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**Master of Arts (Economics)**

**Analysis of Firm Capital Structure Decisions: The Case of Non-Banking Firms in  
Botswana**

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## DECLARATION

This study has not been previously undertaken and as such its content is my original work except where referenced. This study has not been submitted in support of an application for a similar degree or any other degree of this university or any other institution of learning.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

The sustained growth of the private sector is of paramount importance in developing countries; however, financing issues tend to be chief among a myriad of reasons for business failure in most of these developing countries (Abor, 2008). The increasing role that the private sector is expected to play in terms of providing employment, generating tax revenue as well as helping in poverty reduction is often undermined by this lack of financing.

In order to understand firm financing decisions, capital structure is often used. Capital structure refers to a firm's decision on how to efficiently mix debt and equity to finance their operations (Luigi and Sorin, 2009). Huong (2018) emphasized how there was a need for such since developing countries tend to have different institutional structures. These institutional structures are often underdeveloped and characterized by poor law, order and governance as well as underdeveloped capital markets and financial sector (Riaz et al, 2014 ; Rehman, 2016 ; Ater, 2017). As such, when a firm takes on too much debt, this may impair its credit rating, making the firm a risky vehicle for investment. Furthermore, it makes it harder for the firm to maneuver their way out of economic and business downturns. Nevertheless, too much equity use could signal poor use of existing capital. It is therefore of interest to policy makers to understand how well businesses in the country are able to arrange their capital structure. Capital structure of firms can have direct impacts on a country's investment prospects through such local firms as well as direct consequences on employment levels in the country.

In Botswana, there is a "heightened sense of urgency" with regards to funding small businesses, nurturing local entrepreneurs to form startups, attracting foreign domestic investment as well as improving and helping already existing firms carry out their businesses in a conducive environment that allows for growth opportunities.

There are several sources of finance in Botswana that include commercial banks, micro lenders, the Botswana Stock Exchange as well as various firm financing institutions set up by the Botswana government. These financing vehicles provide finance to firms in the country, allowing capital structure decisions to be made with ease and accessibility. This is more so that firms in developing countries obtain their financing in more “innovative and non-conventional ways” which include obtaining financing requirements from microlenders as a result of poorly developed stock markets (Rashem and Abdullah, 2018). These alternative financing institutions tend to have poor customer outreach and high interest rates. This implies that there is a high cost of debt that comes with poorly developed financial markets.

There is also a need to have an in-depth understanding on the efficiency of fiscal and monetary policies and their impact on the private sector as well as the effect of a country’s financial sector stability on its private sector and economy (Zinecker and Mokhova, 2014). The studies carried out with this particular focus still continue to offer results which vary per country. However, because of the specificity of the results, this enables researchers, policy makers as well as firm managers to make more informed and consequently, more appropriate decisions relevant to their economies. For example, Zinecker and Mokhova (2014) found that there were weaker relations between capital structure of firms in Greece and macroeconomic conditions. Such a result, in the light of how hard hit by the Global Financial Crisis Greece was, shed light on how Greek firms managed to persevere despite the challenges faced by the economy. Moreover, results from Mahmud (2003) on three Asian countries (Japan, Malaysia and Pakistan) in different stages of economic and corporate environments reveal how there tends to be similarities between developed and developing countries’ capital structure decisions of firms. However, upon further investigation, such similarities tend to be rooted in the prevailing macroeconomic conditions.

## **1.2 Problem Statement**

The need to investigate firms’ capital structure decisions hinges on the risks associated with the manner of financing (short term debt, long term debt, internal funds, equity or bonds) as well as the source of financing. Amidu (2014) argues that taking on too much debt may make highly

indebted firms susceptible to bankruptcy which may result in employee layoffs. This would inevitably increase the unemployment rate and burden on the government. Furthermore, there is a need to investigate the sectoral capital structures to ascertain whether there exists a significant difference in the manner firms in different sectors arrange and obtain their financing. In addition to this, macroeconomic conditions have been found to play a significant role in firms' capital structure decisions, however the results are inconclusive since differing results have been obtained from studies on effect of fiscal and monetary policies on capital structure decisions (Mahmud, 2003; Bokpin, 2009; Cekrezi, 2013; Chipeta and Deresa, 2016; Ater, 2017; Huong, 2018). This may imply that there exists a country-specific effect of macroeconomic conditions on capital structure. This then begs the question of how policy makers, specifically through the use of fiscal and monetary policies influence firms' investment decisions in Botswana. Moreover, macroeconomic conditions have a strong link to the development of a country (financially and otherwise). This then implies that the development of institutional structures as well as their ability to allow for the seamless attainment of capital by firms and consequently investing such in a profitable and meaningful way depends on a country's macroeconomic conditions. Botswana has, over the years intensified their diversification efforts with minimal results, despite the governments' capital provision drive through programs like CEDA and the NDB. As such, firm capital structure decisions as well as how they are affected by macroeconomic conditions warrants examination.

This study then seeks to bridge the knowledge gap by analyzing capital structure decisions of non-banking firms in Botswana. The study also investigates the effects of macroeconomic conditions on firms' investment behavior as measured through their capital structure decisions, with a specific focus on Botswana non-banking firms. This study's focus on non-banking sectors is based on the difficulty in comparing firms in banking sector and those who are not, mainly due to the regulations firms face regarding capital structure. Moreover, since Botswana's diversification efforts are targeted at expanding the economy's productive sectors in order to reduce dependence on the mining sector, the study seeks to focus on the capital structure of the firms in these other sectors. As a consequence, the study looks at the banking sector as part of the

sources of capital structure which they provide to firms in the country, hence the exclusion of the commercial banks and the Botswana Stock Exchange as firms in the study. The capital structure decisions of non-banking firms in Botswana are examined using a Two-step Generalized Method of Moments (GMM) which takes into account simultaneity issues in the dataset, as well as through Quantile regression in order to examine the sectors in depth.

### **1.3 Objectives of study**

The main objective of this study is to analyze capital structure decisions in Botswana

Its specific objectives are:

- Investigate the influence of macroeconomic conditions on firms' choice of capital structure;
- To compare capital structure decisions across industries/sectors;
- To examine the variations between the leverage ratios (long term debt ratio and short term debt ratio) and how they are influenced by changes in macroeconomic conditions

### **1.4 Hypotheses**

**Hypothesis 1:** Monetary policy indicators do not influence capital structure

**Hypothesis 2:** Fiscal policy indicators do not influence capital structure

**Hypothesis 3:** External Factor Conditions do not influence capital structure

### **1.5 Significance of Study**

There is a vast amount of literature on factors which inhibit private sector growth in Botswana that includes high utility costs and stringent business registration and licensing practices, limited management skills and lack of competitiveness (Sekwati, 2011; Mutoko, 2014; Motlhabane,

2015). However, the capital structure decisions of firms have not been extensively investigated in Botswana.

This study therefore adds to existing literature by carrying out an analysis of capital structure decisions made by non-banking firms in Botswana within a GMM framework. In addition, the study examines the effect of macroeconomic conditions on firm capital structure. It also incorporates external factor variables that take into account the business conditions firms face locally and globally. This departs from past empirical work such as Chipeta and Deresa (2016) by taking into account not only the fiscal and monetary policy indicators, but also the external factor variables. This study extends the scope of variables that had been used by Chipeta and Deresa (2016) whose study only considered fiscal policy variables and stock market development. Moreover, a decomposition of the sampled firms by sector and the influence of the above outlined variables in each sector and between sectors is done through the use of the Two Step-Generalized Method of Moments to take into account simultaneity issues in the dataset, as well as through Quantile regression in order to examine the sectors in depth. As is implied in most similar studies carried out across several countries, the effects of macroeconomic conditions on capital structure tend to vary. Therefore, in order for appropriate and focused policy design regarding local firms, country specific results have to be obtained, which is the focus of this study. The overarching intention of this study is then to obtain an indicative picture of how macroeconomic conditions affect firms in Botswana.

## CHAPTER TWO

### OVERVIEW OF BOTSWANA'S FINANCIAL SECTOR

#### 2.1 Introduction

This section seeks to give a brief overview of the financial sector in Botswana as well as the reforms that led to its subsequent growth. The sector has been characterised by steady growth as well as the incorporation of technology in its services. However, in terms of provision of financial avenues for firm funding, the sector has been lagging behind despite the sector's general growth trend.

#### 2.2 Overview of Botswana Financial Sector and Growth of Botswana Economic Sectors

The financial sector in Botswana has evolved over the years as the economy grew in size from 481.79 USD GDP per capita in 1966 to a 7523.22 USD GDP per capita in 2017. Such economic growth warranted a need for financial products and instruments for private individuals as well as for firms. This led to the formation of banks and other financial institutions and subsequently, adjustments to the regulations which allowed for growth of the sector.

Table 2.1 below shows a brief overview of financing institutions in Botswana given as a timeline that details the history of financial sector.

**Table 2.1 Brief Overview of financing institutions in Botswana**

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<b>Year</b>	<b>Institution</b>	
1911	Botswana Savings Bank	Set up as a branch of the South African Post Office Savings Bank
1950s	Barclays and Standard Chartered Bank	Incorporated outside Botswana
1964	National development Bank	Mainly set up with agriculture at the forefront
1970	Botswana Development Corporation	Established to invest in commercial and industrial projects through loans and equity finance

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1970	Botswana Building Society	Set up as a branch of the South African United Building Society
1970	Barclays and Standard Chartered	Incorporated in Botswana
1977	Botswana Building Society	Incorporated in Botswana
1982	Bank of Credit and Commerce Botswana	Established in Botswana
1989	Government of Botswana/World Bank Report	“Financial Sector Policies for Diversified Growth” report suggests reforms to the financial sector
1991	First National Bank, ANZ Grindlays, Zimbank	Entry into market after reforms
1992	Botswana Cooperative Bank, Stanbic	Entry into market after reforms
1997	Peo Venture Capital by Debswana	
2000	Bank of Baroda	
2001	Citizen Entrepreneurial Development Agency	Incorporated in Botswana
2002	Youth Development Fund	Set up to provide youth with loans (set up such that 50% of the loan was a grant hence only 50% was to be paid back)
2004	Local Enterprise Agency	Set up to assist entrepreneurs
2006	Bank Gaborone	
2007	Young Farmers Fund	Fund offered by CEDA
2008	Capital Bank	

Source: (Sekakela, 2018; Jefferis & Tacheba, 2010)

The first bank in Botswana was the Botswana Savings Bank (BSB), which was established by the South African Post Office Savings Bank in 1911. This was followed by the establishment of Barclays Bank of Botswana (BBOB) and Standard Chartered Bank of Botswana (SCBB) in the 1950s. Even though these two banks opened branches in the country, they were incorporated outside the country due to poor financial development. The country did not have a well-developed Registrar of companies as well as a stock exchange that could facilitate incorporation of the firms. In the years leading up to independence, the National Development Bank (NDB) was opened. Its main aim was to provide funding for farmers more so that the country was still heavily reliant on Agriculture. In the early 1960s, the Agriculture sector contributed over 35per

cent in value added to GDP (refer to Fig 2.1 below). Botswana Development Corporation (BDC) and Botswana Building Society (BBS) were established in the 1970s, with the BDC being formed as a response to the need for financial vehicles for commercial and industrial projects. Moreover, in the early 1970s, the industrial sector overtook the agriculture sector in terms of value added to GDP.

