March 2019

The Impact of Macroeconomic Variables on Capital Market Development in Botswana's Economy

Koketso Molefhi

bidpa

Botswana Institute for Development Policy Analysis

BIDPA

BIDPA WORKING PAPER SERIES

Koketso Molefhi is Associate Researcher at the Botswana Institute for Development Policy Analysis

DISCLAIMER

TABLE OF CONTENTS

ABSTRACT

The study examines the impact of macroeconomic variables on stock and bond markets development in Botswana using Autoregressive Distributed Lag (ARDL)-Bounds Test. The results indicate that macroeconomic variables have an impact on capital market development in Botswana. In the short run, real output, money supply and inflation have a positive influence on the development of the stock market, while real exchange rate retards its development. Real output further supports the development of the stock market in the long run. For the bond market, only two variables, inflation rate and lending rate have positive and negative impact on the bond market in the long run respectively, while none of the variables influence the bond market in the short run. Policy implications include increased efforts by policy makers to increase money supply, gross domestic product for the development of stock market, while the bond market development requires a decrease in lending rates.

Key Words: ARDL-Bounds test, Botswana, bond market, stock market, macroeconomic variables

1. INTRODUCTION

The role of capital market development in an economy cannot be overemphasised. According to El-Wassal (2013), capital markets play a crucial role and serve as mechanisms for transforming savings into financing for the real sector. Countries with efficient capital markets have a better degree of savings and investment in projects yielding high returns. Aggarwal (1999) postulates that capital markets exist to help allocate funds to firms and liquidity to investors. They also allow the transfer of risk between different parties because investments are inherently risky. Stijn (1995) argue that the stock market plays an important role in providing firms with capital. Most companies and governments of the developing countries have turned to the stock market as an avenue for raising capital to finance various projects instead of depending on financial institutions for funds. In contrast, underdeveloped capital markets have a negative impact on the economy through increasing investment risks, financial structure and asymmetric information problems (Demirguc-Kut and Levine, 1996).

According to Torre and Schmukler (2003), capital markets in many emerging economies looks particularly poor when considering the many efforts already undertaken to improve macro-economic environment and reforms of institutions believed to foster financial development. Many African countries are not immune to this phenomenon and this has left policy makers without clear guidance on how to revise the reform agenda and brighten the future for domestic capital markets, particularly for local stock markets in smaller emerging economies. Therefore, a better understanding of the impact of macroeconomic variables on capital market development in emerging economies can provide a useful guide to policy makers.

Moreover, given that a lot of developing countries especially in Africa face government deficits, and economic theory suggests that one way that a government, which is in a deficit can finance the deficit, is through by borrowing or by issuing government bonds. If the government borrows money this will lead to interest rate increase and crowd out of some private investment spending. Decreases in private spending reduce the expansionary impact of the deficit spending. This indeed shows that different macroeconomic variables affect the capital market

The impact of macroeconomic variables on capital markets development have been examined by a number of researchers among them are Maghyereh (2002), Chen et al. (1986) etc. Maghyereh (2002) argues that macroeconomic environment is trends in gross domestic product (GDP), inflation, employment, spending, and monetary and fiscal policy and the interrelationship among diverse economic sectors. Conducive macroeconomic environment promotes the profitability of businesses which propels them to a stage where they can access securities for sustained growth. Chen et al. (1986) argues that the macroeconomic variables systematically affect the stock return through their effect on future dividends and discount rates. Mukherjee and Naka (1995) also

found that a co-integrating long run relationship exists between exchange rate, inflation, money supply, real economic activity, long-term government bond rate, call money rate and stock prices.

Despite the fact that a vast amount of research work Talla (2013), Cheopkoiwo (2011), Gunsekaraage et al. (2004) etc., has been done on the capital market development in developed countries, a very few studies have been conducted for developing countries. The few studies conducted, focussed on stock market development at the exclusion of the bond market development. Although the omission of the bond market is not defended in the literature, one could argue that it departs little from reality. In most emerging economies, bond markets are very small relative to the banking system or stock markets and in most cases, data are much more readily available for stock markets and the banking system than for bond markets.

Similarly, research work on capital market development in the context of Botswana's economy, including the work of Lekobane and Lekobane, (2014), only discusses the impact of macroeconomic variables on stock prices without taking into consideration the bond market. Little is known about what drives bond market development in other economies whose bond markets development historically took place well before stock markets came into being (Litan, Pomerlano and Sundararajan, 2003). However, the bond market plays a critical role in the efficient functioning of capital markets as it channels savings and makes funds available to long term borrowers (Thumrongvit et al. 2013). Additionally, bond markets worldwide are increasingly being recognised as an important component of financing development, and hence should be analysed as an integral part of a well-functioning financial market.

Botswana's economy has for many years been driven by mineral-led growth and remains dominated by the mining sector, particularly diamond mining (Botswana Financial Sector Overview, 2016). However, the end of the diamond-led growth is within sight. The Government of Botswana is undertaking ongoing efforts towards diversifying the economy and stimulating alternative engines of growth, including promotion of a services-led economy. In this respect, the role of the financial sector, including the role of Botswana Stock Exchange (BSE) in capital market development, in implementing the diversification strategy, is indeed very critical.

Even so, a clear distinction between stock market and bond market is necessary. In Botswana particularly, the stock market has been, over the years performing better than the bond market with stock market capitalisation estimated at about 35% of GDP at the end of 2008 and bond market capitalisation equivalent to some 7% of GDP (Botswana Financial Sector Overview, 2016). Nevertheless, both the stock and the bond market face a number of challenges, liquidity being one of them. Hence, there is a need to study each market individually, to find out the impact of macroeconomic variables on each.

It is against this background, that the current study is undertaken in order to fill this gap. The objective of this study is to determine the impact of macroeconomic variables on capital market development in Botswana's economy. Specific objectives are to determine the effect of macroeconomic variables on stock market development measured with market capitalisation and on the bond market development measured by Botswana Bond Index.

