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The relationship between financial market development and economic growth in the
Southern Africa Development Community

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Abstract

The two opposing views on the finance-growth nexus can be compared to the “chicken and egg” adage. The one school of economic thinking as proposed by Bagehot (1873) and Hick (1969) in Levine (1997, p.688) states that industrialisation in England was ignited by the availability of capital to undertake “immense works”. To support this argument, Schumpeter (1912) in Levine (1997, p.688) contends that the banking institutions encourage technological innovation by identifying and supporting those entrepreneurs with the most innovative products or processes.

In contrast to this, Levine (1997, p.688) also presents the arguments of those economists (Robertson [1952] and Lucas [1988]) who contend simply that finance follows enterprise and that financial markets are a consequence of growth. However, considerable empirical research on the subject of the nexus between financial market development and economic growth was carried out in the 1990’s, which supports the positive causal effect between financial market development and economic growth.

The recent global financial crisis (GFC) has shed light on the impact that financial markets have on the economy of nations. For this reason, an investigation into the finance-growth nexus within the SADC regional context was undertaken. The study used data from 13 countries over a 19 year period from 1993 to 2011. The Granger causality results indicate that there is a demand-leading phenomenon where finance follows growth, however panel data regression models could not conclusively predict a relationship between economic growth and financial market development. However, it was found that the level of banking sector development did have the greatest impact on economic growth when compared to other financial market indicators.

Keywords: financial market development, economic growth, SADC

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Name Deevani Pillay

Signature



Date 11 November 2013

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List of Acronymns/ Abbreviations

ADI	African Development Indicators
FEVD	Forecast Error Variable Decomposition
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GMM	General Method of Moments
GNI	Gross National Income
IMF	International Monetary Fund
OECD	Organisation for Economic Cooperation and Development
SADC	Southern African Development Community
SSA	Sub-Saharan Africa
USD	United States Dollar
VAR	Vector Autoregressive

Chapter 1

A machine cannot operate satisfactorily without lubricants... Metaphorically, finance is the lubricant of the process of economic growth, and the banking system is the chief dispenser of finance.

Cameron et al. (1967) in Ndikumana (2001)

1. Introduction to Research Problem

Chapter One provides an introduction to the research project where the research problem is introduced and the aims of the research project are clarified. It highlights the motivation for undertaking such a research project and provides an overview of the remainder of the report.

1.1. Introduction

The first decade of the 21st century has seen a focus on economic growth in Africa, with 14 countries achieving average growth rates greater than five per cent since the 1990's (World Bank, 2006). However, the World Bank (2006) contends that a lot more must be done to sustain this growth and expand this magnitude of growth to the rest of the region.

The recent 2007/08 Global Financial Crisis (GFC) has highlighted the impact of global and local financial markets on economic growth. According to Beck, Demirguc-Kunt and Levine (2010, p.77), the GFC has moved the financial sector to the top of international policy agenda where a large body of research shows that financial sector affects the rate of economic growth and the distribution of income. It is therefore seen that the consequence of failure within the financial markets can have a devastating effect on the lives of many people, as the world is currently experiencing (Beck et al., 2010). It is within this context of increasing economic growth within a volatile global financial sector that this research project is placed.

1.2. Research Problem

This section begins with a brief description of the two concepts to be discussed in this research project.

Economic growth is defined as the increase in gross domestic product (real GDP) where GDP is the market value of final goods and services in an economy, stated in

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prices of a given year (Colander, 2010, p.155). According to Colander (2010, p.209), economists list the sources of growth as growth-compatible institutions; capital accumulation; available resources; technological advancement and entrepreneurship.

The financial sector is the market for the creation and exchange of financial assets such as money, bonds, and stock (Colander, 2010, p.310). Andrianaivo and Yartey (2009) in their discussion of "Growth of African Financial Markets" further breakdown the financial market into banks; stock markets; private equity and the bond market. As the latter definition proposed by Andrianaivo and Yartey (2009), is more descriptive of African markets, this is the definition which will be used for the discussion of financial markets. In the context of the research project, financial markets will fall into the 'capital accumulation' as a source of growth because investment is required for growth and financial markets transfer savings into investments (Colander, 2010, p.210).

According to the World Bank (2013, p.7), Africa has the highest rate of poverty in the world, where 47.5 percent live in poverty and which accounts for 30 percent of the world's poor. However, for the first in history, poverty has been declining in Africa with a nine million reduction in the number of people living on less than USD1.25/day (World Bank, 2013). Furthermore, for over a decade the economic growth in Sub-Saharan Africa (SSA) has averaged approximately 5 percent annually.

Therefore, according to the World Bank (2013), it is important to establish why Africa is performing better today than it was 20 years ago. The World Bank (2013) proposes that strong macroeconomic and financial policies could be one of the key factors leading to better economic growth in SSA. Furthermore, according to Ahmed and Suardi (2007, p. 159), new growth theories have identified three different factors which have an impact on economic growth in Africa. These factors (Ahmed & Suardi, 2007, p.160) include a country's institutional environment (this comprises of political openness and stability; civil liberties, free versus command systems and ethnic fractionalisation); geographic factors (this comprises of lack of access to the sea; tropical climate and natural resource abundance); and factors under macroeconomic fundamentals (this comprises inflation; the extent of financial development; the degree of openness to trade and fiscal policies).

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It is within this context that it is important to understand how financial market development affects economic growth and how the different attributes of financial market development influence economic growth within the African continent.

1.2.1. Research Problem within SADC Context

According to the World Bank (2013), Africa (and even the SSA region) is a continent which displays a wide variation in economic performance. This is highlighted by the World Bank (2013) where it shows that the average Gross National Income (GNI) in 2010 was USD1 589 per capita but it ranged from USD180 per capita to USD13 720 per capita. The different macroeconomic frameworks within each country and region can be attributed to the varying economic performance.

The Southern African Development Community (SADC) is an established regional economic community, which has sought to increase the level of economic and financial integration among member countries and as such as development frameworks to encourage alliances in economic, financial, trade and political affairs (Okeahalam, 2005, p.77). Furthermore, according to Seleteng (2012, p.9), through SADC's shared mission, there is a commitment from member countries to strive towards common goals and hence it is likely that member countries will pursue similar macroeconomic policies.

Furthermore, Seleteng (2012, p.9) highlights the fact there are limited studies on macroeconomic relationships conducted within the regional context (SADC). Therefore, macroeconomic relationships which are studied in developed countries may differ from the SADC region, as the level of economic development and prudent macroeconomic policies practised in those regions may be different from the SADC region (Sarel, 1996 as cited in Seleteng, 2012).

Therefore, the SADC is chosen as the region within which to investigate the finance-economic growth relationship. The central problem to be investigated through this research project is that of the financial market development and its relationship to economic growth in SADC.

1.2.2. Background to SADC Region

SADC comprises 15 member countries and seeks to promote peace, security, and economic integration in the region (SADC, 2013). SADC is one of eight regional

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economic communities formally recognized by the African Union as building blocks toward achieving an African Economic Community (Burgess, 2009, p. 2). Figure 1.1 shows a map of SADC region including its member countries.

Figure 1.1: Map indicating SADC Countries



Source: <http://www.sadc.int/about-sadc/overview/>

The countries in SADC are shown in Table 1.1 and classified according to World Bank Classification of Economies (World Bank, 2013, p.5).

Table 1.1: IMF Classification of SADC Countries

Classification		SADC Countries
Upper Income	Middle	South Africa, Botswana, Seychelles, Namibia and Mauritius
Lower Income	Middle	Angola, Lesotho, Swaziland and Zambia
Low Income		Zimbabwe, Tanzania, Mozambique, Malawi, Madagascar and Democratic Republic of Congo (DRC)

Adapted from Table 1: World Bank Classification of Economies, 2010 GNI per capita (World Bank, 2013)

The classification is based on Gross National Income per capita where the following classification is used,

- High Income – GNI per capita of USD12 276 and over

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- Upper Middle Income - GNI per capita of USD3 976 but less than USD12 276
- Lower Middle Income - GNI per capita of USD1 006 but less than USD3 976
- Low Income – GNI per capita of USD1 005 or less

According to Burgess (2009, p.5), SADC is the largest regional economic grouping in SSA and it accounts for approximately half of the regional GDP. It is also the richest region with real per capita income about two-thirds above the continental average. However, there are variations across member countries. South Africa, the main contributor to regional GDP, accounts for almost two-thirds of total output, although per capita income is higher in Botswana and Mauritius (Burgess, 2009, p.5).