The preceding years were also followed by BBOB, SCBB and BBS being incorporated. In 1989, as per recommendation of the Financial Sector Policies for Growth report, there was establishment of Botswana Stock Exchange (BSE), the liberalization of commercial banking requirements and other financial sector reforms. As a result of these reforms, First National Bank (FNB), ANZ Grindlays, Zimbank, Botswana Cooperative Bank (BCB) and Stanbic Bank of Botswana (SBB) were able to enter the banking sector. The Services sector experienced a sharp increase in value added to GDP as a result (refer to Figure 2.1 below). However, from the late 1990s onwards, the Government of Botswana increased the funding platforms they provided to entrepreneurs in the country. This saw the formation of Citizen Entrepreneurial Development Agency (CEDA), Youth Development Fund (YDF), Local Enterprise Agency (LEA) and Young Farmers Fund (YDF) among others.

As noted from the above table, the level of financing, particularly to entrepreneurs was relatively low from independence until the late 1990s when the financial sector reforms which were restrictive to entry of new banks was introduced. The entry of new financial institutions fostered increased competition. Nonetheless, banks were and continue to cater mostly to large established businesses and individuals with loans. As such, there arose a need for organizations such as the Botswana Development Corporation, National Development Bank, Citizen Entrepreneurial Development Agency as well as Local Enterprise Authority alongside funding provided by ministries such as the Youth Development Fund.

With the increase in financial institutions, there was an increase in financial deepening as a result. In Table 2.2 below, we have Liquid Liabilities/GDP, which is a measure of the size of financial sector as well as Total Bank Credit/GDP which is the level of credit that commercial banks give to firms and individuals.

**Table 2.2 Financial Deepening**

The table below presents two measures of financial deepening and shows how Botswana's financial sector has grown for the period of 1976-2015.

Year	Total Bank Credit/GDP	Liquid liabilities/GDP
1976-1980	15.30	27.89
1981-1985	12.25	25.70
1986-1990	7.85	27.93
1991-1995	13.33	23.60
1996-2000	12.10	21.80
2001-2005	19.51	26.35
2006-2010	25.01	44.31
2011-2015	30.94	41.45

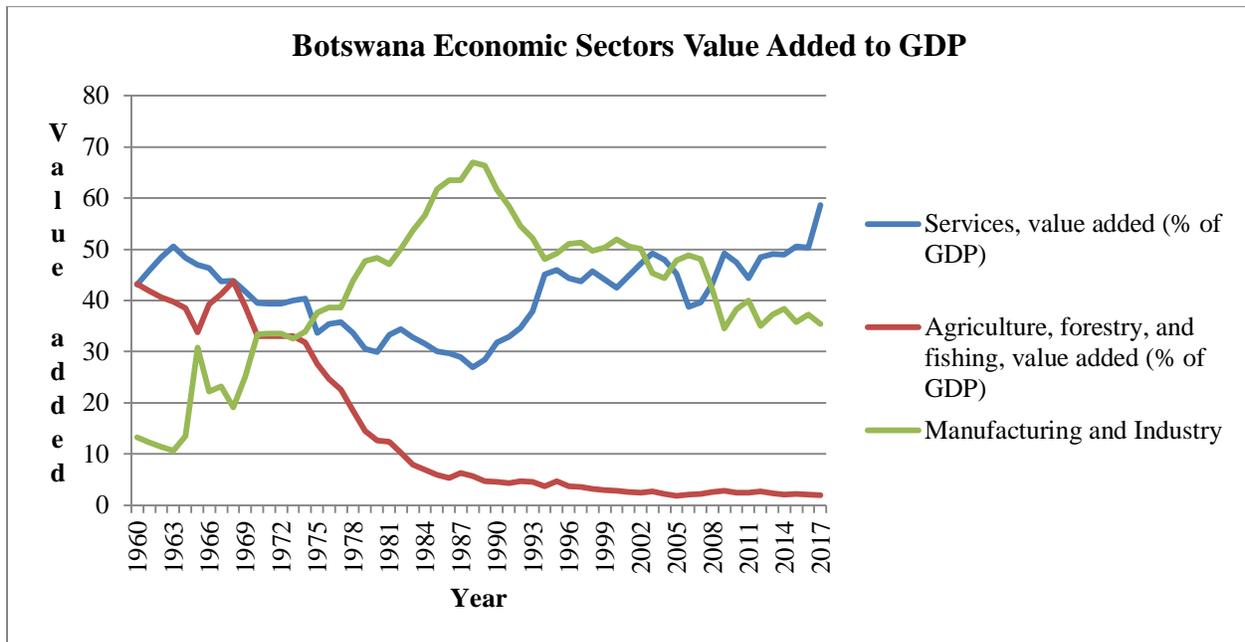
Source: Sekakela (2018)

In the period from 1976-1980, the Industry sector experienced an increase due to the discovery of diamonds. However, during this period, the Services sector and the Agriculture sector were also declining. The effects of the decline manifested in 1981-1990 with the Total Bank Credit/GDP declining in this period, moving from 15.30 per cent to 12.25 per cent and ultimately dropping to 7.85 per cent in the 1986-1990 period. The incorporation of BBOB, SCB and BBS as well as the entry of Bank of Credit and Commerce Botswana (BCCB) is reflected by the slight variation of the Liquid Liabilities/GDP over the same period. After 1990, both the Total Bank Credit/GDP and the Liquid Liabilities/GDP experience a steady increase up to 2015. In the 2011-2015 periods, Total Bank Credit/GDP and the Liquid Liabilities/GDP are 30.94 and 41.45 respectively. However, as has been pointed out by Sekakela (2018), although there is an increase in Total Bank Credit/GDP, most of the credit by banks is mostly to households. Despite Botswana's great strides in growing its financial sector, much is still lacking in terms of providing finance to local firms.

## 2.1 Growth of Economic sectors in Botswana

This subsection presents how the sectors of Botswana economy have contributed to the economy through their value added to GDP for the years 1960-2017.

**Figure 2.1 Value added to GDP (by share) of Economic sectors in Botswana**



Source: Author generated from World Bank Development Indicators

From the above figure, the value added to GDP by the Agriculture and the Services sector contribute above 40per cent in value added to GDP in 1960. However, after 1960, the Agriculture sector experienced a decline which went below 5per cent value added to GDP in 1990. Despite the introduction of government funding targeted at agriculture as well as institutions like NDB and funds like Young Farmer’s Fund, the agricultural sector’s contribution to GDP has remained stagnant. The Mining and Industry sector experienced an increase in value added to GDP beyond 33per cent in 1970 which was the time when diamonds were discovered in the country. The sector reached a peak in value added to GDP of beyond 60per cent in 1988 which was followed by a sharp decline due to the effects of the Great Depression on diamond prices. The contribution of services sector has grown steadily, surpassing Mining and Industry

sector which includes mining industry which was hard hit by reduced global demand due to the global financial crisis (UNDP, 2014). Agriculture sector continued to remain stagnant despite increased government intervention. The size, diversity and influence of the private sector in Botswana is still lacking, an argument made by (Motlhabane, 2015). This phenomenon ultimately points to the need to pursue overall development through the enhancement of financial markets and real sector growth (Eita & Jordaan, 2010). This calls for implementation of appropriate macroeconomic policies. Financial development enables firms to diversify their capital structure accordingly, implying that poorly developed stock markets leave firms with few options in terms of financing. In addition, foreign firms desiring to invest in the country may be deterred by the poor development of financial markets. Less developed markets tend to lead to less supply of capital hence a high price of debt.

### **2.3 Sources of Finance in Botswana**

There are several avenues through which firms in Botswana can obtain financing for investment purposes. Among these is the Botswana Stock Exchange, which gives firms an opportunity to raise funds through equity and bonds. There are other sources such as banks, investment companies as well as microfinance institutions which offer loans to firms. There are 10 commercial banks in Botswana which include Barclays Bank, First National Bank and Standard Chartered Bank (Bank of Botswana, 2018). The government also provides other financing avenues for firms and entrepreneurs who are otherwise not considered for funding by the aforementioned lending institutions for various reasons ranging from low/no collateralization or no proven business track record. Institutions like the Citizen Entrepreneurship Development Agency (CEDA), government banks like the National Development Bank (NDB) as well as ministerial finance sources such as the Youth Development Fund (YDF) under the Ministry of Youth, Sports and Culture (MYSC) exist to aid firms. This is a significant move away from what (Jefferis, The Botswana Share Market and its Role in Financial and Economic Development, 1995) referred to as a perceived lack of long term finance, although much can still be done by way of improvement

## CHAPTER 3

### LITERATURE REVIEW

Capital structure refers to the specific mix of debt and equity that a firm uses to finance its operations. It is essential in that how a firm decides to structure its capital has bearings on how it minimizes risk, cost of capital as well as the maximization of firm value

#### 3.1 Theoretical Literature Review: Capital Structure Theories

Several capital structure theories have been posited over the years. The most influential are outlined in the table below:

##### 3.11 Modigliani-Miller Theory

The theory, commonly referred to as the Capital Structure Irrelevance Theory, generally assumes that the firm has a set of expected cash flows. The Modigliani Miller theory is also based on the following assumptions which were laid out by Modigliani and Miller (1958). This theory assumes that there is a perfect capital market, investors are free to buy, sell and switch between securities due to availability of information, securities are indefinitely divisible, investors can borrow without restrictions, there are no transaction cost, corporate income taxes, profit retentions and investors are rational and well informed so they tend to maximize returns. Moreover, investors have homogenous expectations regarding cash flow. They emphasize capital structure irrelevance by the use of two propositions:

- **Proposition I: The value of a levered firm is the same as the value of an unlevered firm**
- **Proposition II: Given a perfect market, neither capital structure choice or dividend policy decisions matter**

These assumptions and their subsequent results were argued to be unrealistic by other researchers, hence the development of other capital structure theories such as Trade-off Theory and Pecking Order theory as a result. Consequently, Modigliani and Miller also relaxed one of their assumptions of no corporate income taxes. When taxes are included, specifically the tax

deductibility of interest by the firm; the value of the firm is enhanced by tax shield provided by the interest deduction. The tax shield lowers the cost of the debt implicitly, lowers the Weighted Average Cost of Capital (WACC) and as more debt is used, it increases the value of the firm (Modigliani and Miller, 1963).

### **3.12 Trade off theory**

According to Luigi and Sorin (2009), the Tradeoff Theory is a family of related theories which grew out of the Modigliani Miller Theory of Capital Structure Irrelevance. The theory explains the benefit of using leverage in financing operations of an organization because of the advantages that comes as a result of using debt. It advocates that firms limit the use of debt to halt bankruptcy related costs. It recognizes the advantages of using debt because tax is deductible which in turn reduces tax liability hence increasing tax shield. The firm can be exposed to the risk of uncertain cash flow streams and low tangible asset base hence companies should not place high confidence on the debt in their capital structure (Lemmon and Zender, 2010). As such, the theory posits that firms with a stable revenue stream and a sound asset base face a lower risk of bankruptcy. Therefore, such firms can apply a moderately higher level of leverage in their capital structure. Since debt to equity ratio increases there is a tradeoff between the interest tax shield and bankruptcy costs leading to an optimal capital structure.