The rest of this paper is organised as follows; section two gives an overview of capital market development in Botswana, whereas section three presents a review of the literature. Section four and five present the methodology and analysis of results respectively. Section six gives a summary and conclusion as well as policy recommendations.

2. OVERVIEW OF CAPITAL MARKET DEVELOPMENT IN BOTSWANA

The Botswana Stock Exchange (BSE) was established in 1989 as the Botswana Share Market (BSM). With only five listed entities and a single broking firm in the market, the pressure to grow and develop came with the need to separate the running of the exchange from the broking firm and this set in motion preparation for the establishment of an independent exchange.

BSE is Botswana's national stock exchange with the mandate to operate and regulate the equities and fixed interest securities market. The role of BSE goes beyond being a host to the most preeminent companies doing business in Botswana, the BSE is also an avenue through which government, *quasi- government* and the private sector can raise debt and equity capital. To date, BSE is one of Africa's best performing stock exchanges, averaging 24% aggregate return in the past decade. This has allowed the BSE to be the third largest stock exchange in terms of market capitalization in Southern Africa. The stock market has developed in terms of the number of firms listed and total trading volume while total market capitalization has been fluctuating between the years 2010 and 2017 (see Table 1).

Table 1: Market Capitalisation, Total Trading Volume and Number of shares listed in BSE (2010-2017)

Year	Market Capitalisation (P'Bn)	Number of firms listed	Total trading volume
2010	434 626	31	308 662 263
2011	411 603	33	458 721 565
2012	412 349	37	409 909 708
2013	413 742	35	710 451 879
2014	418 157	36	591 637 972
2015	421 099	32	803 074 011
2016	421 313	34	778 232 574
2017	418 144	35	775 009 145

Source: BSE Market Status Report, 2017

Table 1 shows market capitalisation, total trading volume and number of firms listed over the years 2010 to 2017. The table shows that market capitalisation has been fluctuating over the years registering P434 626 billion as at December 2010, declined to P412 349.0 billion in 2012 and finally P418 143.8 billion as at December 2017. Total trading volume has however been on a rise from 2010 with 308 662 263 billion shares traded to 775 009 145 billion shares traded as at December 2017 whereas only 35 companies were listed in BSE as at December 2017 compared to 31 as at December 2010 (BSE Market Status Report, 2017).

Efforts to develop the bond market in Botswana include the formation of the Bond Market Association Steering Committee in 2010. The committee comprises of the Botswana Stock Exchange (BSE) and other market participants. The main aim of the committee is to resolve structural issues impeding bond market development in Botswana, strategise on ways to develop the bond market in Botswana as well as establish an association for the bond market participants. Some of the reforms that have been put forward as a way of developing the bond market in Botswana include; the need to build a robust yield curve, improve liquidity in the bond market, market data dissemination, transparency and information systems etc. (Botswana Bond Market Development Strategy Paper, 2011).

Table 2 shows the bond market performance from 2015 to 2017. In 2017, there were a total of 43 bonds listed on the BSE, 5 of which are government bonds. The limited number of Government bonds is a great concern with respect to maintaining a robust risk free curve and the viability of the existing 3 BSE bond indices. Activity in the bond market has improved over the years. With overall liquidity totalling P535.7 million as at December 2017.Total market capitalisation is also grew from P10.1 billion in 2015 to P14.3 billion in 2017.

Table 2: Bond Market Performance

Year	Liquidity (P'Mn)	Market Capitalisation (P'Bn)	Number of Bonds Listed
2015	858.0	10.1	38
2016	483.9	12.2	41
2017	535.7	14.3	43

Source: BSE Market Status Report, 2017

3.   REVIEW OF LITERATURE

3.1   EMPIRICAL LITERATURE REVIEW

In the past decades, researchers, financial analysts and practitioners have attempted to predict the relationship between capital market development and macroeconomic variables. Many have conducted empirical studies to examine the effect of stock price on macroeconomic variables or vice-versa. The results of each of the studies have provided different conclusions depending on the combination of variables, methodologies and tests used. Below is some previous work and their findings.

Several studies (Lekobane and Lekobane, 2014; Cheopkoiwo, 2011; Jefferis and Okeahalam,2000; and Fama, 1981) investigated the relationship between stock market returns and gross domestic product. Lekobane and Lekobane (2014) found a positive and significant in relationship between domestic stock market prices and gross domestic product in Botswana. These results are consistent with those of Jefferis and Okeahalam (2000) who found a positive long-run relationship between the stock market development and real GDP in South Africa, Zimbabwe, and Botswana. Chepkoiwo, (2011) also found a positive relationship between capital market development and economic growth. Fama (1981), also investigated the relationship between economic activities and stock returns in the US and concluded that there is a positive relationship between stock returns and gross national product (GNP).

Studies on the relationship between money supply and stock market prices have produced mixed results. Lekobane and Lekobane (2014) found a negative relationship between stock market prices and money supply in Botswana. Talla (2013) using multivariate regression model observed that money supply is positively associated to stock prices although not significant. While Abugri (2006) found that in Latin America countries, money supply significantly affect the stock market. The research results indicated that exchange rates, interest rates, industrial production and money supply are consistently significant in explaining returns in all the markets. The country macroeconomic variables are found to impact the markets at varying significance and magnitudes. Gunsekaraage

et al. (2004), examined the impact of money supply and inflation on the stock market in Sri Lanka and found that money supply has a positive and significant influence on the stock market.

The relationship between inflation and capital market growth has been mostly found to be negative as the following studies indicate. Okulenu et al. (2016) found a negative relationship between inflation and capital market growth in Nigeria. The results are supported Kimani and Mutuku (2013), who found a negative and significant relationship between overall stock market performance and inflation rate in Kenya. Furthermore, Talla (2013) also found a negative relationship between inflation rate and stock prices in Sweden. However, Ochieng and Adhiambo (2012) found out that inflation had a weak positive relationship with the Nairobi Stock Exchange Share Index (NASI).

