Interest Rates on Business Loans Demand in The Gambia

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ABSTRACT

The main goal of this research is to empirically examine whether there is a relationship between interest rates and the demand for business loans in the Gambia using monthly time series data ranging from January 2010 to December, 2020. The OLS results shows that business loans demand in the long-run, has a negative relationship with real interest rates, and a positive relationship with real gross domestic product but both are statistically insignificant while Inflation and Exchange rate are negatively and positively related to Business Loans Demand respectively and statistically significant at the 99% confidence interval. The Johansen Cointegration Test reveals the existence of a long-run equilibrium relationship between business loans demand, real gross domestic product, real interest rates, inflation and nominal exchange rate.

Furthermore, the results from the VECM shows that there exist a long term causality of 6.95% on Business Loans demand that is derived from GDP, Interest rate, Inflation and Exchange rate while there exist no short term relationship on business loans demand that is derived from the explanatory variable and no short run relationship derived from also the lag of private business loans itself.

Based on this findings, the policymakers should come up with an efficient monetary policy mechanism that is geared towards improving private investment. Thus, reducing the monetary policy rate (MPR) might leads to high commercial banks liquidity, thus increasing the accessibility of loanable funds for commercial banks. The policymakers should come up with laws that require commercial banks to maintain specific level of minimum requirements for loanable funds. This would increase the availability of loanable funds to the private sector, thus increasing private sector investment and consumption spending in the economy.

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List of Acronyms

CBG - Central Bank of the Gambia

TBILLS - Treasury Bills

ADF - Augmented Dickey Fuller

AIC - Akaike Information Criterion

BCPS - Bank Credit to the Private Sector

OLS - Ordinary Least Squares

VECM - Error Correction Model

ECM - Error Correction Model

ECT - Error Correction Term

GDP - Gross Domestic Product

VAR - Vector Auto Regression

SMEs - Small and Medium Enterprises

USD - United States Dollar

GMD - Gambian Dalasi

CPI - Consumer Price Index

FEVD - Forecast Error Variance Decomposition

IRF - Impulse Response Function

DF - Dickey Fuller

JB - Jarque Bera

GLS - Generalized Least Squares

UK - United Kingdom

ARDL - Auto Regressive Distribution Lag

MPR - Monetary Policy Rate

BLUE - Best Linear Unbiased Estimators

IMF - International Monetary Fund

CHAPTER ONE

INTRODUCTION

1.1 Background of Studies

The debate on whether higher (lower) interest rates have an impact on business loans demand can be better understood by looking at the context in which interest rates are defined and how they are classified. Generally, interest rates are the prices a borrower pays for the use of money they borrow from a lender such as a financial institution or fees paid on borrowed assets. They are the prices paid for the use of money for a period of time and are expressed as a percentage of the total outstanding balance that is either fixed or variable. There are two ways by which interest rates can be defined: first, from the stand point of a borrower, it is the cost of borrowing money known as the borrowing rate; and second, from a lenders point of view, it is the fee charged for lending money called the lending rate. For the purposes of this study, our concern is on the lending rate since we will examine the relationship between interest rates on demand for business loans.

The interest rates charged on borrowed funds are generally classified according to the duration or the maturity period: short-term (less than one year); medium-term (more than one year but less than five years); medium-term (more than five years). Interest rates differ, depending on the type of instruments (example traditional deposit instruments like savings deposit, time deposit, and some demand or current accounts, and investment instruments like bonds, securities) and on the tenor of investment.

The monetary policy framework in the Gambia is handled by the Central bank of the Gambia, which dictates and controls the policy rate. It adopts a monetary policy framework that focuses on reserve money as the operating target and broad money as the intermediate target. The monetary

policy framework target is normally in line with its inflation target. The bank uses open market operations to achieve the goal of the reserve money target that deals with the weekly auction of Central bank Treasury Bills. Open market operations has continued to be a major driving force for liquidity management and the bank sometimes uses other policy tools such as foreign exchange intervention and statutory reserve requirements ratio.

The Central Bank of The Gambia kept its benchmark interest rate unchanged at 10% during its May 2021 meeting to continue supporting the economy's recovery from the Covid-19 pandemic setback and the interest rate has remain stable for the past few months. Policymakers said that economic activity is expected to have contracted 0.2 percent in 2020, compared to an earlier estimate of zero growth reflecting weaker domestic and foreign demand. In 2021, the domestic economy is predicted to grow 4.1 percent as some of the lockdown measures were relaxed to allow movements of persons, goods, and services. Meanwhile, the near-term inflation forecast predicts underlying inflationary pressures building up since the beginning of 2021. Consequently, headline inflation is forecast to be above the medium-term target for the forecast period (Central bank of the Gambia).

The benchmark interest rate in Gambia was last recorded at 10 percent in July 2021. From 2002 until 2021, Gambia interest rate averaged 18 percent reaching an all-time high of 34.0 percent in July of 2003 to September 2004 and a low record of 10.0 percent in June of 2020. In the Gambia, the interest rates decisions are taken by the central bank of Gambia's (CBG's) monetary policy committee in its monetary policy meetings. The CBG's official interest rate is the policy rate. Usually, the central bank benchmark interest rate is the overnight rate at which central banks make loans to commercial banks under their jurisdiction. Moving the interest rate, the central bank is able to make an impact on interest rates of commercial banks, inflation level of the country and

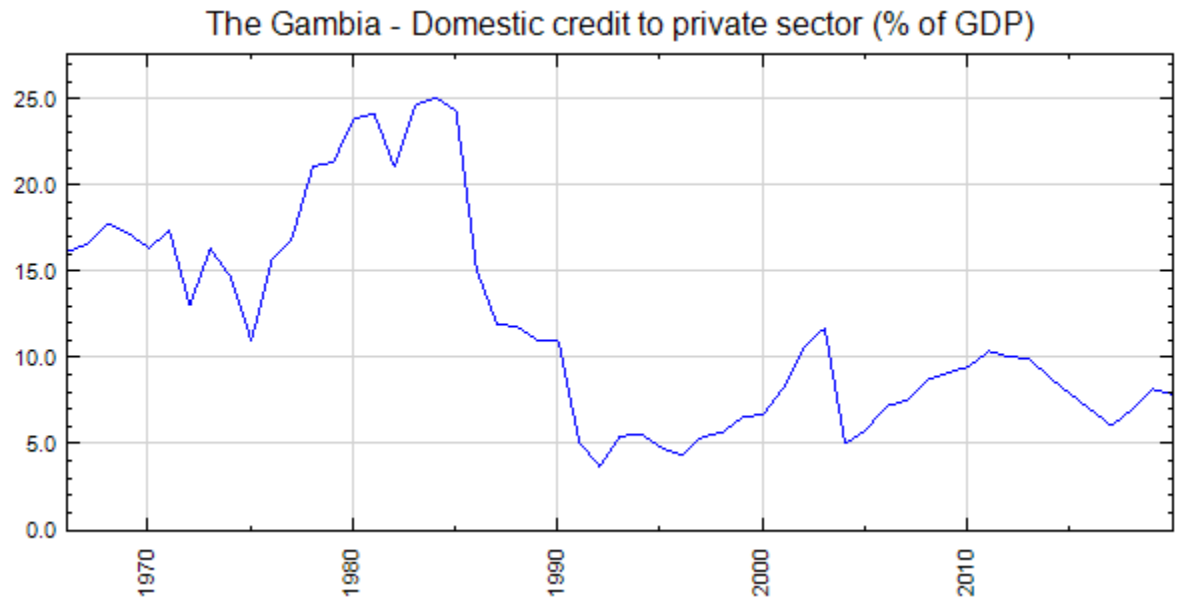
weakening of the national currency. In a case of increase in interest rates the level of business activity is likely to drop, inflation declines and national currency strengthens. In the Gambia, lending interest rate was 28% as of 2020 and remains unchanged from the previous year. The lending rate is the bank rate that usually meets the short-and medium-term financing needs of the private sector. This is a rate that is usually differentiated based on the credit value of borrowers and objectives of financing. An increase in the market interest rate would cause the rate of return on deposits to increase. As a result of this, it would increase the bank's cost of funds which would in turn cause the interest rates on loans to increase at least in proportion to the increase in the deposit rate.

Currently in the Gambia there are over 13 operating commercial banks operating in the financial sector of which only one is established and owned by the Gambia. Out of these financial Institutions only one is an Islamic bank and the others are running conventional commercial operations. The trend of private sector credit as a percentage of GDP over the period 1966-2020 in the Gambia is explained in figure 1.1. Domestic credit to private sector refers to financial resources provided to the private sector by financial Institutions except the central bank through loans, trade credits and purchases of non-equity securities, and other accounts receivables, which requires repayment (World Bank data).