### **3.13 Pecking Order Theory**

The Pecking Order Theory integrates the cost of asymmetric information into the theory of capital structure. According to Fama and French (2005), the Pecking Order Theory is the result of issuing risky securities such that transactions costs and the costs created by management's superior information about the value of the firm's risky securities overwhelm the costs and benefits proposed by the Trade-off model. It argues that the capital structure decision is affected by management choice of a source of capital that gives higher priority to sources that reveal the least amount of information asymmetry. As such, firms prefer to raise capital from retained earnings, debt and equity, with the order reflecting the least informational asymmetry.

Firms may sometimes choose to not follow the Pecking order so that it can maintain a spare debt capacity or hold internal earnings in favor of debt if it is believed that it will be essential to fund profitable future investment opportunities (Ryen et al, 1997).

### **3.14 The agency theory**

Agency cost theory which was posited by Meckling and Jensen (1976) discusses the conflict of interest between principals (shareholders) and decision makers of firms (managers, board members, etc.). This conflict stems from the differences in behavior or decisions of the parties (agents and shareholders) who often have different goals and different tolerances toward risk. The managers may focus on their personal agenda rather than maximizing shareholders' dividends. The main conflict that shareholders face is to ensure that managers (agents) do not invest the free cash flow in unprofitable projects. According to this theory increasing the debt to equity ratio would assist firms to make sure that managers are running the firm more efficiently.

### 3.2 Empirical Literature Review

Firm's capital structure decisions have not been investigated satisfactorily in the context of Botswana. As shown by a study conducted by Mapharing et al (2016), firms in Botswana are not consistent in their adoption and use of capital structure strategies. Their results also revealed an inclination of Botswana firm managers to prefer the use of external equity over retained earnings and debt. As such, the authors concluded that there is a possibility of unidentified factors that might be leading to the seemingly economic irrationality of firm managers in Botswana. The study hence drew attention to the need to further investigate the firm financing proclivities of Botswana firm managers. This was more so that the study results indicated a preference for the use of external equity over retained earnings. This result, given the relatively small size of the Botswana Stock exchange as well as what Mapharing et al (2016) referred to as the seemingly economic irrationality of firm managers in Botswana, indicated a need for further investigation of capital structure in Botswana.

Moreover, Chipeta and Deresa (2016) studied 412 firms in 12 Sub-Saharan countries<sup>1</sup> using unbalanced panel data analysed using the General Method of Moments (GMM). According to the study, Botswana's risk values were the highest of the 12 countries investigated, in addition to the highest average score for control of corruption as well as having the highest average number of days it took for a contract to be enforced. Firm size was found to be significantly related to long term debt ratio for Botswana, Kenya, Mauritius and South Africa. Moreover, GDP, interest rate, stock market development as well as banking sector development were all found to be insignificant in explaining capital structure decisions. The study demonstrated the need for further investigation, making use of other variables that could capture other potent aspects of the Botswana economy. In doing so, a need to incorporate economic sector analysis, a broader dataset as well as the use of methodology that separates the different macroeconomic forces in order to capture specific effects showed a need for further investigation.

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<sup>1</sup> Botswana, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, South Africa, Tanzania, Uganda, Zambia, Zimbabwe

This is in contrast with other studies such as the one carried out by (Çekrezi, 2013). Making use of multiple regression analysis on a sample of 69 non-listed SME firms in Albania, the findings indicate that GDP growth and interest rate have a positive and significant impact on capital structure decisions. The firm specific variables (which were used as controls) were also found to be mostly significant in predicting capital structure decisions of firms. These results are also in line with those obtained by (Bokpin, 2009). Through the use of Seemingly Unrelated Regression on panel data on firms from 34 emerging market countries, the results pointed to the significance of GDP growth rate, inflation, development in banking industry as well as bank credit in capital structure decisions. Development in stock market was found to be insignificant in capital structure decisions. As way of conclusion, Bokpin (2009) asserted that improvement in general economic conditions drives firms to resort to the use of their internal resources. Moreover, the study emphasized how the interactions in financial markets where firms obtain their financing can have tremendous implications on firm choice of financing.

Ater (2017) also came to the same conclusions as Bokpin (2009), indicating that there is a significant effect on the joint relationship between capital structure, firm growth and macroeconomic factors on firm value, whereas exchange rate had a significant positive relationship with firm value. The study, whose focus was on 36 non-financial firms listed in the Nairobi Securities Exchange made use of step-wise multiple regression analysis. The findings pointed out how capital structure on its own cannot determine firm value, since GDP growth tended to lead to firms making more use of long term debt, coupled with economic and internal factors such as growth rate of firm as well as exchange rate, leading to increase in firm value.

Abzari, Fathi & Nematizadeh (2012) made use of questionnaires to collect data on perceptions of managers on macroeconomic variables impact on capital structure decisions. Similar to the results found by Mapharing et al (2016) who also employed the same use of questionnaires on Batswana firm managers, Iranian managers were also found to express significant effect of exchange rate, inflation and interest rates on capital structure decisions. Nonetheless, there was no significant relationship between these perceptions and how the managers actually arranged capital structure. A different approach in methodology was employed by Riaz et al (2014) whose study on Pakistani macroeconomic conditions and firm choice of capital structure made use of

OLS technique with 3 dependent variables. That is, the definition of capital structure was not only considered as total debt ratio, but was also considered in terms of long term debt ratio and short term debt ratio. The findings of the study were consistent with similar studies, implying an influence of key economic factors on capital structure decisions. GDP growth rate was found to have a significant negative impact on all debt ratios whereas inflation rate was only found to have significant positive relationship on textile firms. In way of conclusion, the assertion made from the study results was that due to the undeveloped capital markets, firms made more use of financing from commercial banks due to the higher costs associated with floating shares.

Mahmud (2003) carried out a study with the intent of representing different stages of economic and social development, focused on listed firms in Japan, Malaysia and Pakistan. Japanese and Pakistani firms exhibited higher leverage ratios in excess of 70 per cent, a result which was due to differing reasons in each country. In Japan, higher gearing is to be expected since Japan is a developed country and as such firms tend to take advantage of the tax shield whereas in Pakistan, higher leverage is mostly due to undeveloped capital markets. Industry influence was also found to be the strongest in Japan and Pakistan, whereas results for firm specific factors were mixed. Moreover, GDP per capita significantly influenced growth in capital structure decisions of Japanese and Malaysian firms.

The use of several proxy variables for capital structure was also utilised by Perera (2015), making use of total, long term and short term debt ratios as dependent variables. The study, which utilised panel regression with fixed and random effects investigated 40 listed companies in the Colombo Stock Exchange. Perera (2015) investigated the influence of macroeconomic variables being GDP, inflation, stock market size, and banking sector development. Of these, only banking sector development was found to be significant. The study by Mokhova and Zinecker (2014) on 7 countries<sup>2</sup> representing developed and emerging markets also made use of three proxies for capital structure. Its focus was to find the influence of fiscal and monetary policy through the use of macroeconomic development indicators such as GDP growth rate and rate of unemployment on capital structure decisions. Mixed results as to the significance of fiscal

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<sup>2</sup> Czech Republic, Slovakia, Poland, Hungary, Germany, France, Greece

and monetary policy as well as macroeconomic development across the countries were obtained in their study sample, however, the study emphasized that external determinants of capital structure played a significant role in firm capital structure decisions.

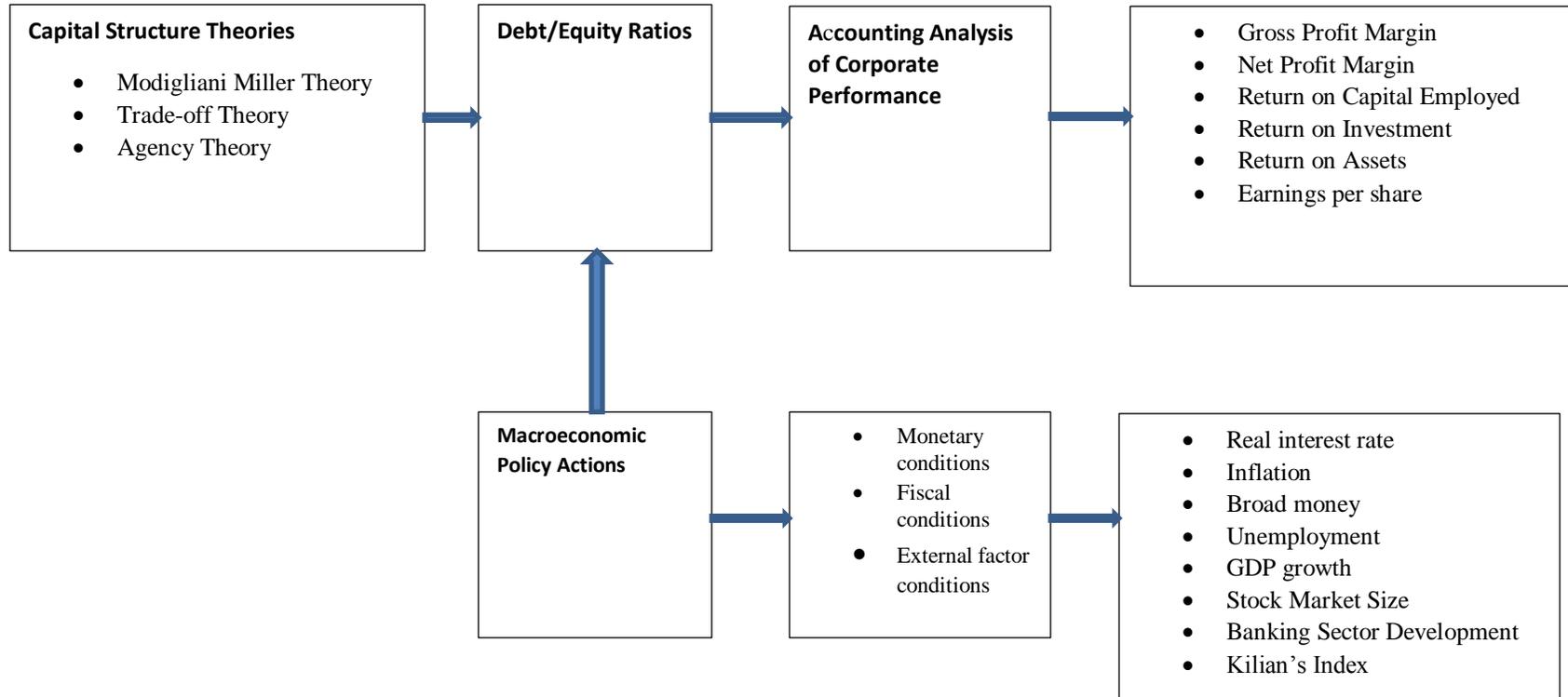
## **CHAPTER FOUR**

### **METHODOLOGY**

#### **4.01 Conceptual/Theoretical Framework**

The study of Capital structure is predicated on the several capital structure theories that have been posited over the years. These seek to explain how firms arrange their capital structure as well as seek to define an optimal capital structure. Capital structure decisions are proxied through the use of debt ratios which are then regressed against the macroeconomic policy actions (Monetary, Fiscal and External Factor conditions). The relationships obtained henceforth are explained through the use of the existing capital structure theories. The figure below provides a summary of the conceptual/theoretical framework used in this study.

