AN ANALYSIS OF FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH NEXUS: EVIDENCE FROM THE SOUTH AFRICAN DEVELOPMENT COMMUNITY

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ABSTRACT

While there is vast evidence on finance-growth literature, the lack of consensus in the literature calls for continuous, renewed and more robust evidence. This study extends the empirical analysis of finance-growth nexus, by examining the possible non-linear relationship that could exist for the SADC region. The study analysed the impact of financial development on economic growth using annual panel dataset for 16 SADC countries from the period 1995 to 2019. The study used three proxies for financial development, namely, broad money, domestic credit to private sector, and domestic credit to private sector by banks. The study employed the system generalized method of moments (SYGMM) to address panel estimation problems, such as the presence of unobserved country specific effects, common time effects and potential endogeneity. The study found that liquid liabilities and domestic credit to the private sector have a negative and significant relationship with economic growth. The study found no non-linear relationship between financial development and economic growth when domestic credit to the private sector and liquid liabilities are considered. However, the results suggest an inverse U-shaped relationship between domestic credit to the private sector and economic growth. The results show a uni-directional causality between economic growth and financial development, confirming the demand-following hypothesis in the SADC region. For SADC to support growth through financial development, there is need to promote reforms that will address factors hindering the potentials of financial development in stimulating growth. This includes adopting appropriate policies that improve innovative financial infrastructure and promoting sound regulatory frameworks. In addition, it is recommended that pro-growth policies be strengthened so that growth subsequently pulls with it financial development.

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ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
EU	European Union
FE	Fixed effects
FIP	The SADC Finance and Investment Protocol
IMF	International Monetary Fund
GMM	Generalized Method of Moments
OECD	Organization for Economic Cooperation and Development.
OLS	Pooled Ordinary least squares
PCA	Principal Component analysis
SARB	South African Reserve Bank
RE	Random effects
RGDP	real gross domestic product
RTGS	Real Time Gross Settlement System
SADC	Southern African Development Community
SADCC	Southern African Development Coordination Conference
SMEs	Small and Medium Enterprises
SURE	Seemingly unrelated regression estimators
SYGMM	System Generalized Method of Moments
UNICEF	United Nations International Children's Emergency Fund
VECM	Vector Error Correction
VAR	Vector autoregressive

DECLARATION

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

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DEDICATION

I dedicate this thesis to my beloved mother Mrs. Meriam Heita who nurtured me into a disciplined, focused and determined lady. Thank you for being strong through all adversities mother, and supporting me in all accords, I am because of you. Exodus 20:5 “Honour your father and your mother: that your days may be long upon the land which the LORD your God giveth you”.

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The global financial crisis has substantially changed the perception of how financial markets impact on the real economy. While Levine (2005), suggested that financial markets provide important services to the economy and thereby foster growth, Prettner (2016) suggested that with recent developments in the financial environment, this relationship needs to be re-examined. Traditionally, the debate on the direction of causality between financial development and economic growth is four-fold, namely, the supply leading hypothesis, growth-driven finance hypothesis, bi-directional causality and the independent hypothesis. These debates provide significantly different implications for policy formulation.

The supply leading hypothesis asserts that financial development advances the process of economic growth (Goldsmith, 1969; Kalio *et al.,* 2015; Abel *et al.,* 2019). Here, financial development stimulates the allocation of capital, mobilization of savings through attractive investments, and lowers transaction costs of gathering information which propel economic growth. The growth-driven finance hypothesis states that it is increases in economic growth that lead to increased demand for financial services (Odhiambo, 2011). That is, economic growth generates new financial institutions and markets to satisfy the increased demand. The bi-directional causality is a combination of the supply leading and demand following hypotheses (Odhiambo, 2005). It is asserted that a country with a well-developed financial system could promote economic growth through technological progress, which in turn, induces high demand for financial arrangements and services. The banking institutions in responding effectively to the changes in demand, promotes a higher economic activity. The independent hypothesis argues that financial development and economic growth are not causally related and that the role of finance in promoting economic growth has been overstressed (Lucas, 1988).

Based on these postulated relationships, the financial sector development and economic growth nexus has been investigated and discussed extensively in economic literature.

The pioneer work of Schumpeter (1911) explains how banks actively stimulate economic growth. Based on this explanation, a number of arguments and empirical evidence have emerged as to why and how financial sector development is essential for economic growth. The study by Goldsmith (1969) was one of the first to empirically confirm the positive relationship between financial development and economic growth. Bencivenga and Smith (1991) asserted that financial intermediation increases efficiency before increasing the volume of investment and could be regarded as one of the reasons for the positive association between financial development and economic growth. While this concept has been increasingly supported with consistent empirical evidence (King & Levine, 1993; Hassan *et al*., 2011; Masten *et al.,* 2008), ongoing debates on the direction of causality suggest the need for renewed evidence on the relationship between financial development and economic growth.

There is vast evidence on the financial development and economic growth nexus, yet there is no consensus on the nature of the relationship or direction of causality. The debate on the positive impact of financial development on growth is ongoing and strongly supported by conclusions from cross-sectional studies (Uddin & Shahbaz, 2013; Adeniyi *et al.,* 2015). Evidence based on time-series and panel data techniques, however, show conflicting conclusions. For instance, Caporale *et al.,* (2015); Asteriou and Spanos, (2019); Assefa and Mollick, (2017) found a positive relationship between financial development and economic growth while Ang and McKibbin (2005), and Ono (2017) support the demand following hypothesis. Jedidia *et al.,* (2014) and Eita (2010) found a bi-directional relationship between financial development and economic growth. In addition, evidence of a non-linear relationship is still inconclusive, and many studies suggest an inverted U-shaped relationship

(Law and Singh, 2014; Adeniyi *et al.,* 2015; Ibrahim and Alagidede, 2018). Deidda and Fattouh, 2002; Rioja and Valev, (2004); Rousseau and Wachtel, (2002) examined the possible non-linear relationship between financial development and economic growth and observed that there is an inverted U-shaped relationship between finance and growth in the long-run and even spotting occasions of a negative relationship.

In the context of Africa, there is growing evidence of financial sector development and economic growth (Demetriades & James, 2011; Rousseau & D'Onofrio, 2013; Adeniyi *et al.,* 2015; Ibrahim & Alagidede, 2018). However, the strong need and potential for sustainable growth in the continent, suggest the importance of revisiting topics that are essential in addressing the problem of economic underdevelopment. The lack of consensus in the economic growth and financial market literature also suggests the need for country or region-specific studies for better policy options. Ibrahim and Alagidede (2018) highlighted the need for empirical studies to examine the threshold or the non-linear effect of financial development on economic growth. Several studies have investigated whether there is a threshold, above which the effect of financial development could be insignificant or even negative (Samargandia *et al.,* 2015; Ruiz, 2018). Discerning the turning point of the finance growth nexus is vital as it will allow policy makers to focus on other growth-enhancing strategies when the appropriate finance threshold has been achieved. To support this, the Bank for International Settlements and the International Monetary Fund (IMF) have also postulated that the level of finance is only good up to a point, after which it becomes a drag on growth (Law & Singh, 2014). Therefore, this study contributes to the growing literature by investigating financial development and economic growth nexus in the Southern African

Development Community (SADC).

1.2 Institutional Context

1.2.1 Financial Development and Economic Growth in the SADC region

The Southern African Development Community (SADC) is the predecessor of the Southern African Development Coordination Conference (SADCC), which was established in 1980. The SADCC was formed to drive the cause of national political liberation within Southern Africa, and to minimize the dependency specifically on the then apartheid era South Africa, via effective coordination and utilization of the specific characteristics and strengths of each member state (SADC, 2012). Subsequently, the SADCC was transformed into SADC in 1992, with the focus on economic integration and development. SADC aims to achieve economic growth and economic development, alleviate poverty, improve the living standards of the inhabitants of the Southern Africa community and buttress the socially marginalized through regional integration.

In light of the SADC's commitment towards the enhancement of regional integration, a Protocol on Finance and Investment was established in 1996. The protocol sets out the policy on development of banking, financial regulation, and investment, promoting sustainable and equitable economic growth and socioeconomic development. The financial reforms set within the Southern Africa community are centred on creating a functional and competitive banking environment. The financial sector has been liberalized through the removal of government restrictions and easing conditions of banking, enabling new financial institutions to emerge and develop new products, thereby contributing towards strengthening the financial sector (SADC, 2012). Having realized the paramount importance of a financial system in an economy, most countries in the Southern African community explored liberalized financial systems and thus far, such liberalized policies have yielded a positive effect on economic growth in the region.

In terms of progress towards stimulating financial sector development within the region, SADC recorded notable progress in financial markets and regional integration in the area of payments systems in the region. At a national level, all the 16 SADC Member States have implemented the Real Time Gross Settlement System (RTGS) which facilitates and settles payment obligations between participating banks on either real-time basis transactions, and enhances efficiency in payments. Also, to foster and improve the safety of payments and efficient settlement processes in the region, the SADC RTGS system was developed to support the modernization and harmonization of payments and clearing systems both domestically and regionally (SADC, 2020). The SADC RTGS further aims to lower transaction costs as it minimizes the need for correspondent banks. All Member States (except Comoros) are participating in the SADC RTGS, with a total of 84 participants comprising of 8 central banks and 76 are commercial banks. It is important to note that from the 15 central banks participating in the SADC RTGS, not all of them are participating as settlement banks. Since its inception in 2013, the SADC RTGS performed impressively with more than 1.7 million transactions settled as at end of March 2020, representing 6.87 trillion South African rand (SADC, 2020).

In 2016, the SADC Council of Ministers approved the SADC Strategy on Financial Inclusion programs in all Member States with the aim to support financial development. The plan was approved to pave a way for implementation of activities and aid member states to develop their own strategies and programs aimed at enabling the Small and Medium Enterprises (SMEs) to participate and contribute to economic activity (SADC, 2019). However, access to finance, remains one of the main bottleneck in many SADC countries. To enhance financial inclusion in the region, mobile money has gained momentum in most Member States and the Committee of Central Bank Governors has developed and adopted mobile money guidelines. However, only 27% of the adults are using mobile money (SADC, 2019). The impact that these

developments have had on economic activity in the region and continual evolvement in the financial landscape substantiate the need for a re-assessment of the finance-growth nexus.

Stylised facts on SADC indicate that the level of financial development is diverse across countries. For instance, 90%, 86% and 81% of the adult population in Mauritius, South Africa, and Lesotho are respectively included in the banking sector. Countries such as the Democratic Republic of Congo, Malawi and Mozambique are experiencing extremely low levels of financial inclusion, with over 50% of the population lacking access to formal financial services. It appears that upper-middle-income countries tend to have higher levels of financial inclusion which is mainly driven by the banking sector. However, low, and lower-middle income countries such as Lesotho and Zimbabwe with relatively high rates of financial inclusion achieved this through other formal and informal financial mechanisms. In Lesotho, financial inclusion among the non-banked is mostly driven by funeral cover, whereas in Zimbabwe it is propelled by mobile money and remittance services. In addition, rural areas are inclined to face lower levels of inclusion with 45% of rural inhabitants facing exclusion compared to only 23% in urban areas (SADC, 2016). Majority of the included population in upper-middle-income countries, like Mauritius, South Africa, and Namibia, are considered to have or use at least 3 financial products compared to the Democratic Republic of Congo, Zambia, Mozambique, and Malawi where the majority only have/use one financial product (SADC, 2016).

1.2.2 The financial systems in SADC and Economic Growth

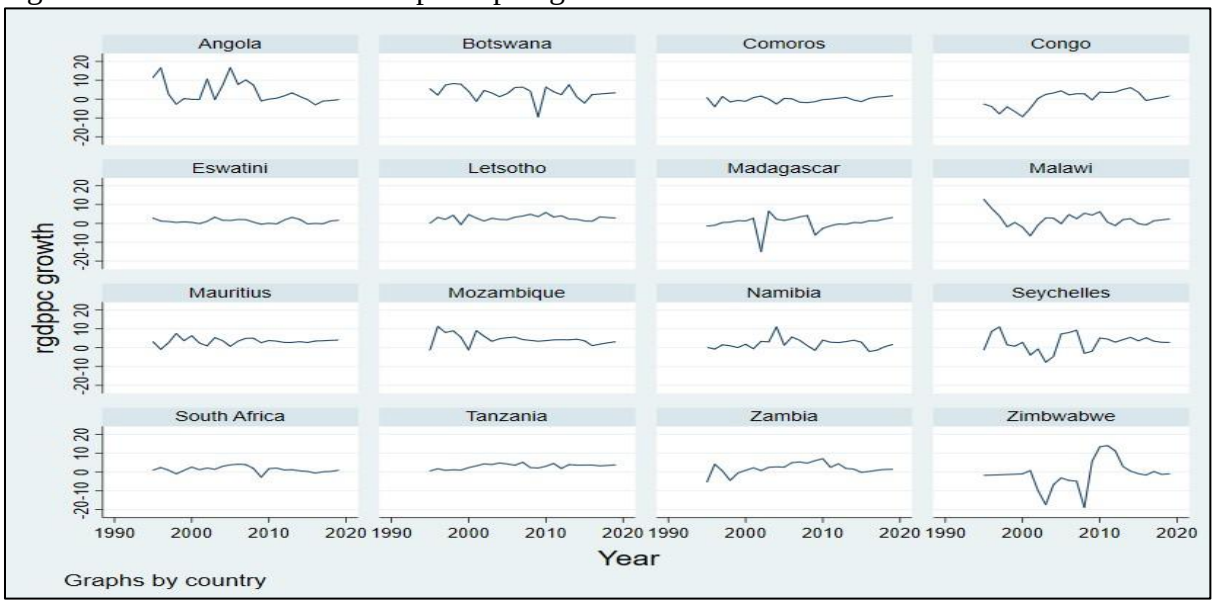
The financial structures of SADC Member States constitute primarily of central banks, deposit taking institutions (commercial banks), money lenders (micro-financial institutions), non-bank deposit-taking institutions (unit trust companies, pension funds etc.), foreign exchange dealers, mutual banks, stockbroking firms and primary dealers (SARB, 2014). The financial system of most SADC countries are, however, largely dominated by banks, with a few countries such as

South Africa, Namibia, Mauritius, and Zimbabwe having relatively developed non-bank financial sectors. Botswana, Mauritius, Namibia, and South Africa are the most banked countries in the SADC region in terms of usage and access to banking services (Schoombee, 2011). South Africa's financial sector has relatively better levels of financial inclusion and depicts better financial depth and efficiency compared to others. This is indicated by the number of branches, deposits, and the level of credit to the private and domestic sectors.