Lekobane and Lekobane (2014) and Okulenu et al. (2016), and Gunsekaraage et al. (2004) found a negative relationship between lending rates and stock market development. The results are consistent with those of Jefferis and Okeahalam (2000).

Based on the findings that macroeconomic variables affect stock market development, Ochieng and Adhiambo (2012) recommends monitoring of the macroeconomic environment, which also influences the foreign investor's decisions in the local investments.

Mukherjee and Naka (1995) applied Johansen's (1998) VECM to analyse the relationship between the Japanese Stock Market and exchange rate. They concluded that a cointegrating relation indeed existed and that stock prices contributed to this relation. The same results were found by Maysami and Koh (2000) in their study on the relationship between macroeconomic variables and the stock market in Singapore as well as Kimani and Mutuku (2013) negative and significant relationship with net effective exchange rate in their study on inflation dynamics on the overall stock market performance in Kenya.

With respect to the bond market, Nkwede (2017) explored the macroeconomic determinants of bond market development in Nigeria and found that exchange rate, interest rate, inflation rate and banking sector development have negative and significant influence on the Nigerian bond market capitalization and as such, they demonstrated strong evidence as robust macroeconomic determinants of bond market development in Nigeria.

Githinji (2013) on their study on the impact of macroeconomic variables on the bond market development in Kenya found out that three macroeconomic variables (exchange rate, interest rate and gross domestic product per capita) had a positive effect on bond market development.

Even so, Mu et al (2013) worked on bond markets in Africa firmly argue that even though African bond market has steady growth rate, but the market is still underdeveloped. The results of their study indicated that government bond market capitalisation is directly related to better institutions and interest rate volatility, but inversely related to the fiscal balance, higher interest rate spread, exchange rate volatility and capital account openness. Adelegan and Radzewicz-Bak (2009) carried out a study on what determines bond market development in sub-Saharan Africa and found that various macroeconomic factors influence bond market development. The study concluded that GDP has a positive impact on bond market development while interest rates have a negative and significant relationship with bond market development.

From the literature, a conclusion can be drawn that the studies are in agreement that macroeconomic variables have an impact on capital market development and do so with varying magnitude and mixed direction of change depending on the country of study.

Nonetheless, from the empirical literature, it can also be drawn that the studies focused more on the stock markets without including the bond market on their analysis, and therefore little is known on how macroeconomic factors affect the bond market. The current study will be based on both the stock and bond markets. This study is not aware of any studies that investigate the impact of macroeconomic variables on capital market development in Botswana. It is with this view that this study wishes to bridge the gap in literature.

4. METHODOLOGY

4.1 THEORETICAL BACKGROUND FOR THE MODEL

The response of market returns to changes in macroeconomic variables cannot be determined in advance since it varies across countries. In addition, it is generally claimed that the global variables are consistently more important than the domestic ones in explaining returns across markets. Nevertheless, since the markets are inherently linked to some of the domestic economic variables, weaknesses in the macroeconomic environment, poor policy making and implementation even in a single emerging market may be transmitted to other markets in today's global market place (Acikalin et al. 2008).

The Arbitrage Pricing Theory (APT) developed by Ross's (1976) has been the primary motive of earlier studies and may be considered as global asset pricing models. Among macroeconomic factors included in the models are either monetary ones such as inflation, interest rate, exchange rate, etc. or real economic ones such as production, oil prices, etc. This study is based on the theoretical reasoning of the Arbitrage Pricing Theory stating that asset return can be explained by multiple risk factors. It is also used in an aggregate stock market framework, where a change in a given macroeconomic variable could be seen as reflecting a change in an underlying systemic risk factor influencing future returns. A

number of APT theory based empirical studies by the likes of Fama (1981,1990), Fama and French (1989), Black et al. (1972) collectively conceded that there exists a significant relationship between stock market prices and macroeconomic variables such as inflation, production index, yield curve, interest rates and risk premium. This paper therefore, intends to explore the long-run relationship between key macroeconomic variables and capital market development considering the case of Botswana.

4.2 THE EMPIRICAL MODEL

In time series analysis, the appropriate model to use depends on the order of cointegration. To test the impact of macroeconomic variables on capital market development, the study employed Autoregressive Distributed Lag (ARDL) model. This approach is chosen because the variables used in this study contain different orders of integration as indicated in Table 4 and Table 5. The ARDL model is suitable for a mixture of I (0) and I (1) (Nkoro and Uko, 2016). The ARDL technique has certain advantages in comparison to other single equation estimation techniques. ARDL minimises the endogeneity problems and all the variables are assumed to be endogenous. Moreover, the long run and short run estimates are estimated simultaneously, removing problems associated with omitted variables and autocorrelation (Kumar, 2012). Based on the empirical literature, the variables used on the model specification below are used in the study.

The model is specified as follows:

$$
\Delta\log(MC_t) = \partial_0 + \sum_{i=0}^{n} \alpha_{1i}\Delta\log(MC_{t-i}) + \sum_{i=0}^{n} \alpha_{2i}\Delta\log(GDP_{t-i}) + \sum_{i=0}^{n} \alpha_{3i}\Delta\log(M2_{t-i}) + \sum_{i=0}^{n} \alpha_{4i}\Delta\log(CPI_{t-i})
$$

$$
+ \sum_{i=0}^{n} \alpha_{5i}\Delta\log(LR)_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta RER_{t-i} + \beta_1\log(MC_t) + \beta_2\log(GDP_t) + \beta_3\log(M2_t)
$$

$$
+ \beta_4\log(CPI_t) + \beta_5(LR_t) + \beta_6\log(RER_t) + \beta_7 EC_t + \varepsilon_t \tag{1}
$$

$$
\Delta\log(BBI_t) = \partial_0 + \sum_{i=0}^{n} \alpha_{1i}\Delta\log(BBI_{t-i}) + \sum_{i=0}^{n} \alpha_{2i}\Delta\log(GDP_{t-i}) + \sum_{i=0}^{n} \alpha_{3i}\Delta\log(M2_{t-i}) + \sum_{i=0}^{n} \alpha_{4i}\Delta\log(CPI_{t-i})
$$

$$
+ \sum_{i=0}^{n} \alpha_{5i}\Delta\log(LR)_{t-i} + \sum_{i=0}^{n} \alpha_{6i}\Delta RER_{t-i} + \beta_1\log(BBI_t) + \beta_2\log(GDP_t) + \beta_3\log(M2_t)
$$

$$
+ \beta_4\log(CPI_t) + \beta_5(LR_t) + \beta_6\log(RER_t) + \beta_7 EC_t + \varepsilon_t \tag{2}
$$

where:

Equation (1) has market capitalisation (MC) as the dependent variable and Equation (2) dependent variable is represented by Botswana Bond Index. MC is market capitalisation, BBI is the ratio of the amount outstanding of domestic debt securities to GDP, GDP is real gross domestic product, M2 is money supply, CPI is consumer price index, a measure of inflation, LR is the prime lending rate, RER is real exchange rate, *EC* is error

correction term used to capture the deviation of variables from long-run equilibrium and is expected to be negative and significant, ε_t is an error term assumed to be distributed with zero mean and constant variance, and Greek letters are parameters to be estimated.

4.3   DATA

With a view to accomplish the pre-determined set of objectives of this study, five macroeconomic variables namely: inflation, exchange rate, money supply, prime lending rates and GDP were taken as indicators of economic environment based on already reviewed empirical literature. The study used quarterly data for a 11-year period from 2006Q1 to 2017Q4 for analysis of indicators of stock market development, while for the bond market, the data are from 2010Q1 to 2017Q4 due to the unavailability of data on the bond market index prior to 2010Q1. Data was collected from Bank of Botswana's Botswana Financial Statistics and capital market indicators were sourced from Botswana Stock Exchange Annual Reports.

Table 3: Description of variables

Variables	Proxy	Description
Stock market Development	Market Capitalisation (MC)	Share price multiplied by the number of shares outstanding as a percentage of GDP
Bond Market Development	Botswana Bond Index (BBI)	Ratio of the amount outstanding of domestic debt securities to GDP
Real Output	Real Gross Domestic Product(GDP)	An inflation-adjusted GDP, 2016Q3 prices.
Consumer Price Index	Measure of Inflation	Consumer Price Index
Money supply	Monetary base	Money supply in real terms
Lending rate	Lending Rate	Prime lending rate
Exchange rate	Exchange Rate	Real exchange rate

4.3.1 Variables Expected Signs and Theoretical Arguments

The Dependent Variables

Stock Market Development
The dependent variable of interest is capital market development. Capital market development is measured using market capitalisation as a proxy for stock market development and Botswana Bond Index as a proxy for the bond market development.

The Independent Variables

Real Output
The demand driven hypothesis suggests that the expansion of an economy will create new demand for financial services (Yartey, 2008). Increased demand will in turn increase pressure to establish larger and more sophisticated financial institutions to satisfy the new demand for their services. This study therefore adopts the real GDP to measure output in the economy. The study expects a positive relationship between the real GDP and capital market development.

Inflation rate
Macroeconomic stability is necessary for capital market development. The most common measure of macroeconomic stability used in this study is the inflation rate measured by CPI. Literature suggests that inflation can be either positive or negative in influencing capital market development. Proponents for a positive relationship between inflation and capital market development include the Fisher Hypothesis (1930) who argue that stocks provide a hedge against inflation and that nominal equity returns should be positively related to inflation, while McCarthy et al (1990), however suggest a contradictory view that there is a negative relationship between stock returns and inflation. The study expects that the relationship between inflation and capital market development can be either positive or negative.

Exchange Rate
Economic theory proposes that depreciation of the local currency makes exporting goods attractive, increases foreign demand and hence revenue for the local firm and its value appreciates thus stock prices increases. Conversely, appreciation of local currency reduces the profit for an exporting firm and thereby affect it value of stock price negatively (Jorion, 1991). The study expects a negative relationship between capital market development and real exchange rate.

Money Supply
This study adopts broad money supply (M2) as a proxy money supply because it is the most acceptable definition of money supply. The coefficient of money supply is expected to be positively signed because the greater the money supply, the greater the level of economic activities and as such the greater the level of investment in the stock market.

Lending Rate
The lending rate is proxied by the prime lending rate. The coefficient of prime lending rate is expected to be negatively signed because of the inverse relationship between interest rate and capital market activities through investment.

4.3.2 Non-Stationarity and Unit Root Tests

Most of empirical work on time series data assume that time series data are nonstationary. This is in accordance with the typical behaviour of macroeconomic variables. Hence, it is essential to carry out unit root tests before running the model to ensure appropriate model specifications. To test for unit root, Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were performed. These tests are done so as to check whether the variables are stationary or nonstationary. A stochastic process is said to be stationary if its mean and variance are time invariant and the auto-covariance does not depend on time, but depends on the time lag between the variables, and the reverse is true for non-stationary time series. Most importantly, running a model using non-stationary data has high chances of leading to spurious relationships.