**Figure 4.1 Conceptual Framework**



Source: (Adopted and modified from Abiodun, 2014)

In the above figure, capital structure theories such as the Modigliani Miller and Trade-off theories are used to explain how firms arrange their capital. Capital structure is proxied through the use of debt ratios. Debt ratios are then used in the analysis of corporate performance alongside other performance indicators such as Gross Profit Margin, Return on capital Employed and Earnings per share. In this dissertation, the debt ratios are then regressed against macroeconomic policy conditions which include monetary, fiscal and external factor conditions.

Consequently, the capital structure theories are used to explain how the impact of macroeconomic conditions affects firms, hence adding onto the literature on analysing corporate performance.

Empirically and methodologically, several studies have been carried out that investigated the impact of macroeconomic indicators on capital structure. The table below illustrates the methodologies that other researchers employed:

**Table 4.1 Summary of empirical methodologies**

<b>Methodology employed</b>	<b>Authors</b>
Simple Regression (OLS and Simple Multiple Regression)	Mahmud (2003), Abzari et al (2012), Cekrezi (2013), Mokhova & Zineker (2013), Riaz et al (2013), Ater (2017)
Panel regression: Seemingly Unrelated Regression, Dynamic Panel Regression (One Step and Two Step System/Difference GMM)	Bokpin (2009), Perera (2014), Chipeta & Deresa (2016), Huong (2018)

By its nature, the data made use of in carrying out research pertaining to capital structure is dynamic. The performance of a firm in one year is often dependent on its past performance. Moreover, the performance indicators of firms are tracked over several years, hence making the use of dynamic panel regression more suitable for such analysis. It is for these reasons that recently, more authors favour the use of Dynamic Panel Regression. As is emphasized by (Bokpin (2009); Perera (2014); Chipeta & Deresa (2016); Huong (2018)), GMM estimators are advantageous over linear regression techniques since they control for endogeneity in variables

being tested and they account for the autocorrelation that often arises due to the presence of a lagged dependent variable. Moreover, the System GMM is more efficient than the difference GMM, which is achieved by minimizing the loss of information during the transformations made in estimating difference and level equations.

As such, this study makes use of the Two Step System GMM, the results of which are analysed through the use of the Capital Structure theories.

#### 4.02 Dynamic Panel Data Models (A Brief Overview)

Panel regression model is used in carrying out this research. It has the advantage of pooling observations on a cross section of units over several time periods. The results obtained from the use of dynamic panel regression have increased degrees of freedom and reduced collinearity among the explanatory variables. Furthermore, panel data helps in controlling for individual heterogeneity due to hidden factors which can lead to biased estimations (Bokpin, 2009; Chipeta and Deresa, 2016; Huong, 2018). As per the empirical studies carried out before, the use of the dynamic panel regression is thus appropriate as it takes into account the dynamic nature of the data analysed in this study, as well as taking into account collinearity and heterogeneity between variables used in the dissertation.

The dynamic panel data general form is such that;

$$Y_{it} = \delta y_{i,t-1} + V_t \delta + e_{it} \quad (1)$$

where  $e_{it}$  is composed of  $\mu_{it}$  (the individual effect) and  $\nu_{it}$  (general error term). That is:

$$Y_{it} = \delta y_{i,t-1} + V_t \delta + \mu_{it} + \nu_{it} \quad (2)$$

Where the subscript  $i$  denotes the cross-sectional dimension and  $t$  represents the time series dimension. Furthermore,  $Y_{it}$  represents the vector of the dependent variables in the model, given at time  $t$  for each given firm  $i$ .  $V_t$  represents the vector of macroeconomic variables being either monetary, fiscal or external factor variables, given at time  $t$ .

In order to account for possible simultaneity in the study, the two-step system GMM is used. It is an improvement on the one step system GMM model and was suggested by Blundell and Bond (1998). They showed that the instruments in the first differenced GMM estimator tend to become weak and are less informative when the value of the GMM estimator,  $\alpha$  increases towards unity and as the relative variance of fixed effects increases. In order to overcome this weakness, the two step GMM improves upon the choice of weights used in calculating  $\alpha$ , defined as:

$$\hat{\alpha}_{dif} = (\bar{y}'_{-1} Z A_N Z' \bar{y}_{-1})^{-1} \bar{y}'_{-1} Z A_N Z' \bar{y} \quad (3)$$

Such that the weights used in calculating above GMM estimator are replaced with optimal weights obtained as:

$$A_N = (N^{-1} \sum_{i=1}^N Z_i' \hat{\mu} \hat{\mu}' Z_i)^{-1} \quad (4)$$

The GMM estimator,  $\alpha$  obtained using optimal weight is referred to as the two-step GMM estimator. The residual term,  $\hat{\mu}$  is obtained from the one step GMM. Finally, to test the two-step GMM estimators, autocorrelation tests at level 2 and the Sargan test in the instrumental variables is conducted.

#### **4.03 Diagnostic tests**

This subsection presents the diagnostic tests that were followed in estimating the Two Step GMM. As per convention, there are no endogeneity or exogeneity tests since the response variable is regarded as the endogenous variable and the explanatory variables are regarded as the exogenous variables. Moreover, the following post estimation diagnostic tests were carried out.

##### **a) Test for zero autocorrelation in second differences**

This test was done using the Arellano Bond test. The test checks whether there are enough lags to control for possible autocorrelation. The null hypothesis is such that:

*H<sub>0</sub>: there is no autocorrelation of order 2*

If the p-value is greater than 0.05, we cannot reject the null hypothesis at 5per cent significance level, implying that there is no autocorrelation of second order.

##### **b) Test for over-identifying restrictions**

This test was done using the Hansen test. The test checks the joint validity of the GMM and IV instruments. Furthermore, the rule of thumb is that the number of instruments does not exceed the number of panels (groups). If this condition is not met, we cannot rely on the Hansen tests, which is usually weak. The null hypothesis is such that:

*H<sub>0</sub>: over-identifying restrictions are valid*

If the p-value is less than 0.05, we reject the null hypothesis at 5per cent level of significance and conclude that the GMM and IV instruments are not jointly valid.

#### 4.04 Quantile Regression with Fixed Effects

In estimating the model using quantile regression, we now consider the model below for the conditional quantile functions of the response of the  $j^{\text{th}}$  observation on the  $i^{\text{th}}$  firm,  $Y_{ij}$ :

$$Q_{y_{ij}}(\tau|x_{ij}) = \alpha_i + x_{ij}^T\beta(\tau) \quad \text{where } j=1,\dots,m_i, \quad i=1,\dots,n \quad (5)$$

The  $\alpha$ 's have a pure location shift effect on the conditional quantiles of the response. The effects of the covariates,  $x_{ij}$  are permitted to depend upon the quantile,  $\tau$ , of interest but the  $\alpha$ 's do not.

#### 4.1. Model Specification

This study closely follows the model specification that was made use of by Huong (2018). Similar to Bokpin (2009) and Chipeta and Deresa (2016), Huong (2018) took into account the dynamic nature of capital structure decisions. The study made use of the two-step differenced GMM in order to obtain unbiased and consistent results by accounting for possible endogeneity issues. As such, the model specifications to be used in this study are as below:

$$\text{Model 1:} \quad Y_{i,t} = \alpha_0 + \alpha_1 Y_{i,t-1} + \alpha_2 M_t \quad (6)$$

$$\text{Model 2:} \quad Y_{i,t} = \alpha_0 + \alpha_1 Y_{i,t-1} + \alpha_2 F_t \quad (7)$$

$$\text{Model 3:} \quad Y_{i,t} = \alpha_0 + \alpha_1 Y_{i,t-1} + \alpha_2 I_t \quad (8)$$

Where  $Y_{it}$ , the dependent variable reveals the capital structure of listed firms in Botswana and is measured by two indicators: Long Term Debt Ratio and Short Term Debt Ratio. The lagged variable,  $Y_{i,t-1}$  is used to avoid persistence problems that might arise.

Moreover,  $M_t$  represents the monetary policy conditions being real interest rate, inflation rate as GDP deflator and broad money as a share of GDP.

$F_t$  represents the fiscal conditions being unemployment growth rate, GDP growth rate and savings as a share of GDP.

Additionally,  $I_t$  represents the external factor variables being stock market size, banking sector development and Kilian's index.

## **4.2 Definition and Justification of Variables**

The variables to be used in this study are now fully outlined and defined in the following section:

### **4.2.1 Dependent Variables**

As argued by Mokhova and Zinecker (2014), the use of two proxy variables for capital structure takes into account its nature such that consideration is made of the fact that firm debt and investment decisions can either be long term or short term.

#### **a) Long Term Debt Ratio (LTDR)**

The long term debt ratio is used to capture the long term effects of leverage dynamics as well as to provide a clearer picture through decomposition of the total leverage. Researchers like Huong (2018) and Mahmud (2003) made use of the long term debt ratio, obtaining results which differed in some instances from results obtained by the total debt ratio, hence providing more insight in their study results. The LTDR considers only the non-current assets which tend to be less liquid than current assets.

$$LTDR = \frac{\textit{Total non - current liabilities}}{\textit{Total assets}}$$

#### **b) Short Term Debt Ratio (STDR)**

Similar to long term debt ratio, the short term debt ratio was made use of by authors such as Bokpin (2009), Perera (2015) and Huong (2018) whose study results gave support to the argument regarding the debt maturity structure of firms over time, with different variables not found significant in long term proxy being significant in the short term debt ratio proxy. The short term debt ratio captures the short term in that it only takes into account current assets which are often highly liquid.

$$STDR = \frac{\textit{Total current liabilities}}{\textit{Total assets}}$$

#### **4.2.20 Independent Variables**

This subsection discusses the independent variables which have been divided into monetary condition variables, fiscal condition variables as well as external factor variables. This allows for easier and more focused analysis.

#### **4.2.21 Monetary Conditions Proxy variables**

##### **a) Real interest rate**

The real interest rate or effective interest rate is the nominal rate (that is controlled by the central bank) with inflation taken into account. An increase in the real interest rate is viewed as an increase in costs of borrowing, and as such tends to have a negative impact on debt ratio. There can be a negative or positive relationship between interest rate and capital structure: however, based on theory, it is expected that there will be a negative relationship in this study (Bokpin, 2009; Cekrezi, 2013; Mokhova and Zinecker, 2013).

##### **b) Inflation, GDP deflator (annual per cent)**

Inflation rate measure using the GDP deflator refers to the change in general price levels in an economy, and is a measure of the prices of all goods and services in Botswana. (Huong, 2014; Perera, 2014) found that inflation rate has a positive relationship with debt ratios, hence it is expected that there will be a positive relationship obtained in this study.

##### **c) Broad money as a share of GDP**

Following the study by Mokhova and Zinecker (2014), the inclusion of broad money as a share of GDP is meant to capture the monetary conditions in general. Broad money is defined as the money supply that is held in easily accessible accounts, with the exclusion of the most liquid forms of money commonly referred to as M1 or narrow money. As such, broad money is a general measure of the money supply in an economy.