Domestic credit to private sector (% of GDP) in The Gambia was reported at 8.4% in 2017 resulting to a decrease from the previous number of 13% in 2014. This huge decline in Private sector credit from 13% in 2014 to 8.4% in 2017 is attributed to the political instability surrounding the 2016 elections. It was reported at 7.91 as of 2020 this decline from 8.21% in 2019 to 7.91% in 2020 is due to global Covid-19 pandemic that affected global supply and demand. Its highest value over the past 54 years was 25.12 in 1984 and its lowest value was 3.73 in 1992. Domestic credit

to private sector (% of GDP) in The Gambia is updated annually, averaging 13.6% from December 1966 to 2017 (World Bank data).

Figure 1.1: Trend of Gambia's domestic credit to the private sector (% of GDP) (1966-2020)



Source: World Bank Development Indicators

In a nutshell, the central bank controls the banks for borrowed reserves according to its monetary policy dictates. The motivation of the central bank to control the policy rate is that the demand for bank loans (the foremost source of money creation) is heavily influenced by its level i.e. in real terms.

1.2 Research Objectives

The main goal of the study is to find out whether interest rates influence the demand for business loans demand in the Gambia. Secondly, is there a relationship between interest rates and business loans demand? Because the lending rate is the main driving force behind the monetary policy mechanism, thus, it will also help us to ascertain the effectiveness and efficiency of the monetary

policy as a policy tool in the Gambia. Moreover, as an import- driven economy it can also help us to mitigate the risk of inflation by tightening the monetary policy to reduce the excess liquidity in the economy. Finally, we also find out the main determinants of demand for credit in the Gambia.

1.3 Research Hypothesis

The null hypothesis employs that, neither gross domestic product, interest rates, nor exchange rate have effect on business loans demand in the Gambia against the alternative that each explanatory variable has effect on business loans demand in the Gambia. Thus, the null hypothesis implies that none the independent variables has a statistically significant impact on demand for credit against the alternative they are statistically significant. The main hypothesis test in this research is to test the consequences of an increase in the real interest on business loans demand in the Gambia, vice versa.

1.4 Significance of the Study

In developing countries, like the Gambia. The number of research papers on the subject matter are quite limited and very little is so far known. There is no known research paper focusing on the effects of interest rates on credit demand in The Gambia, it is against this gap that I find it timely to do a research that strictly focuses on The Gambia.

Moreover, if we correctly identified the relationship between interest rates and demand for business loans. This will enable us ascertain whether interest rates is the main driver of demand for credit or there are other factors which has a significant impact on demand for credit in the Gambia. This research will also help us to closely monitor the effectiveness of monetary policy measures and in the development of the international and domestic economy.

1.5 Limitation of the Study

Several problems was encountered the modeling of this paper. Literature about the demand for business loans is relatively scarce compared to the demand for money studies. Most of the empirical findings are based on demand for money demand studies. The availability of data is relatively scarce, which forced us to disaggregate some of the data in monthly rather annually. This was done in order to have a sample size that will enable us conduct a meaningful research.

1.6 Scope of the Study

Following this introduction as chapter one. Chapter two shows a review of the literature on both theoretical and empirical findings. Chapter three presents the methodology employed in this paper. While chapter four discusses the analysis and interpretation of the results obtained using the methodologies estimated in chapter three. Furthermore, chapter five highlights the conclusion and recommendations on the impact of interest rates on credit demand in the Gambia.

CHAPTER TWO

LITERATURE REVIEW

2.1 *Overview of the literature*

This chapter therefore begins with an overview of the theoretical literature focusing on the interest rate channel of the monetary policy transmission mechanism and then discussed the empirical findings about the effects of the lending rate on demand for credit. The final part of the chapter provides a summary explanation of credit demand and an overview of the literature. From the literature findings, we have seen several studies has been investigated about credit demand. Several researchers has employed different variables and different phenomena to analyze their research topics. Most of the studies focused on modelling business loans demand on an aggregate level. From the reviewed literature most of the studies has employed a set of explanatory variables that included an economic activity variable such as GDP per capital or real GDP and some kind of financial cost (real or nominal) interest rates. These variables are used as the main determinants of most of the reviewed literature.

Based on these literature reviews our research paper to model the impact of interest on business loans demand in The Gambia was built. In relation to the reviewed literature, credit demand will be modelled as a function of GDP, interest rates, inflation rate and the exchange rate.

2.2 The interest rate channel of monetary policy transmission mechanism framework

The interest rate is the key instrument in the Keynesian IS-LM framework, which indicates that a change in the monetary policy, such as a contractionary monetary policy, may affect aggregate demand. That is, a decrease in the interest rate will cause a fall in investment which will lead to a fall in output which in turn will lead to low aggregate demand while an expansionary move i.e. an increase in the interest rate will lead to an increase in investment which trigger a rise in output which in turn will lead to a high aggregate demand. "A policy-induced change in the policy interest rate(s) positively affects money-market interest rates and, negatively affects lending and deposit rates that are normally made available by the banks to their group of customers. "An increase in the short-term nominal interest rate can be expected to persist and should therefore – according to the expectations hypothesis of the term structure– lead to an increase in longer-term nominal interest rates. When nominal prices are slow to adjust, the movements in nominal interest rates also translate into movements in real interest rates. Firms, finding that their real cost of borrowing over all horizons has increased, cut back on their investment expenditures or hiring decisions. This affects supply and demand conditions in the goods and labour markets resulting in a downward impact on inflation" (Andreas Beyer et al, 2017).

Stiglitz and Weiss (1989) in their paper about the theoretical paradigm of the financial market argues that information asymmetry in credit markets as one of the main factors that is hindering the financial market in developing countries. The imperfect or asymmetric information leads to factors, namely moral hazard (post contractual opportunism) and adverse selection (pre-contractual opportunism) and these factors often leads to market failure due to the provision of

insurance. Imperfect information in credit markets arises because borrowers have more information about their situation and potential risk of default than the lenders.

Moral hazard phenomenon can be explained as individuals with insurance are likely to take greater risks than they would do without it because they know that they are insured, so the insurer may get more claims than it bargain for. These actions shifts the risk to the lender especially if the project was unsuccessful. Debtors may also be tempted to divert funds from the approved to other projects with high risk that are normally not communicated to the lenders, thereby increasing the probability of default. Creditors may refuse to take actions that will enhance loan repayment incentives and enforcement problems (Hoff and Stiglitz, 1990). A rise in the lending rate may also leads to a moral hazard problem, where borrowers with less risky projects shift to high risk projects with the intention of earning a higher returns but also increases the probability of default. Since lenders are always faced with asymmetry of information and lack a control over the actions of debtors, for this reason borrowers tends to design contracts that will increase the likelihood of borrowers repaying the loan and reduces the risk of default. The lenders may therefore find it optimal to charge lower than equilibrium interest rates and use non-price mechanisms to ration credit (Hoff and Stiglitz, 1990).

Adverse selection can be explained as a pre-contractual opportunism that arises from private information and when one party to a transaction have more information than the other party and can leads to market failures. Adverse selection is a common phenomenon in the insurance and banking industry, capital markets, and in most marketplaces. It is assumed that debtors knows more about their situation and the level of risk associated with their projects than the financial institution. Borrowers with high risk investments may succeed on getting loans at higher interest rates while people with low risky projects may failed to get loans because their businesses are seen

to be less viable or profitable. If the interest rate is high and the borrower with greater risk is preferred and defaults, this may lead to decrease in the capital of the lender. Lower interest rates might be preferred by lenders that wants to minimize the risk of default. Amonoo et al (2003) explains that "a realignment of the average quality of the lender's portfolio may mean that the interest rate mechanism will not bring about market rate equilibrium rather rationing of access to credit at a lower interest rate will follow"

Theoretical and empirical literature related to the monetary policy transmission phenomenon has identified several channels (interest rates, bank lending, asset prices, etc.) these are the channels the central bank employs through which the monetary policy stance of the central bank is transmitted to the rest of the economy. This study only considers the interest rate channel. The traditional interest rate channel is seen as the first link in the monetary policy transmission mechanism process, and is the most vital link in the transmission mechanism owing to the fact that it cannot be isolated from other channels of the monetary policy transmission.

2.3 Empirical literature

Before testing our model predictions regarding the response of business loans to interest rates-monetary tightening or expansionary policy. There are a few empirical findings on the effect of interest rates on business loans demand.

Fred L. Mannering (1987) estimated the impact of interest rates on automobile demand with a sample size of 26 respondents, each of the respondents made selection from 30 different new vehicle choice sets. He argues that participants overvalue interest rates relative to their actual worth. However, the extent of the overvaluation varies across the sample population that was seen in the individual logit model estimates. The findings shows that automobile manufacturers' can

easily exploit its customers to boost new car sales and it also explains that domestic firms have a higher chance of benefitting than their fellow Japanese competitors.

Hoshi et al, (1991) examined a set of test using aggregate Japanese data. They compare the behavior of bank loans which were subjected to informal control by the Bank of Japan with loans from insurance companies. They find that when the Bank of Japan tightens, the fraction of industrial loans coming from banks drop significantly. They also find that in a four variable VAR (which includes interest rates) the mix is a significant determinant of both fixed investment and finished goods inventories.