Steady growth has been experienced by most countries within the region over the past decade which is in line with the improved performance across the rest of the African continent (Burgess, 2009, p.10). Due to high oil prices and rising production levels, Angola has experienced the highest growth in the region over the last decade. Malawi, Mozambique, and Tanzania which are countries which are classified as low-income countries in the region have also been among the continent's leading performers and have experienced growth in above or close to 7 percent in the last decade (Burgess, 2009, p.10).

Growth in middle-income countries has averaged between four and five percent in recent years (Burgess, 2009, p.10). This is due to the growth in domestic demand in South Africa; an expansion of the minerals sectors in Botswana and Namibia and a mini-recovery in the textile sectors in Lesotho and Mauritius after preferences under the U.S. Africa Growth and Opportunity Act were extended to 2012 (Burgess, 2009, p.10).

1.3. Research Motivation

In terms of the relevance to business in South Africa, it is important for South African companies that may want to expand into the region to understand the drivers of growth in these regional economies and the influence of financial market development on economic growth. Also, companies expanding into the region need access to capital in order to grow, and this study will provide some clarity on the financial markets in the SADC region. Overall, the research project will benefit South African businesses wishing to expand into the region beyond South African borders.

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According to the World Bank (2006, p.5), Africans and their development partners need to increase their focus on supporting the drivers of growth, sharing participation in and the benefits of growth, and building capable states. This research project will therefore focus on the role of the financial system, which comprises markets and institutions, to facilitate growth in Africa. The purpose of the research is to guide policymakers and academics dealing with African issues to implement strategies focusing on economic growth in the region.

1.4. Research Objectives

The research project will examine the macroeconomic environment within the SADC by investigating the relationship between finance and economic growth. Therefore the objectives of the research project are,

- To identify the most suitable analytical techniques to investigate the relationship between finance and economic growth within the SADC region by reviewing current empirical and theoretical literature on the topic,
- To measure analytically the relationship between finance and economic growth in the SADC region, and
- To identify important policy implications which may emanate from the relationship between finance and economic growth in the SADC region.

Therefore, these objectives will be expanded upon throughout the research project.

1.5. Structure of Research Report

Chapter Two provides a review of the theoretical and empirical literature related to the finance-economic growth nexus. A review of the empirical analytical frameworks is also conducted to determine the most appropriate econometric tests and to identify the most appropriate variable to be used in the analytical framework. Chapter Three describes the conceptual method which is adopted for the research project by identifying the research questions and hypotheses for the research project. Chapter Four provides a description of the research methodology that was adopted and followed to answer the research questions.

Chapter Five is a presentation of the research results from the econometrics testing and Chapter Six provides a discussion of the results in relation to the research objectives and research questions. Chapter Seven presents the summary of findings together with conclusion of research project and the recommendations for future work.

Chapter 2

2. Literature Review

2.1. Introduction

Chapter Two presents an overview of the literature related to the relationship between financial market development and economic growth. This chapter is divided into two broad sections of literature related to the research topic. The first section covers the theoretical literature and discusses the theoretical basis for the topic by comparing and discussing evolving current thinking and philosophy on the nexus between financial market development and economic growth. The second section presents the evolution of empirical literature related to the topic by discussing the various studies that were undertaken specific and similar to the research topic. The conclusion provides a summary of the key areas of literature which will be investigated in this research project.

2.2. Theoretical Literature Review

This section will provide the overview of the literature used in this study.

2.2.1. Financial Market Development

2.2.1.1. Definition of the Financial Market

In the context of the relationship between finance and economic growth, literature often refers to various terms associated with finance and these include and are not limited to financial market development (Kagochi, Nasser, & Bebede, 2013; Hafer, 2013; Masoud & Hardaker, 2012; Kendall, 2012; Agbloyor, Abor, Adjasi, & Yawson, 2013; Shen & Lee, 2006; Tang, 2006); financial systems (Narayan & Narayan, 2013; Beck, Demirgüç-Kunt, & Levine, 2010); financial sector (Sunde, 2012; Colander, 2010); financial intermediary development (Allen & Ndikumana, 2000; Beck, Levine, & Loayza, 2000; Levine & Zervos [1998]); financial liberalisation (Misati & Nyamongo, 2012; Fowowe, 2008; Bekaert, Harvey, & Lundblad, 2005) and financial deepening (Rosseau & Wachtel, 2011).

With reference to this research project, the term 'financial market development' will be used as it is the focus of the most recent research and the most commonly used term associated with financial development research in developing countries (Kagochi et al., 2013; Hafer, 2013; Masoud & Hardaker, 2012; Kendall, 2012; Agbloyor et al., 2013; Shen & Lee, 2006; Tang, 2006). Furthermore financial market development will be

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used synonymously with financial sector development and financial intermediary development, as these terms allude to the broader aspects of the financial market. According to Misati and Nyamongo (2012, p.150), financial liberalisation refers to the act of opening up of a country's financial sector to allow foreign investment and according to Rosseau and Wachtel (2011, p.277), financial deepening refers to the improvement in accessibility to finance by improving regulatory provisions. Therefore it is noted that these two terms deal with specific aspects of financial market development and will not be used synonymously with financial market development.

According to Colander (2010, p.310), the financial sector is the market for the creation and exchange of money, stocks and bonds, and Chami, Fullenkamp and Sharma (2010, p.207), extended this definition to state that the financial market broadly encompasses the loan, bond and equity and includes the asset-backed and derivative markets. This definition is further supported by Beck et al. (2010, p.79) who stated that the financial system comprises banks; bank-like financial institutions; equity markets and private bond markets. Arnold (2012, p.8) further expanded the definition of financial markets to also include the foreign exchange market. However, Čihák, Demirgüç-Kunt, Feyen and Levine (2012, p.2) suggested that financial institutions refer to banks and insurance companies while financial markets refer to stock markets, bond markets and derivative markets, therefore indicating a separation of banks from the financial market.

Therefore the financial market includes,

- Loan market or banks
- Money markets
- Public and private bond markets
- Equity or share market
- Derivative and commodity market
- Foreign exchange market

The definition of financial markets which is used in this research report will therefore broadly encompass all financial intermediaries, institutions and markets as supported by Beck et al. (2010, p.79), Chami et al. (2010, p.207), Arnold (2012, p.8) and Colander (2010, p.310).

2.2.1.2. Development of Financial Markets

Čihák et al. (2012, p.4) contended that at a conceptual level, financial market development can be defined as the degree to which the financial system eases market imperfections. These imperfections arose as a result of costs and uncertainties associated with enforcing financial contracts related to transacting goods, services and financial instruments (Čihák et al., 2012, p.4). However, both Levine (2005, p.870) and Čihák et al. (2012, p.5) agreed that a more efficient and broader definition of financial market development is one that focuses on what the financial system actually does.

Levine (2005, p.870) focused on the five broad functions of the financial system which was linked to the theory behind the finance-growth nexus. The first function is that financial systems produce information *ex ante* about possible investments and allocate capital. That is, by economising on information acquisition costs, financial intermediaries improve the ex-ante assessment of investment opportunities with positive implication on resource allocation. Furthermore, financial intermediaries that produce better information on firms or investments, fund more promising ventures and therefore induce a more efficient allocation of capital (Greenwood & Jovanovic, 1990 in Levine, 2005, p.871).

Secondly, financial systems monitor investments and exert corporate governance after providing finance. According to Stiglitz and Weiss (1983) in Levine (2005, p.872), the effectiveness of corporate governance mechanisms directly impacts the financial performance of a firm. Financial arrangements found within financial markets may influence corporate governance but theory suggests that a well-functioning stock market fosters good corporate governance (Jensen & Meckling, 1976 in Levine, 2005, p.784).