#### **4.2.22 Fiscal Conditions Proxy variables**

##### **a) Unemployment, total (as a share of total labor force) (modeled ILO estimate)**

Unemployment rate is often defined as the number of people in an economy who are willing and able to work. Botswana's unemployment rate as at 2017 has been recorded at 18.1 per cent by (Statistics Botswana, 2017). According to the Pecking Order and Trade-off theories, one of the largest bearers of bankruptcy costs are the employees, hence it is important to understand how unemployment dynamics factor into capital structure decisions. Mokhova and Zinecker (2013) showed that unemployment growth rate can either positively or negatively affect capital structure.

##### **b) GDP growth (annual per cent)**

The Gross Domestic Product is, by definition, a monetary measure of the market value of all goods and services produced in a country within a given period of time, usually a year. Past studies such as the one by Chipeta and Deresa (2016) found GDP growth to be either positively or negatively related to debt ratios depending on the country under consideration. However, their study found a positive but insignificant relationship between debt ratios and Botswana GDP.

#### **4.2.23 External Factor Variables**

##### **a) Stock Market Size**

The size of a stock market indicates the ease with which firms can diversify their capital structure by either using equity from the stock market or through borrowing. Hence, countries with low or poor development of the stock market tend to have firms with a high debt ratio, not because they are aiming at taking advantage of the tax shield benefits but because they do not have full access to the stock market or the funds that they can source from the stock market tend to be lower (Mahmud, 2003). Empirically, studies have found that the size of the stock market can have both a positive or negative effect on capital structure.

$$\text{Stock Market Size} = \frac{\text{Market capitalization}}{\text{GDP}}$$

### **b) Banking Sector Development (BSD)**

Similar to stock market development, banking sector development gives an indicator of the financial system and the accessibility of different financial instruments available to firms. Past studies indicate that there is a negative effect of banking sector development on capital structure.

$$\text{BSD} = \text{Domestic credit to private sector by banks (per cent of GDP)}$$

### **c) Kilian's index of global economic activity**

Kilian and Zhou (2017) developed the index in 2009. The Kilian Index tracks global demand which is proxied by single voyage freight rates of dry bulk cargoes. It incorporates single voyage freight rates available for various bulk dry cargoes such as grain, oilseeds, coal, iron ore, fertilizer and scrap metal. Its use as an index for cyclical variation in global real economic activity has risen over the years. Its proponents argue that coincident indicators for real output such as global industrial production which tend to misidentify the timing of shifts in aggregate demand in commodity markets. Moreover, there exists a co-movement of the index with oil prices. This co-movement has been shown to track oil changes efficiently. Galebotswe (2012) showed that even though US real output and interest rates are negatively associated with Botswana's business cycle, these relationships are weak and hence should not be a concern for output that is non-mineral based. However, world oil prices are strongly countercyclical and may dampen economic activity. Furthermore, the index automatically aggregates real economic activities in all countries. Therefore, in order to account for global demand changes and their effect on Botswana firms, the Kilian index is seen as appropriate for use in this study due to its co-movement with world oil prices as well as the components used in its calculation. Kurronen (2018) study results indicated that for resource dependent countries, there was a positive relationship with oil price collapse and growth in firm leverage. This decline was partly attributed to a reduction in credit supply. As such, since Kilian's index has been shown to not only track real economic activity but oil prices as well, the positive relationship found in Kurronen's study was used in deducing apriori expectations for the index in this study.

### 4.3. Expected Signs

**Table 4.2 Expected Signs of Variables used - Summary**

Variable name	Expected sign
Real interest rate	+/-
Inflation rate	+
Broad money as a share of GDP	+/-
Unemployment, total (per cent of total labor force) (modeled ILO estimate)	+/-
GDP growth	+/-
Stock market size	+/-
Banking Sector Development	-
Kilian Index	+

Source: Author's computations

In Table 4.1 above, the expected signs of the variables to be used in the study are outlined as per the literature that was reviewed (refer to Appendix 1). It can be seen that from previous studies, real interest rate can have either a negative or positive effect on capital structure, whereas banking sector development has, from previous studies, been shown to have a negative effect on capital structure.

### 4.4 Data

The data used in this dissertation is secondary data obtained from individual annual financial reports for 25 firms out of the 34 listed in the Botswana Stock Exchange for the period 1995 - 2017. The sample period selected led to an unbalanced panel dataset. Moreover, capital structure decisions tend to become more nuanced over a longer period of time; hence, it was decided to use firms that have been listed on the stock exchange for a long period of time, as well as some firms with available data but were delisted or suspended. The inclusion of delisted firms was done as a means to derive all possible information regarding the listed firms in the Botswana Stock Exchange, more so that the listed firms in the Botswana Stock Exchange are few in number and most of them have not been operating for long time periods. That is, although the firms are delisted, their financials are still available to the public, such that all the data from the firms spanned from their time of listing until 2017. However, the use of delisted firms could provide retrospective insight in terms of policy recommendations. The data on the

macroeconomic variables to be used as proxies was obtained from the World Development Indicators (WDI) dataset. The data on Kilian index was obtained on L. Kilian's website. The data collected is unbalanced panel data with 25 firms collected over a time period of 23 years. Data collection and cleaning was done in Excel from whence Stata was used to analyse the data.

## CHAPTER FIVE

### RESULTS AND FINDINGS

#### 5.0 Introduction

This chapter presents the empirical results obtained from the Two-Step System GMM model as well as the break-down of the sectors which is estimated through the use of quantile regression for panel data using the Fixed Effects model. The results presented herein are presented thus: Section 5.1 focuses on the descriptive statistics of the variables used in the regression; Section 5.2 then focuses on the 3 models used to run the Two-Step GMM. Section 5.3 presents the summary and discussion of results of Two-Step System GMM and finally Section 5.4 focuses on Quantile Regression with Fixed Effects of the sectors and the discussion of salient results.

#### 5.11 Descriptive statistics of variables

In estimating the models, the sample data used was obtained from 25 firms in Botswana for the period of (1995-2017), such that the data obtained was unbalanced panel data. Table 5.1 below shows the descriptive statistics of the variables made use of in the study.

**Table 5.1 Descriptive Statistics of Model variables**

Variable	Observations	Mean	Std. Dev	Min	Max
Long Term Debt Ratio	298	185.3584	2585.238	-56.69775	43613.3
Short Term Debt Ratio	298	61.87274	480.7092	-61.18711	6184.765
Real Interest Rate	298	4.447415	5.870808	-5	14.8447
Inflation	298	6.951262	5.340846	0	16.1122
Broad Money as a % of GDP	298	43.36104	6.129988	19.79454	53
Unemployment	298	17.8303	1.664106	15.88	23.8
GDP Growth	298	4.127351	4.555215	-8	11
Gross Domestic Savings	298	34.73172	5.273522	27.31	44.2319
Market Capitalisation	298	30.30556	6.295195	6.89876	43.913

					9
Domestic Credit (by banks)	298	27.45815	5.611276	9.685511	34
Kilian Index	298	-6.012275	65.19884	-92	142.92
					3

Source: Author's computations

From the above summary of the descriptive statistics, it can be seen that the firms that were used in the sample had more long term debt such that the mean of the LTDR ratio was computed as 185.36 which was about 3 times as large as the STDR mean of 61.87. That is, on average, firms had long term liabilities that were about 185 larger than their total assets, with short term liabilities that were 62 times larger than their total assets. In addition, most of the macroeconomic variables were generally low. Inflation had a mean rate of 6.95 with several periods of very high inflation over the years used in the study, as shown by the maximum inflation rate of 16.11 in the year 1996 when there was a construction boom driven by the building of infrastructure for new mines and military airports. GDP growth had a mean value of 4.13 per cent with a minimum value of -8 per cent in 2009, spurred by the 2007-2008 recession and dropping mineral prices as well as sluggish demand.

The Kilian Index tracks global demand which is proxied by single voyage freight rates of dry bulk cargos. The index has a mean value of -6.01 over the study period, a figure which is juxtaposed between a minimum value of -92 and a maximum of 142.92. The maximum value of 142.92 occurred in 2007 where there was an economic boom in terms of demand. This was followed by the 2007-2008 recession which saw the global demand values as per the Kilian index dropping to -7 in 2011, a trend that continued up to 2016 with minimum value of the index recorded at -92. Botswana's market capitalization is generally low compared to that of countries like South Africa, whose maximum market capitalization is 332.2 per cent compared to that of Botswana at 30.31per cent. The tax paid by firms is given at -64.77, and indication of the low profits and prolonged periods of losses made by firms, some of which delist as a result.

## 5.2 Two-Step GMM estimation: Main Regression Models

This sub-section presents the results of the regressions that have been used to address the study's objectives. In order to do so, the variables have been grouped such that there are monetary condition variables, fiscal condition variables as well as external factor variables.

**Table 5.2 Model 1 (Monetary condition variables)**

The table below presents the results of Model 1 where the dependent variables, LTDR and STDR are regressed against monetary condition variables.

	<b>LTDR</b>	<b>STDR</b>
LTDR (T-1)	-0.2513	
	0.000***	
STDR (T-1)		-0.105
		.000***
Real Interest Rate	404.0191	37.7816
	0.004***	.006***
Inflation	454.3371	48.2522
	0.003***	.001***
Broad money as % GDP	-42.8422	-9.0133
	0.119	.023**
CONSTANT	-8066.433	-591.4637
	0.004***	.083*
Observations	273	273
Instruments	23	23
F test (p-value)	0	0
AR(1) test	-1.02	-1.43
(p-value)	0.306	0.152
AR(2) test	-0.97	-1.15
p-value	0.331	0.25
Sargan test	125.54	126.86
(p-value)	0	0
Hansen test	18.12	22.12
(p-value)	0.381	0.18

\*\*\* The significance levels at the 1%, \*\* The significance levels at the 5%, \*The significance levels at 1

Source: Author's computations

The two models used to test the hypothesis being addressed by Model 1 were all significant with the F-test p-values indicating that the models are highly significant. Moreover, the AR (2) test indicated no existence of second order autocorrelation, with insignificant p-values which led to failure to reject null hypothesis that there is no autocorrelation. The Hansen test of over rid instruments also showed that there are no estimation issues resulting from over-instrumentation. Such then is an indication that the model can be used with a considerable level of confidence in the instruments that were used. The lagged dependent variables were also all highly significant, a result which is indicative of the validity of using a dynamic panel model in the estimation of the results.

The results show that the real interest rate is highly significant in all the models, with a positive relationship with all the debt ratios. The real interest, which is the cost of borrowing, is then reflective of the increased level of borrowing by firms in both the long and short term. This result is in line with the studies by (Bokpin, 2009; Cekrezi, 2013; Riaz et al, 2014). As cost of borrowing goes up, firms increase the level of debt in their capital structure. This, as pointed out by Çekrezi (2013) could be indicative of the higher costs of floating shares to increase financing, more so that Botswana’s financial sector is still developing. Moreover, theoretically, an increase in borrowing could be indicative of a decreased premium from banks such that an increase in real interest rate does not offset the low premium provided by banks. Furthermore, inflation was also found to be highly significant and positively related to all the debt ratios. This, as explained by Bokpin (2009) and Riaz et al (2014), is indicative of the need for firms to finance the increased costs wrought on by increased higher raw material prices. Broad money as a per cent of GDP was, however, only negatively related to STDR. The implications of such a result are that as money supply increases, short term debt decreases.