1.2.3 Economic growth rate trends for SADC

The SADC region registered a decline in real gross domestic product (RGDP) over the past years. For example, the RGDP growth rate for the region declined from 4.5% in 2010 to 1.4% in 2019 (SADC, 2016). Generally, there has been fluctuations in RGDP growth rate within the period 2010 to 2019. The RGDP growth rate declined from 4.5% in 2010 to 4.2% in 2011, increased to 4.5% in 2012 and plummeted significantly between 2013 and 2016. In 2017, the region started recovering, recording an average growth rate of 2.1% compared to 1.5% in 2016, but declined to 1.9% in 2018 and to 1.4% in 2019 (SADC, 2016).

Figure 1. 1: Trends of real GDP per capita growth in SADC



Source: Author's Computations using Stata

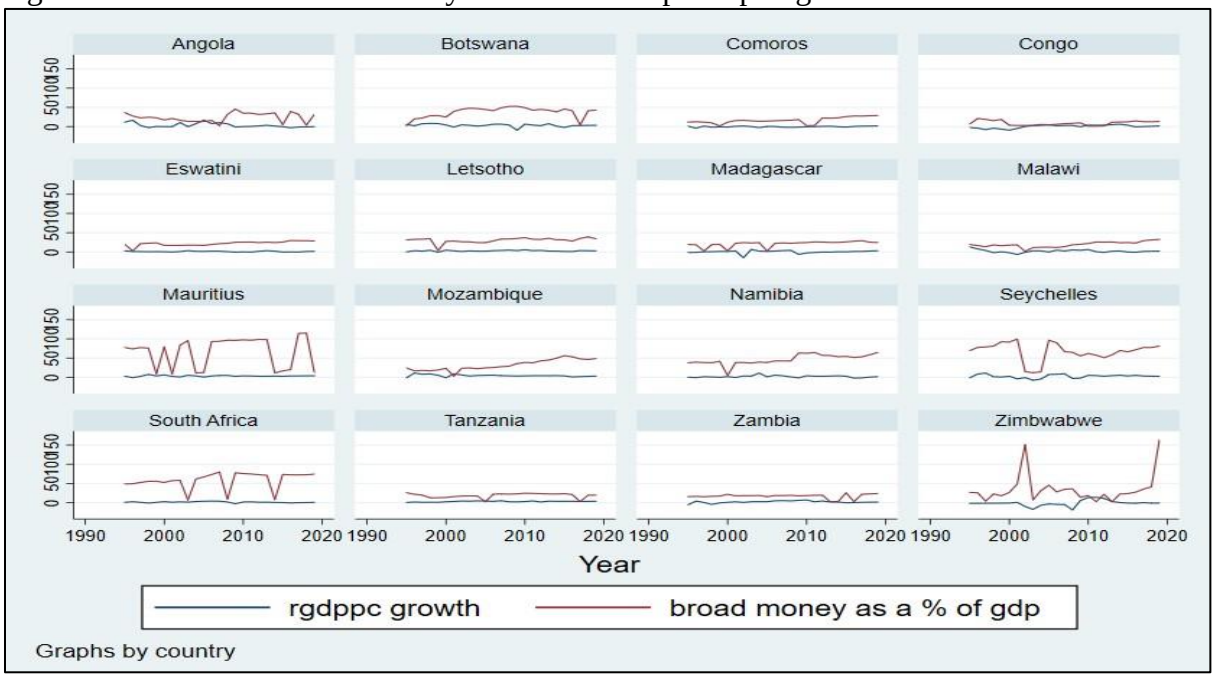
Figure 1.1 shows the trends for real GDP per capita growth for SADC countries over the period of 1995 to 2019. The Figure shows that real GDP per capita growth for countries like Eswatini, Lesotho, Mauritius, Namibia, South Africa, Seychelles, and Mozambique has been on an increasing trajectory, though minor fluctuations have been experienced. Member States such Zimbabwe, Angola, Madagascar, and Malawi experienced slumps in real per capita growth over the period under review. The poor economic performance in Angola could be attributable to the fall in oil production and low levels of investment (Banco Nacional De Angola, 2018). For Malawi, real GDP per capita could have been adversely affected by the 2012 'Cash gate' scandal, floods in 2014, drought in 2015 and 2016 induced by El Nino that affected agricultural production and left millions of Malawians food insecure, and significant electricity supply deficits that have curtailed industrial production and increased macroeconomic instability (African Development Bank, 2018). In Zimbabwe, the deterioration in real GDP per capita growth could be as a result of the hyperinflation crises, economic instability, and the removal of subsidies on maize meal, fuel, and electricity prices; suppressed foreign exchange earnings; and excessive money creation (African Development Bank, 2021).

1.2.4 Financial Development indicators trends within SADC

Figure 1.2 shows the trends of broad money as a percentage of GDP and real GDP per capita growth for the SADC Member States over the period 1995 to 2019. Broad money reflects the overall size of the financial intermediary sector in a country and is used to measure financial depth and the size of the financial intermediation sector to economic activity. With the exception of South Africa, Mauritius, Namibia, Botswana, Seychelles, and Zimbabwe, all other SADC countries recorded relatively low levels of broad money to GDP ratio. This implies that for these countries, financial depth is low, reflecting underdeveloped financial sectors which therefore translate into lower financial intermediary development.

Notwithstanding the fluctuations in broad money over the period, broad money in Angola, Comoros, Democratic Republic of Congo, Malawi, Tanzania, and Zambia has not been growing rapidly as compared to other SADC Member States. This implies that the monetary sector is not growing faster than the real sector.

Figure 1. 2: Trends of Broad money and Real GDP per capita growth

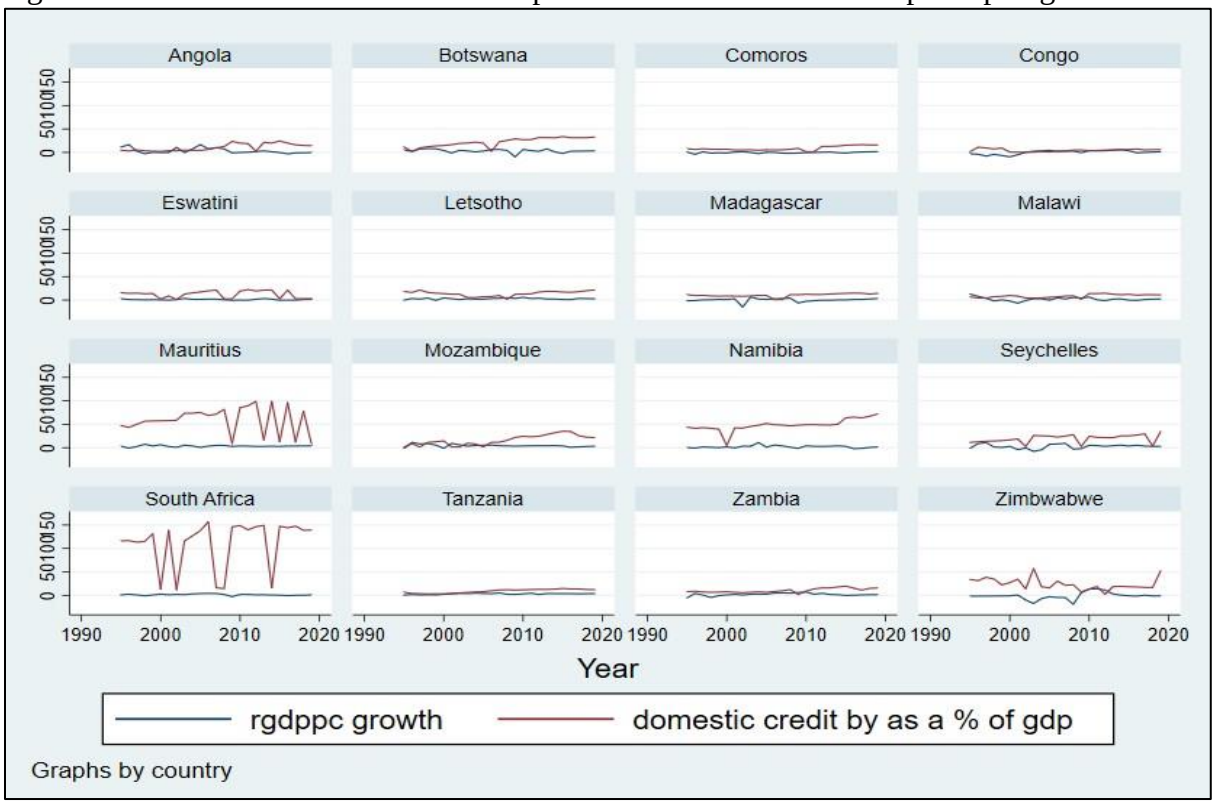


Source: Author's Computations using Stata

Figure 1.3 shows the trends for domestic credit to private sector as a percentage of GDP and real GDP per capita growth for SADC countries over the period 1995 to 2019. The results depict that domestic credit extended to the private sector in relation to GDP is relatively low in Angola, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Tanzania, and Zambia. Similarly, real GDP per capita growth in these Member States was relatively low, depicting a similar pattern to that of domestic credit to private sector. South Africa, Botswana, Namibia, Mauritius, Zimbabwe, and Seychelles are countries with high levels of credit extended to the private sector. On a macro level, expansion of credit to the

private sector is vital to the economy as it fuels household consumption, and production capacities when extended to businesses which is important for growth.

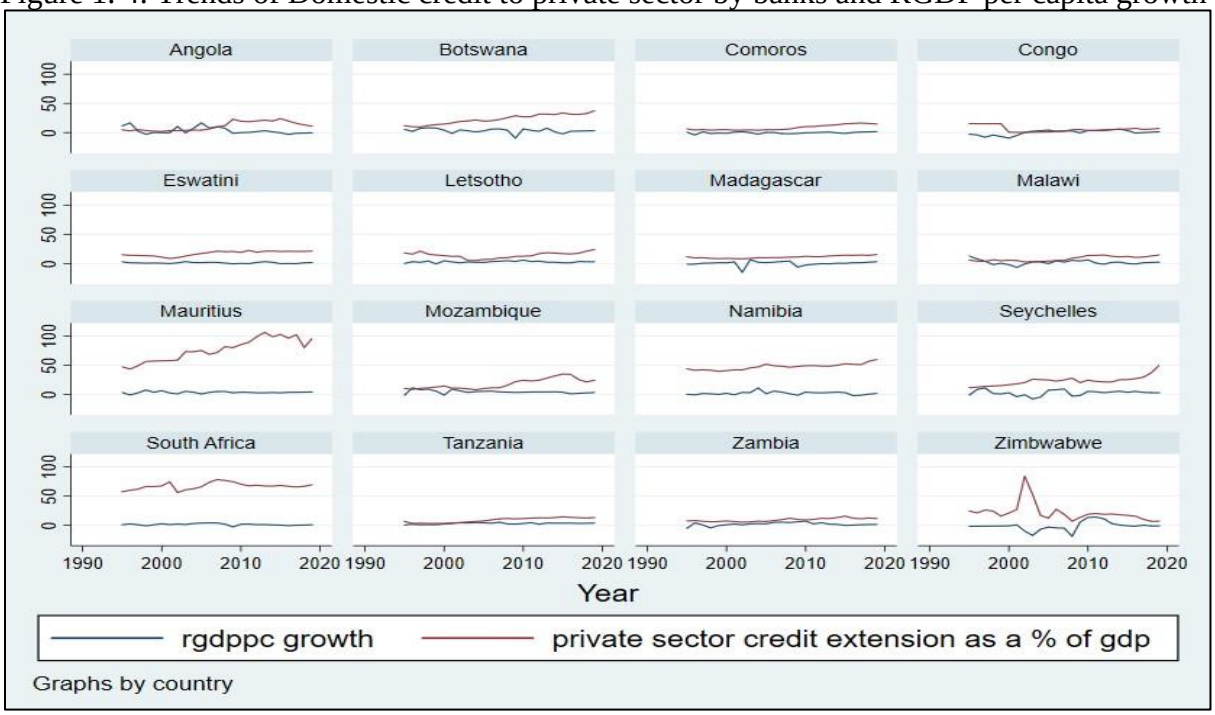
Figure 1. 3: Trends of Domestic credit to private sector and Real GDP per capita growth



Source: Author's Computations using Stata

Figure 1.4 depicts the trends for domestic credit to the private sector by banks as a % of GDP and real GDP per capita growth for SADC countries over the period of 1995 to 2019. Similar to Figure 1.2 which broadly shows credit extended to the private sector, Figure 1.4 shows that banks in South Africa, Mauritius, Namibia, Seychelles, and Botswana extend the most credit to the private sector as opposed to other SADC countries such as Tanzania, Zambia, and Comoros with relatively low levels of credit extended to the private sector.

Figure 1. 4: Trends of Domestic credit to private sector by banks and RGDP per capita growth



Source: Author's Computations using Stata

1.3 Statement of the problem

The SADC region is characterized with persistent macroeconomic problems such as high poverty rates, financial exclusion, and subdued economic growth. While it has been acknowledged that rapid and sustained economic growth is required for achieving the Sustainable Development Goals (SDGs), economic growth in the SADC region has been low and declining on average from 4.5% in 2010 to 1.4% in 2019 (SADC, 2019). Regarding access to financial services, financial inclusion in the SADC region is relatively low and varies widely across countries, with 41.9 million people (34%) having no access to formal or informal financial services. However, there is substantial variation between countries in terms of levels of access and the quality of financial services (SADC, 2016). Should the underlined challenges persist, the SADC Finance and Investment Protocol (FIP) goal of achieving macroeconomic convergence and foster regional capital and financial markets for sustainable economic growth

and eradication of poverty will be compromised. Thus, SADC countries could accelerate economic growth through improving their financial systems.