Thirdly, financial systems facilitate the trading, diversification, and management of risk. The cross-sectional diversification of risk is an extensively researched topic and it is shown that financial systems may mitigate the risks associated with individual projects; firms; industries; regions and countries. According to Levine (2005, p.875) banks, mutual funds, and securities markets all provide vehicles for trading, pooling, and diversifying risk.

Fourthly, financial systems mobilise and pool savings. According to Levine (2005, p.879), mobilising or pooling is the costly process of bringing together capital from

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different investors. In an attempt to economise on the costs associated with multiple bilateral contracts, pooling may also occur through intermediaries, where thousands of investors entrust their wealth to intermediaries that invest in hundreds of firms (Sirri and Tufano, 1995, p. 83 as cited in Levine, 2005, p.879).

And finally, financial systems ease the exchange of goods and services. Financial arrangements that lower transaction costs can promote specialisation, technological innovation and growth (Levine, 2005, p.880). Greenwood and Smith (1996) in Levine (2005, p.881) have suggested that more specialisation requires more transactions and since each transaction is costly, financial arrangements that lower transaction costs will facilitate greater specialization.

Therefore, according to both Levine (2005, p.870) and Čihák et al. (2012, p.5) financial market development can be defined as improvements in the quality of the five key financial functions. Chami et al. (2010), in their presentation of a framework for financial market development conclude that financial market development is the wider use of existing financial instruments and the process of creating and adopting 'new' financial contracts to intermediate funds and manage risk. This definition of financial market development focuses on the institutional and regulatory aspect of the financial market while Levine (2005, p.870) and Čihák et al. (2012, p.5) looked at the functions of the financial market which focus its relationship to economic growth and hence this definition is more relevant to this research project which focuses on the relationship between financial market development and economic growth.

2.2.2. Financial Market Development in SADC

Although extensive research has been carried out to investigate financial market development in Sub-Saharan Africa (Gelbard & Leite, 1999; Ahmed & Suardi, 2007; Andrianaivo & Yartey, 2010; Misati & Nyamongo, 2012; Kagochi et al., 2013), research on the financial markets in the SADC region has not been extensive (Allen & Ndikumana, 2000; Aziakpono, 2005; Okeahalam, 2005). Although it is difficult to generalise about the banking systems in Africa because countries are so diverse in terms of financial development and access to financial services, there are common trends which do exist. Therefore the financial markets of SSA are the closest reflection of SADC financial markets.

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According to Andrianaivo and Yartey (2010, p.394), the surge in world capital markets over the last few decades has included significant contributions from emerging markets. In Africa, the financial landscape has changed to include growth in the stock; bond and private equity markets, and in the banking sector, where credit to the private sector and bank asset have increased significantly since 1990 (Andrianaivo & Yartey, 2010, p.394). This is confirmed by Kagochi et al. (2013, p.62) who have indicated that there has been considerable development in both stock market and bank based financial markets in Sub-Saharan Africa.

According to Gulde, Pattillo and Christensen (2006) in Andrianaivo and Yartey (2010, p.396), African banking systems are reasonably sound despite their small size when compared to other economies. Furthermore, banks are profitable even though they are less efficient than in other countries (Beck & Honohan, 2007 as cited in Andrianaivo & Yartey, 2010). However, Kagochi et al. (2013, p.62) indicated that the growth of the banking sector in SSA is stifled by the inability to save. This is mainly driven by the high banking costs which is reflected in the high spread between deposits and lending interest rates and therefore these items act as a disincentive for both saving and lending. However, according to Beck, Fuchs and Uy (2009) in Kagochi et al. (2013, p.63), the biggest deterrent to opening a savings account in SSA might be the high documentation requirements including presentation of several documents for identification (these include passport; pay slip and utility bills). This is a challenge as most live and work in the informal sector.

The number of stock exchanges in SSA has increased from five in 1989 to eighteen in 2010, with a 113% market capitalisation increase from 1995 to 2005 (Andrianaivo & Yartey, 2010, p.397). Senbet (2008) in Andrianaivo and Yartey (2010, p.397) confirm that although problems of small size and low liquidity exist in African stock markets, these markets represent unexploited opportunities for international investors. Table 2.1 presents some indicators for selected stock exchanges in SSA (as at 2008).

With regard to the priority of banking sector development over the stock market development in Africa, Singh (1999) in Okeahalam (2005, p.76), argued that at this stage of its development, SSA would do better to improve its banking sector before development of its stock market. This would also enhance the development of formal savings institutions; improve transparent allocation of credit and develop real economy monitoring mechanisms such as capacity in accounting and institutions which are

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necessary to protect property rights (Singh, 1999 as cited in Okeahalam, 2005, p.76). This argument was presented in the context of the efficient use of scarce resources in relation to the development of mechanisms and institutions to allocate capital resources in SSA. However Okeahalam (2005, p.77) argued that the development of the stock market together with supporting institutions and improved efficiency of financial exchanges could lead to better economies of scale and therefore improvement of the financial markets.

Table 2.1: Indicators for Selected Stock Exchanges in SADC by 2008

Country	Listed Domestic Companies	Market Capitalisation (USD bn)	Value Traded (USD bn)	Turnover Ratio (%)	Market Capitalisation (% of GDP)
Malawi	14	1.8	0.06	3.9	41.5
Mauritius	41	3.4	0.4	8.	39.8
Namibia	7	0.6	0.02	2.8	7.2
South Africa	425	491.3	401.49	60.6	177.5
Swaziland	7	0.2	0	0	7.8
Tanzania	7	1.3	0.01	2.1	6.3
Zambia	15	2.3	0.07	4.1	16.4
Zimbabwe	81	5.3	0.81	5.1	NA

Adapted from Standley (2010) in Kagochi et al. (2013, Table 1, p.62)

Yartey (2007b) in Andrianaivo and Yartey (2010, p.398) indicated that although there appears to be difficulties and risks associated with private equity transactions (these include poor governance; absence of systems and institutions to ease deal flow and exit of private equity and political instability), foreign investment is attracted by high returns over the last few years which arise as a result cheap labour; little competition; low rents and therefore higher margins.

With regard to the bond market in Africa, Blommestein and Horman (2007) in Andrianaivo and Yartey (2010, p.399) highlighted the market microstructure problems in Africa (these include small size; low liquidity; lack of long-term maturities and limited investor base) which have led to the lack of reliable yield curve, pricing benchmarks and financial products to hedge risk. Therefore, the building of market infrastructure would be beneficial to the growth of the bond market in Africa.

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Overall, it was shown that the financial markets in SSA are of small size and therefore economies of scale to reduce transaction costs are unlikely. Furthermore, the rate of saving is low due to socio-economic and institutional shortcomings. However, due to the high potential for growth and relatively low input costs, the financial market in SSA represents a large opportunity for development and therefore economic growth.

In terms of financial market development within the SADC region, Okeahalam (2005, p.92) highlighted the need for the development of a domestic savings culture as it is critical to increasing the rate of foreign investment. Therefore, according to Okeahalam (2005, p.92), the basic appropriate financial policy emphasis for the SADC should be on improving the level of service delivery and efficiency in the banking sector and the relevant institutions. Okeahalam (2005, p.92) suggested that a larger region-wide stock exchange is likely to present more competition in the financial sector than a number of small national stock exchanges and that economies of scope and scale derived from mergers and strategic alliances of financial stock exchanges in the SADC would reduce unit costs and increase the likelihood of better service for traders and investors. It is therefore deduced from above that the financial market in the SADC is concentrated in the banking sector and hence literature related to banking sector development will also be relevant to this research project.

2.2.3. The Financial Market Development and Economic Growth Nexus

Although the relationship between financial development and economic growth has been extensively researched in the last two decades, there has been little consensus on the direction of the relationship. Literature outlines five types of finance-growth relationships which countries may experience (Ince, 2011, p.3738; Banda, 2007, p.53; Pradhan, 2011, p.115 & Graff, 2002 in Tang, 2006, p.1891). These can be listed as,

- Demand-following – economic growth to financial development
- Supply-leading – financial development to economic growth
- No causal relationship
- Bi-directional causality between financial development and economic growth
- Finance may have negative impact on economic growth

The first two types of relationships will be discussed in this section as these are structured around a theoretical argument while the last three types of relationships focus are based on empirical literature and will be discussed in section 2.3.