Table 4: Augmented Dickey Fuller Unit Root Tests

Augmented Dickey Fuller					
Variable	**Without Trend**		**With Trend and intercept**		**Conclusion**
	Level	**First Difference**	**Level**	**First Difference**	
Market Capitalisation	0.9085 [0.9003]	7.5944*** [0.0000]	1.8886 [0.6446]	7.7711*** [0.0000]	I(1)
Botswana Bond Index	8.49354 [1.0000]	2.07020*** [0.0387]	1.55371 [0.7880]	5.5053*** [0.0001]	I(1)
GDP	2.1620 [0.9918]	6.7139*** [0.000]	2.8203 [0.1975]	7.4125*** [0.0000]	I(1)
CPI	1.1329 [0.9309]	0.5829 [0.4590]	0.1189 [0.9965]	4.0621*** [0.0139]	I(1)
Money Supply	3.0234 [0.9991]	7.3892*** [0.0000]	2.9248 [0.1645]	8.7724*** [0.0000]	I(1)
Lending rate	2.7493*** [0.0071]	4.0313*** [0.0001]	3.2257* [0.0924]	4.5493*** [0.0036]	I(0)
Exchange rate	1.2316 [0.9422]	7.76871*** [0.0000]	2.8575 [0.1852]	5.42110*** [0.0004]	I(1)

Table 5: Phillips Perron Unit Root Tests

Phillips Perron					
Variable	Without Trend		With Trend and intercept		Conclusion
	Level	First Difference	Level	First Difference	
Market Capitalisation	0.9085 [0.900]	7.5739*** [0.0000]	1.8600 [0.6591]	7.7716*** [00000]	I(1)
Botswana Bond Index	7.8824 [1.0000]	2.0702*** [0.0387]	1.6112 [0.7652]	5.9857*** [0.0002]	I(1)
GDP	4.2060 [1.0000]	6.7181*** [0.0000]	2.8517 [0.1871]	7.9636*** [0.000]	I(1)
CPI	6.2703 [1.0000]	2.8012*** [0.0061]	0.0382 [0.9957]	4.6755*** [0.0025]	I(1)
Money Supply	3.4063 [0.9997]	7.36173*** [0.0000]	2.8168 [0.1987]	9.1443*** [0.0000]	I(1)
Lending rate	2.6885*** [0.0085]	4.0313*** [0.0001]	2.2296 [0.4646]	4.5796*** [0.0033]	I(0)
Exchange rate	1.1020 [0.9275]	7.7687*** [0.0000]	2.8209 [0.1974]	7.7962*** [0.0000]	I(1)

Where:

*** represents significance level at 1% level of significance
** represents significance level at 5% level of significance
* represents significance level at 10% level of significance

Table 4 and Table 5 shows that all variables are stationary in first difference with the exception of the lending rate (LR) which is stationary in levels. The ARDL approach is therefore appropriate model to use in testing for the impact of macroeconomic variables on capital market development as some variables are stationary in levels, while one is first difference stationary (Nkoro and Uko, 2016).

4.4 DESCRIPTIVE STATISTICS

Table 6 and Table 7 presents the descriptive statistics on the selected macroeconomic variables used in this study. Descriptive statistics help describe and understand the features of a specific data set by giving short summaries about the sample and measures of the data. The standard deviations indicate that money supply and gross domestic are more volatile than inflation, lending rate and real exchange rate on

both the stock and bond market. Furthermore, the standard deviation indicates that the level of exchange rate is the least volatile compared to other capital market and macroeconomic variables.

The analysis of skewness showed that the distributions for real gross domestic product, lending rate and money supply were positively skewed, while the distribution for inflation and exchange rate were negatively skewed in the stock market, while for the bond market, distributions for money supply is positively skewed while all other variables are negatively skewed.

Table 6: Descriptive Statistics for the Stock Market

	MC	CPI	GDP	LRATE	M2	RER
Mean	36201.02	79.79574	18944.17	11.43042	48808.11	97.41749
Median	33084.00	81.74550	18511.35	11.00000	46782.60	97.74456
Maximum	50451.00	103.4333	23896.57	17.00000	73320.55	100.9876
Minimum	23777.00	50.49968	14372.31	6.500000	24567.70	91.74778
Std. Dev.	8822.722	16.87682	2848.693	3.446911	14494.84	2.931107
Skewness	0.186749	-0.252390	0.044152	0.383310	0.210377	-0.417132

Source: Author's Computation (2019)

Table 7: Descriptive Statistics for the Bond Market

	BBI	CPI	GDP	LRATE	M2	RER
Mean	83.72469	89.82988	20482.04	9.328750	56361.05	99.14334
Median	85.42410	91.67251	21080.46	9.165000	50763.70	99.90000
Maximum	104.5860	103.4333	23896.57	11.50000	73320.55	100.9876
Minimum	60.57015	70.09687	16504.13	6.500000	42860.10	94.76650
Std. Dev.	14.16676	9.954620	2133.329	1.712445	11120.80	1.685058
Skewness	-0.120244	-0.446782	-0.444798	-0.173217	0.279921	-0.892683

Source: Author's Computation (2019)

4.5 DIAGNOSTIC TESTS

Diagnostic tests are often used to detect model misspecification and guide for model improvements. The study undertook several diagnostic tests to check robustness of the results. Following the diagnostic tests carried out, one may conclude that this model is correctly specified.

The Jarque-Bera test for Normality showed that residuals are normally distributed and hence the regression model explains all trends in the dataset. The study tested for the presence of serial correlation using Breusch-Godfrey Serial Correlation LM Test and heteroscedasticity using Breusch-Pagan-Godfrey and both were not detected in the model. The results are presented in Table 8 and Table 9 below.

Table 8: Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.050535	Prob. F(1,22)	0.8242
Obs*R-squared	0.071046	Prob. Chi-Square(1)	0.7898

Table 9: Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.541090	Prob. F(7,23)	0.2033
Obs*R-squared	9.897601	Prob. Chi-Square(7)	0.1945
Scaled explained SS	19.16536	Prob. Chi-Square(7)	0.0077

In order to test for long run relationship in the model, ARDL Bounds Test was used. From the Table 10 and 11, the results indicate that there is a long run relationship between the variables since the value of the F-statistic is greater than the upper bound at all levels of significance.

Table 10: Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.880986	5

Table 11: Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.08	3
5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15

5. RESULTS AND DISCUSSION

5.1 THE IMPACT OF MACROECONOMIC VARIABLES ON MARKET CAPITALISATION

The results of the ARDL model used to estimate the impact of macroeconomic variables on market capitalisation are presented in Table 12.