The SADC FIP seeks to foster harmonization of the financial and investment policies of the SADC Member States so that they are consistent with the objectives of SADC (SADC, 2006). Yet the role of finance in stimulating economic growth in the region has not been extensively researched. Abel *et al.,* (2019) investigated the relationship between financial development and economic growth in SADC, however, the study did not consider the possible non-linearities and the heterogeneity between countries. Similarly, the study by the Bank of Botswana (2020) examined the relationship between financial development and economic growth in the SADC region, however, the main focus was on the casual relationship between finance-growth variables. Bara *et al.,* (2016) also sought to establish the causal relationship between financial development and economic growth in the SADC region, factoring in the role of financial reforms. The study also addressed the issue of possible heterogeneity among SADC countries by employing the System Generalized Method of Moments (SYGMM). Existing literature in the context of the SADC region, though insightful, did not ponder on the possible non-linearities that could exist between the financial development variables and economic growth. This study contributes to this literature by using a dynamic panel model to explore the non-linear relationship between financial development variables and economic growth in the SADC region.

1.4 Objective of the study

The main objective of this study is to empirically analyse the financial development and economic growth nexus in the SADC region. Specifically, the study:

- Investigates the impact of financial development on economic growth in the SADC region.

- Test for the non-linear relationship between financial development on economic growth in the SADC region.

1.5 Hypotheses of the study

H_{oa}: Financial development has no impact on economic growth in the SADC region.

H_{1a}: Financial development has an impact on economic growth in the SADC region.

H_{ob}: There is no non-linear relationship between financial development and economic growth.

H_{1b}: There is a non-linear relationship between financial development and economic growth.

1.6 Significance of the study

The study provides the research fraternity with knowledge on the linkage between financial development and economic growth, and the implications thereof. This study further contributes to existing empirical literature on the debate between the finance-growth nexus by considering the possible heterogeneity between countries and non-linearities in the relationship. That is, since the study ponders on the possible thresholds that exist between the finance-growth nexus, it enables policymakers to develop and put forward measures that promote and strengthen the appropriate type and quality of financial services rather than just expanding the finance sector in stimulating economic growth (Law & Sigh, 2014). In addition, discerning the nature of the relationship of the finance-growth nexus is vital for policy makers who could focus on other growth-enhancing strategies if the appropriate finance-growth relationship has been determined. Equally, the study is relevant for regulatory bodies who supervise financial institutions in SADC countries, to ensure the implementation of sound and efficient financial policies that can aid and promote economic growth. That is, the study is relevant because the findings contributes to policy decisions for enhancing economic growth among SADC economies.

1.7 Limitation of the study

The study is limited in terms of data availability for all SADC countries, which influenced the data coverage of the study. However, data sources including the World Bank Development Indicators, and the African Development Bank Indicators have been used to reduce the possible gaps in the data and to ensure that the data is sufficient for the empirical analysis.

1.8 Delimitation of the study

The study focused on countries within the SADC region and data between 1995 and 2019. The different proxies for financial development were identified from the literature and only proxies with available data were used in this study.

1.9 Organisation of the study

The study is structured as follows: Chapter One provides a background of the study, introduces the statement of the problem, the objectives of the study, the hypotheses, the significance of the study, and the limitations and delimitations of the study. Chapter Two focuses on the theoretical and empirical literature review underpinning the finance-growth nexus. Chapter Three presents the methodology by outlining the data types and sources, measurement of variables and estimation techniques employed in the study. Chapter Four is dedicated to data analysis and the discussion of the empirical findings. Chapter Five highlights the key conclusions, policy implications and provides areas for future research consideration.

CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

This chapter presents the review of literature in relation to the finance-growth nexus. The first part focuses on the theoretical literature review on financial development and economic growth, whilst the second part focuses on the empirical literature review and conclusion.

2.1 Theoretical Review

The theoretical essence for associating economic growth with financial development is that a well-developed and functioning financial system provide financial services to entrepreneurs, improves the efficiency of financial intermediation by reducing transaction and information costs, fuels technological innovation and also reduces risks. The reduction in transaction and information costs and enhancement of technological innovation is therefore important for economic growth. The provision of financial services to businesses also enhances their productive capacity. Detail discussions are provided in subsequent sub-sections.

2.1.1 Schumpeterian Model of Economic Growth

The theoretical support on the connection between financial development and economic growth can be traced back to the work of Schumpeter (1911). Schumpeter (1911) highlighted the important role of financial intermediation through the banking channel on economic growth. In particular, Schumpeter postulated that a well-developed financial system fuels technological innovation and economic growth through the provision of financial services and resources to entrepreneurs who provide evidence of successfully producing innovative products and processes (Adusei, 2013). In essence, the argument is that since financial intermediaries mobilize savings of surplus economic agents, manage risk transformation, and catalyzes trade by giving credit and guaranteeing payments, it could potentially foster economic growth and development if it is prioritized. Some of the notable research on financial development and

economic growth that follow the Schumpeterian argument, includes that of Goldsmith (1969) and Hicks (1969). Contrary to this notion, is the argument that financial development follows economic growth as a result of higher demand for financial services. This is because when an economy grows, more financial institutions, products and services develop in the markets in response to higher demand of financial services (Ang & McKibbin, 2005).

2.1.2 The Standard Neoclassical Theory

According to this school of thought, financial development is viewed to affect economic growth through two channels. The first is the direct channel which is based on the Endogenous growth theory. In the direct channel, financial development propels economic growth by increasing domestic investment which augments domestic saving and thereby reducing the cost of capital. The second channel places emphasis on indirect channels through which financial development propels economic growth. This school of thought views financial development as a catalyst for certain collateral benefits such as domestic institutional development, better governance, and macroeconomic discipline that positively affect economic growth (Aziakpono, 2011).

2.1.2.1 The Direct Channel for Finance-growth Nexus

The potential effects of financial development on economic growth, are captured using the Endogenous growth model particularly the "AK" model as outlined in Romer (1989) which views aggregate output as a linear function of the aggregated capital stock as follows.

$$Y_t = AK_t \tag{2.1}$$

Pagano (1993) modelled the marginal product of capital, capital market equilibrium and the steady state growth rate as represented by Equations 2.2, 2.3, 2.4, and 2.5 respectively. The steady state marginal product of capital:

$$f'(k) = r + \delta \tag{2.2}$$

$$\Longrightarrow r = A - \delta \tag{2.3}$$

Equation 2.2 which depicts that marginal product of capital is equal to the interest rate r, plus the rate of depreciation δ, illustrates the equilibrium condition for investment in a closed economy. At equilibrium, gross saving should be equal to gross investment and is given by:

$$\varphi S_t = I_t \quad (2.4)$$

Equation 2.4 represents capital market equilibrium which requires that gross saving S_t equals gross investment I_t in a closed economy. It is assumed that a proportion of $1 - \varphi$ of the flow of saving is lost in the process of financial intermediation (Pagano, 1993). This could lead to total domestic saving being a constraint to total investment in a closed economy, and that the cost of capital will be high in a capital poor country due to limited saving. From equation 2.2, the steady state growth rate can be written as:

$$g = A\varphi S - \delta \quad (2.5)$$

Equation 2.5 reveals that the steady state growth rate depends on the marginal productivity of capital A, the proportion of saving channelled to investment φ, and the saving rate S. From Equation 4, financial development can affect economic growth by raising φ, A, S. For example, consider two economies, one with a higher level of financial development and the other with a lower level of financial development ($\varphi^1 > \varphi^2$, $A^1 > A^2$ and $S^1 > S^2$). This suggests that the country with a more developed financial system should have a higher economic growth rate. In addition, with financial development, capital is assumed to flow freely among the two economies (African Economic Research Consortium, 2020). To capture the effects of financial development on economic growth in an open economy scenario, Equations 2.3 – 2.4 are modified as follows:

$$f'(K^*) = r^* + \delta$$

$$\Rightarrow r^* = A^* - \delta \quad (2.6)$$

where r^* denotes the world interest rate,

$$\varphi^*(S_t + CF_t) = I_t \quad (2.7)$$

where CF_t is the net international capital flows. The new steady-state growth rate can be represented as:

$$g^* = A^*\varphi^*S^* - \delta \quad (2.8)$$

Therefore, if it happens that $\varphi^* > \varphi$, $A^* > A$ and $S^* > S$, with financial development, other things being equal, $I^* > I$, and $g^* > g$. Based on the Standard Neoclassical model, financial development enhances the allocative efficiency and the sharing and trading of risks motives investors. In addition, the notion of the Neoclassical model is that financial development facilitates a more efficient allocation of international resources by enabling funds to flow from where the existing capital intensity is lower rather than from where it is higher. If this assumption holds, financial development should stimulate the flow of capital from rich capital countries to poor capital developing countries. Such inflows to developing countries would then complement their limited domestic saving, reduce their cost of capital and lead to increased investment and economic growth (African Economic Research Consortium, 2020).

2.1.2.2 The Indirect Channels of Finance-Growth Nexus

In this context, financial development does not act as catalyst for economic growth directly, but through its spill-over effects on other variables within the economy. According to literature, the spill-over effects include domestic financial development, domestic institutional development, better governance, macroeconomic discipline and signalling effects (Kose *et al*., 2006; Obstfeld and Taylor 2004; Prasad *et al*., 2004; Agenor, 2003). Financial development is viewed to act as either a complement or a substitute to domestic financial development (Gourinchas, 2004 and Aziakpono *et al.,* 2009). As a complement, financial development boosts domestic financial market development by initiating greater competition on financial intermediaries and introducing international best practices in the sphere of accounting, financial regulation, and supervision. In addition, foreign ownership of banks may facilitate the transfer

of technology and risk-management techniques or help stabilize domestic financial systems. These may improve the quality and efficiency of local financial intermediaries, thereby boosting domestic financial development which leads to economic growth (Aziakpono, 2011). On the contrary, foreign ownership of banks can deteriorate domestic financial development. This may occur, for instance, when individuals and firms bypass inefficient domestic financial institutions to access more efficient foreign markets for their financial service needs. Thus, considering that financial development ease capital controls, private savings may move freely across countries. When a domestic financial system is repressed, it may lead to a drying up of liquidity in such a country. Here, it is likely that financial intermediaries in smaller countries or countries with weak domestic institutions may bypass the domestic financial markets to invest savings mobilized locally in foreign financial markets in larger countries. This may lead to higher costs for small and medium firms that may find it difficult to access foreign markets, which could further stifle the development of the domestic financial system (Gourinchas, 2004; Guiso *et al*., 2004).

Regarding institutional development and better governance, numerous studies have shown that financial integration, by helping to improve domestic institutions and governance, may promote economic growth (Stulz, 2005; Rajan & Zingales, 2003). Improvement in macroeconomic discipline is a paramount channel through which financial development can stimulate economic growth and translates into better macroeconomic policies. The notion is that financial development rewards good macroeconomic policies and penalizes bad policies. For instance, large public sector deficits, over-expansionary fiscal and monetary policies, weak financial practices (Obstfeld & Taylor, 2004). Inadequate policies could cause macroeconomic instability for example high inflation rate and capital flight, among others.

Thus, financial development creates an incentive for governments to adopt good macroeconomic policies. Moreover, with more policy discipline, greater macroeconomic stability could be realized which in turn, may lead to long-term economic growth.

This implies that capital controls signal future government behavior. Since investors have imperfect information about the intention of governments and their constraints, investors may use the current policy towards investment to predict the course of future policy (Aziakpono, 2011). The willingness of a country to open its financial system can be deemed as a signal that it wants to adopt sound macroeconomic policies (Agenor, 2003; and Prasad *et al*., 2004). Bartolini and Drazen (1997) demonstrate that the adoption of external financial liberalization can encourage capital inflow through signalling. In this regard, governments would then use free capital mobility as a signal of favorable future investment policies to attract investors which results in capital inflow if the signal is effective. The increase in capital inflow may, in turn, increase the level of domestic investment and growth. Moreover, through the signalling, financial openness may promote macroeconomic and financial stability that could increase the efficiency of resource allocation and, in turn, cause higher rates of economic growth.

2.1.3 Arrow-Debreu Theory

This school of thought places emphasis on the information-processing role of financial institutions. In the traditional Arrow-Debreu model, which is based on the paradigm of complete markets, financial intermediaries play no role. This implies that when markets are perfect and complete, the allocation of resources is Pareto efficient, hence there is no room for financial intermediaries to enhance welfare. The Modigliani-Miller theorem applied in this context, postulates that the financial structure does not matter as households are able to construct portfolios which offset any role played by financial institutions, and hence,

intermediation does not add value. This makes the model the starting point in the present theory of financial intermediation. The imperfections such as information asymmetry, and transaction costs from this model are the cause of intermediation in the real world. This is because in the real-world financial intermediation is likely to be undertaken by specialized institutions, rather than by individuals because the information-gathering and processing functions are likely to be subject to large fixed costs, making it cheaper for such activities to be carried out by agents who undertake them on a large scale. Firms that specialize in this function also provide financing to potential investors. To achieve this, financial institutions obtain funds from surplus economic agents and lend to deficit economic agents. Thus, financial institutions play two distinct roles, namely, identifying the most promising investment projects and monitoring the behavior of entrepreneurs and channelling resources from savers to investors (Bwire & Musiime, 2008).

2.1.4 Walter Bagehot Theory

The theory places emphasis on how the financial system is of paramount importance for economic growth. In the work "Lombard Street: A Description of the Money Market", Bagehot (1873) provided a comprehensive narrative of how processes in the financial environment are associated with the real economy. The theory dwells on the role that financial intermediaries play in extending credit to the private sector which stimulates economic activity. These loanable funds are held in banks unclaimed until some sector suddenly becomes very profitable. Then, the loanable funds are allotted to its development, though other sectors associated with it technologically also start booming. As a result, the private sector receives a vast volume of funding (Mikhail, 2012). Gradually, this process spills over the whole economy.