2.2.3.1. Supply versus Demand Leading Approaches

The two main opposing views on the finance-growth nexus can be compared to the “chicken and egg” adage. According to Hassan, Sanchez and Yu (2011, p.89), early economic growth theory argued that economic development is a process of innovations whereby the interactions of innovations in both the financial and real sectors provide a driving force for dynamic economic growth. However, new growth theory argues that financial intermediaries and markets appear ‘endogenously’ in response to market incompleteness and therefore contribute to long run growth (Hassan et al., 2011, p.89). The remaining discussion on the relationship between finance and economic growth therefore refers to finance as endogenous to economic growth.

According to Hassan et al. (2011, p.89), most authors in the literature agree on the relation between finance and economic growth, however they disagree on the direction of the causality.

The one school of economic thinking as proposed by Bagehot (1873) and Hick (1969) in Levine (1997, p.688) stated that industrialisation in England was ignited by the availability of capital to undertake “immense works”. To support this argument, Schumpeter (1912) in Levine (1997, p.688) contended that the banking institutions encourage technological innovation by identifying and supporting those entrepreneurs with the most innovative products or processes. Tang (2006, p.1890) stated that a well-developed banking system that improves the legal and accounting standards in the banking sector, would facilitate financial development and therefore boost economic growth.

Mihalco (2007) in Kagochi et al. (2013, p.62) added that financial sector development generates local savings which in turn leads to productive investments and better allocation of resources thereby increasing borrowing options available to investors and allowing investors to choose an optimal debt structure.

This is supported by Hetamsaria (2008, p.35) who stated that well-developed stock markets improve economic performance and growth by providing alternate ways for growing companies to raise capital at lower interest rates. This reduces the reliance of growing companies on bank financing to fund their growth. In this way, the financial sector promotes the efficient allocation of funds (Mitchener & Wheelock, 2013, p.161).

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Allen and Ndikumana (2000, p.134) argued that the financial system develops more choices for investors and savers thereby allowing them to allocate resources in a more effective manner which may lead to overall economic growth.

Finally, Masoud and Hardaker (2012, p.151) identified three channels through which the functions of the financial markets influence economic growth. Financial market development mobilises and allocates resources to their efficient use; change the savings rate and hence affect physical capital accumulation and increase the productivity of capital utilised in an economy.

In contrast to this, Levine (1997, p.688) also presented the arguments of those economists (Robertson, 1952 and Lucas, 1988) who contended simply that finance follows enterprise and that financial markets are a consequence of growth. This view was presented in Hassan et al. (2011, p.89), where it was argued that the direction of the relationship is from economic growth to finance. As the economy grows, it increases the demand for financial services that induces the growth of the financial sector (Gurley & Shaw 1967; Goldsmith, 1969; Jung, 1989 in Hassan et al. 2011, p.89).

However, extensive empirical research on the subject of the nexus between financial market development and economic growth was carried out in the 1990's, which supports the positive causal effect between financial market development and economic growth. This will be presented in section 2.3.

2.2.3.2. Finance and Growth Reinforce Each Other

According to Patrick (1966) in Hassan et al. (2011, p.90), at the early stages of economic development, causality runs from finance to economic growth but later on when the economy is in the growth phase, there will be increasing demand for financial service which induces an expansion in the financial and real sector. This is further supported by Khan (2001) in Hassan et al. (2011, p.90). Khan (2001) in Hassan et al. (2011, p.90) postulated that when borrowing is limited, producers with access to loans from financial intermediaries obtain higher returns, which creates an incentive for others to undertake the technology necessary to access investment loans, which in turn reduces financing costs and increases economic growth.

2.2.3.3. Finance having a negative impact on economic growth

Furthermore Levine (2002) in Shen and Lee (2006, p.1909) presented three reasons that explained how banking development may hinder growth. Banks may be involved with intermediaries that have a huge influence on firms, and this may manifest itself in negative ways. Banks may have an inherent bias towards prudence so that their banking development may impede corporate innovation and growth. And finally, the capacity of banks is highly related to corporate governance and bankers may become too involved with firms and prevent the removal of inefficient management, who may be particularly generous to the bankers.

In terms of how stock markets may hinder economic growth, Shen and Lee (2006, p.1909) presented several arguments proposed by different authors. Devereux and Smith (1994) in Shen and Lee (2006, p.1909) indicated that greater risk sharing through stock market activities could actually reduce savings rates, hence slowing economic growth. Excessive trading could introduce 'noise' into the market and can be detrimental to efficient resource allocation when resource allocation is seen as one of the functions of the financial system in promoting economic growth (De Long, 1989 in Shen & Lee 2006, p.1909). Furthermore, Summers (1988) in Shen and Lee (2006, p.1909) pointed out that stock market development could hurt economic growth by facilitating counterproductive corporate takeovers.

In support of this view of stock market development on economic growth, Singh (1997) in (2004, p.58) claimed that financial development may not be beneficial for economic growth. The reasons presented by Singh (1997) in Christopolous and Tsionas (2004, p.58) included,

- The inherent volatility and arbitrariness of the stock market pricing process under developing country conditions make it a poor guide to efficient investment allocation
- The interactions between stock and currency markets in the wake of unfavourable economic shocks may exacerbate macroeconomic instability and reduce long term growth
- Stock market development is likely to undermine the existing group-banking systems in developing countries, which although may have had their challenges, have added value within several developing countries.

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Hence, it can be seen from current literature that there still is uncertainty regarding the nexus between financial market development and economic growth. Some of the possible reasons for the apparent contradictions and decline in strength of relationship are provided by Levine (2002) in Shen and Lee (2006) and in Rosseau (2011). These include the following,

- Incidence of finance crises in later years. According to Ince (2011; p.3783), these include the European Exchange Rate Crisis (1992-93); Asia Banking Crisis (1997); Global Financial Crisis (2007-09); Lehman Brothers bankruptcy (2008) and the US Mortgage deterioration (2007).
- Premature financial development without regulations and institutions can lead to crises that have a real effect on the economy.

Therefore, it is seen from the preceding three sections that theoretically, the relationship between finance and growth has not conclusively put forward a clear picture of the nexus. In summing up the theoretical view of the relation between finance and economic growth, it is seen that there isn't any conclusive consensus on the causality and the direction of causality. For this reason, a large body of empirical evidence exists to improve the literature on the finance-economic growth nexus. This is examined in section 2.3.

2.3. Empirical Literature Review

The empirical literature on the finance-economic growth nexus is extensive but a good starting point would be the seminal work conducted by King and Levine (1993), on which most recent studies on the topic are built (Hafer, 2013; Sunde, 2012; Misati & Nyamongo, 2012; Hassan et al., 2011; Kilimani, 2009). Additional pioneering work that was built on King and Levine (1993) was conducted by Beck et al. (2000). In addition, there has been extensive research conducted on the finance-economic growth nexus in emerging or developing economies. This will also form part of this review. And finally, the work conducted by Allen and Ndikumana (2000) will be reviewed as it forms the starting point of this research as it focuses on the SADC region.

The large body of empirical evidence to support the finance-growth nexus includes firm-level; industry wide; individual country and regional cross country analysis (Pradhan, 2011, p.115). However, the three dominant investigation frameworks which

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emanate from the literature include cross-country; times series and panel data analysis.

2.3.1. Cross-country Studies

Cross-country studies involve average data for each country over the time period under investigation and performing simple regression analysis (King & Levine, 1993, p.723). It also involves contemporaneous regression where country data is pooled or averaged over a five or ten year interval during the time period under investigation. According to Khan and Senhadji (2000, p.11), this allows for the smoothing out business cycle fluctuations in output growth.

King and Levine (1993) used cross-country evidence to study the empirical link between financial development and economic using data on 80 countries for the period 1960 to 1989. The authors used the rate of capital accumulation; improvements in economic efficiency and per capita growth rates as 'growth indicators'. The aim of the study was to investigate whether higher levels of financial development are significantly and robustly correlated with fast current and future 'growth indicators'.