Calza, Gartner and Sousa (2003) in an empirical study using vector error correction method (VECM) to co-integration carried out a study on aggregate demand for credit in the euro area. The model is examined as a function of real GDP, real weighted short-term and long-term interest rates. The findings shows that there exist a long-run relationship between loans to the private sector and interest rates and GDP. This implies that there exist a positive relationship between real loans and real GDP in the long-run. On the other hand, real loans are negatively related to real short-term and long-term interest rates. The study was examined using quarterly data over the period of 1980 Q1 - 1999 Q2.

Hofmann (2001) estimated the determinants of credit to the private non-bank sector in industrialized countries. The study was examined using interest rates, real GDP and property prices as explanatory variables with a sample of 16 industrialized countries using quarterly data over the period 1980Q1 – 1998Q4, based on a co-integrating VAR. The findings of the Co-integration results shows that a long-run relationship between real credit and the explanatory variables only exists when real residential and real commercial property prices are added to the model.

Moreover, the study employs that real credit is negatively related to real interest rate, real property prices and real GDP have a positive and significant effect on real credit. The increased in credit demand is as a result of an increase consumption and investment.

Edwin Amonoo et al, (2003) evaluated the impact of interest rate on demand for credit in Ghana as well as interest rates and loan repayment by the poor and the SMEs in a rural region of Ghana using an ordinary least squares (OLS) estimation procedure.. The findings shows that the relationship is negative and statistically significant. The findings also displays that factors like owner's equity and annual profit are correlated with the credit demand. Furthermore, interest rates also have negative effect on loan repayment. The study further observed that this relationship is brought about by small medium enterprises' aversion to acquiring credit due to high interest rates. It can be inferred that small medium enterprises that are financially strong are more likely to have easy access to loans compared to enterprise with less financial resources.

Cottarelli, Dell' Ariccia and Vladkova-Hollar (2003) estimated a study on Bank Credit to the Private Sector (BCPS) in twenty four countries, using annual data for 1973-1996. The variables of interest were GDP per capita, public debt to GDP ratio, inflation, financial liberalization and accounting. Using a random effects Generalized Least Squares (GLS) estimation procedure, the findings were as follows gross domestic product (GDP) per capital, financial liberalization and accounting positively affect the BCPS, while inflation and Public debt to GDP ratio negatively affect Bank credit to the private sector (BCPS).

Zagred, (2007) estimated demand for total loans in Croatia using OLS method on standard credit demand determinants. The model was estimated as a function of a scale variable i.e. gross domestic product and the cost of loans (Interest rates). The findings shows that the behavior of loans can be explained using the developments of real interest rates and real GDP. Secondly, Gross Domestic

Product explains most important forces that are behind the demand for loan. Furthermore other explanatory variables are not significant determinants of credit demand.

Khawaja and Din (2007) studied the factors that affect the interest rate spreads in Pakistan. The model was investigated using the data of 29 banks over the period of 1998- 2005. They considered inflation, real interest rate, and real output and deposit inelasticity. The firm level variables factored are market share, asset quality, liquidity and administrative costs. They argued that the firm specific and macroeconomic variables better explained the interest rate spread in different banks.

Chebet (2014) investigated the factors influencing demand for credit by the private sector in Kenya and OLS method was used to estimate the model. The findings shows that short term interest rate, long term interest rate, public investment, employment and domestic debt have a positive effect on demand for credit by the private sector, whereas exchange rate and per capital GDP and have a negative effect on demand for credit by the private sector.

Sule Alan (2013) estimated the interest rate sensitivity of subprime credit card borrowers of a UK credit card company. The model was employed using panel and the findings indicated that an increase in interest rates will leads to a reduction in monthly credit demand at about 3 percent and is statistically significant. Moreover, the results reveals that only the risk averse borrowers who fully utilize their credit cards reduce their demand for credit when subject to increases in interest rates as high as 3 percentage points, which is evidence of binding liquidity constraints. Finally, increasing the interest rates will also significantly leads to an additional revenue for the creditor without prompting delinquency over a short horizon.

A study done by Lydiah N. Zachary (2013) on the impact of interest rates on credit demand by small medium enterprises in Nairobi County showed that interest rates have a positive effect on the demand for credit from lending institutions by SMEs The study also revealed that 86.9% of credit demand by SMEs in Nairobi County could be explained by interest rates.. Furthermore, there also exist a strong positive relationship (R equals 0.932) between credit demand, interest rate, profit and owner's equity and all the variables revealed statistically significant values. Credit demand was fashioned as a function of interest rate, profit and owner's equity.

Khalil Jebran et al (2016) explored the impact of interest rate on private sector credit on Pakistan for the period of 1975 to 2011. The study was investigated using an Auto Regressive Distribution Lag (ARDL) model in order to analyze the long and short term relationship. The findings highlighted a statistically significant negative effect of interest rate on private sector credit in both the short run and long run. The results also point to a significant positive effect of inflation on private sector credit in the long-run and short-run while the authors also argued that exchange rate has no influence on the private sector credit. Private sector was investigated as a function of consumer price index as an indicator for inflation, lending rate (interest rate) and the exchange rate.

Jallow et al (2020) estimated the impact of interest rates and inflation on the exchange rate in The Gambia using a dynamic model of FMOSLS, DOLS and CCR. The model was employed using monthly data over the period of 2007M1-2018M12. Interest rate and inflation rate were used as explanatory variables. The finding shows there exist a positive long-run relationship between inflation and exchange rate, signifying that rise in inflation will cause the dalasi (GMD) to appreciate against the dollar (USD) while there exist a negative long-run relationship between the

interest rate and the exchange rate. This implies that an upward movement in the interest rate will lead to a decrease in the exchange rate.

2.4 Demand for Credit

In developing countries, credit plays an important role in improving the standard of living of poor individuals by smoothing consumption and as well enhancing their productive capacity through financial investment and in human and physical capital. The main purpose of credit is to bridge the gap between enterprise owner's financial assets and the required financial assets of the enterprise. Due to the persistence of this imbalance, enterprises are forced to demand for credit. Credit plays a crucial role in both consumption and investment, the availability of credit is impartially constrained, particularly from formal credit sources that is confined to formal banks only. The demand for loans for productive investments usually comes from the less privilege individuals who are less risk-averse and enables them to overcome liquidity constraints, making it possible to undertake investment that have a positive impact on production, employment and income.

According to Aryeetey et al (1994) demand for credit can be classified into potential, perceived, and revealed demand. Potential demand is explained as a desire for credit which is not actualized due to asymmetry of information in markets and institutional barriers. Perceived demand can be defined as a situation where enterprises that assume to be in need of cash, considers finance as constraint. Revealed demand is basically a written application for financial assistance at a given rate of interest.

CHAPTER THREE

METHODOLOGY

In this chapter, we present the empirical methodology we used in investigating the relationship between interest rates and credit demand. The goal is to establish the effect of interest rates on business loans demand holding other factors constant in the Gambia.

3.1 Model Specification and Description of Variables

This study will capture a similar model that was examined by Calza et al. (2001) and also Chebet (2014) with some modifications to capture other macroeconomic variables. However, Calza et al. (2001) investigated the relationship without considering Gross Domestic product and Chebet (2014) modelled credit demand without including inflation as an explanatory variable although his model was fashioned with more explanatory variables. The model is incorporated as a function of real GDP, inflation, real interest rate and the nominal exchange rate as the determinant factors for credit to the private sector. The relationship that is employed is a demand relationship that is initiated from the independent variables to the business loans demand by the private sector. A similar approach was also used by Zagreb (2007) and Edwin Amonoo et al (2003). However, both models were modified excluding exchange rate from the models of Zagreb (2007) and Edwin Amonoo et al (2003).

The general specification of credit demand model's description is shaped in a way that the independent variables and their relationship with the dependent variable can be captured. The first relationship can be stated as follow:

$$BLD = f\,(GDP, INF, IR, EX) \quad [1]$$

Where BLD is business loans demand; GDP is gross domestic product; INF is inflation; IR is the interest rate; EX is the exchange rate. Preliminary estimations pointed to a log-linear specification of the demand for business loans, which can be econometrically presented as follows: the first equation can be formulated into equation 2 as follows

$$BLD = \beta_0 + \beta_1 GDP + \beta_2 INF + \beta_2 IR + \beta_3 EX + \varepsilon t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [2]$$

Where β_0 is the intercept and β_1 is the GDP elasticity of loan demand; β_2 is the inflation elasticity of credit demand, β_3 is the interest rate elasticity of loan demand; β_4 is the exchange rate elasticity of loan demand; and ε_i is the stochastic disturbance term and captures all other variables that are not included in the model. A prior restrictions are that; $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 < 0$, $\beta_4 > 0$. Credit modeled as function of economic growth, inflation, interest rate, and exchange rate may represent a demand relationship, but may also capture supply effects.