2.1.5 The McKinnon-Shaw Model

The "financial repression" paradigm or "Complementarity Hypothesis" is attributed to the works of McKinnon (1973) and Shaw (1973). The McKinnon-Shaw hypothesis places emphasis on the effects of financial repression or the low and negative real interest rates on savings and investment levels in developing countries. Although the financial repression hypothesis is focused on interest rates, it also accounts for the adverse effects of high reserve requirement ratios and government directed programs which are deemed to contribute to low savings and investment, and credit rationing. McKinnon (1973) and Shaw (1973) examined the need to reduce the impact of financial repression on the domestic financial systems within developing countries. Accordingly, the Complementarity Hypothesis concluded that alleviating financial restrictions can have a positive effect on growth rates as interest rates rise toward their competitive equilibrium (African Economic Research Consortium, 2020). The Complementarity Hypothesis assumes that liberalization which would be associated with higher real interest rates would stimulate saving, and that saving is responsive to interest rates. The higher saving rates would, in turn, finance a higher level of investment, leading to higher growth. This implies that higher saving rates will be realized, following financial liberalization. The McKinnon-Shaw (1973) hypothesis suggests that the demand for real money balances (M/P) depends on real income (Y), the ratio of gross investment to Gross National Product, investment ratio (I/Y), and the real deposit rate of interest, $(d - \pi^e)$, where d is the nominal deposit rate and π^e is the expected rate of inflation. The money demand is expressed in the following function:

$$(M/P) = L(Y, I/Y, d - \pi^e) \quad (2.9)$$

The investment ratio must be positively related to the real rate of return on money balances because a rise in the real return on bank deposits if it raises the demand for money and real

money balances is complementary to investment. Hence, McKinnon's complementarity hypothesis gives a demand for investment function as:

$$I/Y = f(\ R, d - \pi^e) \qquad (2.10)$$

In a nutshell, the model propounds that countries that liberalize the financial sector as opposed to financial repression, spur economic growth. Financial liberalization allows penetration of financial services among the rural population, providing them accessible tools of finance which could help achieve economic growth (African Economic Research Consortium, 2020). In addition, liberalization of the financial system allows for financial deepening and increases the competition in the financial sector. In this regard, there will be an increase in the use of financial intermediation by savers and investors which will allow for efficient use of resources and the financial system agents. Lastly, savings are encouraged through liberalization, and constraints on capital accumulation are reduced. On the contrary, the existence of financial repression may result in financial disintermediation and inhibit saving mobilization. Savers may switch from the acquisition of claims on the banking system to accumulating real assets traded in the informal markets and foreign assets, and lead to inefficiencies in credit allocation by financial intermediaries as the prospective investors will be unable to obtain financing (Tadesse & Abafia, 2019). Moreover, financial repression prevents financial intermediaries from functioning at their full capacity, impeding the smooth flow of resources to the financial sector and retard economic growth. Similar conclusions were drawn by Goldsmith (1969), who contends that financial development is an important determinant of economic growth which increases savings and facilitates capital accumulation thereby resulting to greater investment and growth (Samargandi *et al*., 2014).

2.1.6 Endogenous Growth Model

The Endogenous growth theory considers economic growth to be determined by investments in innovation, knowledge and human capital and the externalities effects (Elia, 2018). Advocates for this theory contend that economic growth is mainly determined by internal factors and not external forces. Central to this theory is the role that financial intermediation plays with regard to achieving economic growth. In this regard, several authors such as Levine (1997), and Bencivenga and Smith (1991) have incorporated, in the Endogenous Growth Model, the role of the financial system in determining economic growth.

Moreover, Nnanna *et al*., (2004) asserted that financial development could affect growth in three ways in an endogenous growth model, which are raising the effectiveness of financial intermediation, improving the social marginal productivity of capital, and inducing the private savings rate. Thus, a financial institution can influence economic growth by efficiently performing its functions of financial intermediation.

2.2 Empirical Literature Review

Given the theoretical underpinnings discussed in Section 2.1, the finance-growth nexus is not only paramount, but also interesting as it has attracted a lot of empirical research from many countries and regions in the world. The empirical literature on the relationship between financial development and economic growth exists in a number of ways and has generated a mixed array of inconclusive results.

2.2.1 Evidence from country-specific studies

The empirical work consistent with the supply-leading hypothesis include that of Samargandi *et al*., (2014) who constructed a single measure of financial development by using principal component analysis (PCA) to investigate the effect of financial development on economic growth in Saudi Arabia. The study used data from 1968 to 2010 and the Autoregressive

Distributed Lag (ARDL) model to estimate the relationship between financial development and economic growth. The study used the ratio of broad money to GDP, ratio of liquid liabilities to GDP, and ratio of credit to private sector to GDP to proxy for financial development and found that financial development has a positive impact on economic growth in the long run.

Al-Naif (2012) examined the causal relationship between financial development and economic growth in Jordan using annual time series data from 1977 to 2008. The study employed the Granger Causality, Cointegration, and vector error correction (VECM) techniques. The results indicated the existence of a long run equilibrium between financial development and economic growth. The study also found a uni-directional causal relationship from financial development to economic growth in both the long and short run. Kalio *et al*., (2015) examined the relationship between financial development and economic growth in Kenya using annual time series data for the period 1970 to 2013. The study employed the ARDL technique and revealed that financial development has a positive and statistically significant effect on economic growth in Kenya, thus, confirming the supply leading hypothesis.

Belinga *et al*., (2016) examined the causal relationship between bank credit by considering the domestic credit to the private sector by banks and bank deposit as proxies for financial development and economic growth in Cameroon using time series data from 1969 to 2013. The study tested for stationarity using the Augmented Dickey Fuller (ADF) and Johansen Multivariate Cointegration tests. The VECM was used to analyze the relationship between bank credit and economic growth. The study found that there is a uni-directional causal relationship flowing from financial development to economic growth.

In contrast to the proponents of the supply-leading hypothesis, several studies have documented the demand-following hypothesis between financial development and economic growth. For instance, Ang and McKibbin (2005) examined whether financial development leads to

economic growth or vice versa, in Malaysia. The study used time series data for the period 1960 to 2001 and employed the Johansen approach to determine Cointegration of the variables, as well as the VECM to estimate the long run relationship. The results of the study support the view that output growth causes financial depth in the long run. Chiumia *et al*., (2012) examined the causal relationship between financial development and economic growth in Malawi using the ARDL approach. The study found that there is a positive and significant relationship between financial development and economic growth in the long run. However, the Granger Causality tests revealed that economic growth drives financial development with no feedback effects. This indicates that financial development is not a driver of economic growth in Malawi, rather, it is economic growth that drives financial development. Ono (2017) used the VECM model to investigate the finance-growth nexus in Russia for the period 1999 to 2008 (Sub-period 1) and 2009 to 2014 (Sub-period 2). The results for Sub-period 1 confirm the causality from economic growth to money supply and bank lending, which, in turn, implies demand-following responses. Similarly, results from Sub-period 2 indicate that economic growth Granger-causes bank lending with no causality from money supply to economic growth.

In contrast to the studies lending support to the two competing conventional hypotheses, is the empirical work consistent with a bi-directional relationship between financial development and economic growth. For instance, Wolde-Rufael (2009) examined the causal relationship between financial development and economic growth in Kenya for the period 1966 to 2005 using the quadvariate vector autoregressive (VAR) framework and the Granger Causality test. The study used money supply (M2), liquid liabilities (M3), domestic bank credit to the private sector and total domestic credit provided by the banking sector (all as a percent of GDP) as proxies for financial development. The study found that neither the supply-leading nor the demand-following hypotheses are supported in Kenya and that economic growth and financial development are jointly determined.

Eita (2010) analyzed the causal relationship between financial development and economic growth in Botswana for the period 1977 to 2006 using Granger Causality through cointegrated VAR methods and two proxies for financial development. The results showed that there is a stable long-run relationship between financial development and economic growth regardless of which proxy for financial development been used. The results further provide evidence of supply-leading and demand leading views of finance-growth nexus. Jedidia *et al*., (2014) examined the relationship between financial development and economic growth in Tunisia for the period 1973 to 2008. The study used the ARDL method to assess the finance growth relation taking private credit, value traded and issuing bank's securities on the financial market as financial development proxies. The results showed that the domestic credit to private sector indicator has a positive effect on the economic growth suggesting that financial development is a driver of long-term economic growth. The study also confirmed the view of the bi-directional relationship between financial development and economic growth.

2.2.2 Evidence from cross-sectional studies

Like in country specific studies, cross-country studies have also found mixed results from a relationship and causality perspective. For instance, Acaravci *et al*., (2009) investigated the causal relationship between financial development and economic development in sub-Saharan Africa over the period 1975 to 2005 using the panel Cointegration and panel causality methods. First, to determine the order of integration in series and explore the long-run relationships between the variables, the study used heterogeneous panel unit root tests and a heterogeneous Cointegration test, respectively. Second, the study tested causality using the panel Generalized Method of Moments (GMM) estimator. The findings indicated that there is no long-run relationship between financial development and economic growth.

Further, the study found a bi-directional causal relationship between economic growth and financial development for the panel data of 24 sub-Saharan African countries.

Eng and Habibullah (2011) used the SYGMM model to examine the impact of financial development on economic growth during the period 1990 to 1998 in selected countries from African, Asian, Europe and the Western Hemisphere countries. The study concluded that financial development positively and significantly contributes to economic growth in these regions, hence, supporting the supply leading hypothesis. Furthermore, the authors argued that despite the evidence supporting other theories such as demand following and two-way causality, the results were not as substantial as the supply-leading view. Using data from 286 Chinese cities over the period 2001 to 2006, Jin *et al*., (2012) investigated the relationship between financial development and economic growth using the SYGMM estimators for dynamic panel data. The study found that the financial development indicators are positively associated with economic growth after controlling for many factors associated with growth. The size and depth of the financial sector spurs economic growth.

Adusei (2013) used the dynamic GMM model and panel data from 1981 to 2010 to examine the finance-growth nexus in 24 African countries. The study found a positive relationship between financial development and economic growth. The study also found that there is a bidirectional causal relationship between finance and economic growth. Caporale *et al*., (2015) investigated the relationship between financial development and economic growth in 10 European Union countries using a dynamic panel model over the period 1994 to 2007. The study used the GMM and found that financial depth is lacking in all 10 European countries, and the contribution of the relatively under-developed credit and stock markets to growth has been rather limited, with only some indicators of financial development with a positive effect. Assefa and Mollick (2017) used both the static and dynamic panel methods and data between 1995 and 2010 to explore the relationship between financial development and economic growth. For static methods, the study estimated the fixed effects (FE) model for preliminary analysis and for the dynamic model, it used the SYGMM method to capture the reverse

causation mechanism between economic growth and market capitalization. Estimates from the FE model show very weak support for the working hypothesis between growth of equity market and economic growth in Africa. However, the SYGMM results indicate that financial development is consistently positive and significantly associated with economic growth.

Asteriou and Spanos (2019) confirm the supply leading hypothesis by examining the relationship between financial development and economic growth in the European Union (EU) using a panel dataset for 26 countries over the period 1990 to 2016. The study employed panel regressions, and multiplicative dummies to compare between two distinct sub-periods before/after the crisis and gleaned from the empirical results that financial development promoted economic growth, while it hindered economic activity after the crisis.

Using the FE method, and Panel Cointegration tests to determine the relationship between financial development and economic growth in sub-Saharan African countries over the period 1975 to 2006, Demetriades and James (2011) found no relationship between financial development and economic growth. However, the study found that economic growth Granger-causes financial development. Alimi (2015) examined the link between financial development and economic growth in seven Sub-Saharan African countries over the period of 1981 to 2013. The study applied both the static and dynamic panel data approaches to investigate the relationship between financial development and economic growth. The results show that financial development has not led to economic growth in the panel of the selected countries when domestic credit provided by the banking sector is used as a proxy for financial development. Yartey and Adjasi (2007) examined the importance and development of stock markets in Africa. The study used panel data from 14 African countries and employed the Generalized Method of Moments (GMM) and found no conclusive empirical evidence on the impact of stock markets on economic growth in these African countries.

Similarly, Naceur and Ghazouani (2007) report for 11 Middle East and North Africa (MENA) countries, using dynamic panel models that overall financial development is unimportant for economic growth. The results thus, support the independent hypothesis that financial development and economic growth are causally independent. This is in line with Lucas (1988) who argued that economists "badly overstress" the importance of the financial system on economic growth.

2.2.3 Evidence of a non-linear relationship

Several studies placed emphasis on investigating whether there is a threshold above which the effect of financial development might be insignificant or even negative. Deidda and Fattouh (2002) investigated the nexus between financial development and economic growth for 119 developed and developing countries using the threshold regression for the period 1960 to 1989. The study observed a non-linear relationship between finance and economic growth. Finance was found to be a significant determinant of growth in high-income countries but insignificant in low-income countries. Rioja and Valev (2004) aimed at investigating the finance growth nexus for 74 developed and developing countries for the period 1961 to 1995. The study employed the dynamic panel GMM method and determined that finance has a positive effect on growth in intermediate financial development region. Shen and Lee (2006) also investigated the finance-growth nexus for 48 developed and developing countries for the period 1976 to 2001 using the Pooled Ordinary least squares (OLS) method. A non-linear inverse U-shaped relationship between finance (stock market variables) and economic growth was found.

Huang *et al.,* (2009) examined the relationship between financial development and economic growth for 71 countries using the Instrumental Variable (IV) threshold model. The study found a non-linear relation between finance and economic growth. The positive effect is more pronounced in the low-income countries than in the high-income countries. Cecchetti and

Kharroubi (2012) investigated the non-linear relationship between financial development and economic growth for 50 developed and developing countries. The study revealed that financial sector development has an inverted U-shaped effect on productivity growth.

Financial sector growth was found to be a drag on productivity growth. Law and Singh (2014) provided evidence on the non-linear relationship between financial development and economic growth using data from 87 countries covering 1980 to 2005. The study adopted the dynamic panel model based on the concept of threshold effect to capture rich dynamics in the growth equation. The empirical results indicated that there is a threshold in the finance growth nexus. Financial development below the threshold exerts a positive effect on economic growth while beyond the threshold level further development of finance tends to adversely affect growth. These findings reveal that more finance is not necessarily good for economic growth and highlight that an "optimal" level of financial development is more crucial in facilitating growth.

Adeniyi *et al*., (2015) examined the relationship between financial development and economic growth in Nigeria using annual data from 1960 to 2010. The study incorporated thresholds through the use of second order polynomial terms for each of the financial development variables. The study employed the ARDL model to determine the existence of a long-run relationship between financial sector development and economic growth. The study found that financial development negatively impacted growth. Ibrahim and Alagidede (2018) investigated whether the impact of finance on economic growth is based on the initial levels of countries' income per capita, human capital and financial development for 29 sub-Saharan Africa countries. The study used data over the period 1980 to 2014 and a sample splitting and threshold estimation technique. The study found that while financial development is positively and significantly associated with economic growth, below a certain estimated threshold, finance is

largely insensitive to growth while significantly influencing economic activity for countries above the thresholds.