King and Levine (1993) found that the financial development indicators (these indicators include financial depth; domestic asset distribution and importance of specific financial institutions) which they used in their study were strongly and robustly correlated with the 'growth indicators'. Beck et al. (2000, p.263) states that one of the shortcomings of the King and Levine (1993) study is that financial development may be a leading indicator of economic growth but not an underlying cause of economic growth.

However, the later study by Levine et al. (2000) in Beck et al. (2000) which used more robust techniques (these include pure cross country instrumental variables and dynamic panels), showed that there is strong positive relation between the level of financial development and long run economic growth. These strong connections are not due to biases created by endogeneity or unobserved country specific effects (Beck et al., 2000, p.265).

Rosseau and Wachtel (2011) re-examined the relationship between finance and economic growth conducted by King and Levine (1993) and used similar techniques used by King and Levine (1993) to extend the data set to 2004. It was found that the

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finance-economic growth relationship that was proposed by King and Levine (1993) was not apparent in the subsequent 15 years. Rosseau and Wachtel (2011, p.277) found that financial deepening has positive impact on economic growth as long as it is not done in excess.

This hypothesis is tested by looking at countries that have and have not experienced financial sector crises. Rosseau and Wachtel (2011, p.277) found that the finance-economic growth relationship remains intact as long as the crisis episodes are removed. Therefore, the weakening of the finance-economic growth over time appears to be a result of increased incidence of financial crises in the later years of the data sample. Rosseau and Wachtel (2011, p.287) highlighted the need for the systematic study of the financial development experiences of individual countries as the next step in furthering research on the finance-economic growth nexus.

However, subsequent studies have found shortcomings in using the pure cross-country framework to investigate the relationship between finance and economic growth. Demetriades and Hussein (1996, p.390) identified some of these shortcomings in the context of the King and Levine (1993) study as the unrealistic assumption that each economy has a stable growth path; omitted variable bias; sample selection bias and inappropriate weighting of countries. Furthermore, Thangavelu and James (2004, p.249) highlighted the fact that cross-country analysis failed to effectively control for cross-country heterogeneity and for the endogeneity of the explanatory variables and that these lead to large biases in the results. Finally, Hassan et al. (2011, p.88) added that conclusions based on cross-country analysis are sensitive to estimation methods, data frequency, functional form of the relationship, and proxy measures selected in the research, and all of which raise doubts about the reliability of cross-country regression analysis.

Therefore, cross-country analysis has not been widely used by authors in the last decade, to investigate the finance-growth relationship.

2.3.2. Time Series Studies

According to Levine (2005, p.905), a variety of time series techniques have been used to examine the finance-growth relationship. These include Granger-type causality tests and Vector Autoregressive (VAR) procedures. Furthermore, Levine (2005, p.906) indicated that individual country studies allow researchers to design country-specific

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measures of financial market development and expand the time series dimension of the study. This ensures that research will target country-specific objectives.

The dynamic relationship between financial development and economic growth in Australia was investigated by Thangavelu and James (2004). A time series approach using the Vector Auto Regression (VAR) model was used and it was found that although financial market development did cause economic growth, there was no evidence of any causality from economic growth to financial market development. A similar study using the similar causality technique was conducted by Kilimani (2009) with data from Uganda and it was also found that financial market development did cause economic growth.

In a time series study within the SADC region, Sunde (2012) undertook a study to investigate the relationship between financial development and economic growth in South Africa using the growth model that was used by King and Levine (1993). The results of this study indicated that there is a bi-directional relationship between financial sector development and economic growth. However, Sunde (2012) recommended that a more detailed study including many economic growth and financial sector indicators will provide a clearer picture on this nexus for South Africa.

2.3.3. Panel Data Studies

Most recent studies on the finance-growth relationship have employed panel data techniques due to the shortcomings of the cross-country studies. Levine (2005, p.900) listed the benefits of panel data techniques as,

- The ability to exploit the time-series and cross-country variation in the data.
- It avoids biases associated with country regressions
- It permits the use of instrumental variables and thereby provides more precise estimates of the finance-growth relationship.

This has led to widespread use of panel data techniques in studying the relationship between finance and growth and the findings from some of these studies are listed in the next sub-section. The studies are divided into those undertaken on developing and emerging countries, and those undertaken on a regional basis as these ties in to research project under investigation.

2.3.3.1. Developing and Emerging Country Studies

Christopoulos and Tsionas (2004) combined cross-sectional and time series data to examine the relationship between financial development and growth in ten developing countries. This study concluded that there is fairly strong evidence in favour of the hypothesis that long run causality runs from financial development to growth and that the relationship is significant and there is no evidence of bi-directional causality. Furthermore, the evidence showed that there is no short run causality and the effect is long run in nature. According to Christopoulos and Tsionas (2004, p.72), the implication on policy is that policies aimed at improving financial markets will have a delayed but significant effect on economic growth.

Dawson (2008) investigated the finance-economic growth nexus in 44 developing countries from 1974 to 2001. The study highlighted the importance of the measurement and use of financial development indicators. The result showed that financial development promotes economic growth in theoretically consistent growth equations, however when proxy measures of financial development were used, the results showed that financial development inhibited economic growth. Therefore, according to Dawson (2008, p.325), measuring financial development appropriately appears critical for policy advice.

Hassan et al. (2011) examined the relationship between financial development and economic growth in low, middle and high income countries as classified by the World Bank. They also classified their sample by geographic regions. Their results were consistent with Levine (2002) in Hassan et al. (2011, p.100) and King and Levine (1993), where it was found that there are strong linkages between financial development and economic growth.

Using the Granger causality test to study the direction between finance and economic growth, Hassan et al. (2011) found that there was two way causality between finance and economic growth in the short run (except for SSA and East Asia & Pacific). Furthermore, for SSA and East Asia & Pacific, the causality runs from economic growth to finance. These two regions had the lowest GDP per capita in the sample and the underdeveloped financial systems do not Granger-cause growth. Hassan et al. (2011) concluded that policy makers and international organisations should consider a country's legal system, political stability and stage of financial development when designing policies to boost economic growth and reduce poverty.

Masoud and Hardaker (2012) investigated the relationship of the independent correlation between stock market development and economic growth in emerging markets. The study was based on the endogenous growth model and was the first study to incorporate a broad collection of indicators within the model. The findings indicated that the stock market has played a significant role in emerging markets. Furthermore, it emerged from this study that banking sector development indicators enter significantly the growth regression model. According to Masoud and Hardaker (2012, p.167), determinants of banks and stock markets development is an important issue for policy makers as greater financial market development would facilitate economic growth in all countries.

Kagochi et al. (2013) investigated the relationship between financial development and economic growth for seven SSA countries using panel data analysis. The study found that financial development will originally grow in response to services that are directed at the financial systems by the economic growth (Kagochi et al., 2013, p.76). However, once this stage is reached, the direction of causality is reversed and financial development directly stimulates economic growth. Furthermore, Granger causality tests suggest that the level of financial development in the region may not be sufficient to support sustained economic growth (Kagochi et al., 2013, p.76).

2.3.3.2. Regional Studies

A regional study focused on the SADC was conducted by Allen and Ndikumana (2000). The study tested the hypothesis that financial intermediation has a positive impact on growth. The results showed a positive and significant relationship between financial development and economic growth. However, the findings show mixed results when using different proxies for financial market development.

A possible reason presented by Allen & Ndikumana (2000) for these mixed results is that aggregate indicators of financial development do not fully capture the positive effects that the expansion of financial systems has on the allocation of resources into productive activities. Another explanation was that the relationship between financial development and economic growth may be discontinuous as proposed by Berthelemy and Varoudakis (1998) in Allen and Ndikumana (2000, p.156).