The coincidence of cycles in business loans demand and economic activity may reflect variations of credit demand to changes in economic activity. Favorable economic conditions are favoured by investors who anticipates profits in the near future and an increase in output stimulate consumption and investment demand, thus increasing the demand for credit within the financial sector. Net investment increases as capital stock grows. This in turn leads to an increase in credit demand. Therefore, a prior GDP is expected to have a positive effect on demand for credit ($\beta 1 > 0$).

Inflation is predictable to have a positive relationship with business loans demand, it allows debtors to pay back their borrowings to creditors with money that is mostly worth less than during the period when it was originally borrowed. Inflation leads to higher prices which in turn increases the demand for credit. The rise in demand will also influences interest rates positively that benefits the

lenders. The Consumer Price Index (CPI) is often used as the indicator for inflation. It is measured as the mean change in the general prices of goods and services during a specific period.

Interest rate is controlled by the government through the central bank of The Gambia as a primary instrument for regulating money supply and raising funds through open market operations known as Treasury Bills (TBILLS). TBILLS are sold to the highest bidder during an auction. When the demand for treasury bills is at the high sight investors bid at or above the face value. Therefore, this will leads to a low yield at a lower risk. When the economy is at a recession period of the business cycle. This will lead to a fall in bank lending rates and all other interest rates within the economy. As a result of this, it stimulates demand for credit in the financial sector by investors who are need to finance their investments. A prior, interest rate is expected to have a negative coefficient on business credit ($\beta 3<0$). Interest rate is expected to have a negative relationship with demand for loans. As the interest rate increases the cost of borrowing becomes more expensive and this leads to fall in credit demand. This can be expected on both theoretical and empirical grounds.

Exchange rate is the price of the domestic currency paid for another currency country. One of the major challenges for the past years of the Gambian economy is the fluctuation of the exchange rate as the Gambian Dalasi (GMD) is fast depreciating against other major currencies like USD, Euro and Pounds. The nominal dalasi/dollar exchange rate is expected to have a positive relationship with credit demand; it enters the specification to capture the external effect because Gambia is highly dependent on imports. An exchange rate appreciation stimulates the return on investment for exports whereas a depreciation in the exchange rate will lead to fall in investment returns which in turn affects the demand for business loans. When the dalasi appreciates against the dollar, which is fewer dalasi can purchase more dollars; As a result the demand for loans will increase,

suggesting that appreciation increases demand for credit. Finally, a prior we expect exchange rate to have positive influence on credit demand ($\beta 5 > 0$).

3.2 Regression Technique and Dataset

The data on business loans, gross domestic product, interest rates, inflation and exchange rate that are used to test the model are obtained from the database of the Central Bank of The Gambia. Except for real Gross Domestic Product that is recorded annually, the data collected is monthly data ranging from 2010 to 2021 on the Gambia for all the selected macro-economic variables. However, to develop an authentic research, the Denton method of disaggregation was used to split the data of real gross domestic product into monthly in order to match the rest of the variables factored in our study.

The regression techniques used to fashion the model are Ordinary least squares (OLS) and Vector error correction model (VECM). OLS is used to estimate the long-run relationship. A VECM model is used to estimate the short-run relationship between demand for loans and its regressors'. It accounts for cointegrated variables. If two or more time series suggests that there is a long-run or equilibrium relationship between them despite being individually non stationary, we can test for cointegration to determine whether a linear combination of two or more time series can be stationary or not. The VECM model is represented as:

$$Y_t = \beta_0 + \beta_1 x_t + \beta_2 x_t + U_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \text{[3]}$$

Where $U_t \sim I(0)$, thus $U_t = Y_t - \beta_0 - \beta_1 x_t - \beta_2 x_t$ will be stationary. In an error correction model we need the error correction coefficient to have a negative value, the Impulse Response Function (IRF), the Forecast Error Variance Decomposition (FEVD) and the stability test.

3.3 Pre-estimation Test: Test for Cointegration

Numerous pre-estimation tests were estimated before running any regression analysis. It is a common phenomenon that time series data are non-stationary but move together over time, which implies that the series are bound by a long-run equilibrium relationship. Testing time series data of the model established for unit root and cointegration is necessary to avoid a spurious or nonsense regression analysis. Therefore, to avoid a nonsense or spurious regression, the analysis starts by employing unit root tests. The Augmented Dickey Fuller (ADF) test (Dickey and Fuller, 1979) is used for detecting stationarity and unit root problem. The ADF (tests the null hypothesis that the series have a unit root against the alternative of stationarity) is an extension of the Dickey Fuller test and it takes into account of autocorrelation. It is a more formal test for stationarity and it is performed to establish the properties of the time series variables. It is employed when a model exhibits autocorrelation. The main aim of a unit root test is to determine the order of integration in a time series. That is, whether the series are integrated of order zero I (0), order one I (1) or higher orders. The test is implemented by augmenting each variable with its lags. The number of the lags used in this research is obtained by using the Akaike Information Criterion (AIC). The test could be estimated with the regression below:

$$\Delta Y_t = \beta_0 + \delta Y_{t_{-1}} + \sum_{i=1}^{m} \propto i \, \Delta Y_{t_{-1}} + \varepsilon_t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{[4]}$$

where ΔY_t=$Y_{t_{-1}}$- Y_t, β_0 and $\propto i$ is the constant and the j^{th} lag coefficient respectively, Y_t is the individual variables at time t, m is the maximum number of lags suggested by the Akaike Information Criteria (AIC) and the number of lags which should be large enough to make sure that the error terms are white noise and small enough to save degree of freedom, t is the trend variable in monthly, $\delta = \rho - 1$and εt is a pure white noise error term. The null hypothesis is $\delta = 0$; which

means the time series is non stationary against the alternative of stationary $\delta < 0$. Using a Tau (τ) statistics, if the p-value is less than or equal to 0.05, we reject the null hypothesis, otherwise we do not reject the variable of non-stationary at the 95% confidence interval. At 5 percent significance level, if the t-statistic is greater than the critical value from the Dickey Fuller (DF) distribution, we reject the null hypothesis of non-stationarity. Otherwise, we will fail to reject the null hypothesis.

Several techniques for testing for cointegration between series of a unit root data have been employed in empirical studies of this nature. With regards to this paper, three approaches will be performed to test for cointegration among the time series. These include Engle-Granger approach, the Error Correction based approach, and the Johansen Maximum Likelihood approach (Johansen, 1988).

3.4 Diagnostic Tests

Several post-estimation techniques have been used in empirical studies of this nature. For the purpose of this paper, the post-estimation techniques costumed in this research are test for autocorrelation, the normality test and the test for heteroscedasticity. The serial correlation to test whether the error terms from different time periods are correlated or not. The normality test of the disturbance term test the null hypothesis that the error tem is not normally distributed against the alternative the error term is normally distributed. The heteroscedasticity test will be used to check whether the errors have a constant variance. The key assumption with this diagnostic testing is that the variance of the error term is homoscedastic across all the observation.

CHAPTER FOUR

ANALYSIS AND INTERPRETATIONS OF THE RESULTS

In this chapter of the paper we discuss the analysis and interpretation of the results of the research paper. Several findings emerged from the empirical effect of interest rates on business in the Gambia. The results are presented in sections as follows: sections 4.1 Descriptive statistics. 4.2 Stationary Test Results Section. 4.3 Co-integration test results. Section 4.4 Results of the Ordinary Least Squares (OLS) Estimation. 4.5 Results of the Vector Error Correction Model (VECM) Estimation and finally Section 4.6 concludes the chapter that presents the post estimation Test results. Credit Demand by the private sector was fashioned against real GDP, real interest rates, Inflation and nominal Exchange rate.

4.1 Descriptive statistics

Before we rollout any inferential analysis we first try to estimate the descriptive statistical values to describe the characteristics of our sample size in this research paper and have a prior knowledge of the data. This helps us to ascertain whether our sample size is normally distributed. The mean and median is estimated to establish the central tendency of our sample size. The standard deviation and the variance to measure the variability or dispersion of the data, the skewness that measures the degree of symmetry and the kurtosis to establish the degree of sharpness or flatness of the distribution. Finally, we measure the Jarque-Bera test to determine whether the data is normally distributed. The summary statistics are indicated in table 4.1 below. The results of the skewness and kurtosis shows that all the variables mirrors normal skewness and platykurtic because all the values are less than 3. The results of the Jarque-bera test indicates that private loans and inflation has p-values of 0.05411 and 0.3821 respectively that is higher than the conventional p-value of

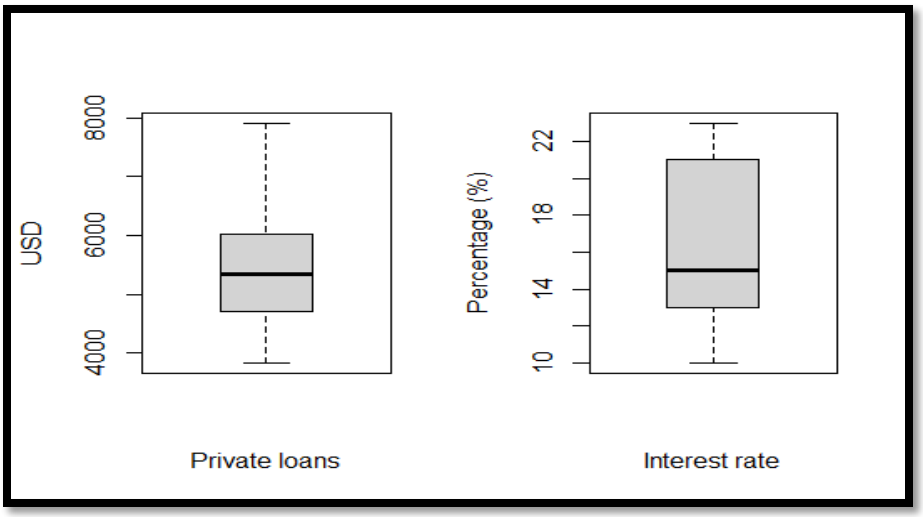
0.05, therefore these variables are normally distributed while real gross domestic product, real interest rate and the nominal exchange rate has p-values that are below the conventional p-value of 0.05, thus, they are not normally distributed.