In the short run, money supply, gross domestic product and inflation are positively and significantly related to stock market development. These results suggest that an increase in these variables leads to an increase in stock market development in the short run. The real exchange rate negatively influences market capitalisation, while lending rate does not have any significant influence stock market development.

Long run estimates indicate that gross domestic product is the only variable that has a positive relationship with market capitalisation. This shows that in the long run, an increase in national output has a positive influence on stock market development.

The coefficient of the error tem is also an indicator for goodness of fit of the model. The results indicate that the coefficient for error correction term is significant with negative expected sign (-0.241776), indicating that more than 0.23 percent of errors in the short run are corrected back to its equilibrium in the long run.

Table 12. Short run estimates and Long run Estimates

Variable	Short Run Estimates	Long Run Estimates
GDP	0.671941*** [0.0116]	1.894498*** [0.010]
CPI	2.466002*** [0.0015]	0.526535 [0.720]
M2	0.374804 *** [0.0102]	-0.333449 [0.659]
LR	0.121803 [0.5800]	-0.007242 [0.986]
RER	-4.648822 *** [0.0002]	-0.629567 [0.895]
ECT	-0.241776*** [0.0023]	
C		-4.112313 [0.847]

NB: market capitalisation is the independent variable, M2; money supply, LR; lending rate, GDP: gross domestic product, CPI; inflation and RER; real effective exchange rate, ECT is the error correction term, C is the constant term

***represents level of significance at 1%

The coefficient for GDP is positive and significantly related to market capitalisation both in the long run and in the short run suggesting that a healthy and stable economic situation has a positive influence on capital market development. The results are consistent with Lekobane and Lekobane (2014) and Jefferis and Okeahalam (2000). In addition, a positive relationship between GDP and stock market was found by Moolman and du Toit (2005), whilst Aron and Muelbauer (2002), found a positive, but insignificant relationship. Hsing (2011) found a positive influence of GDP on stock market development in the Johannesburg Stock Exchange using a GARCH model.

The results show that market capitalisation has a negative relationship with the real exchange rate in the short run and a negative and insignificant relationship in the long run. Market capitalisation has positive relationship with inflation in the short run and this is consistent with what Fama and Shwert (1977), Chen et al (1986) and Fishers (1930) found. The explanation for this is the inflation hedge hypothesis, which states that stocks offer a hedge against inflation and the hedge is obtained when the investor is fully compensated for price rise through an increase in nominal stock returns.

Money supply (M2) has a positive and significant effect on market capitalisation in the short run. Arguments by Gupta and Modise (2011) posits that the increase in money supply creates an excess supply of money and this results in excess demand for equity through portfolio allocation and thereby increase in stock prices. In addition, Mukherjee and Naka (1995) confirm that the injections of money supply have an expansionary effect that boosts corporate earnings, which then gets reflected in the share price and hence leading to a positive relationship between the two variables. The long run estimates however indicate a negative and insignificant relationship between money supply and market capitalisation.

The lending rate is insignificant both in the long and short run. This result corresponds with that of Akpan and Chukwudum, (2014) who in their study found out that interest rate is not an important determinant when considering the changes in stock market as the impact of interest rates on the stock market was also insignificant. However, the study indicated that though insignificant, a continuous hike in interest rates will not be in the best interest of the economy of which the stock market is a part of. This is because high interest rates increase the cost of borrowing for investment purposes thereby creating a major deterrent to the growth of the stock market.

5.2 THE IMPACT OF MACROECONOMIC VARIABLES ON BOTSWANA BOND INDEX

Similar to the previous model, the impact of macroeconomic variables was measured on Botswana Bond Index. Short run and long run estimates are presented on Table 13.

Table 13. Short run estimates and Long run Estimates

Variable	Short Run Estimates	Long Run Estimates
GDP	0.004747 [0.9407]	-0.104204 [0.517]
CPI	-0.099202 [0.6357]	1.228869*** [0.000]
M2	-0.029861 [0.4233]	-0.036055 [0.632]
LR	-0.076409 [0.1665]	-0.203827*** [0.005]
RER	0.378263 [0.1992]	0.437909 [0.557]
ECT	-0.581363*** [0.0000]	
C		-1.211047 [0.650]

NB: Botswana Bond index is the independent variable, M2; money supply, LR; lending rate, GDP: gross domestic product, CPI; inflation and RER; real effective exchange rate, ECT is the error correction term, C is the constant

***represents level of significance at 1%

The results from Table 13 indicate that the only variables that have a significant relationship with the bond market are inflation and the lending rate. In the long run, inflation has a positive and significant influence on the Botswana Bond Index, while the lending rate has a negative relationship with the Botswana Bond Index. Theoretically, interest rates have a negative impact on bond market development. This is because high interest rates increase the cost of borrowing for investment purposes therefore reducing bond market development. Our results, therefore, corroborates this view as evidenced by the negative relationship between the bond market index and the lending rate.

Similar to the first model, the coefficient for error correction term is significant with negative expected sign (-0.581363), indicating that errors in the short run are corrected back to its equilibrium in the long run.

6.   CONCLUSION AND POLICY IMPLICATIONS

The paper explored the impact of macroeconomic variables on capital market development in Botswana using quarterly data for the period 2006Q1-2017Q4 for stock market development and from 2010Q1-2017Q4 for the bond market. The main objective was to determine the effect of macroeconomic variables on stock market development measured with market capitalisation and on the bond market development measured by Botswana Bond Index using Auto Regressive Distributed Lag (ARDL) bounds test framework. ADF test and PP test have been applied to check the stationarity of data.

 The study revealed that money supply, gross domestic product and inflation have a positive and significant impact on with stock market development while a negative relationship exists between real exchange rate and stock market development in the short run. In the long run however, gross domestic product has a positive and significant relationship with stock market development. For the bond market, none of the variables are significant in the short run, however, in the long run, inflation rate and lending rate have a significant impact on bond market development.