**Table 5.3 Model 2 (Fiscal Condition variables)**

The table below presents the results of Model 2 where the dependent variables, LTDR and STDR are regressed against fiscal condition variables.

	<b>LTDR</b>	<b>STDR</b>
LTDR (T-1)	-0.223	
	.000***	
STDR (T-1)		-0.1058
		.000***
Unemployment	155.7952	21.3825
	.030**	0.219
GDP Growth	-26.1753	-0.4936
	.019**	0.907
Gross Domestic Savings	50.2634	5.1357
	0.144	0.516
CONSTANT	-7999.165	-915.5322
	0.003***	.001***
Observations	273	273
Instruments	23	23
F test (p-value)	0	0
AR(1) test	-0.99	-1.39
(p-value)	0.322	0.166
AR(2) test	-0.93	-1.31
p-value	0.352	0.189
Sargan test	129.7	130.6
(p-value)	0	0

Hansen test	7.54	17.44
(p-value)	0.975	0.425

\*\*\* The significance levels at the 1%, \*\* The significance levels at the 5%, \*The significance levels at 10%

Source: Author's computations

All the models above are significant with the F-test p-values indicating that the regressions are highly significant. Moreover, the AR (2) test indicates no existence of second order autocorrelation, with insignificant p-values which leads to failure to reject null hypothesis that there is no autocorrelation. The lagged dependent variables are also all highly significant, a result which is indicative of the validity of using a dynamic panel model in the estimation of the results. However, the Hansen test of over-rid instruments show that there is problems resulting from over-instrumentation only in the model estimating STDR but not for the LTDR model. As a result, even though Unemployment and GDP growth are significant in the model estimated for LTDR, the results obtained in that regression are not used because of the p-value of 0.975 which implies a non-usable regression. Moreover, none of the variables that have been estimated under the dependent variable STDR have been found to be significantly related to STDR. Chipeta & Deresa (2016) obtained similar results where GDP growth was found to be insignificant in capital structure decisions of firm managers. This result is a reflection of how the Botswana economy has continued to record an upward growth trend despite the lack of growth in most of the other productive sectors of the economy.

**Table 5.4 Model 3 (External Factor variables)**

The table below presents the results of Model 3 where the dependent variables, LTDR and STDR are regressed against external factor variables.

	<b>LTDR</b>	<b>STDR</b>
LTDR (T-1)	-0.1182	
	.000***	
STDR (T-1)		-0.1261
		.000***
Market Capitalization	121.6438	15.0915
	.081*	0.122
Domestic Credit (Banks)	-240.6533	-34.4121
	.026**	.049**
Kilian Index	-5.9184	-0.8419
	0.398	0.363
CONSTANT	-814.6179	-24.0185
	0.148	0.789
Observations	273	273
Instruments	23	23
F test (p-value)	0	0
AR(1) test	-1.04	-1.39
(p-value)	0.3	0.165
AR(2) test	-1.06	-1.36
p-value	0.29	0.173
Sargan test	213.29	127.18
(p-value)	0	0
Hansen test	22.93	23.96
(p-value)	0.151	0.121

\*\*\* The significance levels at the 1%, \*\* The significance levels at the 5%, \*The significance levels at 10%

Source: Author's computations

The F-test p-values indicate that the models are all highly significant, alongside the AR (2) test that indicate no existence of second order autocorrelation, with insignificant p-values which leads to failure to reject null hypothesis that there is no autocorrelation. The Hansen test of over rid instruments also shows that there are no problems resulting from over-instrumentation. Such then is an indication that the model can be used with a considerable level of confidence in the instruments that were used. The lagged dependent variables are also all highly significant, a result which is indicative of the validity of using a dynamic panel model in the estimation of the results.

From the results in the table above, Market Capitalization is positively related to LTDR. The size of the stock market positively influences long term debt and by extension, the level of investment

that firms undertake. Domestic credit (by banks) is negatively related to all debt ratios. The result is indicative of reluctance of firms to take on debt. Sekakela (2018) pointed out that household credit account for 60 per cent of the commercial bank loan book. As such, despite growth in credit provided by banks, most of it goes to households.

Furthermore, the size of the stock market positively influences long term debt and by extension, the level of investment that firms undertake. Lastly, the level of bank credit to local firms is negatively related to both the LTDR and STDR. The result is indicative of reluctance of firms to take on debt. Sekakela (2018) pointed out that household credit account for 60per cent of the commercial bank loan book. As such, despite growth in credit provided by banks, most of it goes to households.

### **5.3 Quantile Regression (with Fixed Effects) estimation of Sectors**

This subsection presents the results of the quantile regression results. The sectors have been subdivided into two groups being Services sector as well as the Mining and Industry (MI) sector. The dependent variables, LTDR and STDR are regressed against monetary condition variables, fiscal condition variables as well as external factor variables, done per sector in order to obtain richer, more in depth results to complement the Two Step GMM results obtained in previous subsection. In order to provide a comprehensive comparison of the capital structure of the economic sectors in which the sampled firms are in, the work of MacKay and Phillips (2005) was loosely followed, with adjustments made to suit the context of the current study.

The variation between and within industries was done through the use of;

- a) The two debt ratios
- b) Debt/ asset percentiles (calculated for each of the two debt ratios)

**Table 5.5 Descriptive statistics for Services sector**

The table below presents the descriptive statistics of the Services sector

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
Long Term Debt Ratio	96	7.504924	21.85955	-56.69775	43.5219
Short Term Debt Ratio	96	37.83058	98.14301	-44.75189	438.4461
Real Interest Rate	96	3.041667	5.75448	-5	11
Inflation	96	6.65625	5.626681	0	16
Broad Money as a % of GDP	96	43.76042	4.283984	38	53
Unemployment	96	17.23958	0.6112075	16	18
GDP Growth	96	3.510417	5.176861	-8	11
Gross Domestic Savings	96	31.97239	3.802367	27.31	44.23119
Market Capitalisation	96	31.30243	3.9132	24.656	38.736
Domestic Credit (by banks)	96	30.43499	2.158879	27	34
Kilian Index	96	-30.95833	46.16285	-92	52
Firm Size	96	19.64713	1.699678	15.42326	22.91612
Asset Structure	96	63.66042	32.10161	0	100
Profitability	96	15.39817	29.36202	-69.49757	155.9453
Firm Growth	85	2.831809	34.34136	-136.3759	70.28188
Tax (paid by firms)	96	-169.279	1355.542	-13150	282.9518

Source: Author's computations

The services sector is an amalgamation of 11 firms from five industries with a heavy focus on service delivery. Of these firms, one is a technology company, three firms are in the tourism industry, two are from the retail industry, one firm is from Support Services industry and the remaining three are investment firms. In the above table, firms in the Services sector prefer short term debt over long term debt as is shown by shown by a mean STDR of 37.83 which is five times as large as mean LTDR of 7.50. That is, firms had short term liabilities that were 38 times larger than their total assets, with their long term liabilities being 8 times larger than their total assets. The macroeconomic variables such as real interest rate, unemployment, gross domestic savings, market capitalization as well as domestic credit (by banks) have very low deviations away from the mean as indicated by the standard deviation. However, the LTDR and STDR have relatively large deviations away from the mean. The standard deviation of the LTDR indicates that firms can have long term liabilities that are about 27 times larger than their total assets, either above or below the mean LTDR of 7.50.

**Table 5.6 Descriptive statistics for Mining and Industry (MI) sector**

The table below presents the descriptive statistics of the Services sector.

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Std. Dev</b>	<b>Min</b>	<b>Max</b>
Long Term Debt Ratio	130	413.82	3910.714	-47.70922	43613.3
Short Term Debt Ratio	130	95.98	720.2077	-26.38626	6184.765
Real Interest Rate	130	4.07	5.98198	-5	11
Inflation	130	6.3431	5.315603	0	16
Broad Money as a % of GDP	130	44.12797	4.467492	38	53
Unemployment	130	17.23668	0.5560978	16	18
GDP Growth	130	4.01202	4.819468	-8	11
Gross Domestic Savings	130	33.81849	5.10272	27.31	44.23119
Market Capitalisation	130	31.94632	4.351052	24.656	43.9139
Domestic Credit (by banks)	130	29.77894	3.1152	20.48441	34
Kilian Index	130	-17.2399	63.53123	-92	142.923
Firm Size	130	18.80606	1.642727	13.40538	21.60408
Asset Structure	130	1483.15	11271.16	12.78092	92647.3
Profitability	130	303.8509	2283.311	-64.11351	19215.57
Firm Growth	116	-2387.071	13087.07	-90393.69	99.90632
Tax (paid by firms)	130	-11.68424	33.43836	-299.061	83.00525

Source: Author's computations

The Mining and Industry sector (MI), is an amalgamation of four Mining firms, four Energy firms, one Industrial Holdings firm, four Property firms and one Beverages firm. In the above table, firms in the MI sector prefer long term debt over short term debt as is shown by shown by a mean LTDR of 413.82 which is four times as large as mean STDR of 95.98. The LTDR of 413 indicates that MI sector firms have long term liabilities that are about 414 times larger than their total assets. This is in stark contrast to the Services sector whose LTDR and STDR are much lower at 7.50 and 37.83 respectively. The macroeconomic variables such as real interest rate, unemployment, gross domestic savings, market capitalization as well as domestic credit (by banks) have very low deviations away from the mean as indicated by the standard deviation. However, the LTDR and STDR have very large deviations away from the mean. The standard deviation of LTDR for MI sector firms is shown to have long term liabilities that are 3911 times larger than their total assets.

**Table 5.7 Lower quantile (0.25) [Firms with lower LTDR and STDR]**

The table below presents the regression results of the firms with a lower debt ratio, represented by the firms in the 25<sup>th</sup> percentile. The two dependent variables, LTDR and STDR are regressed against the monetary condition variables, fiscal condition variables as well as external factor variables as per model 1, 2 and 3 respectively. These were estimated for both the Services sector and MI sector.

Model	LTDR		STDR	
	Services	MI	Services	MI
1	-	Real interest rate*** (-) Inflation*** (-) Broad money as % of GDP*** (-)	-	Real interest rate*** (+) Inflation*** (-) Broad money as % of GDP*** (-)
2	-	- - -	Unemployment*** (-) GDP growth*** (+) -	Gross domestic saving*** (-) - -
3	-	-	Domestic credit by banks** (+) - -	Market capitalization*** (+) Domestic credit by banks*** (-) Kilian Index***(+)

Source: Author's computations

From the above table, in Model 1, in the MI sector, real interest rate, inflation and broad money as a per cent of GDP are negatively related to LTDR. For firms which are in the MI sector, an increase in real interest rate negatively affects their ability to use long term debt and hence hampers their investment ability. Moreover, an increase in inflation is indicative of an increase in costs, hence MI firms are more wary in obtaining long term debt. Broad money, which is a proxy for money supply tends to reduce the level of long term debt taken on by firms. Inflation and broad money as a per cent of GDP are negatively related to STDR. Real interest rate on the other hand is positively related to STDR. In terms of STDR, firms are not deterred by an increase in interest rate and hence take on more short term debt. This could be as a direct result of having to compensate for the non-use of long term debt. In Model 2, none of the variables are significantly related to LTDR in either sector. However, unemployment is negatively related to STDR in the Services sector whereas GDP growth is positively related to STDR. This relationship points to the fact that in most instances, wage bill can be paid using short term debt hence a reduction in employment is a direct cost reduction method. Moreover, as GDP growth increases, firms in

Services sector take on more short term debt. In the MI sector, gross domestic saving is negatively related to STDR. Similar to Model 2, none of the variables are significantly related to LTDR in Model 3. However, domestic credit (by banks) is positively related to STDR in the Services sector. Market Capitalization and the Kilian index are positively related to STDR in the MI sector whereas domestic credit by banks is negatively related to STDR. Services sector firms take on more short term debt from banks compared to MI sector firms which take on less short term debt from banks. The Kilian Index, which is a proxy for global demand, is positively related to STDR. This implies that as global demand increases, local firms take on more short term debt. This is in line with the results of (Domanski et al, 2015) which showed that since 2008 there was an increase in borrowing by oil sector firms. In Botswana, such borrowing by firms was therefore done through acquisition of short term debt in order to finance expansion of production capacity.