Table 4.1: ***Descriptive statistics results***

STATISTICS	**PRIV**	**RGDP**	**INF**	**INTE**	**EXC**
Mean	5407	4394	6.127	16.41	40.89
Median	5341	4229	6.215	15.00	42.60
Std. Dev.	966.6014	438.7933	1.249987	4.349035	8.140955
Variance	934318.4	192539.6	1.562468	18.91411	66.27514
Maximum	7910	5147	8.800	23.00	51.85
Minimum	3827	3807	3.570	10.00	26.88
Skewness	0.4884466	0.6420309	-0.1040356	0.4307906	-0.3017709
Kurtosis	-0.3220159	-0.9913204	-0.6705606	-1.356488	-1.355774
Jarque-Bera Test	0.05411	0.003552	0.3821	0.01744	0.01699
Observations	132	132	132	132	132

The figure below represents a boxplot that visualizes the results obtained from the findings of the descriptive statistics on our two main target variables; private loans and real interest rates. Boxplots explains how well our data is distributed from our data set.

Figure 4.1: Boxplot of private loans and interest rates.



4.2 Stationary Test Results Section.

Prior to rolling any formal regression analysis, the empirical analysis starts by determining the order of integration and testing for unit root for all the variables. To ascertain this, the Augmented Dickey-Fuller test has been implemented to check whether the time series variables used in the model are stationary or non-stationary. This helps to ascertain whether the variables are integrated at order I (0) or I (1). The Decision rule is based on the null hypothesis that the time series variable has a unit root (non-stationary) against the alternative test that the variable has no unit root i.e. it is stationary. The analysis are based on comparing the results of the ADF test statistics and the critical values at the 5% interval. The results of the ADF test obtained for each variable are presented in the table below and It reveals that all the variables are integrated of order one (I (1)) meaning they are held stationary after differencing once. Differencing is done to transform non stationary variables to stationary time series variables. One of the main loopholes with differencing variables is that there is loss of long run time series properties. However, the vector error correction

model (VECM helps in recuperating the lost properties through the error correction term generated from the short-run estimation regression analysis.

Table 4.2: Augmented Dickey Fuller (ADF) Unit root test result

Variable	**At levels**						**First Difference**		**Order of integration**
	Level		**Drift**		**Trend**		**Level**		
	t-stat	5% critical value	t-stat	5% critical value	t-stat	5% critical value	t-stat	5% critical value	
PRIV	1.3787	-1.95	-0.2282	-2.88	-0.4220	-3.43	-10.1293	-1.95	**I(1)**
GDP	0.9857	-1.95	-0.2841	-2.88	-3.3812	-3.43	-7.8538	-1.95	**I(1)**
INF	-0.0498	-1.95	-2.3573	-2.88	-2.1434	-3.43	-6.8519	-1.95	**I(1)**
INTE	-0.5715	-1.95	-0.6779	-2.88	-0.8306	-3.43	-6.8308	-1.95	**I(1)**
EXC	1.5315	-1.95	-1.2152	-2.88	-3.2935	-3.43	-9.3730	-1.95	**I(1)**

Note: *The numbers presented are the estimated P-values at 5% significance level*

4.3 Co-integration test results

Before we get into a formal discussion on the VECM, it is important to ascertain whether there exist a co-integration among our variables in the model. The key idea about co-integration is that time series variables could be non-stationary but in the same time there is something hidden in these series that drives two or more of these time series at the same time. Co-integration exists between two non-stationary time series if they have the same order of integration and a linear combination of them becomes stationary. The Johansen Co-integration techniques is employed to check whether there exist a steady long-run relationship among the variables in the model. The Johansen Co-integration approach test for the co-integration rank for ECM process, estimates the

Eigenvalues, Maximum Lambda statistics and the trace statistics. This allows us to ascertain whether our non-stationary variables could be held stationary. The most common method used to detect this is the Johansen Trace Statistics. For the purpose of this study, we used the Johansen trace statistic to establish our references. The results revealed that the trace statistic is 49.83 less than critical value of 53.12 at the 5% interval. From these we therefore accept the null hypothesis. The decision is that there are at least one co-integrating equation at 5% level or all variables have long run relationship among them. The results below shows that there exist at least 1 cointegration relationship represented as r <= 1 where the test statistics is less than the critical values at 5% (see table 4.3 below). Therefore, this proves that the variables are co-integrated and there exist a long-run relationship between business loans demand, real gross domestic product, real interest rates, and inflation and nominal exchange rate in the Gambia and hence we run the Vector Error Correction Model (VECM).

Table 4.3: ***Johansen test using (trace) results***

Rank	**Test**	**10pct**	**5pct**	**1pct**
r <= 4	4.20	7.52	9.24	12.97
r <= 3	10.32	17.85	19.96	24.60
r <= 2	27.32	32.00	34.91	41.07
r <= 1	49.83	49.65	53.12	60.16
r = 0	80.58	71.86	76.07	84.45

Note: *The numbers presented are the values of the test statistic and critical values of test*

Prior to testing the order of co-integration, we first estimated the optimal lag length to use in running our model. Based on the AIC selection criterion, the lower the test statistic, the better our model. As a result this lag selection criterion recommends 3 lags as the optimum and chosen most

as indicated by both the AIC and Final prediction error (FPE) test results that are given in table 4.4. Adopting this criterion, this study adopts an optimum lag length of 2. As a result, we roll a regression using Johansen co-integration test approach to establish the linear co-integration among our variables.

Table 4.4: ***Lag selection Criteria results***

AIC(n)	HQ(n)	SC(n)	FPE(n)
3	2	1	3

Note: *Since 3 is the optimum and chosen the most, we use 3-1 = 2, therefore k=2.*

AIC: Akaike information criterion

HQ: Hannan-Quinn information criterion

SC: Schwarz information criterion

FPE: Final prediction error

4.4 Results of the Ordinary Least Squares (OLS) Estimation

Firstly, the findings on credit demand was estimated using robustness checks (OLS) in order to establish the long run relationships between demand for credit and the selected macroeconomic variables since each of the variables has been assumed as exogenous. Table 4.5 below represents the long run effects on business loans demand. The intercept exerts a positive or direct effect on demand for credit. This implies that holding other factors constant, the demand for loans will grow by about 52% and is statistically very significant.

The results of the study indicates that the lending rate has a negative and a statistically insignificant effect on credit demand. This implies that holding other factors constant, one unit increase in the real lending rate would leads to a decrease in the demand for business loans by about 31 units. The

negative relationship between the lending rate and credit demand can be attributed to the lack of an alternative borrowing scheme for debtors. As a result, this might force them to reduce borrowings when the real interest rate increases vice-versa. This findings are in conformity with the findings of Amonoo et al (2003), Quashigah et al (2017). and Maiti M. et al (2020)

Secondly, real gross domestic product has a direct or positive relationship on credit demand but statistically insignificant. In the long run a 1 unit increase in real gross domestic product would lead to a 0.2102 unit increase in demand for credit (see table 5). The direct effect on credit demand by real gross domestic product is in conformity with economic theories. Economic growth would have a positive impact on personal income and an increase in consumer spending or demand for credit. As a result, leads to an increase in profits for financial institutions and corporations and an overall growth in the economy. This is consistent with the findings of Calza (2001) who also found a positive relationship. Secondly, these findings are also in support of the outcomes of Quashigah et al (2017), which argues that the relationship between income level and the demand for credit is insignificant in the long-run.

Furthermore, inflation has a negative and statistically very significant effect on credit demand. A one unit increase in inflation would lead to a decrease demand for credit by about 438.191 units (see table 5). A higher level of inflation signifies distortion in an economy. This reasoning is agreement to Stiglitz theory. According to Stiglitz, a rise or fall in the expected rate of inflation increases the moral hazard and adverse selection difficulties of financial institutions, leading to the real lending rate being used as a benchmark tool between potential borrowers and lenders. In addition, if high inflation is linked with the highly variable rate of interest, it might increase the risk associated with the return on investment. As a result, this would leads to the negative impact

of the rate of inflation on the demand for bank lending. This finding is in line with the results of Amonoo et al (2003), Olweny (2011) and Quashigah et al (2017).