Policy makers should develop strategies for attaining optimum levels of broad money growth because an increase in money supply leads to an increase in stock market development. The study found that money supply is one of the macroeconomic factors that promotes the growth of stock market. Expansionary monetary policy is prudent for stock market development, however the growth in money supply should not be in such a way that it is inflationary. GDP yielded a positive and significant impact on the stock market, both in the short run and in the long run. GDP is the most crucial economic indicator which tells us about the health of our economy. Therefore, the stock markets can be flourished with economic growth of the nation and policy makers should strive to improve growth in order to grow the stock market. In order to develop the bond market, there is need to keep lending rates low because there is a trade-off between lending rates and bond market development.

REFERENCES

Acikalin, S. Aktaş, R. and Unal, S. (2008). Relationships Between Stock Markets and Macroeconomic Variables: An Empirical Analysis of the Istanbul Stock Exchange. *Investment Management and Financial Innovations*, Vol.5, No.1.

Aggarwal, R. (1981). Exchange Rates and Stock Prices: A study of the US capital Markets Under Floating Exchange Rates. Akron Business and Economic Review, Vol. 12, pp 7-12.

Aron J and Muellbauer J. (2002). Interest rate effects on output: evidence from a GDP forecasting model for South Africa. IMF Staff Papers, Vol. 49, pp.185 - 213.

Bagehot, W. (1873), Lombard Street (Edition). Homewood, IL: Richard D. Irwin.

Black, F., Jensen, M. and Scholes, M. (1972) 'The capital asset pricing model: some empirical tests', in Jensen, M.C. (Ed.):   Studies in the Theory of Capital Markets, pp.79–124, Praeger, New York.

Chen, S. Roll, F. and Ross, S., (1986). Economic Forces and the Stock Market. *Journal of Business*, Vol. 59, pp. 505-523.

Chepkoiwo, N, K. (2011). Factors Affecting the Development of Emerging Capital Markets. The Case of Nairobi Stock Exchange.

El-Wassal, K, A. (2013). "The Development of Stock Markets: In Search of a Theory," *International Journal of Economics and Financial Issues*, Econjournals, Vol. 3, No.3, pp. 606-624.

Fama, E., and French, R. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance*, Vol. 51, pp. 55-84

Fama, E. F. (1981). Stock returns, real activity, inflation and money. The American Economic Review, Vol. 71, No.4, pp.45-565.

Fama, E. F. and Schwert, G. W. (1977), "Asset Returns and Inflation", *Journal of Financial Economics, Elsevier*, Vol. 5, No. 2, pp. 115-146.

Fama, E. F. (1970), "Efficient capital markets: A review of theory and empirical work", *The Journal of Finance*, Vol. 25, No. 2, pp. 383–417.

Fisher I. (1930). The Theory of Interest: As Determined by Impatience to Spend Income and Opportunity to Invest it. Macmillan, New York.

Friday E. Nkwede. (2017). Selected Macroeconomic Factors versus Bond Market Development in Nigeria. *International Journal of Business and Management Invention,* Vol, 6, No.4, pp. 88-97.

Githinji, G. (2013), The Effect of Selected Macro-Economic Variables on Bond Market Development in Kenya, Masters Dissertation

Goldsmith, R. (1969), "Financial structure and economic development". *New Haven: Yale University Pres*s.

Gupta, R., & Modise, M. P. (2013), "Macroeconomic variables and South African stock return predictability", *Economic Modelling*, Vol. 30, pp. 612-622.

Hsing Y. (2011). The Stock Market and Macroeconomic Variables in BRICS Country and Policy Implications, *International Journal of Economics and Financial Issues*, Vol.1, No.1, pp. 12-18.

Jefferis, K. R. and Okeahalam, C. C. (2000), "The Impact of Economic Fundamentals on Stock Markets in Southern Africa", *Development Southern Africa*, Vol. 17, No. 1, pp. 23-51.

Jefferis, K. R. and Tacheba, A. (2016), Botswana Financial Sector Overview.

Jorion, P.(1991). The Pricing of Exchange Rate Risk in the Stock Market, *Journal of Financial and Quantitative Analysis*, Vol. 26, No. 3, pp. 363-376.

Lekobane, O and Lekobane R. (2014). Do Macroeconomic Variables Influence Domestic Stock Market Price Behaviour in Emerging Markets? A Johansen Cointegration Approach to the Botswana Stock Market. *Journal of Economics and Behavioral Studies*, Vol. 6, No.5, pp. 363-372.

Levine, R. (1996), Stock markets: A spur to economic growth. Finance and Development, Vol.46, pp. 7-10.

Nkoro, E. and Uko, A.K. (2016) Autoregressive Distributed Lag (ARDL) Cointegration Technique: Application and Interpretation. Journal of Statistical and Econometric Methods, Vol. 5, pp. 63-91.

Maghyereh, A. I. (2002). Causal relations among stock prices and macroeconomic variables in the small, open economy of Jordan. Available at http://ssrn.com

Maysami R and Koh T. 2000. A vector error correction model for the Singapore stock market. *International Review of Economics and Finance*, Vol.9, pp 79-96.

McCarthy, J., Najand, M., and Seifert, B., 1990, "Empirical Tests of the Proxy

Hypothesis," *TheFinancial Review,* Vol. 35, pp. 59–78.

McKinnon, R. I. (1973), "Money and capital in economic development". Washington D. C. Brookings Institution Press.

Moolman E and Du Toit C. (2005). An Econometric Model of the South African Stock Market. *South African Journal of Economics*, Vol.8, No. 1, pp.77-91.

Mukherjee T and Naka A. (1995). Dynamic relations between macroeconomic variables and the Japanese stock market: an application of a vector error-correction model. *The Journal of Financial Research*, Vol.18, No.2, pp. 223–237.