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Both Aziakpono (2005) and Kagochi et al. (2013) presented critique of the Allen & Ndikumana study on the finance-economic growth nexus in the SADC. Aziakpono (2005, p.138) stated that the study failed to take into account the heterogeneous nature of the countries in the SADC region and that the study failed to recognise the weak level of financial and monetary integration in the SADC region. Kagochi et al. (2013, p.65) indicated the model used by Allen and Ndikumana (2000) failed to include the human capital accumulation. According to Kagochi et al. (2013), this was a huge oversight as growth theory suggests that there exists a positive relationship between education and economic growth in developing countries (Barro, 1991 as cited in Kagochi et al., 2013).

In a regional study which focused on the Asia-Pacific Economic Cooperation (APEC), the three aspects of financial development (stock market; banking sector and capital flow) were tested for causality on economic growth (Tang, 2006). This study was divided into developed and developing countries. It was found that only stock market development showed a strong growth enhancing effects (Tang, 2006) for developing countries. Overall the study found that there was no evidence to support the view that the level of financial development affects the overall finance-growth relationship in the study.

Narayan and Narayan (2012) in their study to investigate the finance-economic growth nexus for developing countries found that there were mixed results. Narayan and Narayan (2012) investigated the nexus within regional panels. Overall, for their panel of 65 countries (1995 to 2011), Narayan and Narayan (2012) found that there was evidence of finance-led economic growth. However on a regional level, the role of financial-led economic growth was relatively weak (except for Asia), where in the Middle East, the financial sector did not even contribute to economic growth. Finally, it was found that the financial market development proxy, bank credit, had a statistically significant and negative effect on economic growth (except for the Middle East). This recent study highlighted the necessity to conduct regional studies on the finance-growth nexus, as the causality varies across regions.

From the preceding review of the findings on the relationship between financial development and economic growth, it is seen that there is still variation as to the direction of causality between finance and economic growth or that if there is a continuous or discontinuous relationship between the two. Also, from the preceding

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review, the stage of financial development is a key determinant to the causality between financial development and economic growth. This aspect will be investigated in this research project. Overall, there does appear to be greater consensus on the finance-economic growth relationship through empirical research than through theoretical research, however, most recent studies highlight the need for detailed studies to be carried out on a country or regional level.

2.4. Framework for Empirical Analysis

The empirical literature provides an extensive array of methodologies used in terms of the determinants used to measure economic growth and financial development indicators; the economic growth models and the regression and causality methods adopted. Furthermore, many types of conditioning or controlling variables are used in these studies and different types of robustness and sensitivity tests are undertaken. However, it is clear from the preceding sections that the finance-growth nexus is evolving. It therefore becomes necessary to review the econometric techniques used to investigate this relationship. The review will therefore once again start with the pioneering work of King and Levine (1993) and build on their methodology to review the most recent econometrics techniques and those which are relevant to the African and SADC regional context.

2.4.1. Panel Data Approach

According to Levine (2005, p.897), one needs instrumental variables that explain cross-country differences in financial development but which are uncorrelated with economic growth beyond their link with financial development and other growth determinants. Levine et al. (2000) used the legal origin of a country as such an instrument when applied to their regression model. The general method of moments (GMM) regression was used. GMM is an econometric tool used to estimate parameters in econometric models (Nielsen, 2007).

2.4.1.1. Economic Growth Models Used in the Empirical research

According to Alghamedi (2012), economic growth theory deals with the determination of living standards, and is a matter which is of the greatest significance to human welfare. Furthermore, most authors define economic growth as the growth in real per capita gross domestic product (*GDP*) (Alghamedi, 2012; Narayan & Narayan, 2013; Masoud & Hardaker, 2012; Beck et al., 2000 & Hassan et al., 2011).

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Economic growth models which are discussed extensively in literature and related to the finance-economic growth nexus include the traditional neoclassical economic growth models and the endogenous growth model. According to Alghamedi (2012, p.12), the generally accepted growth modelling approach was based on neo-classical growth theory as exemplified by the work of Solow (1956), Swan (1956) and Cass (1965). This type of framework assumes a neoclassical production function with a constant return to scale, diminishing returns to each input (that is, labour and capital) and easy flexibility of substitution between the inputs (Alghamedi, 2012, p.12). This model has been named the exogenous growth model, as in it the steady state rate can be positive if an exogenous force such technological development affects the system. Similarly, financial factors cannot therefore influence the rate of economic growth but only the equilibrium level of capital stock per worker (Alghamedi, 2012, p.13).

However, Alghamedi (2012, p.14) indicated that the 'endogenous growth theory' grew out of a new trend in research that began in the mid-1980's. Here, alternative methods of modelling the determination of long term growth rates by focusing on economic growth as an endogenous result of an economic system were generated (Alghamedi, 2012, p.14). The endogenous growth theory demonstrated that, by changing the rate of technological progress or human capital accumulation, and hence changing investment in physical and human capital, they could have an influence on steady, long-term growth. In this way, a country's general policy system (these include financial structures, market and regulatory systems, taxes, and macro-economic distortions), could change decisions on savings and investment in such a way as to change long-term growth (Alghamedi, 2012, p.14). Subsequent to the introduction of endogenous growth theory, research has focused on the role of financial development of economic growth as the traditional neoclassical model did not allow for the introduction of financial development in the determination of the long run growth rate. The research led by Levine (1993; 1997; 2005) highlights how economic growth can be influenced by functions performed by financial intermediaries such as monitoring managers, facilitating risk management, mobilising capital, and assisting in the allocation of resources (Alghamedi, 2012, p.16).

2.4.1.2. Functional Form of Economic Growth Models Used Empirically

The empirical literature highlighted various forms of the economic growth model used for regression analysis. These include indicators (independent variable) linked to banking sector development (Mitchener & Wheelock, 2013); stock market development

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(Alghamedi, 2012; Nurudeen, 2009); financial deepening (Rosseau & Wachtel, 2011); financial liberalisation (Misati & Nyamongo, 2012; Bekaert, Harvey & Lundblad, 2005) and private capital inflows (Brambila-Macias & Mass, 2010). This review however will focus on economic growth regression models which feature financial market (or sector or system) development.

King and Levine (1993) proposed a growth regression model which has been widely used by most researchers on the finance-economic growth topic (Hafer, 2013; Sunde, 2012; Rosseau & Wachtel, 2011; Hassan et al., 2011; Beck et al., 2000). According to Rosseau and Wachtel (2011, p.278), King and Levine's version of the Barro growth regression is of the form,

$$Y_{it} = \alpha_0 + \alpha F_{it} + \beta X_{it} + \mu_{it} \quad (1)$$

where Y_{it} is the growth rate of real per capita GDP, F_{it} is a measure of financial sector development and X_{it} is a set of baseline explanatory variables that have been shown empirically to be robust determinants of growth. Explanatory variables include log of initial real per capita GDP; log of the initial secondary school enrolment (reflect the investment in human capital); trade to GDP and ratio of government consumption.

According to Masoud and Hardaker (2012, p.151), most growth regressions based on the endogenous growth model follow the form,

$$\text{Growth} = a + b_1R + b_2T + b_3C + \varepsilon \quad (2)$$

Where growth is the per capita growth GDP growth rate, a is intercept, R is a vector of variables that are generally measure to explain growth (including per capita income; investment; human capital and labour); T is a vector of variables that are under study where the assumption could affect growth rate; C is a vector of selected variables frequently used as controls in estimation (including inflation; economic freedom; political stability and openness to trade) and ε is the error term (Barro, 1991; Hermes & Lensink, 2001; Omran & Bolbol, 2003; Bolbol et al., 2005 as cited in Masoud & Hardaker, 2012).

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Overall, both these forms are derived from the production function and include measure for the explanatory variables; control variables and other non-financial variable which influence growth.

However Allen and Ndikumana (2000) have used a growth regression model that was not based on the production function and their model followed the form

$$\ln y_{i,t} - \ln y_{i,t-T} = \alpha_i + \beta \ln y_{i,t-T} + \gamma \ln FIN_{i,t-\tau} + \delta' \ln X_{i,t-\tau} + \mu_{it} \quad (3)$$

where y is the real per capita GDP for country i at time t , T equals 1 for annual data and 5 for pooled data, α_i is the country specific intercept, FIN is an indicator of financial development, X is a vector of control variables and μ is an error term. However, as the Allen & Ndikumana (2000) study was not explicitly derived from the production function as with the previous two growth regressions, it will not be used in this study it is the outcome of this study to compare findings to other studies based on the production function.