Ruiz (2018) analyzed the non-linear relationship between financial development and economic growth over the period 1991 to 2014 by examining 116 economies (industrialized and developing economies). Using the dynamic panel threshold model, the study found two regime independent effects for the finance variables (bank credit to the private sector or domestic credit to the private sector). In addition, the study found a positive and statistically significant effect of private sector credit on economic growth in both developing (pension funds as the institutional investor) and industrialized (all three types of institutional investors) economies.

Samargandia *et al*., (2015) analyzed the relationship between financial development and economic growth using data for 52 middle income countries over the period 1980 to 2008. Using pooled mean group estimations in a dynamic heterogeneous panel setting, the study revealed that there is an inverted U-shaped relationship between finance and growth in the long run, however, insignificant in the short run. The study suggested that too much finance can exert a negative influence on growth in middle-income countries. Ioannou and Wojcik (2020) used the FE and random effects (RE) models to investigate the relationship between finance and growth over the period 2001 to 2015. The study used data on 75 countries, including 28 OECD member states and 47 non-OECD countries and found evidence of an inverted U-shaped pattern. At lower levels of financial development financial expansion appears to promote economic growth. There is, however, a threshold and once it is crossed, finance becomes a drag on economic growth.

2.2.4 Evidence from SADC

In the context of SADC, there is limited empirical evidence on the link between financial development and growth, and there is also no consensus regarding the direction of causality between the variables of interest. For instance, Phakedi (2014) investigated the relationship between financial development and economic growth in the SADC region for the period 1990 to 2012, using the FE, GMM and seemingly unrelated regression estimators (SURE). Results from the SURE and GMM models found that the proxies for financial sector development negatively affected economic growth in the SADC region. The ratio of money supply to GDP, as a proxy for financial development, was however, found to have a positive impact on economic growth under the FE model. The study concluded that financial development is crucial for growth despite contrary results for the SADC region.

The South African Reserve Bank (2014) examined the nature of the relationship between financial sector development and economic growth for the period 1990 to 2012 using data for 14 SADC member states. The study employed the FE model to deal with the problem of heterogeneity, the GMM model to deal with endogeneity among variables, and the SURE to deal with cross-sectional dependence. The results showed that the financial sector is important for economic growth, and in contrast to the supply-leading hypothesis, the results showed that in SADC the variables which were used as proxies for financial sector development were negatively related to economic growth. Mixed results were, however, observed in individual SADC countries. Using panel data for the period 1985 to 2014 for 15 SADC countries, Bara *et al*., (2016) investigated the role of financial development on economic growth. The study used the GMM approach and the panel FE model. The variables used as proxies for financial development and economic growth were domestic credit to GDP, liquid liabilities to GDP and the bank credit to private sector to GDP ratios. The results showed that financial sector development negatively affected economic growth in the SADC region, while financial reforms

were found to have a positive, but weak impact on economic growth in the region. Furthermore, the study established a bi-directional causal relationship between financial development and economic growth.

Abel *et al*., (2019) contributed to the ongoing finance-growth debate by examining the relationship between financial sector development and economic growth in SADC. The study used the FE panel regression and SURE methods covering the period 1990 to 2014. The FE results confirmed a positive relationship between financial sector development and economic growth in SADC region, thus confirming the supply-leading hypothesis. The Bank of Botswana (2020) examined the impact of financial development on economic growth in the SADC region, using a panel dataset for the period 1990 to 2014. The study developed financial development indices, using the PCA technique. Particularly, the study used the GMM and SYGMM and observed that financial development has a positive and significant impact on economic growth in SADC.

2.3 Conclusion

Evidence in Section 2.2 suggest that there is extensive empirical literature testing the theoretical developments between financial development and economic growth using different techniques. These empirical investigations can be classified into three main groups. The first group consists of those studies that used time series data for individual countries to examine the causal relationship between financial development and economic growth. The studies have generated a mixed array of findings as per the reviewed empirical literature. This could be attributed to the different aspects and the measurements for financial development used. The second group consists of those studies that used cross-country growth regression methods to investigate the relationship between financial development and economic growth. The third group consists of

studies whose devotion was to investigate the possible nonlinearities that could exist between financial development and economic growth.

Despite the prevailing evidence on the finance-growth nexus, there is generally no consensus on the nature of the relationship or direction of causality. The findings are mixed and vary significantly with the econometric techniques used and study areas. The mixed results by the growing body of literature pinpoints the need for further research on the finance-growth nexus through the use of new innovative research techniques. Although there is recent literature on the nexus for the SADC region, the studies did not ponder on the possible nonlinearities between financial development and economic growth. Thus, the current study contributes to the existing literature in three ways. First, it contributes to the evidence on the finance-growth nexus in the SADC region by using the system GMM approach to examine the finance-growth nexus, and in contrast to the existing literature in the SADC region, the study brings to the fore the possible non-linear relationship that could exist between financial development and economic growth. This approach, to the knowledge of the author, has not been used for scrutiny of the finance-growth in the SADC context to date, thus, introducing a methodological innovation in the SADC evidence. Second, the study also investigates the finance-growth causality, adding to the debate on finance-growth from SADC perspective as most studies merely delved into the relationship between financial development and economic growth. Third, the study contributes to the body of existing literature globally, on the finance-growth nexus debate.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

This chapter presents the data type and sources, justification and measurement of variables considered in the study. It also specifies the models employed to answer the research objectives, of ascertaining the financial development and economic growth nexus in the SADC region. The study follows a quantitative approach and makes use of annual panel data. The study adopted an econometric method used by Bara *et al.,* (2016), however, it deviated in terms of examining the possible non-linearities of the financial development variables.

3.1 Data Type and Sources

The study is based on annual panel data consisting of 16 SADC Member States over the period 1995 to 2019. The data used in this study is obtained from the World Bank Development Indicators, and the African Development Bank Indicators, databases. The data on the financial development indicators, inflation, life expectancy, government expenditure was obtained from the World Development Indicators, while the data on real GDP per capita, real GDP per capita annual growth rate, gross fixed capital formation, exports and imports were obtained from the African Development Bank Indicators. The data descriptions and a priori expectations are presented in Table A.1 under Appendix 1.

3.2 Justification and Measurement of Variables

3.2.1 Economic Growth

Real gross domestic product per Capita (RGDP/pc) is used in this study as a proxy for economic growth. RGDP/pc is obtained by dividing real GDP by the total population. Accordingly, RGDP per capita indicates growth in the economy as it accounts for general welfare of a country's citizens. This is the commonly used measure of economic growth in the finance-

growth nexus literature (see Adusei, 2013; Adeniyi *et al.,* 2015; Jiunn & Thangavelu, 2004; Zhang & Wang, 2012; Acaravci *et al*., 2009; Masoud & Hardaker, 2012; Mbulawa, 2015; Assefa & Mollick, 2017) among others.

3.2.2 Measures of Financial Development

In the finance-growth nexus literature, there is controversial views about the appropriate measure for financial development. Most studies used the liquid liabilities of the financial system to measure financial depth (Goldsmith, 1969; McKinnon, 1973; King & Levine, 1993). Financial depth is the capacity of financial sectors and agents to use a range of financial assets for savings and investment. Higher financial depth would imply a larger financial sector and, therefore, translate in greater financial intermediary development.

To oppose the use of this measure, Levine and Zervos (1998) argued that liquid liabilities which is M3/GDP solely measures financial depth and there is no theoretical relationship between the ratio and economic growth. Levine and Zervos (1998) proposed the use of bank credit in measuring financial development as credit granted to the private sector portrays an accurate indicator of the functioning of financial development as it is a measure of the quality and quantity of investment. The appropriateness of this measure of financial development lies in the fact that it accounts for credit granted to the private sector that enables the utilization of funds and their allocation to more efficient and productive activities. Following literature, this study used the following variables to proxy for financial development.

Broad money as a % of GDP (***BMGDP***) – Broad money as a percentage of GDP is also referred to as liquid liabilities or M3. Liquid liabilities comprise of currency held outside the banking system plus interest-bearing total deposit liabilities of banks and other financial

institutions. Broad money reflects the overall size of the financial intermediary sector in a country and is used as a measure of financial depth and thus of the size of the financial intermediation sector to economic activity. The demand for money is vital in macroeconomics as economic agents use it as a medium of exchange, thus implying that economic agents hold money in the form of cash or assets. The variable has been commonly used in the literature as a measure of financial development (Acaravci *et al*., 2009; Bara *et al*., 2016; Adusei, 2013; Abel *et al*., 2019, Demetriades & James, 2011).

Domestic credit to private sector as a % of GDP (DCGDP) - This is another commonly used to measure of financial development (Abel *et al.,* 2019; Eita, 2010; Sunde, 2013; Kalio *et al.*, 2015; Adusei, 2013). Domestic credit provided by the financial sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.

Domestic credit to private sector by banks as a % of GDP (PSCGDP) - The value of credit given by the banking sector to the private sector as a percentage of GDP provides a measure for financial intermediary development and is expected to have a positive effect on economic growth. The private sector credit extended in the context of this study is credit extended to both businesses and household sectors in SADC countries. Hence, the availability of credit to the private sector is one of the essential elements of investment. Studies that have used this variable as a proxy for financial development include those of (Samargandi *et al.,* 2014; Bara *et al.,* 2016; Ibrahim & Alagidede, 2018). In addition to the variables used to capture financial development, the study would have considered stock market capitalisation as a measure of financial development to capture the non-bank financial sector as mainly used by studies in

developed countries (Hardaker & Masoud, 2012; Assefa & Mollick, 2017). However, due to lack of data and limited development of stock markets in most SADC countries, this variable has not been used in this study.

3.2.3 Other Control Variables included in the Analysis

Trade openness (***TO***) - Trade openness is a channel through which foreign direct investment (FDI), capital inputs, goods, and services flow to host countries or regions, and is derived by taking the ratio of the sum of exports and imports to GDP and has been measured as such in this study. Trade openness can potentially stimulate economic growth through the provision of access to goods and services, achieving efficiency in the allocation of resources and enhancing total factor productivity through technology diffusion and knowledge distribution (Keho, 2017). Trade liberalization which entails policy measures to increase trade openness, provides an arena for the export sector to prosper, and as a result, improves the current account balance and increases investment incentives. A larger degree of openness is expected to lead to a better economic performance. A number of studies have measured and employed trade openness as a ratio of total exports and imports of goods and services to GDP (Bank of Botswana, 2020; Leitao, 2010; Bara *et al.*, 2016; Mbulawa, 2015).

Gross Fixed Capital Formation as a % of GDP (GFCFGDP) – is used in this study as a proxy of physical capital or investment, and it captures the amount of capital required in a nation's productive activities. Investment, as proposed by Solow is positively related to economic growth (Abel *et al.*, 2019). Gross fixed capital formation is an important catalyst for innovation, increasing productive capacity as well as creating new opportunities for acquiring new and more efficient techniques of production thus increasing the rate of capital accumulation thereby enhancing the productive capacity of a country. Gross fixed capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of

inventories (World Bank, 2021). Thus, the ratio of gross fixed capital formation to GDP is a vital indicator for the future development of any country. An increase in private investment tends to accelerate the growth rate, which in turn could increase financial development. Gross fixed capital formation is, therefore, expected to have a positive effect on economic growth. This variable has been used in several studies (Abel *et al.,* 2019; Bank of Botswana, 2020; Bara *et al.,* 2016; Ibrahim & Alagidede, 2018).

Inflation (INF) – the persistent and sustained increase in the general price level, and high levels of inflation have the potency to distort economic activities and reduce investment in productive enterprises thus reducing economic growth. In this study, inflation is used as a control variable for economic growth. Inflation is measured as the annual percentage consumer prices, and it reflects changes in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals (World Bank, 2021). Studies that used this control variable include Bara *et al.,* (2016); Bank of Botswana (2020); Abel *et al.,* (2019); Caporale *et al.,* (2015) among others.

Government expenditure (***GOVTEXP***) - government consumption expenditure is used as a control variable influencing economic growth. Government consumption expenditure is measure in current U.S. dollars (USD) and includes all government current expenditures for purchases of goods and services. Government expenditure can promote growth through the provision of public goods and services, such as education, healthcare services, national defence, legal system, and police protection. Thus, government expenditure could have a positive impact on growth. Excessive public expenditures could, however, tend to crowd out potentially productive private investments. In addition, increased government consumption implies that less resources are channelled to development which is critical for economic growth of any country. Thus, the effect of increased government consumption could lead to a decrease in GDP

per capita growth rate of a country. Several studies that have used government expenditure in the finance-growth nexus (Bara *et al.*, 2016; Adeniyi *et al*., 2013; Adusei, 2013; Kiprop *et al*., 2015; Caporale *et al.*, 2015).

Life expectancy at birth (LEB) – This variable is used as a proxy for human capital. Most studies on the finance-growth nexus used the secondary school enrollment as a proxy for human capital. However, this study could not use secondary school enrollment as a proxy due to too many missing data points. Life expectancy is expected to have a positive influence on growth through its effect on productivity and has been used as a proxy for human capital in the finance-growth literature (Adusei, 2013; Samargandi *et al.*, 2015). This study measured life expectancy at birth as the average number of years a newborn infant would live if prevailing patterns of mortality at birth stays the same throughout its life (World Bank, 2021)

3.3 Model Specification

According to Caporale *et al*., (2015) a dynamic panel regression with lagged values of the endogenous explanatory variables as instruments have several advantages over standard instrumental variable regressions. This approach controls for endogeneity and measurement error not only for the financial development variables but also of other explanatory variables. Thus, this study adopts a dynamic panel regression technique specified as follows:

$$RGDPC_{it} = \beta_0 RDGPC_{it-1} + \beta_1 FD_{it} + \beta_2 FD^2_{it} + \gamma X_{it} + {}_{it} \quad (3.1)$$

Equation (3.1) is expressed in natural logarithms, to avoid heteroscedasticity (Gujarati, 2004) and to estimate elasticities of the variables and it is presented as follows:

$$LnRGDPC_{it} = \beta_0 LnRDGPC_{it-1} + \beta_1 LnFD_{it} + \beta_2 LnFD^2_{it} + \gamma LnX_{it} + {}_{it} \quad (3.2)$$

The error term has two orthogonal conditions:

$$\varepsilon_{it} = \mu_{it} + \nu_{it} \quad (3.3)$$

$$E(u_i) = E(v_{it}) = E(u_i v_{it}) = 0 \quad (3.4)$$

Where $RGDPC_{it}$ is real gross domestic product per capita, i and t are subscripts for SADC countries and time respectively ($t = 1,2, \dots, T \quad i = 1,2, \dots, N$), $_{it}$ is time invariant and it accounts for μ_{it} and v_{it} which represent the unobserved country-level effects and the error term, respectively, FD_{it} is a vector of financial development measures (Broad Money (M3) as a % of GDP, Domestic credit to private sector as a % of GDP and Domestic credit to private sector by banks as a % of GDP), X_{it} is a vector of control variables including inflation, gross fixed capital formation, trade openness, government expenditure, and life expectancy at birth.