Ross, S. A. (1976). The Arbitrage Theory of Capital Asset Pricing. *Journal of Economic Theory*, Vol. 13, pp. 341-360.

Shaw, E. S. (1973), "Financial deepening in economic development", *Oxford University Press*. New York, Vol. 270.

Talla, J. T. (2013). Impact of Macroeconomic Variables on the Stock Market Prices of the Stockholm Stock Exchange.

Thumrongvit, P. Yoonbai, K. and Pyun, C. S. (2013). "Linking the missing market: The effect of bond markets on economic growth," International Review of Economics & Finance, Elsevier, Vol. 27, C, pp. 529-541.

Yartey, C. A. (2008). The Determinants of Stock Market Development in Emerging Economies: Is South Africa Different? IMF Working Paper WP/08/32.African Department. International Monetary Fund.

OTHER BIDPA WORKING PAPERS

- **Working Paper No. 61:** Goitseone Khanie (2019). *Education and Labour Market Activity of Women in Botswana.*

- **Working Paper No. 60:** Koketso Molefhi (2019). *Financial Inclusion and its Impact on Employment Creation in Botswana.*

- **Working Paper No. 59:** Thabile A. Samboma (2019). *Challenges of Project Implementation in Local Government: The Case of Francistown City Council and Kweneng District Council.*

- **Working Paper No. 58:** Goitseone Khanie (2018). *Impact of Internationalization on Firm Performance in Botswana.*

- **Working Paper No. 57:** Kedibonye Sekakela (2018). *Financial Development and Economic Growth in Botswana.*

- **Working Paper No. 56:** Mpho Raboloko. (2018). *Determinants of Service Sector Growth in Botswana.*

- **Working Paper No. 55:** Tebogo B. Seleka and Thula S. Dlamini. (2018). *Competitiveness of ACP Sugar Exports in the Global Market.*

- **Working Paper No. 54:** Tebogo B. Seleka and David Mmopelwa. (2018). *Effects of Input Subsidies on Subsistence Crop Acreage Diversity in Botswana.*

- **Working Paper No. 53:** Johane Moilwa Motsatsi. (2018). *Determinants of Tourism Demand in the SADC Region.*

- **Working Paper No. 52:** Johane Moilwa Motsatsi. (2018). *Analysis of Tax Performance in Botswana: Tax Effort Index Approach*

- **Working Paper No. 51:** Tebogo B. Seleka and Ajuruchukwu Obi. (2018). *Revealed Comparative Advantage in the Global Citrus Market and Implications for South Africa.*

- **Working Paper No. 50:** Goitseone Khanie. (2018). *Financing SMEs In Botswana: Factors Influencing Access to Credit*

- **Working Paper No. 49:** Marumo Omotoye. (2018). *Public Policy Implementation Prospects and Challenges in Botswana: Case of the National Policy on Care for People with Disabilities*

- **Working Paper No. 48:** Masedi Tshukudu. (2018). *The Relationship Between Electronic-Money Penetration and Household Consumption: VECM Granger Causality Analysis*

- **Working Paper No. 47:** Tshepiso Gaetsewe. (2018). *Determinants of Informal Sector Business Success in Botswana*

- **Working Paper No. 46:** Tshepiso Gaetsewe. (2018). *Determinants of Self-Employment in Botswana*

- **Working Paper No. 45:** Molefe B. Phirinyane. (2016). *Technology and the Nature of Active Citizenship: The Case of Botswana*

- **Working Paper No. 44:** Madala, Naledi C. and Phirinyane, Molefe B. (2016). *Strengthening Local Government Service Delivery Systems Through the Open Government Initiative: The Case of Botswana*

- **Working Paper No. 43:** Lekobane, Khaufelo R. and Mooketsane, Keneilwe S. (2015). *Examining Evidence of Feminization of Poverty in Botswana*

- **Working Paper No. 42:** Seleka, Tebogo B. and Kebakile Pinkie G. (2015). *Export Competitiveness of Botswana's Beef Industry.*

- **Working Paper No. 41:** Kaboyakgosi, Gape and Mookodi, Lillian. (2014). *Integrated Results Based Management in Botswana: Institutions, documentation and progress to date.*

- **Working Paper No. 40:** Sekakela, Kedibonye. (2014). *The Impact of Trading with China on Botswana's Economy.*

- **Working Paper No. 39:** Sengwaketse, Margaret. (2014). *Towards a Diversified Economy: A preliminary assessment of the potential, prospects and challenges for electricity exports from Botswana.*

- **Working Paper No. 38:** Lekobane, Khaufelo R. and Seleka, Tebogo B. (2014). *Determinants of Household Welfare and Poverty in Botswana, 2002/03 and 2009/10.*

- **Working Paper No. 37:** Seleka, Tebogo B. and Lekobane, Khaufelo R. (2014). *Public Transfers and Subsistence Producer Disincentives in Botswana.*

- **Working Paper No. 36:** Taye, Haile K. (2013). *Inflation Dynamics in Botswana and Bank of Botswana's Medium-Term Objective Range.*

- **Working Paper No. 35:** Grynberg, Roman and Sekakela, Kedibonye. (2013). *Water Pricing and Policy in Botswana.*

- **Working Paper No. 34:** Motswapong, Masedi and Grynberg, Roman. (2013). *Key Issues in the Textile and Clothing Sector in Botswana.*

- **Working Paper No. 33:** Taye, Haile K. (2013). *Is the Botswana Pula misaligned?*

- **Working Paper No. 32:** Grynberg, Roman and Motswapong, Masedi. (2012). *SACU Revenue Sharing Formula: Towards a Development Agreement.*

- **Working Paper No. 31:** Motswapong, Masedi and Grynberg, Roman. (2011). *Competition and Trade Policy: The case of the Botswana poultry industry.*

- **Working Paper No. 30:** Mmopelwa, David and Seleka, Tebogo. (2011). *Factors Underlying Communal Beef Cattle Marketing Decisions in Botswana: The role of public and private transfers.*