2.4.2. Variables and Indicators used in growth regression model

As highlighted by the previous section, the growth model which is widely used is,

$$Y_{it} = \alpha_0 + \alpha F_{it} + \beta X_{it} + \mu_{it} \quad (4)$$

The section provides a discussion on the types of variables and their indicators that were used in this growth regression model.

Financial Development Indicators/Proxy Measures

Various authors have used different measures of financial development indicators and the subsequent section provides a discussion on the main financial development indicators found in empirical literature.

- **Size of the Financial Sector**

According to Beck et al. (2010) and Kagochi et al. (2013, p.68), this is a traditional measure of the size of the financial sector. It is the ratio of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries to GDP. According to Levine (2000) in Tang (2006, 1895), as the size of the financial intermediary sector is directly related to the quality and

quantity of financial services being offered, *liquid liabilities* (LLY) is considered the most crucial variable for measuring banking sector size (Levine et al., 2000). According to King and Levine (1993) in Kagochi et al. (2013, p.68), this indicator has been found to be strongly associated to the real GDP per capita, but may not be associated to other financial services like risk management and information processing.

- ***The level of development of the financial sector***

This is a measure of the relative degree to which the central bank and commercial banks allocate credit and is equal to the ratio of bank credit divided by bank credit plus central bank domestic assets (Levine, 2005, p.890; Beck et al., 2000). This is commonly known as Bank Assets (BANK). The intuition underlying this measure is that banks are more likely to provide the five financial functions than central banks. However Levine (2005, p.890) pointed out two notable weaknesses with this measure and that is banks are not the only financial intermediaries providing valuable financial functions and banks may simply lend to the government or public enterprises.

- ***Currency outside banking system to base money***

This is the share of base money that is not held as bank deposits. The level and change in currency outside the banking sector are used as an estimate of the underdevelopment of the formal financial system (Schneider & Ernste, 2000 as cited in Beck et al., 2010).

- ***The depth of the financial sector***

This is the ratio of claims on the private sector by deposit money banks and other financial institutions to GDP. According to King and Levine (1993); Beck et al. (2000) and Beck et al. (2007) in Beck et al. (2010, p.85), this is a standard finance indicator as it has been shown that countries with higher levels of private credit to GDP grow faster and experience faster rates of poverty reduction. According to Levine (2005, p.890), the assumption underlying this measure is that financial systems that allocate more credit to private firms are more engaged in researching firms, exerting corporate control, providing risk management services, mobilising savings, and facilitating transactions than financial systems that simply funnel credit to the government or state owned enterprises. Furthermore according to Levine and Zervos (1998) in Tang (2006, p.1895), *Private Credit* is considered to be reliable variable as it only measures the total credits issued to the private sector, as opposed to the credits issued to governments and other public enterprises.

- **Size of the stock market**

The *Stock market capitalisation to GDP* (SMC) is the ratio of the value of the listed shares to GDP and it indicates the size of the stock market relative to the size of the economy (Beck et al., 2010, p.81).

- **Private bond capitalisation**

This is ratio of the total amount of outstanding domestic debt securities issues by private or public domestic entities to GDP. This indicator is not widely used as it is not available for most countries especially countries in SADC (Beck et al., 2010, p.81).

Conditioning Variables

The conditioning variables are variables which form part of the main determinants of economic growth but are not related to financial development Tang (2006, p.1895).

- **Trade/Trade Openness**

Trade measures the total volume of trade (export plus import) as a share of GDP. According to Tang (2006, p.1895), the argument that high trade openness would promote economic growth was first put forward by Frankel and Romer (1999) in Tang (2006) and later confirmed by Irwin and Tervio (2002) in Tang (2006). The trade volume rather than trade tariff would be considered a more reliable indicator for trade openness because countries with trade protectionist policies may still experience high trade due to their participation in free trade agreements (Dollar and Kraay, 2003 as cited in Tang, 2006, p.1895). Countries with high trade openness tend to grow faster than those with low trade openness. However, Allen and Ndikumana (2000) stated that the net effect of trade openness can also adversely affect the economy and hence these net effects should be determined empirically.

- **Government Consumption**

Government Consumption equals the amount of government consumption as a share of GDP (Tang, 2006, p.1895). The rationale is that high government expenditure normally requires collecting more tax revenue, which results in less efficient resource allocation (Bekaert et al., 2001 as cited in Tang, 2006, p.1895). Therefore, countries with higher government spending may experience lower economic growth.

- **Investment**

Investment equals the amount of private investment as a share of GDP (Tang, 2006, p.1895). High investment in physical capital can spur technological innovation and can increase the ability to adopt new ideas and this in turn would promote high economic growth in the long run (Henrekson et al., 1997 in Tang, 2006, p.1895).

- **Population Growth**

This measure equals the annual rate of *population growth*. According to Tang (2006, p.1895), the neoclassical growth theory predicts that high population growth may impede economic growth if the population growth is not offset by the proportional increase in capital accumulation and innovation (Temple, 1999 as cited in Tang, 2006, p.1895). Therefore, countries with high population growth may experience low economic growth in general.

- **Debt Service**

This is the measure of debt service to GDP. According to Allen and Ndikumana, debt obligations slow down economic growth because they constitute a drain on national resources and a claim on the country's future wealth. High debt levels are also a deterrent to potential investors and this depresses investment and therefore retards economic growth.

Based on the empirical literature provided above, a number of proxies have been used for financial development and a variety of conditioning variables are available. Unfortunately in most cases, the availability of data determines the use or selection of proxy measures.

2.4.3. Econometric Tests Used in Empirical Literature

According to Hassan et al. (2011, p.91), Ogulogzu and Stengos (2011, p.136), and Jaunky (2012, p. 992), while panel regression analysis can give the effect through the degree of association between financial development and economic growth, it cannot depict the direction of causality and long run relationship between financial development and economic growth. Thus, in order to determine the direction of causality between financial development and economic growth, Granger causality and Wald tests must be performed (Jaunky, 2012, p.993 & Hassan et al., 2011, p.92). Finally, according to Hassan (2011, p.92), forecast error variance decomposition (FEVD) of the growth variable is used to determine what proxy measures are most important in economic growth over time and how much they contribute to economic

growth. This ties in to theoretical literature where it is highlighted that proxy measures must be properly identified in order to support economic policy (Dawson, 2008).

2.5. Conclusion

The literature review indicates that a great deal of research has been conducted on the topic of the finance-growth nexus. It is seen that there has been two schools of thought on the topic, that is, the supply-leading approach and the demanding leading approach.

From the preceding review of the theoretical and empirical literature on the finance-growth nexus, it is seen that consensus regarding the existence and the direction of a relationship between finance and economic has not yet been reached and it does appear that results of empirical analysis vary depending on the time period under investigations; the countries used within dataset; the analytical framework that is used and the proxy measure for financial market development and the conditioning variables.

It is for this reason that it is necessary to conduct empirical research which uses recent data and empirical methodologies to study the finance-growth nexus for the SADC region. The areas have been identified through the literature as needing further investigation.

- The literature highlights the need for more regional studies (Narayan & Narayan, 2012) as the causality between finance and growth varies across regions.
- The study concluded by Allen & Ndikumana (2000) has been the last study on the finance-growth nexus in the SADC region for the period 1970 to 1998. Hence, a new study with updated data is required to re-investigate this relationship.
- Causality and direction of causality needs to established within this relationship as this can have a positive impact on economic policy. In addition, Allen and Ndikumana (2000) did not establish which proxy measures of financial market have the greatest influence economic growth and this represents an area requiring investigation.

3. Research Questions/ Propositions/ Hypotheses

3.1. Introduction

This chapter provides an overview of the development of research questions and the research hypotheses. Following the literature review in Chapter Two, the following gaps in the literature are identified.