**Table 5.8 Upper quantile (0.75) [Firms with higher LTDR and STDR]**

The table below presents the regression results of the firms with a higher debt ratio, represented by the firms in the 75<sup>th</sup> percentile. The two dependent variables, LTDR and STDR are regressed against the monetary condition variables, fiscal condition variables as well as external factor variables as per Models 1, 2 and 3 respectively. These were estimated for both the Services sector and MI sector.

Model	LTDR		STDR	
	Services	MI	Services	MI
1	Real interest rate*** (-) Inflation*** (-) -	Real interest rate*** (-) Inflation*** (-) -	- - -	Real interest rate*** (+) Inflation*** (-) -
2	Unemployment*** (-) - -	- - -	Unemployment*** (-) GDP*** (+) -	- - -
3	Market Capitalization*** (-) - -	Market capitalization** (-) - -	- - -	Market capitalization*** (+) Domestic credit by banks*** (-) -

Source: Author's computations

In Model 1, for both Services and MI sectors, the real interest rate and inflation rates are negatively related to LTDR. An increase in real interest rate negatively affects these firms ability

to use long term debt for investment. However, real interest rate is positively related to STDR in the MI sector, with inflation being negatively related to STDR in the MI sector. Similar to firms in the lower quartile, MI sector firms are not deterred by an increase in interest rate and hence take on more short term debt. Moreover, just like the firms in the lower quartile, Unemployment is negatively related to STDR in the Services sector. They differ however in that LTDR also has a negative relationship with unemployment in services sector. Unlike firms holding lower debt, firms which have higher long term debt ratios are more susceptible to reducing costs by reducing the number of workers. GDP is positively related to STDR in the Services sector. Market capitalization is negatively related to LTDR in both the Services and MI sector. However, market Capitalization is positively related to STDR in the MI sector, with domestic Credit by Banks being negatively related to STDR in the MI sector.

The results obtained from the quantile regressions are generally consistent with the results of the main regression results. However, due to subdividing the sample, some results are not aligned with main regression results which are a consequence of the way in which macroeconomic conditions affect sectors differently. That is, in the main regression, the effect of some sectors tended to pull the results towards their favor. A notable example is the MI sector which had most firms in the dataset (130) whose leverage tended to be higher. The results of the main regression for real interest rate were positively related both STDR and LTDR. However, only the MI firms with higher leverage gave a consistent result. This phenomenon was also observed for the Inflation rate, Market Capitalization, Domestic Credit by banks as well as the Kilian's Index. In other instances, the variables were not statistically significant, pointing to the utility of having subdivided the sample in order to better discern the effects on the firms.

## Chapter 6

### Summary, Conclusion and Recommendations

This chapter presents a summary of the main conclusion and findings from the dissertation in subsection 6.1. It also presents the policy recommendations that the author makes as per the results from the study in sub section 6.2. Subsection 6.3 is then a delineation of the limitations of the current study as well as possible areas of further research that can be derived from the results of this study.

#### 6.1 Summary and Conclusion

Capital structure theories have been posited over the years as a means to try and explain, understand as well as inform capital structure decisions. The main theories that have been posited are the Modigliani-Miller Capital Structure Irrelevance theory, the Trade-off theory, Pecking Order theory as well as Agency theory. The main aim of the study was to analyze capital structure decisions in Botswana through the use of capital structure proxies being Long Term Debt Ratio (LTDR) as well as Short Term Debt Ratio (STDR). These were then regressed against variables which reflected monetary conditions, fiscal conditions as well as the economic and financial conditions within which firms find themselves (external factor variables). An unbalanced panel from the year 1995-2017 was used for 25 firms that were listed or had been listed in the Botswana Stock Exchange, provided those firms did not have any significant gaps in data.

The results of the study obtained from the Two Step System GMM show that the real interest rate, inflation and market capitalization are all positively related to debt ratios. The increase in real interest rate which results in increase in firms taking on both long and short term debt is indicative of the developing financial sector and as postulated by Çekrezi (2013), could be indicative of the higher costs of floating shares to increase financing. This result is contrary to what is posited by the Tradeoff theory as well as the modified Modigliani Miller theories which argue that firms take on more debt so as to enjoy the tax benefits. However, in this case, firms do not take on more debt as a way to enjoy tax benefits, but do so as a response to increased costs of

operating their firms. This is also true of inflation which increases costs of raw materials and as a result forces firms to take on more debt in order to finance their investments as well as production. The Pecking Order theory is also in line with the results obtained for real interest rate and inflation since firm managers prefer to use debt which has least amount of information asymmetry and also does not reduce shareholder's earnings from dividends in the short term. The analysis further reveals that market capitalization is positively related to the LTDR. This result is in agreement with the Trade-off theory which argues that firms take on more debt as a way of benefiting from tax shield and hence finance their investments. Broad money as a per cent of GDP as well as the Domestic Credit provided by Banks are both negatively related to all the debt ratios. The results obtained relate to the level of finance as well as the amount of money circulating in the economy. As such, as the level of money supply increases, the level of debt taken on by firms reduces. Similarly, as credit provided by banks increases, firms take on less debt. These results are in disagreement with both the modified Modigliani-Miller theory as well as the Trade-off theory. However, they could be signaling a possible agency problem where firm managers insist on using retained earnings over debt for investment purposes and hence reducing the amount of dividends that shareholder can be given.

The results obtained from the Quantile regression divided the firms by sector. The results obtained showed that firms in the lower quantile (0.25th percentile) in both sectors tend to make more use of short term debt. MI sector firms are negatively related to all monetary condition variables in terms of LTDR implying that these firms are negatively affected by adverse monetary conditions. As such, these decisions by firms show that they do not make use of debt in the long term as a tax shield as posited by the Trade-off theory. However, since firms in both sectors make more use of short term debt, they are affected differently by monetary, fiscal as well as external factor variables. Firms in the Services sector have unemployment negatively related to STDR, implying that as unemployment increases, their short term debt decreases. This result, points to the fact that in most instances, wage bill can be paid using short term debt hence a reduction in employment is a direct cost reduction method. Similarly, MI firms have The Kilian Index, which is a proxy for global demand, positively related to STDR. This implies that as global demand increases, local firms take on more short term debt. These results are in disagreement with the modified Modigliani-Miller and the Trade-off theories since firms make more use of short term debt hence are not investment orientated.

The analysis further reveals that firms in both sectors with higher debt ratios (firms in the 0.75th percentile) are affected in a similar way by most of the explanatory variables. Services and MI sectors are significantly affected by Real interest rate and Inflation which are negatively related to LTDR. An increase in real interest rate negatively affects these firms ability to use long term debt for investment. Moreover, MI sector firms are not deterred by an increase in interest rate and hence take on more short term debt. Furthermore, just like the firms in the lower quartile, Unemployment is negatively related to STDR in the Services sector. They differ however in that LTDR also has a negative relationship with unemployment in services sector. GDP is positively related to STDR in the Services sector.

The capital structure theories give differing results with each of the sectors whose firms are in the 75th percentile. However, most of the results obtained for firms in the upper and lower quartiles are similar in disagreeing with the Modigliani-Miller and Trade-off theories. This then implies that most firms in the country are not making use of debt in order to avoid tax shield but take on debt as a way to either cover costs or debt is more accessible and cheaper to local firms than equity. Furthermore, the results give credence to the Pecking order theory which posits that firm managers tend to make use of financing which has least information asymmetry.

In concluding, the results obtained show that the sampled local firms' capital structure contains higher debt. However, this debt is not held as a means to take advantage of the tax shield but rather is a consequence of a poorly developed financial sector. Moreover, the capital structure of firms in the MI sector show a more frequent significant relationship with the monetary, fiscal as well as external factor variables compared to the Services sector. Lastly, there is a significant relationship between unemployment and debt ratios when firms are divided by sector, a result which sheds light on how unemployment is linked to firm investment decisions.

## **6.2 Policy Recommendations**

Following from the results, several policy recommendations can be given. There is a need for a more focused and concerted effort to improve the financial sector in Botswana. Firstly, there is a need to create more accommodative policy that will allow the growth of firms to a point where

they can be listed on the Botswana Stock Exchange. Moreover, commercial banks have to provide suitable products for firms owners to allow for them to obtain their needed capital. This issue, as mentioned by Sekakela (2018) has seen commercial banks in the country gradually decrease firm financing in the late 1990s in favor of domestic credit. As such, there needs to be products made for firms which will favor both them and the banks, hence a need for the policy makers to step in and come up with an amicable solution to ease the burden from government schemes.

The MI sector has been growing slowly in the country, with the exception of the mining sector. The results showed that this sector tends to be more susceptible to change in the economy. Therefore, there needs to be investigations into the extent of the susceptibility to change since it may be able to reveal as well as shed light on stagnancy of firms and provide relevant policy guide on how to diversify the economy.

It was also noted from the results that there is a significant negative relationship between unemployment and the debt ratios. Local firms then prefer to take on fewer employees so as to reduce costs which would then be financed by debt, hence increasing possibility of bankruptcy as well as employees losing their jobs. The implications of this finding are such that they can help inform policies on wage bills as well as the minimum wage policies.

Lastly, there is a need for the government to keep financial records of small firms for more detailed analysis of firms in the country as well as more appropriate policy design for firms at their differing levels (SMMEs as well their well-developed counterparts).

### **6.3 Limitations of the study and areas of further research**

This study was carried out on non-banking firms hence the results are only applicable to those firms. Moreover, due to the small number of listed firms as well as the relatively short time the Botswana Stock Exchange has been operating, the sample size was restricted. Given this issue, a longitudinal study on SMMEs across the country should be carried out under the capital structure framework such that policy makers can be able to monitor the impact of policy changes as well as general economic environment on local firms. Another limitation of the study was from the

use of delisted firms. However, such use of the firms could provide retrospective insight for study of similar firms. Furthermore, further investigations into the subdivisions of the sub samples of sectors could be done, including firms with less than 5 years of listing (or with data available for such a length of time as they were excluded from this study).