Equation 3.1 suffers from an endogeneity problem, due to the unobserved country level effects and the fact that financial development is determined within the model. Instrumental variables are used to correct for endogeneity in the model and could be internal and/or external instruments. Internal instruments are the current or lagged values of endogenous regressors, while the external instruments are the current or lagged values of exogenous variables. In this study, the lagged values of the endogenous explanatory variables are chosen as the instruments. This is because GMM panel estimators allow the usage of appropriate lags of the independent variables as instrumental variables to deal with possible endogeneity in the regressors. The GMM panel estimators thus allow the possibility to address econometric problems using lagged observations of the explanatory variables as instruments (Jin *et al.*, 2012).

Equation 3.1 is estimated using the SYGMM estimator developed by Arellano and Bover (1995). The system GMM combines a regression in differences with one in levels, reducing the potential bias in finite sample (Blundell and Bond, 1998). In addition, the GMM technique controls for unobserved country-specific effects, first-difference non-stationary variables, overcome the endogeneity of the explanatory variables by using instruments and test for the presence of autocorrelation (Saci *et al.*, 2009). Adusei (2013) assumed that there is no serial

correlation between error terms, and no correlation between the lagged explanatory variables and future error terms. This allowed the lagged explanatory variables to be used as instrumental variables.

3.3.1 The Sargan Test for the validity of instruments

The use of GMM in the estimation has two main issues. First, the proliferation of instruments and second, the serial autocorrelation of errors. These two issues tend to be higher when the panel is made up of large periods (T) and small number of countries (N). The proliferation of instruments refers to the existence of a higher level of instruments which causes over identification in the model (Labra and Torrecillas, 2018). The Sargan test of over-identifying restrictions is used to test the validity of the instruments.

3.3.2 Determination of Optimal Lag length

The lag length in the GMM methodology is from an instrumental variable perspective, that is, the optimal lag length for the model in relation to the instrumental variables to be used when estimating the system GMM model. In this case, the lags of the dependent and independent variables can be used as instruments. While not all lags of the dependent and independent variables are valid instruments, it is imperative to determine which lags to use. For the dependent variable instruments, the first lag of the dependent variable is not a valid instrument because it is correlated with the first difference error term. If there is no serial correlation, then all further lags starting from two are valid instruments because they are no longer correlated with the error term (Kripfganz, 2019). For the independent variables the first lags of the endogenous variables cannot be valid instruments because it is correlated with the error term. Thus, the lag structure can then start at 2. In addition, it is possible to use $\Delta y_{i,t-2}$ for $\Delta y_{i,t-1}$= $(y_{i,t-1} - \Delta y_{i,t-2})$ because these instruments will not be correlated with

$\Delta v_{i,t} = \quad v_{i,t} - v_{i,t-1} \quad$ as long as the error terms ($v_{i,t}$) are not serially correlated (Baltagi, 2005). For exogenous variables, any lag structure qualifies as an instrument (Kripfganz, 2019).

3.3.3 Panel Unit Root Tests

Non-stationary series pose several econometric implications such as the possibility of spurious regressions that might lead to incorrect inferences. Therefore, to avoid the spurious regression problem that may arise from regressing non-stationary series, it is crucial to transform non-stationary series into stationary series (Gujarati, 2004). The transformation method to be employed depends on whether the time series are difference stationary (DSP) or trend stationary (TSP) (Gujarati, 2004). There are three panel unit root tests namely, the Levin, Lin, and Chu (LLC), Breitung tests and Im–Pesaran–Shin tests commonly used to determine the presence of a unit root and the order of integration of the variables. The Im– Pesaran–Shin and Fisher-type tests allow for unbalanced panels, while the Levin, Lin, and Chu, and the Breitung tests require balanced panels.

This study used the LLC and Breitung tests since the data used is a balanced panel. The two tests are performed based on Augmented Dickey Fuller regressions, where LLC and Breitung (2005) test against the null hypothesis of a common unit root. Panel unit root tests are used to test the following hypothesis.

H_0: $\rho_i = 1$ for all i (null hypothesis)

H_1: $\rho_i < 1$ for all i (alternative hypothesis)

LLC suggested a powerful panel unit root test. The Levin, Lin and Chu test is restrictive as it requires ρ to be homogeneous across i, but the Im *et al*., (2003) (IPS) test allows for a heterogeneous coefficient. According to Breitung (2001), the LLC and IPS tests suffer from a dramatic loss of power if individual-specific trends are included. Thus, Breitung (2001)

suggested a test statistic whose power is substantially higher than that of LLC or the IPS tests. For robustness this study employs both the LLC and Breitung panel unit root test.

3.3.4 Panel Cointegration Tests

When the first difference of a non-stationary process is stationary, the process is said to be integrated of order one I(1). When a linear combination of several I(1) series is stationary, the series are said to be cointegrated (Engle and Granger 1987). In this regard, it is imperative to test for cointegration (long-run equilibrium) since most of the series in this study are I(1). The popular Engle–Granger residual-based test for cointegration has low power when applied to a single time series but has good power when statistics from many individual panels are combined. Thus, the Kao and Pedroni tests combine statistics computed for each individual in the panel, thereby producing a test with higher power. This study employed the Kao and Pedroni tests to test for cointegration between financial development and economic growth. The tests are designed to test the null hypothesis of no cointegration by testing whether the error correction term in a conditional error correction model is equal to zero. The error correction model considered is specified as follows:

$$\Delta RGDPC_{it} = \alpha_i + \rho_i RDGPC_{it-1} + \beta_i FD_{it-1} + \sum_{s=1}^{\rho_i} \delta_{is} \Delta RGDPC_{it-s} + \sum_{s=1}^{\rho_i} \gamma_{is} \Delta FD_{it-s} + \varepsilon_{it} \quad (3.5)$$

3.3.5 Panel Granger Causality

To test the direction of causality between financial development and economic growth, this study employed panel Granger causality tests following Bara *et al*., (2016). Results from empirical literature on the direction of causality between financial development and economic growth has generated a mixed array of findings, as well as inconclusive results. Hence, this is a plausible justification for determining the direction of causality between the financial

development variables and economic growth. This study, therefore tested the direction of causality to confirm which of the four finance-growth hypotheses hold in the SADC region.

Particularly, the study employed the Dumitrescu–Hurlin (DH) test for determining causal relationships between variables of interest. In addition to the Granger Causality test, Dumitrescu and Hurlin (2012) provide an extension designed to detect causality in panel data. The underlying regression is outlined as follows:

$$RGDP/pc_{it} = \alpha_i + \sum_{k=1}^{K} \gamma_{ik} RGDP/pc_{i(t-k)} + \sum_{k=1}^{K} \beta_{ik} FD_{i(t-k)} + \varepsilon_{it} \quad (3.6)$$

$$FD_{it} = \alpha_i + \sum_{k=1}^{K} \gamma_{ik} FD_{i(t-k)} + \sum_{k=1}^{K} \beta_{ik} RGDP/pc_{i(t-k)} + \varepsilon_{it} \quad (3.7)$$

Were $i = 1, \ldots, N$ and $t = 1, \ldots, T = 1$, $RGDP/pc_{i(t-k)}$ and $FD_{i(t-k)}$ are the observations of the dependent variable and financial development proxies which are stationary variables for individual i in period t. Coefficients are allowed to differ across individuals but are assumed to be time invariant (Lopez and Weber, 2017). The lag order K is assumed to be identical for all individuals and the panel must be balanced. The hypotheses to be tested are as follow.

Hypothesis 1

H_{oa}: Lnbmgdp does not Granger cause Lnrgdpn

H_{1a}: Lnbmgdp does Granger cause Lnrgdpn

Hypothesis 2

H_{oa}: Lnrgdpn does not Granger-cause Lnbmgdp

H_{1a}: Lnrgdpn does Granger cause Lnbmgdp

Hypothesis 3

H_{oa}: Lndcgdp does not Granger cause Lnrgdpn

H_{1a}: Lndcgdp does Granger cause Lnrgdpn

Hypothesis 4

H_{oa}: Lnrgdpn does not Granger cause Lndcgdp

H_{1a}: Lnrgdpn does Granger cause Lndcgdp

Hypothesis 5

H_{oa}: Lnpscgdp does not Granger cause Lnrgdpn

H_{1a}: Lnpscgdp does Granger cause Lnrgdpn

Hypothesis 6

H_{oa}: Lnrgdpn does not Granger cause Lnpscgdp

H_{1a}: Lnrgdpn does Granger cause Lnpscgdp

3.4 Research Ethics

The results presented in this study have not been tempered with and have been recorded as they are. All sources of information have been acknowledged using the Harvard reference convention.

3.5 Conclusion

This chapter highlighted the data issues and the methodological aspect that were used to investigate the nexus between of financial development and economic growth within the SADC region. It is very important to note that some of the tests were not explained in the methodology section as these are run as diagnostic tests before running the actual tests. This includes the descriptive statistics, correlation coefficient matrix, linear and non-linear system GMM model using various proxies for financial development, post estimation tests (Auto serial correlation and Sargan and Hansen) and the Granger causality test for the direction of causality.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents the results from the empirical analysis of the study on which the conclusion and recommendations were based. The results are presented in several subsections. This includes the descriptive statistics, the correlation matrix, the unit root test results, the panel cointegration tests, the panel regression from the system GMM estimation, the non-linear panel regression from the system GMM estimation and the panel Granger Causality tests.

4.2 Empirical Analysis

4.2.1 Descriptive Statistics

This section presents descriptive analysis of the data to determine the statistical properties of the data to provide an understanding of the appropriate functional form to use in the estimation. Table 4.1 reports the mean, standard deviation, minimum and maximum values of all the variables used in the study. The descriptive statistics are decomposed into overall, between, and within components. Thus, the statistics presented in Table 4.1 are a decomposition of the individual variable across the countries and overtime into a between ($\bar{x}_i$), within ($x_{it} - \bar{x}_i + \bar{\bar{x}}$), the global mean $\bar{\bar{x}}_i$. In terms of the standard deviations, only inflation, gross fixed capital formation, and government expenditure variables have more within variations than between variations, with standard deviations of 1327.42, 9.68, and 5.73, respectively. This implies that variation in inflation, gross fixed capital formation, and government expenditure across SADC countries is less than observed within individual countries over time. For the remaining variables there is more between variations than within variation. Thus, more variations are observed across countries than within countries over time.

Table 4. 1 Descriptive Statistics

Variables		Mean	Std. Dev.	Minimum	Maximum	Observations
RGDP/pc	Overall	1892.6	2665.77	87.69	13677.87	N= 400
	Between		2676.33	111.51	10147.37	n = 16
	Within		611.92	-955.47	5423.14	T-bar = 25
BMGDP	Overall	32.69	24.94	1.12	163.33	N= 400
	Between		18.26	9.14	67.23	n = 16
	Within		17.56	-25.58	160.81	T = 25
DCGDP	Overall	24.4	31.2	0.49	156.98	N= 400
	Between		27.59	4.63	111.54	n = 16
	Within		16.05	-75.43	69.83	T = 25
PSCGDP	Overall	23.23	22.32	0.45	106.26	N= 400
	Between		21.45	6.09	76.24	n = 16
	Within		8.1	-9.61	85.53	T = 25
INF	Overall	119.75	1396.12	-5.37	24411.39	N= 400
	Between		446.16	3.59	3.59	n = 16
	Within		1327.42	-1675.52	22738.37	T = 25
GFCFGDP	Overall	21.53	11.78	1.172	79.14	N= 400
	Between		6.93	10.02	31.47	n = 16
	Within		9.68	-7.01	75.31	T = 25
GOVTEXP	Overall	5.14	13.3	0.02	82,80	N= 400
	Between		12.4	0.07	50,70	n = 16
	Within		5.73	-24,70	37,20	T = 25
TO	Overall	0.86	0.4	-0.93	2.25	N= 400
	Between		0.34	0.41	1.62	n = 16
	Within		0.23	-1.3	1.87	T = 25
LEB	Overall	56.95	8.64	42.52	74.51	N= 400
	Between		7.27	48.24	72.82	n = 16
	Within		4.99	48.01	68.49	T = 25

Notes: For Government expenditure, it is expressed in nominal values, and is measured in USD. The figures denoted in the figure for Government expenditure are in billions of USD, for ease of interpretation.

The results presented in Table 4.1 further depict that the average real gross domestic product per capita in the SADC region over the period 1995 and 2019 is 1892.6 USD. On average,

broad money as percentage of GDP is 32.69, while the average domestic credit to the private sector and domestic credit to the private sector as percentage of GDP are 24.4% and 23.23% respectively. On average, gross fixed capital formation as percentage of GDP and government current expenditure are 21.53% and 5.14 million USD respectively. In terms of trade openness and life expectancy at birth, an average of 0.86 and 56.95 were recorded for the SADC region. Surprisingly, the average inflation rate for the SADC region is 119.75 implying drastic price instability in the SADC region. However, this could be attributed to the Zimbabwe hyperinflation that skyrocketed during the global financial crises. During this period, Zimbabwe experienced a devastating hyperinflation that peaked at 24 411.39% in 2007 (World Bank, 2021). Rather than rely on this intuition, this study estimated the average inflation for SADC countries excluding Zimbabwe. The study found that the average inflation rate for the SADC region with the exception of Zimbabwe declined from 119.75 to 8.22%. This suggest that the observed high average level of inflation in the SADC region is due to the Zimbabwe hyperinflation and other SADC countries have low inflation rates.