Additionally, also more importantly, the findings indicate a positive and significant relationship between the Demand for credit by the private sector and the nominal exchange rate as expected. The results imply that an increase in nominal exchange rate by one unit leads to an increase in demand for credit by the private sector by 60.249 units (see table 5 below). An exchange rate appreciation stimulates the return on investment for exports whereas a depreciation in the exchange rate will lead to fall in investment returns which in turn affects the demand for credit. This result is inconsistent with the studies done by Khalil Jebran et al (2016) who found that nominal exchange rate has no influence on the private sector credit.

Table 4.5: Ordinary Least Square (*OLS) estimation results*

Variables	**Estimate**	**Std. Error**	**t-value**	**Pr(>|t|)**
INTERCEPT	5213.2112	1542.6332	3.379	0.000965 ***
GDP	0.2102	0.4642	0.453	0.651497
INTE	-30.9712	29.2826	-1.058	0.292215
INF	-438.1912	94.5144	-4.636	8.68e-06 ***
EXC	60.2490	22.4170	2.688	0.008160 **

Note: *The 1%, 5% and 10% significant levels is denoted by ***, ** and * respectively.*

Residual standard error: 805.5 on 127 degrees of freedom

Multiple R-squared: 0.3268, Adjusted R-squared: 0.3056

F-statistic: 15.41 on 4 and 127 DF, p-value: 2.652e-10

Finally, the goodness- of- fit (R-squared) that test how well our regression function fits the data for the OLS model is 0.3268. This findings indicates that 32.6% of the variance in business loans demand by the private sector is explained by the variances of independent variables. Whereas, the Adjusted R-squared in the long-run indicates a value of 0.3056 suggesting that the data fits the Statistical model well. This implies that 30.6% of the variation in the demand for private sector credit is explained by the selected independent variables. The F-statistic explains the overall significance of whether the linear regression model fits the data. The F statistic gives a value of 15.41 with a p-value of zero (see table above). As a result, we reject the null hypothesis. Therefore, jointly the independent variables captured in the model provides sufficient evidence that the regression model significantly explain the changes in the demand for credit by the private sector. These findings are in conformity with the results of Chebet (2014).

4.5 Results of the Vector Error Correction Model (VECM) Estimation

A Vector error correction model explains two causalities. One is the long run causality and the second one is short run causality. It helps to determine the number of co-integration relationships and measures any movement away from the long-run equilibrium. Vector An error correction model explains the short-run behavior of the variables as they return to their long-run equilibrium. Thus, the error correction model talks about the changes in the dependent variable derived from the changes in the independent variables. Therefore, there must be some sort of adjustment made on the variables and the mechanism that corrects this is known as the Error Correction Mechanism and the coefficient of the error correction term describes the speed of adjustment to equilibrium.

The computed short-run equilibrium relationship results are shown in Table 4.6. The results shows that the estimated coefficient of the error term is significant with the expected negative sign. The

estimated results indicates that the error correction term is -00695. The results implies that there exist a long term causality of 6.95% on Business Loans demand that is derived from GDP, Interest rate, Inflation and Exchange rate which are jointly significant at 10%. The significance means that whenever there are deviations in the demand for credit from an equilibrium point, the speed of adjustment of the model corrects at the rate of 6.95% monthly. Additionally, the negative and significant value of the error correction term resonates that there is a long run equilibrium relationship between the dependent variable and independent variables. These results are consistent with the finding of Chebet (2014) and Maiti M. et al (2020).

Finally, the results in table 5 also shows that there exist no short term relationship on business loans demand that is derived from the explanatory variables since all the lags are statistically insignificant. Thus, the null hypothesis of no relationship among the variables in the short-run is accepted. However, the present value of demand for credit is affected by the past month values of demand for credit in the short run. The demand for credit at lag one is significant with a coefficient of -0.3054 this implies that there is a negative effect on credit demand derived from the lag of credit demand itself in the first month. This findings is consistent with the findings done by Quashigah et al (2017).

Table 4.6: ***Vector Error Correction Model (VECM) estimation results***

```
## #############
## ###Model VECM
## #############
## Full sample size: 132    End sample size: 129
## Number of variables: 5   Number of estimated slope parameters 60
## AIC 2044.459     BIC 2227.487    SSR 6791429
## Cointegrating vector (estimated by 2OLS):
##    PRIV       GDP      INF      INTE       EXC
## r1    1 -1.712845 524.6069 -49.24906 -6.769753
##
##
##               ECT                  Intercept           PRIV -1
## Equation PRIV -0.0695(0.0298)*    43.5534(22.8067).   -0.3054(0.0917)**
## Equation GDP  -0.0069(0.0029)*    4.8373(2.2346)*     0.0046(0.0090)
## Equation INF  -0.0001(4.5e-05)*   0.0125(0.0346)      6.7e-05(0.0001)
## Equation INTE 0.0002(9.6e-05)     -0.0381(0.0733)     0.0001(0.0003)
## Equation EXC  0.0002(0.0002)      0.1663(0.1338)      0.0003(0.0005)
##               GDP -1              INF -1               INTE -1
## Equation PRIV -1.1056(0.7965)     48.2576(60.0610)     6.5727(28.6740)
## Equation GDP  0.9617(0.0780)***   2.8521(5.8848)       0.2481(2.8095)
## Equation INF  -0.0010(0.0012)     0.1000(0.0912)       0.0663(0.0435)
## Equation INTE 0.0002(0.0026)      0.0757(0.1931)       0.0689(0.0922)
## Equation EXC  0.0012(0.0047)      0.0091(0.3523)       -0.1635(0.1682)
##               EXC -1               PRIV -2             GDP -2
## Equation PRIV -8.8172(15.7378)     -0.1346(0.0907)     0.2367(0.8167)
## Equation GDP  0.3877(1.5420)       -0.0053(0.0089)     -0.5520(0.0800)**
*
## Equation INF  0.0225(0.0239)       5.8e-05(0.0001)     -0.0002(0.0012)
## Equation INTE -0.0227(0.0506)      0.0002(0.0003)      -0.0007(0.0026)
## Equation EXC  -0.1991(0.0923)*     0.0005(0.0005)      0.0042(0.0048)
##               INF -2               INTE -2              EXC -2
## Equation PRIV 56.7502(60.2448)     12.4751(28.9705)     2.8324(15.6677)
## Equation GDP  0.4881(5.9028)       0.6145(2.8386)       0.3904(1.5351)
## Equation INF  0.1300(0.0914)       0.0134(0.0440)       0.0228(0.0238)
## Equation INTE 0.1111(0.1937)       0.0518(0.0932)       0.0198(0.0504)
## Equation EXC  0.2371(0.3534)       -0.1706(0.1699)      -0.1140(0.0919)
```

4.6 Diagnostic Tests

4.6.1 Test for Autocorrelation

Autocorrelation, also known as serial correlation when describing a statistical concept arises when one of the Gauss-Markov assumptions is violated and the error terms are correlated. The test for autocorrelation is performed to establish whether our error terms in our regression model are correlated or not. To test for autocorrelation, the Double Watson Test is employed to test for the order of correlation. It is common statistical test used for autocorrelation The Durbin-Watson (DW) is a test for first order autocorrelation - i.e. it assumes that the relationship is between an error and the previous error. The presence of autocorrelation invalidates the statistical test in a regression. Test results are shown in table 4.7 below. The null hypothesis states that the errors in our model are serially uncorrelated. The results below shows that the p-value (9%) is greater than 5% interval. This implies that we accept the null hypothesis that there is no evidence of autocorrelation in the residuals.

Table 4.7: ***Test for Autocorrelation estimation results***

```
##  Portmanteau Test (asymptotic)
##
## data:  Residuals of VAR object modelVAR
## Chi-squared = 96.84, df = 80, p-value = 0.09684
```

4.6.2 Breausch Pagan Test: Test for Heteroscedasticity

The key assumption of Breausch Pagan Test in a linear regression is that the error terms are normally distributed. Heteroscedasticity happens when the residuals do not have a constant variance. Presence of heteroscedasticity has a serious consequence on our inferences. This signifies that if we still use OLS in the presence of heteroscedasticity, our standard errors could be

inappropriate and hence any inferences made could be misleading. The OLS estimators is unbiased and also consistent but the coefficient estimates are no longer best linear unbiased estimators (BLUE). The findings are shown in table 4.8 below. The null hypothesis states that the residuals are distributed with equal variance (Homoscedasticity is present). The results below shows that the p-value is greater than 5% interval. As a result we accept the null hypothesis of the presence of Homoscedasticity.