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## Appendix 1: Macroeconomic factors and Capital Structure Empirical Literature Summary Table

Author(s)	Title	Scope of Study	Dependent variables	Independent variables	Findings (Significant variables)
Mahmud (2003)	The Relationship between Economic Growth and Capital Structure of Listed Companies: Evidence of Japan, Malaysia and Pakistan	-505 Japanese firms, 109 Malaysian firms and 104 Pakistani firms -Simple Linear Regression Analysis for period 1989-1998	-Total Liability to Total Asset Ratio -Total Debt to Equity -Long term debt to capital	-Growth in assets -Growth in sales -Firm size -Fixed Asset ratio -Return on Assets -Return on Sales -Degree of operating leverage -Dividend policy	<b>Total Liabilities to Total Assets:</b> [Japan: Size of firm (+), Size of Sales (-), Fixed Asset Ratio (-), ROA (+), ROS (-)], [Malaysia: Growth in assets (+), Growth in Sales (+), Size of firm (+), Fixed Asset Ratio (-), ROA (-)]
Bokpin (2009)	Macroeconomic development and capital structure decisions of firms: Evidence from emerging market economies	-34 <sup>3</sup> emerging market countries -Panel data regression with the Seemingly Unrelated Regression approach for period (1990-2006)	-Leverage -Debt ratio -External financing -Short term debts to total assets	-Dividend -Asset tangibility -Return on equity -Return on assets -Tobin's Q -Risk -Market cap -Bank Credit -Inflation -GDP per capita -Interest rate	<b>Leverage:</b> TANG (-), ROE (-), BC (+), GDPC (-) <b>Debt ratio:</b> ROE (-), GDPC (-) <b>External Financing:</b> TANG (-), ToQ (+), BC (-), INFL (+), INT (+) <b>Short term debt to</b>

<sup>3</sup> Argentina, Brazil, Chile, China, Columbia, Chez, Egypt, Greece, Hong Kong, Hungary, India, Indonesia, Israel, South Korea, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, Portugal, Russian Federation, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Taiwan, Thailand, Turkey, Venezuela, Zimbabwe

						<b>Assets: TANG (-), BC (+), GDPC (-), INT (+)</b>
Abzari et al (2012)	Analyzing the impact of Financial Managers' Perception of Macroeconomic Variables on Capital Structure of Firms Listed in Tehran Stock Exchange	-100 questionnaires filled by managers among top ten Iranian firms -Linear Regression Analysis for period (1 Mar 2012 – 2 May 2012)	-Debt ratio -Financial Leverage		-Perceived interest rate -Perceived inflation rate -Perceived exchange rate -ROE	-Regression analysis results indicate no significant relationship between perceived macroeconomic variables and the way Iranian corporate managers organize their capital structure -The financial managers express the significant effect of exchange rate, inflation rate and interest rate on capital structure of firms
Çekrezi (2013)	Analyzing the Impact of Firm's Specific Factors and Macroeconomic Factors on Capital Structure: A Case of Small Non-Listed Firms in Albania	-69 non listed SME firms in Albania -Simple Multiple Regression Analysis for period (2008 – 2011)	-Total Debt to Total Assets (TDTA)		-Tangibility (TANG) -Liquidity (LIQ) -Profitability (ROA) -Size (SIZE) -Business risk (RISK) -Non-debt tax shields(NDTSH) -GDP growth rate (GDP) -Prime Lending Rate (INT)	-TANG (+) -ROA (-) -SIZE (+) -RISK (+) -NDTSH (-) -GDP (+) -INT (+)
Mokhova and Zinecker (2013)	Macroeconomic factors and corporate capital structure	-From 7 European developed countries and emerging	-Total debt ratio -Long term debt ratio		-Long term interest rate -Short term interest	-Their findings show the importance of corporate debt structure

	markets <sup>4</sup> -Study carried out for period 2006-2011 using correlation and regression techniques	-Short term debt ratio	rate -Inflation as GDP deflator -M2 as a share of GDP -GDP -Tax revenue as a share of GDP -Income tax as a share of GDP -Unemployment rate	and country specifics -Government debt has a positive influence on capital structure for majority of countries in study sample -Inflation rate and interest rate effect on capital structure has mixed results across the countries
Riaz et al (2014)	Macroeconomic Conditions and Firm's Choices of Capital Structure: Evidence from Pakistan's Manufacturing Sectors	-236 manufacturing firms (from 5 major sectors) in Pakistan listed in Karachi Stock Exchange -OLS for period (2001-2010)	-Debt to Equity ratio -Debt to total assets ratio -Capitalization ratio	-GDP growth rate -Inflation rate -Lending rate  <b>Debt to Equity ratio:</b> GDP (-) for textile, engineering and cement sectors, INFL (+) for textile sector, INT (+) for chemical and (-) for sugar  <b>Debt to Total Assets Ratio:</b> GDP (-) for textile, chemical and cement, INFL (+) for textile, INT (-) for engineering and sugar but (+) for chemical  <b>Capitalization ratio:</b> GDP (-) for engineering and sugar, INT (+) for

<sup>4</sup> Czech Republic, Slovakia, Poland, Hungary, Germany, France, Greece

Perera (2014)	The Effects of Macroeconomic Conditions on Corporate Capital Structure: Evidence from Manufacturing Firms Listed in Colombo Stock Exchange	-27 listed manufacturing firms in Sri Lanka (Colombo Stock Exchange) -Panel data regression analysis for period 2004 - 2013	-Total debt ratio -Long term debt ratio -Short term debt ratio	-Stock market size -Banking sector development -GDP growth rate -Inflation	engineering, sugar, chemical, cement <b>Total debt ratio:</b> Banking sector dev (-) <b>Long term debt ratio:</b> Banking sector dev. (-) <b>Short term debt ratio:</b> Banking sector dev. (-)
Mapharing et al (2016)	An Empirical Investigation of Capital Structure Strategies Adopted by Botswana Firms – An Exploratory Study	-Questionnaires given to managers of domestic Botswana Stock Exchange Listed firms in order to carry out in-depth interviews -Six firms were chosen using convenience sampling	-Capital structure	-Perceived interest rate -Perceived inflation rate -Perceived exchange rate -ROE	-The results showed a lack of consideration for the theoretical underpinnings of efficient capital structure arrangement -Most firms in study sample indicated preference for using external equity followed by retained earnings and debt
Chipeta and Deressa (2016)	Firm and Country Specific determinants of Capital Structure in Sub-Saharan Africa	-412 firms from 12 Sub-Saharan African countries <sup>5</sup> -Unbalanced panel data regression for period 2004 - 2013	-Total debt ratio -Long term debt ratio	-Size -Growth of firm -Profitability -Tangibility -Risk -Tax -Rule of Law -Control of Corruption -Legal Rights index	<b>Total debt ratio (for Botswana only):</b> Size (+), Growth (-), ROE (-), TANG (+) <b>Long term debt ratio for Botswana only:</b> Size (+), TANG (+)

<sup>5</sup> Botswana, Ghana, Kenya, Malawi, Mauritius, Namibia, Nigeria, South Africa, Tanzania, Uganda, Zambia, Zimbabwe

				-Contract enforcement days -Cost of enforcement -Stock market capitalization to GDP -Private sector credit to GDP -GDP -Interest rate	
Ater (2017)	The Joint Effect of Firm Growth, Macroeconomic Factors and Capital Structure on the Value of Non-Financial Firms Listed on the Nairobi Securities Exchange	-Kenya -36 non-financial firms listed in NSE -Multivariate Regression for period (2010-2014)	-Tobin's Q (Firm value)	-Capital structure (Short term debt, Long term debt, Debt equity, Debt equity, Retained earnings) -Firm growth -GDP rate -Exchange rate -Real interest rate	DE ratio (+) RTE (+) FG rate (+) RGDP (-) INT (-) EXCR (+)
Huong (2018)	Macroeconomic Factors and Corporate Capital Structure: Evidence from Listed Joint Stock Companies in Vietnam	-464 listed firms in Vietnam -Two step GMM for period 2008 - 2015	-Total debt ratio -Long term debt ratio -Short term debt ratio	-Size -Profit -Growth -Tangibility -Liquidity -Risk -Tax -Inflation -GDP -INT -Corr -Regul -Law	-Macroeconomic conditions have an effect on capital structure -Of the macroeconomic variables, only economic growth and interest rate have shown no effect on capital structure -All financial development indicators/proxies save for financial activity have a significant

influence on capital  
structure  
-Mixed results were  
obtained regarding  
institutional  
development and  
capital structure  
decisions

## Appendix 2: Firms to be used in the study

Firm(s)	Sector
ACAP Resources, Anglo American, Lucara Diamond Corp, Botswana Diamonds	Mining
African Energy Resources, Engen, Raven Energy, Shumba Energy	Energy
BIHL	Insurance
BTC	Technology
Chobe Holdings, Cresta Marakanelo, Wilderness Holdings	Tourism
Furnmart, Choppies	Retail
G4S	Support Services
Letshego, Turnstar, Olympia	Investment
Primetime, RDC Properties, Letlole La rona, New African Properties	Property
Sechaba	Beverages
Sefalana	Industrial Holdings

### Appendix 3: Quantile Regression Results

#### Model 1: Monetary condition variables

##### Services Sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Real Interest Rate	-0.373	-3.516	-0.533	-1.420
	0.373	0.003***	0.804	0.460
Inflation	-0.527	-3.987	-1.049	-1.706
	0.211	0.001***	0.638	0.358
Broad Money	-0.299	-0.471	-0.178	-0.017
	0.179	0.139	0.507	0.966

##### MI Sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Real Interest Rate	-1.415	0.000	0.605	1.658
	0.000***	0.000***	0.000***	0.002***
Inflation	-1.177	0.546	0.478	1.995
	0.000***	0.000***	0.000***	0.001***
Broad Money	-0.318	0.000	-0.111	-0.372
	0.000***	0.546	0.000***	0.102

## Model 2: Fiscal condition variables

### Services sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Unemployment	-0.737	-17.500	-13.314	-5.263
	0.546	0.000***	0.000***	0.000***
GDP Growth	0.049	-0.338	1.556	0.412
	0.485	0.632	0.000***	0.000***
Gross domestic savings	0.009	1.473	-0.733	-0.056
	0.946	0.282	0.112	0.656

### MI sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Unemployment	0.000	-6.542	0.799	3.648
	0.325	0.372	0.508	0.517
GDP Growth	0.000	0.239	0.056	0.326
	0.340	0.769	0.747	0.492
Gross domestic savings	0.000	0.921	-0.324	0.095
	0.301	0.108	0.001***	.

### Model 3: External factor conditions variables

#### Services Sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Market Capitalisation	0.448	-4.067	6.350	-2,190.531
	0.488	0.02**	0.388	0.663
Domestic Credit (Banks)	-0.244	-0.309	0.769	-1,121.648
	0.501	0.218	0.013**	0.664
Kilian Index	-0.066	0.019	0.427	-4.625
	0.462	0.664	0.305	0.683

#### MI sector

	LTDR		STDR	
	0.250	0.750	0.250	0.750
Market Capitalisation	0.000	-0.508	0.153	0.433
	0.685	0.043**	0.000***	0.000***
Domestic Credit (Banks)	0.000	-1.295	-0.374	-2.238
	0.685	0.201	0.000***	0.000***
Kilian Index	0.000	-0.057	0.006	-0.016
	0.685	0.184	0.000***	0.023