4.2.2 Correlation Matrix

To ascertain the correlation amongst the variables employed in the model, the study used the correlation coefficient test. A correlation matrix shows the magnitude of correlation among the respective variables in the model. Thus, the correlation coefficient test was also conducted to determine the possible existence of multicollinearity between the variables. According to Gujarati (2008), the correlation among variables is troublesome when it exceeds

0.8. Thus, results in Table 4.2 suggest that multicollinearity is not a problem.

Table 4. 2 Correlation Coefficient Matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1)	1.00									
(2)	1.00	1.00								
(3)	0.55	0.56	1.00							
(4)	0.57	0.57	0.58	1.00						
(5)	0.72	0.73	0.58	0.80	1.00					
(6)	0.20	0.19	0.12	0.09	0.09	1.00				
(7)	0.28	0.27	0.19	0.40	0.41	0.07	1.00			
(8)	-0.20	-0.19	-0.02	-0.01	-0.05	-0.19	-0.12	1.00		
(9)	0.46	0.46	0.27	0.19	0.30	0.17	-0.003	-0.01	1.00	
(10)	0.48	0.48	0.26	0.34	0.42	0.13	0.08	-0.33	0.17	1.00

Note: (1) is log of real GDP per capita, (2) is log of the lag of real GDP per capita, (3) is log of broad money as percentage of GDP, (4) is log of domestic credit as percentage of GDP, (5) is log of private sector credit from the banks as percentage of GDP, (6) is log of gross fixed capital formation as percentage of GDP, (7) is log of government expenditure, (8) is log of inflation, (9) is log of trade openness and (10) is log of life expectancy at birth.

4.2.3 Panel Unit Root Tests

One of the fundamental assumptions of a classical linear regression model is that variables should have constant mean, variance, and the covariance between the values of two time periods should be zero. Violation of this assumption leads to spurious regression. The LLC and Breitung unit root test were conducted on the variables to determine their stationarity properties. Where non-stationarity was detected, stationarity was induced by taking the first difference of the variable involved.

Table 4.3: Panel Unit Root Test Results

	Levin, Lin, and Chu (LLC)		Breitung		
Variable	At levels	First differenced	At levels	First differenced	Order of integration
Lnrgdpn	-0.80	-6.06***	8.77	-5.35***	I(1)
	(0.21)	(0.00)	(1.00)	(0.00)	
L. Lnrgdpn	-0.85	-5.39***	8.48	-5.36***	I(1)
	(0.20)	(0.00)	(1.00)	(0.00)	
Lnbmgdp	-7.98***	-	-7.66***	-	I(0)

	(0.00)		(0.00)		
Lndcgdp	-2.82***	-	-5.97***	-	I(0)
	(0.00)		(0.00)		
Lnpscgdp	-0.98	-4.86***	0.61	-5.44***	I(1)
	(0.16)	(0.00)	(0.73)	(0.00)	
Lninf	-4.48***	-	-3.54***	-	I(0)
	(0.00)		(0.0002)		
Lngfcfgdp	-3.26***	-	-3.92***	-	I(0)
	(0.00)		(0.00)		
Lngovtexp	-1.16	-8.77***	3.77	-9.71***	I(1)
	(0.12)	(0.00)	(1.00)	(0.00)	
Lnto	-0.83	-6.82***	-3.10***	-	I(1)
	(0.20)	(0.00)	(0.00)		
Lnleb	-26.36***	-	9.8197	1.140	I(0)
	(0.00)		(1.00)	(0.87)	

*Note: ***, **, * indicate significance at 1%, 5% and 10% level of significance respectively. In parenthesis are the p values. (Lnrgdpn) is log of real GDP per capita, (L.lnrgdpn) is log of the lag of real GDP per capita, (Lnbmgdp) is log of broad money as percentage of GDP, (Lndcgdp) is log of domestic credit as percentage of GDP, (Lnpscgdp) is private sector credit from the banks as percentage of GDP, (Lngfcfgdp) is log of gross fixed capital formation as percentage of GDP, (Lngovtexp) is government expenditure, (Lninf) is log of inflation, (Lnto) is trade openness and (Lnleb) is life expectancy at birth.*

Table 4.3 presents the unit root test results, of which the LLC test results show that real GDP per capita (Lnrgdpn), lagged real GDP per capita (L.lnrgdpn), domestic credit to private sector by banks as a % of GDP (Lnpscgdp), and government expenditure (Lngovtexp) are non-stationary at levels. However, these variables are integrated of order one (I(1)), or stationary after first difference. Similarly, results from the Breitung test show that real GDP per capita (Lnrgdpn), domestic credit to private sector by banks as a % of GDP (Lnpscgdp), government expenditure (Lngovtexp), and life expectancy at birth (Lnleb) are non-stationary but are integrated of order one (I(1)), or stationary after first difference except life expectancy at birth. Most of the variables are stationary at levels mainly because these variables are in ratios or in

percentages, which reduction makes them stationary and some of the variables are growth rates which technically are as good as differenced already. The study thus, used the LLC results.

4.2.4 Panel Cointegration Test

The Kao (1999), and Pedroni (2000) panel Cointegration tests is used to determine whether there exists a short run or long run relationship between the dependent variable and the independent variables.

Table 4. 4: The Kao and Pedroni tests for Cointegration

Kao test		
	Statistic	p-value
Modified Dickey-Fuller t	1.69	0.01***
Dickey-Fuller t	0.85	0.00***
Augmented Dickey-Fuller t	0.53	0.03**
Unadjusted modified Dickey-Fuller t	0.84	0.00***
Unadjusted Dickey-Fuller t	-0.02	0.00***
Pedroni test		
Modified Phillips-Perron t	2.88	0.00***
Phillips-Perron t	-4.42	0.00***
Augmented Dickey-Fuller t	-4.14	0.00***

*Note: ***All panels are cointegrated at 0.05% significance level*

Table 4.4 present results for the Kao and Pedroni Cointegration tests. From Table 4.5, the null hypothesis of no Cointegration is rejected in both the Kao and Pedroni tests at a 5% significance level. This provides strong evidence that all panels in the data are Cointegrated. This implies that there exists a long run relationship among all variables, and that all variables could potentially be used to predict one another in the long run. This is consistent with the results of

Samargandi *et al*., (2014) but not with Acaravci *et al*., (2009), and the Bank of Botswana (2020) who could not establish a long run relationship between the variables.

4.2.6 Panel regression using the system GMM estimation

The first objective of the study aimed to investigate the impact of financial development on economic growth in the SADC region. The SYGMM estimation results for the dynamic panel linear model across three measures of financial development are presented in Table 4.5. The estimations for each model maintain the same explanatory variables with the change being on the respective proxy for financial development and the instrumental variables.

Table 4. 5: System GMM Estimation for finance-growth nexus

	Model 1	Model 2	Model 3
Variable	Coefficient	Coefficient	Coefficient
Real GDP per Capita (-1)	1.003***	1.001***	1.001***
	(0.013)	(0.012)	(0.012)
Broad Money (Liquid Liabilities)	-0.032**	-	-
	(0.012)		
Domestic Credit to private sector	-	-0.011***	-
		(0.003)	
Domestic Credit to private sector by banks	-	-	-0.009
			(0.014)
Inflation	-0.014***	-0.017***	-0.017***
	(0.005)	(0.002)	(0.006)
Gross fixed capital formation	-0.001	0.000	-0.001
	(0.005)	(0.006)	(0.005)
Government expenditure	0.025*	0.022***	0.021***
	(0.013)	(0.007)	(0.006)
Trade Openness	0.104**	0.085**	0.047*
	(0.036)	(0.035)	(0.024)
Life expectancy at birth	-0.146*	-0.122*	-0.124*
	(0.093)	(0.070)	(0.070)
Constant	0.147	0.131	0.120
	(0.196)	(0.143)	(0.286)

*Note: In Model 1, broad money is used as a measure of financial development while in Model 2 & 3 domestic credit to private sector and domestic credit to private sector by banks respectively are measures of financial development. Standard errors in parenthesis; ***, **, * indicate significance at 1%, 5% and 10% level of significance respectively.*

Model 1 in Table 4.5 depicts that liquid liabilities have a negative and statistically significant relationship with economic growth. This implies that a 1 % increase in broad money reduces real GDP per capita by 0.03%. This result is consistent with the study by Phakedi (2014) who obtained a negative relationship for liquid liabilities under the GMM estimation. Similarly, Fille (2011) found a negative and statistically insignificant relationship between broad money and economic growth, while Audu and Akumoko (2013) and Deidda and Fattouh (2002) found a negative and statistically significant relationship. On the contrary, Allen and Ndikumana (1998), Bara *et al*., (2016) and the Asian Development Bank (2010) found a positive and significant relationship between liquid liabilities and economic growth in Southern African countries. While the positive results from these studies suggest money supply helps growth by facilitating economic activity (Caporale *et al*., 2009), our results suggest that liquid liabilities dampen growth. The negative relationship found between broad money and economic growth could imply that money supply does not drive economic growth in the SADC region. In addition, the negative relationship could also mean that money supply in the SADC countries has been excessive and led to the increase in inflation, given the already existent production constraints in some SADC countries. In this regard, it is imperative for the central banks of the respective SADC economies to ensure that there is no excess liquidity in the markets by taking the necessary policy measures.

The results from Model 2 reveal that domestic credit to the private sector has a negative and statistically significant impact on economic growth in the SADC. Specifically, a 1% increase in domestic credit to the private sector leads to a 0.01% decrease in real GDP per capita. This result is consistent with the findings by Phakedi (2014), Le Roux and Moyo (2015), Bara *et al*., (2016), Abel *et al*., (2019) whose studies suggested a negative and significant relationship between domestic credit to the private sector and economic growth. However, these findings

do not align with the theoretical postulation of Schumpeter (1911) as well as empirical findings of studies by King and Levine (1993a; 1993b) and Levine *et al.,* (2000) who found that financial sector development (private sector credit) promotes economic growth.

Regarding domestic credit to the private sector by banks, there is a negative but insignificant relationship with economic growth as revealed in Model 3. However, the negative relationship between credit extended to the private sector by banks and economic growth is not uncommon. For instance, Arcand *et al*., (2012), found a negative relationship between bank credit to the private sector and economic growth. Allen and Ndikumana (1998) observed a negative and significant relationship between credits provided by banks in SADC. Other researchers including Petkovski and Kjosevski (2014) and Samargandi *et al*., (2015) found that financial development (bank credit to private sector) has an adverse effect on economic growth in middle income countries. On the contrary, Estrada *et al.,* (2010) found a positive and statistically significant relation between credit by banks to the private sector and economic growth.

The negative effect of domestic credit to the private sector can be attributed to nonperforming loans or credit potentially used to finance non-productive sectors, distortions in the credit supply process), inefficiencies in credit allocation (Gregorio and Guidotti, 1995; Allen and Ndikumana, 1998; Romer, 2012). In the context of SADC, this could also be attributed to the cross-country heterogeneity and higher volatility of business cycles. For instance, according to Bara *et al*., (2016) SADC countries are vulnerable to business volatility stemming from different sources including, internal conflicts (Zimbabwe, Mozambique, Democratic Republic of Congo, and Angola); global developments (South Africa, Botswana) and internal economic instability, which affects currency and production (South Africa, Lesotho, Zambia).

The lagged real GDP per capita has a positive impact on economic growth which indicates a self-propelling growth that is dependent on past period values. Gross fixed capital formation is statistically insignificant in all three specifications. However, Bara *et al*., (2016) and Abel *et al*., (2019) found a positive effect, while Mbulawa (2015) found a negative effect of gross fixed capital formation on economic growth in the SADC region. The results from all three estimations suggest that inflation has a negative and statistically significant effect on growth, which confirms the a priori expectation. An increase in the level of inflation by 1% decreases real GDP per capita between 0.01% and 0.02%. The results are consistent with findings by Bara *et al*., (2016); Abel *et al*., (2019); the Bank of Botswana (2020), and Estrada *et al.*, (2010) who find that inflation does not only reduce economic activity in the SADC region, but also undermines the institutional framework conducive to a stable macroeconomic environment.

Trade openness has a positive and statistically significant coefficient suggesting that as SADC Member States open up their economies for trade, the rate of growth increases. This, therefore, suggests that SADC countries require more effective trade openness policies to boost their economic growth through international trade. This result is in line with Mbulawa (2015), Bara *et al*., (2016) and the Bank of Botswana (2020). Government expenditure has a positive and statistically significant effect on economic growth in all three estimations. This implies that government spending directed at productive expenditures promotes economic growth in the SADC region. An increase in the level of government expenditure by 1% induces an increase in real GDP per capita by 0.02% in all three estimations. The findings are consistent with Phan (2008) who found that government expenditure plays a positive role in promoting economic growth. These findings are contrary to the study of Kalio *et al.*, (2015), and Estrada *et al.*, (2010) who found a negative relationship between government consumption and real per capita GDP. Life expectancy at birth has a negative effect on economic growth and is statistically

insignificant in all three estimations. The results are consistent with Adusei (2013) who found a negative and statistically insignificant effect of life expectancy on economic growth in African countries.

4.2.7 Post Estimation Results

Table 4.6 presents the post estimation results of the diagnostic tests for the linear SYGMM regression estimated for all three models. The results provide post estimation test on the validity of instruments used and the possibility of serial correlation. The Arellano-bond test results show that the $AR(1)$ results for all three estimations are less than the probability value of 0.05, suggesting that there is autocorrelation. The results further show that $AR(2)$ for all three estimations are not significant, suggesting that there is no serial correlation. For validity of instruments the Sargan and Hansen tests results for all three estimations insignificant indicating that the instruments are valid. Thus, suggest that all models are relatively well specified.

Table 4. 6: Diagnostic tests results

	Model 1		**Model 2**		**Model 3**	
Serial Autocorrelation test	**Z**	**Prob**	**Z**	**Prob**	**Z**	**Prob**
Arellano-Bond test for AR(1) 1st differences:	-2.11	0.04	-2.28	0.02	-2.63	0.01
Arellano-Bond test for AR(2) 1st differences:	-0.89	0.38	-0.17	0.87	-0.67	0.51
Instrumental variable test	chi2	**Prob**	chi2	**Prob**	chi2	**Prob**
Sargan test of over-identification. restrictions:	0.82	0.84	1.68	0.64	4.20	0.24
Hansen test of over-identification. restrictions:	2.27	0.52	3.05	0.38	2.78	0.43

Note: In Model 1, broad money is used as a measure of financial development while in Model 2 & 3 domestic credit to private sector and domestic credit to private sector by banks respectively are measures of financial development.

4.2.8 Panel regression using system GMM for non-linear relationship

The second objective of this study is to estimate the possible non-linear relationship between financial developments on economic growth in the SADC region. The study employed the

dynamic SYGMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), where the square term of the financial development proxies were included in the three models estimated in Table 4.5. This is in line with Law and Singh (2014) and Adeniyi *et al.*, (2013) who included the square term of the financial development indicators to determine the non-linear relationship between financial development and economic growth.