Table 4.8: ***Test for Heteroscedasticity estimation results***

```
##  ARCH (multivariate)
##
## data:  Residuals of VAR object modelVAR
## Chi-squared = 1725, df = 3375, p-value = 1
```

4.6.3 Test for Normality

Normality test is used to establish whether our sample data has been drawn from a normally distributed population. The Jarque Bera Test is done to check whether the coefficient of skewness and the coefficient of excess kurtosis are jointly zero. The null hypothesis states that the errors are normally distributed against the alternative it is not normally distributed. From the results in table 4.9, the p-value is than 5% confidence interval. This implies that we reject the null hypothesis of normality in the error terms. However, sometimes that one or two very extreme residuals might lead us to us to reject the normality assumption.

Table 4.9: ***Normality Test estimation results***

```
## $JB
##
##  JB-Test (multivariate)
##
## data:  Residuals of VAR object modelVAR
## Chi-squared = 4241.4, df = 10, p-value < 2.2e-16
##
##
## $Skewness
##
##  Skewness only (multivariate)
##
## data:  Residuals of VAR object modelVAR
## Chi-squared = 102.3, df = 5, p-value < 2.2e-16
##
##
## $Kurtosis
##
##  Kurtosis only (multivariate)
##
## data:  Residuals of VAR object modelVAR
## Chi-squared = 4139.1, df = 5, p-value < 2.2e-16
```

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The main objective of this study was to investigate the impact of interest rates on business loans demand in the Gambia through the Ordinary Least Squares (OLS) regression technique, and the Vector Error Correction Model (VECM). In order to establish this, business loans demand by the private sector was fashioned against real GDP, real interest rates, Inflation and the nominal Exchange rate. The findings on our main objective, indicates that real interest rate have a negative and statistically insignificant effect on business loans demand in the Gambia. This means that an increase in the lending rate decreases the demand for loans, vice versa. Thus, a higher interest rates increases the cost of borrowing, reduces disposable income and decreases the demand for credit. As a result public investment decreases and overall effect is low economic growth. Moreover, holding other factors constant, tightening the Monetary Policy Rate (MPR) leads to higher commercial banks liquidity and increases the demand for credit. This will lead to an increase in consumer spending and private investment, thus reducing unemployment. As a result this increases output; the final effect is economic growth in the economy. This was one of the main reasons why the Central Bank of the Gambia retained the policy rate at 10% at the end of the 4^{th} quarter of 2020.

Secondly, The Johansen Co-integration test explores whether there exist a long-run relationship among the variables in the model. The results revealed that the trace statistic is 49.83 lower than critical value of 53.12 at the 5% interval. From these we therefore accept the null hypothesis. The cointegration test justifies a cointegrating vector of at least one. Thus, this demonstrates that the

variables are co-integrated and there exist a long-run relationship between business loans demand, real gross domestic product, real interest rates, and inflation and nominal exchange rate in the Gambia and hence it gives us the green light run the Vector Error Correction Model (VECM).

The results of the OLS establish that there exist a long-run relationship between business loans demand and its determinants. The results of the study indicates that the lending rate has a negative and a statistically insignificant effect on credit demand. real gross domestic product has a direct or positive relationship on business loans demand but statistically insignificant. Furthermore, inflation has a negative and statistically very significant effect on credit demand. Finally, the findings indicate a positive and significant relationship between the business loans demand by the private sector and the nominal exchange rate. The OLS results also explains that 32.6% of the variance in business loans demand by the private sector is explained by the variances of independent variables and is statistically significant. Thus, jointly the independent variables captured in the model provides sufficient evidence that the regression model significantly explain the changes in the demand for credit by the private sector.

Vector An error correction model explains the short-run behavior of the variables as they return to their long-run equilibrium. The results of the VECM indicates that the estimated coefficient of the error term is significant with the expected negative sign. The results implies that there exist a long term causality of 6.95% on Business Loans demand that is derived from GDP, Interest rate, Inflation and nominal Exchange rate which are jointly significant at 10%. Thus, the negative and significant value of the error correction term clarifies that there is a long run equilibrium relationship between the dependent variable and independent variables.

Finally, The diagnostic results indicate that there was no evidence of serial Autocorrelation, The test for autocorrelation is performed to establish whether our error terms in our regression model

are correlated or not. The results below shows that the p-value (9%) is greater than 5% interval. This implies that we accept the null hypothesis that there is no evidence of autocorrelation in the residuals. Secondly, the test for normality was done to check whether the errors are normally distributed. The findings indicates that our error terms were not normally distributed and finally, the results of the heteroscedasticity test reveals that there was no evidence of heteroscedasticity.

5.2 Recommendation

After estimating the impact of interest rates on business loans demand for the Gambia. The result shows real interest rates is negatively related to credit demand. Based on this findings, I recommend the policymakers of the Gambia through the Central Bank of the Gambia to help us generate the relationship between interest rates and credit demand. Moreover to help us ascertain the effectiveness of the monetary policy as a policy tool in the Gambia. Ceteris paribus, lowering the real interest rate will increase credit demand which in turn will stimulate consumption and private investment demand, thus reducing unemployment. As a result this increases output; the final effect is economic growth in the economy.

Secondly, reducing the monetary policy rate (MPR) might leads to high commercial banks liquidity, thus increasing the accessibility of loanable funds for commercial banks. The policymakers should come up with laws that require commercial banks to maintain specific level of minimum requirements for loanable funds. This would increase the availability of loanable funds to the private sector, thus increasing private sector investment and consumption spending in the economy and final result is growth in the economy.

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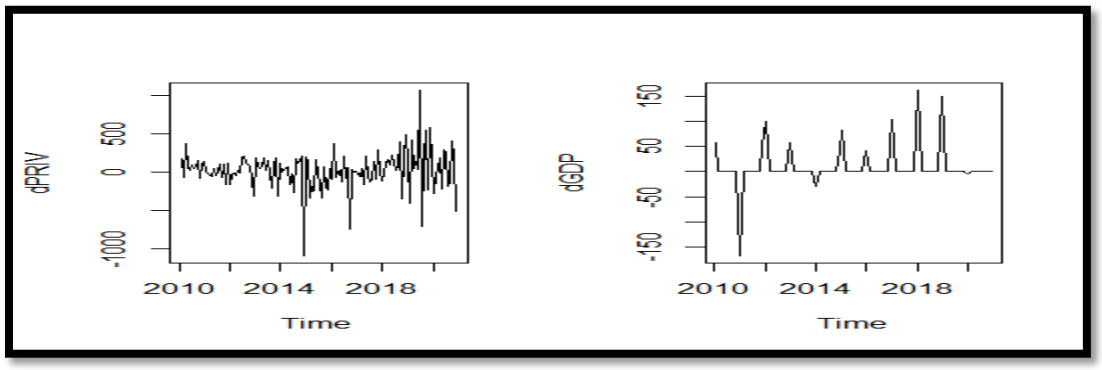
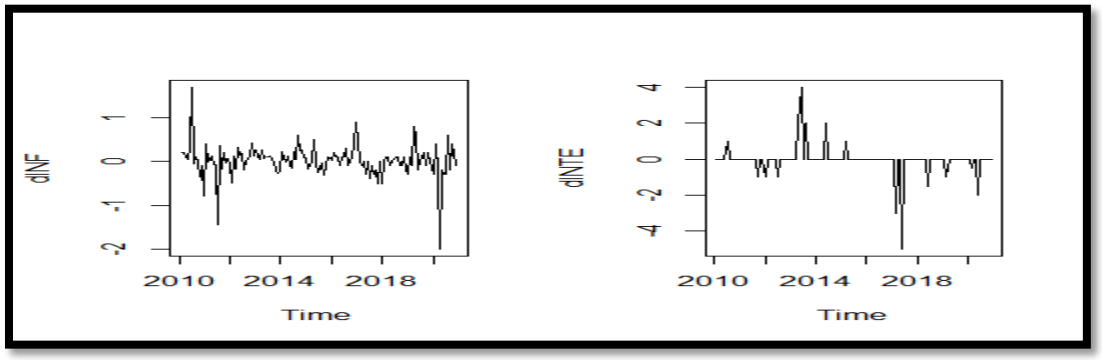
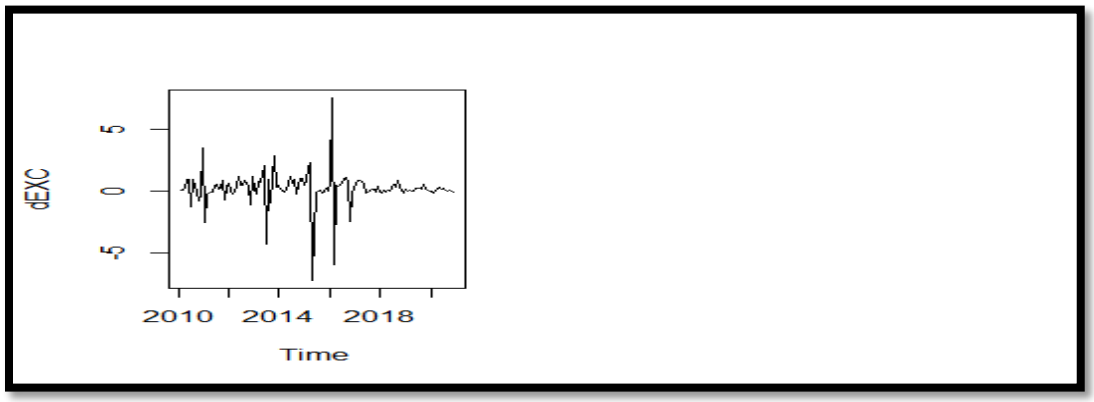
APPENDICES

Appendix B: Stationarity graphs







Appendix B: data used for the study

year	month	priv	smoothed_gdp	inf	inte	exc
2010	1	4306.23	4086.443	3.57	14	26.88
2010	2	4482.38	4144.242	3.77	14	26.93
2010	3	4417.61	4144.242	3.97	14	26.97
2010	4	4788.05	4144.242	4.1	14	27.17
2010	5	4855.97	4144.242	4.14	14	28.12
2010	6	4877.73	4144.242	4.49	14	29.07
2010	7	4975.14	4144.242	6.19	15	27.77
2010	8	5021.94	4144.242	6.13	15	28.7
2010	9	5088.06	4144.242	6.23	15	29.14
2010	10	5235.08	4144.242	6.23	15	29.13
2010	11	5153.69	4144.242	5.88	15	28.28
2010	12	5260.74	4060.005	5.79	15	27.99
2011	1	5396.79	3891.533	5.01	15	31.46
2011	2	5411.18	3807.297	5.42	15	28.89
2011	3	5395.53	3807.297	5.41	15	28.63
2011	4	5341.14	3807.297	5.54	15	28.5
2011	5	5388.42	3807.297	5.47	15	28.39
2011	6	5341.63	3807.297	5.39	15	28.78
2011	7	5353.9	3807.297	3.95	15	29.32
2011	8	5455.34	3807.297	4.31	15	29.45
2011	9	5381.78	3807.297	4.14	15	29.68
2011	10	5485.56	3807.297	4.34	14	30.5
2011	11	5328.76	3807.297	4.31	14	29.8
2011	12	5451.25	3857.187	4.38	14	30.14
2012	1	5293.76	3956.968	4.31	13	30.75
2012	2	5264.32	4006.858	3.82	13	30.78
2012	3	5257.88	4006.858	3.94	13	30.49
2012	4	5208.12	4006.858	3.77	13	30.36
2012	5	5237.29	4006.858	4.09	13	30.75
2012	6	5229.81	4006.858	4.23	13	31.93
2012	7	5421.87	4006.858	4.42	12	32.37
2012	8	5635.2	4006.858	4.23	12	32.81
2012	9	5765.14	4006.858	4.23	12	33.63
2012	10	5838.34	4006.858	4.35	12	34.01
2012	11	5757.64	4006.858	4.77	12	32.88
2012	12	5448.69	4035.636	4.9	12	34.07
2013	1	5641.5	4093.19	5.17	12	34.22
2013	2	5739.14	4121.967	5.3	12	33.98
2013	3	5791.33	4121.967	5.35	12	34.78

2013	4	5867.97	4121.967	5.62	12	35.45
2013	5	6050.16	4121.967	5.68	14	36.81
2013	6	6076.75	4121.967	5.79	18	38.85
2013	7	6224.53	4121.967	5.89	18	34.55
2013	8	6211.12	4121.967	6.01	20	35.5
2013	9	6005.97	4121.967	6.07	20	34.56
2013	10	6106.4	4121.967	6.05	20	35.73
2013	11	6293.76	4121.967	5.85	20	38.58
2013	12	5981.08	4107.464	5.58	20	38.87
2014	1	6098.85	4078.457	5.36	20	39.36
2014	2	6104.08	4063.954	5.58	20	39.53
2014	3	6163.14	4063.954	5.56	20	39.46
2014	4	6233.48	4063.954	5.68	20	39.51
2014	5	6073.33	4063.954	5.6	20	40.08
2014	6	6048.53	4063.954	5.44	22	41.27
2014	7	5783.71	4063.954	5.67	22	41.87
2014	8	5962.16	4063.954	5.71	22	42.82
2014	9	6079.41	4063.954	6.32	22	42.57
2014	10	6220.62	4063.954	6.56	22	42.92
2014	11	6428.16	4063.954	6.83	22	43.97
2014	12	5334.1	4105.184	6.92	22	44.97
2015	1	5534.02	4187.643	7.01	22	45.41
2015	2	5688.35	4228.873	6.83	22	46.23
2015	3	5350.68	4228.873	6.73	23	48.06
2015	4	5162.89	4228.873	6.71	23	50.37
2015	5	4918.51	4228.873	7.21	23	43.1
2015	6	5080.21	4228.873	7.17	23	39.65
2015	7	5085.62	4228.873	6.92	23	39.59
2015	8	4747.23	4228.873	6.88	23	39.66
2015	9	4819.1	4228.873	6.57	23	39.47
2015	10	4627.29	4228.873	6.48	23	39.4
2015	11	4398.16	4228.873	6.58	23	39.59
2015	12	4447.53	4249.418	6.67	23	39.55
2016	1	4354.2	4290.51	6.7	23	40.22
2016	2	4730.48	4311.055	6.9	23	47.79
2016	3	4666.84	4311.055	7	23	41.78
2016	4	4666.84	4311.055	7.1	23	42.24
2016	5	4693.23	4311.055	7	23	42.64
2016	6	4562.22	4311.055	7.1	23	43.14
2016	7	4774.41	4311.055	7.2	23	43.74
2016	8	4698.46	4311.055	7.5	23	44.75
2016	9	4756.36	4311.055	7.4	23	45.81
2016	10	4008.7	4311.055	7.4	23	46.6

2016	11	4048.56	4311.055	7.5	23	44.08
2016	12	4052.07	4363.032	7.9	23	43.82
2017	1	4066.03	4466.984	8.8	23	44.1
2017	2	4009.65	4518.961	8.8	23	44.99
2017	3	4053.44	4518.961	8.7	20	45.83
2017	4	3885.99	4518.961	8.7	20	46.59
2017	5	4099.7	4518.961	8.4	20	47.23
2017	6	4055.8	4518.961	8.4	15	47.07
2017	7	3927.24	4518.961	8	15	47
2017	8	3827.28	4518.961	7.9	15	47.01
2017	9	3970.82	4518.961	7.6	15	47.19
2017	10	3875.05	4518.961	7.4	15	47.36
2017	11	4170.93	4518.961	6.9	15	47.28
2017	12	4183.8	4600.696	6.9	15	47.63
2018	1	4064.61	4764.167	6.4	15	47.52
2018	2	4054.46	4845.902	6.4	15	47.31
2018	3	4175.68	4845.902	6.5	15	47.38
2018	4	4344.9	4845.902	6.6	15	47.32
2018	5	4443.6	4845.902	6.5	15	47.37
2018	6	4668.77	4845.902	6.5	13.5	47.38
2018	7	4687.44	4845.902	6.6	13.5	47.94
2018	8	4756.52	4845.902	6.7	13.5	48.21
2018	9	5148.63	4845.902	6.6	13.5	49.08
2018	10	4799.25	4845.902	6.5	13.5	49.44
2018	11	5021.1	4845.902	6.6	13.5	49.52
2018	12	5505.22	4921.281	6.4	13.5	49.35
2019	1	5645.59	5072.038	6.1	13.5	49.48
2019	2	5244.53	5147.417	6.2	13.5	49.5
2019	3	5668.6	5147.417	6.1	12.5	49.59
2019	4	5710.39	5147.417	6.9	12.5	49.54
2019	5	5851.09	5147.417	7.5	12.5	49.5
2019	6	5890.17	5147.417	7.3	12.5	49.72
2019	7	6965.38	5147.417	7.3	12.5	49.94
2019	8	6254.94	5147.417	7.4	12.5	50.17
2019	9	6454.72	5147.417	7.6	12.5	50.28
2019	10	7006.64	5147.417	7.5	12.5	50.83
2019	11	6770.99	5147.417	7.7	12.5	51.08
2019	12	7350.33	5144.819	7.7	12.5	51.12
2020	1	7068.4	5139.626	7.4	12.5	51.13
2020	2	7020.85	5137.028	7.8	12.5	50.93
2020	3	7080.5	5137.028	7.6	12	50.94
2020	4	7271.36	5137.028	5.6	12	51.14
2020	5	7056.02	5137.028	5.4	12	51.45

2020	6	7346.85	5137.028	5.1	10	51.6
2020	7	7606.43	5137.028	4.8	10	51.81
2020	8	7418.02	5137.028	5.4	10	51.84
2020	9	7290.1	5137.028	5.2	10	51.81
2020	10	7703.46	5137.028	5.6	10	51.85
2020	11	7910.13	5137.028	5.8	10	51.81
2020	12	7402.24	5137.028	5.7	10	51.72