Table 4. 7: System GMM Estimation for finance-growth non-linear relationship

Dependent variable (Real GDP per capita)	Model 1	Model 2	Model 3
Variable	Coefficient	Coefficient	Coefficient
Real GDP per Capita (-1)	1.002***	0.983***	0.983***
	(0.036)	(0.014)	(0.010)
Domestic Credit to private sector by banks	0.072		
	(0.052)		
Domestic Credit to private sector by banks square	0.019**		
	-(0.010)		
Domestic Credit to private sector		-0.001	
		(0.012)	
Domestic Credit to private sector square		-0.004	
		(0.003)	
Broad Money			-0.087*
			(0.049)
Broad Money square			0.016
			(0.010)
Inflation	-0.014**	-0.015***	-0.020*
	(0.006)	(0.002)	(0.004)
Gross fixed capital formation	0.008	0.006	0.004
	(0.007)	(0.006)	(0.006)
Government Expenditure	0.009	0.009	0.012
	(0.006)	(0.007)	(0.009)
Trade Openness	-0.103**	0.055*	0.062
	(0.040)	(0.029)	(0.045)
Life expectancy at birth	-0.012	0.013	-0.117*
	(0.060)	(0.057)	(0.060)
Constant	-0.093	-0.084	0.466
	(0.315)	(0.120)	(0.173)

*Note: In Model 1 & 2 domestic credit to private sector by banks and domestic credit to private sector respectively are measures of financial development while in Model 3, broad money is used as a measure of financial development. Standard errors in parenthesis; ***, **, * indicate significance at 1%, 5% and 10% level of significance respectively.*

Results in Table 4.7 reveal that the squared terms for financial development indicators (Domestic credit to the private sector and Broad money), are statistically insignificant. These results are consistent with evidence from Deidda and Fattouh (2002). They found an insignificant non-linear relationship between finance and economic growth in low-income countries, using liquid liabilities as a proxy for financial development. However, the quadratic for domestic credit extended to the private sector by banks is negative and statistically significant. This implies that domestic credit extended to the private sector by banks and economic growth have an inverted U-shaped relationship. The result is in line with Law and Singh (2014), and Cecchetti and Kharroubi (2012) who found an inverse U-shape relationship between financial development and economic growth in 87 countries.

4.2.9 Post Estimation Results

Table 4.8 presents the post estimation results of the diagnostic tests for the non-linear SYGMM regression estimated for all three models. Table 4.8 shows that the $AR(1)$ results from all three estimations are less than the probability value of 0.05 suggesting that there is autocorrelation. The $AR(2)$ results for all three estimations are not significant suggesting that there is no serial correlation. For validity of instruments the Sargan and Hansen tests results for all three estimations insignificant indicating that the instruments are valid. This suggests that all models are relatively well specified.

Table 4. 8: Diagnostic tests results for non-linear relationship

	Model 1		**Model 2**		**Model 3**	
Serial Autocorrelation test	**Z**	**Prob**	**Z**	**Prob**	**Z**	**Prob**
Arellano-Bond test for AR(1) 1st differences:	-3.01	0.00	-2.63	0.01	-2.26	0.02
Arellano-Bond test for AR(2) 1st differences:	0.58	0.56	-0.15	0.88	-1.04	0.30
Instrumental variable test	chi2	**Prob**	chi2	**Prob**	chi2	**Prob**
Sargan test of overidentification. restrictions:	1.97	0.16	2.64	0.62	1.37	0.85

Hansen test of overidentification. restrictions:	1.37	0.24	4.40	0.36	2.22	0.70

Note: In Model 1 & 2 domestic credit to private sector by banks and domestic credit to private sector respectively are measures of financial development while in Model 3, broad money is used as a measure of financial development.

4.2.10 Panel Granger Causality tests

Empirically, the nature of a relationship between financial development and economic growth in the SADC is not exhaustive in establishing a causal relationship. Causality tests need to be performed to determine the direction of causality between financial development and economic growth. The results of the Granger Causality test are presented in Table 4.9. The results in Table 4.9 reveal that causality between all three indicators of financial development and economic growth significantly runs from real GDP per capita to the financial development. However, causality does not run from all three financial development indicators and economic growth. Thus, panel Granger Causality shows uni-directional causality between economic growth and financial development.

Table 4. 9: Dumitrescu & Hurlin (2012) Granger non-causality test results

Null Hypothesis	W-bar	Z-bar	Z-bar (P-value)	Z-bar tilde	Z-bar tilde (P-value)	Decision
Lnbmgdp does not Granger-cause Lnrgdpn.	4.05	1.71	0.09	0.69	0.49	Accept H_0
Lnrgdpn does not Granger-cause Lnbmgdp.	15.78	20.87	0.00***	14.46	0.00***	Reject H_0
Lndcgdp does not Granger-cause Lnrgdpn.	3.69	1.12	0.26	0.264	0.79	Accept H_0
Lnrgdpn does not Granger-cause Lndcgdp.	10.76	12.67	0.00***	8.56	0.00***	Reject H_0
Lnpscgdp does not Granger-cause Lnrgdpn.	3.74	1.20	0.23	0.32	0.75	Accept H_0
Lnrgdpn does not Granger-cause Lnpscgdp.	10.56	12.34	0.00***	8.33	0.00***	Reject H_0

*Note: rgdpn is real GDP per capita expressed in nominal terms *** represent a 1 percent level of significance.*

Causality is statistically significant at 1% when running from real GDP per capita to financial development indicators. As such, confirming the demand-following causality hypothesis. The demand following causality relationship is highly expected for SADC countries given that the financial sectors of most countries have limited depth and efficiency, and experience high levels of financial exclusion when compared to other countries (Bara, *et al.*, 2016). The weak effects of financial development on growth in SADC support the demand-following hypothesis. The demand following hypothesis is consistent with studies by Aziakpono (2004), Odhiambo (2008), Jiunn *et al.*, (2004), and Acaravci *et al.*, (2009). The demand following causality is also supported by the fact that growth in most Southern African countries has primarily been driven by commodities, natural resources, and tourism. As such, when economies grow, they pull with them the financial systems.

CHAPTER FIVE: CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Research Conclusions

This study set out to empirically analyse the financial development and economic growth nexus in the SADC region. The study specifically investigated the impact of financial development on economic growth and tested for the non-linear relationship between financial development on economic growth in the SADC region. The study employed a dynamic panel regression with lagged values of the explanatory and endogenous variables as instruments. The model was estimated using the SYGMM estimator to determine the finance-growth nexus in the SADC region. The system GMM estimator was also used to test for the nonlinear relationship between financial development and economic growth. Furthermore, the study employed the panel Granger causality test in determining the direction of causality between financial development and economic growth. The study used annual panel data consisting of 16 SADC Member States over the period 1995 to 2019. Data was available for three indicators of financial development, namely, the broad money, domestic credit to the private sector and domestic credit to the private sector by banks. The data was tested for unit root using the LLC and Breitung unit root test to ensure that it was stationary and the Kao, and Pedroni tests for cointegration.

This study found an inverse relationship between financial development and economic growth indicating that financial development adversely affects economic growth in the SADC region. While the results are consistent with findings by Phakedi (2014); Allen and Ndikumana (1998); Le Roux and Moyo (2015); Bara *et al*., (2016), they differ with the theoretical postulations of Schumpeter (1911) and empirical findings from other studies (Eita, 2009; Kalio *et al.,* 2015; Levine *et al.,* 2000; Estrada *et al.,* 2010, Jin *et al.,* 2012). The inverse relationship between financial development and economic growth could be attributable to non-performing loans or

credit potentially used to finance non-productive sectors, distortions in the credit supply process, and inefficiencies in credit allocation. In addition, these results could further be attributable to the cross-country heterogeneity and higher volatility of business cycles in the SADC countries. With the exception of studies from the SADC region, Egbetunde and Akinlo (2014) and Ngongang (2015) also found a negative impact of financial development on economic growth in Sub-Saharan Africa.

In terms of the non-linear relationship between financial development and economic growth, the study found an inverted U-shaped relationship. This finding is consistent with the results by Law and Singh (2014); Cecchetti and Kharroubi (2012); Ibrahim and Alagidede (2018), and Shen and Lee (2006) among others. The study also assessed the causality between financial development and economic growth in the SADC region using the Dumitrescu & Hurlin (2012) Granger non-causality test so as to ascertain which school of thought in terms of causality holds for the SADC region. The results revealed a uni-directional causality running from economic growth to financial development. This confirms the demand-following hypothesis for SADC.

From a control variable perspective, the study found that the lagged real GDP per capita has a positive impact on economic growth. Gross fixed capital formation was found to be statistically insignificant in all three linear specifications. Contrary, Bara *et al.,* (2016) and Abel *et al.,* (2019) found a positive effect, while Mbulawa (2015) found a negative effect of gross fixed capital formation on economic growth in the SADC region. The study also revealed that inflation has a negative and statistically significant effect on growth, which confirms the a priori expectation. The results are consistent with findings by Bara *et al.,* (2016); Abel *et al.,* (2019); and the Bank of Botswana (2020) who find that inflation does not only reduce economic

activity in the SADC region, but also compromises the stability of the macroeconomic environment.

Trade openness was found to have a positive and statistically significant coefficient suggesting that as SADC Member States open up their economies for trade, the rate of growth increases. This result is in line with Mbulawa (2015), Bara *et al.*, (2016) and the Bank of Botswana (2020). Government expenditure was found to have a positive and statistically significant effect on economic growth in all three linear estimations. This implies that government spending directed at productive expenditures promotes economic growth in the SADC region. The study also found Life expectancy at birth to have a negative effect on economic growth and is statistically insignificant in all three estimations. The results are consistent with Adusei (2013) who found a negative and statistically insignificant effect of life expectancy on economic growth in African countries.

5.2 Policy Implications

Given the negative relationship between financial development and economic growth in SADC, there is a need to investigate and mitigate the underlying challenges that may hinder the full potentials of financial development in promoting economic growth. From a policy perspective, there is need for the regulatory authorities of financial institutions in SADC countries to further carry out reforms in the financial sector both in the short-run and long-run addressing the factors that may hinder the role of financial sector development on economic growth. These reforms will help develop the financial sectors and improve their depth and efficiency. In addition, policy makers should develop policies that can lead to the establishment of financial institutions in areas which have limited access to financial services thus, resolving challenges

of limited access to finance. SADC countries may consider promoting alternative delivery channels when providing financial services, such as mobile and agency banking.

In terms of credit extension, the regulatory authorities or banking institutions should focus on expanding productive capacity or projects that will stimulate growth which will therefore promote access to credit to the private sector to finance investments. From a monetary policy perspective, the regulatory authorities in SADC countries could consider expansionary monetary policy stances, through the central bank interest rate (the rate at which the central bank lends money to deposit taking institutions/commercial banks) channel which could translate in the decline of the interest rates charged by the financial institutions to the private sector. The central bank interest rate sets the floor for the interest rate regime in the money market and thereby influences the supply of credit, supply of savings (which affects the supply of reserves and monetary aggregate) and the supply of investment (which affects full employment and GDP). This could then, increase the uptake of credit by the private sector for production and investment purposes. However, enhancement of the credit allocation process should be done through tight regulation so as to ensure that financial institutions do not end up making losses as a result of loans that become non-performing (unsustainable credit growth). In addition, the central banks should ensure that the commercial banks or deposit taking institutions do not extend too much credit to the private sector, as this could lead to too much money supply in the market. The more commercial banks extend too much credit, money supply increases and in turn leads to an increase in prices. Consequently, when money supply is high, inflation tends to rise with the increases in money supply. Moreover, improvement in the performance of the financial systems and credit conditions to the private sector in the SADC region is required in order to enable financial development to stimulate economic growth. This enhancement could be realized through various means such as strengthening of weak financial

systems and institutions, resolution of institutional and structural challenges, and creating an enabling environment for efficient allocation of credit to the private sector in SADC economies.

Given the heterogeneity among SADC countries and the different levels of financial development, the region should promote financial integration in order to enhance development of under-developed financial systems through spatial spill-over gains (Bara *et al*., 2016). Lastly, given the demand-following causality between financial development and economic growth, it is recommended that pro-growth policies be strengthened so that growth subsequently pulls with it financial development.

5.3 Recommendations for future research

The research conducted on the finance-growth nexus is extensive and remains a controversial subject of debate given the mixed array of findings. Given the mixed array of findings, this study provides evidence that creates an opportunity for further extension on the subject. The findings and limitations of this study does not undermine the findings but provide opportunities for further research in this area. The mixed array of findings could be attributed to the different variables, methodologies and time periods used to investigate the relationship between finance and growth. Thus, future researchers could consider exploring different variables to measure financial development and employ more innovative methodologies to determine the nexus between financial development and economic growth for the SADC region. Second, this study finds a negative association between financial development and economic growth suggesting the need to investigate factors that may hinder the potentials of financial sector development from enhancing growth.

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Appendix 1

Table A. 1: Description of variables and expected sign

Variable Category	Variable	Definition	Definition	Expected Sign
Dependent	RGDP/Pc	Real Gross Domestic Product per capita in nominal value expressed in US$	Real Gross Domestic Product per capita in nominal value for all SADC countries	Positive
Financial Development Variables	BMGDP	Broad Money or Liquid Liabilities as a percentage of GDP	Broad money (M3) for all SADC countries	Positive
	DCGDP	Domestic Credit to the private sector	Domestic Credit to the private sector as a percentage of GDP	Positive
	PSCGDP	Domestic Credit to the private sector by banks	Domestic Credit to the private sector by banks as a percentage of GDP	Positive
Control Variables	RGDP/Pc (-1)	Lagged Growth Real Gross Domestic Product per capita	Growth in Real Gross Domestic Product per capita for the previous year	Positive
	GFCFGDP	Gross Fixed Capital Formation	Gross fixed capital formation/GDP	Positive
	GOVTEXP	Government Expenditure	Total Government expenditure/GDP	Positive/Negative
	INF	Inflation	Consumer Price Index	Negative

	TO	Trade Openness	(Exports+ Imports)/GDP for other SADC countries	Positive
	LEB	Life expectancy at birth, total (years)	Life expectancy at birth, total (years)	Positive