- Allen and Ndikumana (2000) study on finance and economic growth was conducted for the period 1970 up to 1998. Therefore, an update (in terms of recent data) on the investigation into this relationship for the SADC region is required.
- Furthermore, the literature indicates that in identifying a relationship between finance and economic growth, the causality and the direction of causality must be shown.
- Ultimately, this type of work will guide policy discussion and hence, it is important to identify the financial market indicators which have the greatest impact on economic growth.

3.2. Research Questions

Based on the gaps identified in the literature review, the aim of this research project is to investigate the financial market development and economic growth relationship for the countries in the SADC region using the most recent available data. Hence the following research questions are identified.

i. Can the relationship between economic growth and financial market development be explained by the differences in economic growth and financial market development within SADC countries?

The research study will test whether there is significant cross-country variation among countries in SADC to estimate a relationship between economic growth and financial market development.

ii. Is there a relationship between financial market development and economic growth?

The research project will test whether an association between financial market development and economic growth for the SADC region still exists, following Allen and Ndikumana (2000) study and using more recent data set.

iii. Does financial market development cause economic growth? What is the direction of the relationship between financial market development and economic growth?

Most recent research stresses that association does not imply causality (Kagochi et al., 2013, p.70) and hence it is necessary to determine if financial market development does in fact influence economic growth. As the literature is not conclusive on the direction of causality between financial market development and economic growth, it is important to investigate this important implication of the relationship.

iv. Which proxy measures of financial market development have the greatest influence on economic growth over time?

There are specific aspects of financial market development that can influence economic growth and these will be investigated.

3.3. Research Hypotheses

Based on the research questions defined in section 3.2, the following research hypotheses will be analysed.

Hypothesis 1

H₀: Cross-country differences in economic growth and financial market development estimate a relationship between economic growth and financial market development

H_a: Cross-country differences in economic growth and financial market development do not estimate a relationship between economic growth and financial market development

To test this hypothesis, a Least Squares Dummy Variable (LSDV) panel data regression model will be run. The value of the coefficients of the dummy variables will represent the growth rates of the variables.

Hypothesis 2

H₀: There is a relationship between financial market development and economic growth

H_a: There is no relationship between financial market development and economic growth

To test this hypothesis, LSDV panel data regression model will be run. The value of the coefficient of correlation will identify whether there is a significant relationship between finance and economic growth.

Hypothesis 3

H₀: There is a causal relationship between financial market development and economic growth

H_a: There is no causal relationship between financial market development and economic growth

To test this hypothesis, a panel Granger causality test will be run.

3.4. Conclusion

The consistency matrix shown in Table 3.1 shows the conceptual framework for the research project.

Table 3.1: Consistency Matrix

Propositions/Questions/Hypotheses	Literature Review	Data Collection Tool (Source)	Analysis
<p>Can the relationship between economic growth and financial market development be explained by the differences in economic growth and financial market development within SADC countries?</p> <p>H₀: Cross-country differences in economic growth and financial market development estimate a relationship between economic growth and financial market development</p> <p>H_a: Cross-country differences in economic growth and financial market development do not estimate a relationship between economic growth and financial market development</p>	<p>King & Levine (1993) Levine (1997 & 2005) Allen & Ndikymana (2000) Beck et al. (2000) Demetriades & Hussein (1996) Hassan et al. (2011) Kagochi et al. (2013) Narayan & Narayan (2013) Ndikumana (2001) Rosseau & Wachtel (2011) Shen & Lee (2006) Tang (2006)</p>	<p>World Bank Development Indicators – African Development Indicators</p>	<p>Descriptive Tests Simple Correlations LSDV Panel Data Regression</p>
<p>Is there a relationship between financial market development and economic growth?</p> <p>H₀: There is a relationship between financial market development and economic growth</p> <p>H_a: There is no relationship between financial market development and economic growth</p>	<p>Oguzoglu & Stengos (2011) Pradhan (2011) Jaunky (2013) Hassan et al. (2011) Seleteng (2012) Masoud & Hardaker (2012) Christopolous & Tsionas (2004) Alghamedi (2012) Sunde (2012)</p>	<p>World Bank Development Indicators – African Development Indicators</p>	<p>LSDV Panel Data Regression</p>

Table 3.1 continued.

Propositions/Questions/Hypotheses	Literature Review	Data Collection Tool (Source)	Analysis
<p>Does financial market development cause economic growth? What is the direction of the relationship between financial market development and economic growth?</p> <p>H₀: There is a causal relationship between financial market development and economic growth H_a: There is no causal relationship between financial market development and economic growth</p>	<p>Hassan et al. (2011) Beck et al. (2000) Kagochi et al. (2013) Oguzoglu & Stengos (2011) Jaunky (2013)</p>	<p>World Bank Development Indicators – African Development Indicators</p>	<p>Granger Causality</p>
<p>Which proxy measures of financial market development have the greatest influence on economic growth over time?</p>	<p>Dawson (2008) Hassan et al. (2011)</p>	<p>World Bank Development Indicators – African Development Indicators</p>	<p>Multiple Regression</p>

4. Research Methodology

4.1. Introduction

This chapter outlines the research methodology used in this research project. The research project followed the methodology used by other authors who have used panel data analysis to study the relationship between economic growth and its determinants. The chapter begins with a description of research parameters and is followed by the methodology and research design adopted. It concludes with the economic growth model used in this research project.

4.2. Research Method

A quantitative method was adopted for this research project. Quantitative research is defined as research that relies on quantitative information that is numbers and figures (Blumberg, Cooper & Schindler, 2008, p.191). The reason that this research was quantitative is because the purpose of the research is to explain if there is a relationship between variables (e.g. financial market development and economic growth). Quantitative econometric data was used and statistical tests were conducted to measure this relationship. As the research project sought to measure this relationship, quantitative analysis was preferred to qualitative analysis. Furthermore, the previous research studies done within this area were also quantitative in nature and hence this provides a comparable means to conduct the analysis.

A causal study was undertaken as the research set out to determine how changes in one variable (independent variable) affect changes in another variable (dependent variable). According to Blumberg et al. (2008, p.218), the basis of causality is grounded on the logic of hypothesis testing which is probabilistic in nature and therefore cannot be demonstrated with certainty. As such, experimental design was undertaken in such a manner as to reduce the influence of extraneous variables on the results. The details of the experimental design used in this research project are shown in the next section.

4.3. Research Design

4.3.1. Description of Experiment

The research objective was to establish if there is a causal relationship between financial market development and economic growth for the countries within SADC region. An experiment was conducted in order to determine if such a causal relationship exists. The experiment included using a growth regression model to predict

the significance of estimators or coefficients in the linear growth regression model. Therefore, if it was found that the estimator or coefficients in the linear growth regression model were in fact significant in explaining the variation in the dependent variable (in this case economic growth), then the variable whose coefficient was significant can be said to influence economic growth and hence a relationship did exist.

4.3.2. Functional Model Used in Experiment

The functional form of the growth regression equation was based on the type of study undertaken, that is, cross-country; time series or panel data analysis. This research report focused on panel data from SADC countries over the period 1993 to 2011 and hence panel data growth regression models were discussed.

The proposition is that Economic Growth = f (financial market development). The functional model that was used in this experiment is the Barro growth equation adapted by King and Levine (1993). This is the most widely used growth regression model and hence will be used in this experiment. The model takes the form,

$$Y_{it} = \alpha_0 + \alpha F_{it} + \beta X_{it} + \mu_{it} \quad (4.1)$$

where Y_{it} is the growth rate of real per capita GDP and is a proxy for economic growth, F_{it} is a measure of financial sector development and X_{it} is a set of baseline explanatory variables that have been shown empirically to be robust determinants of growth.

4.3.3. Variables used in the Experiment

Based on the variable most widely used in empirical literature and then subsequently based on the availability of data for these variables in the SADC region, Table 4.1 shows the variables used in this experiment.

Table 4.1: Proxies used in the Panel Data Regression Model

Variable	Indicator or Proxy	Description
Dependent Variable: Economic Growth	Growth rate of real per capita GDP	This variable is the annual increase in the per capita GDP for each country
Explanatory Variable: Financial Market Development	The size of the banking sector	Liquid Liabilities (LLY) - the ratio of currency plus demand and interest-bearing liabilities of banks and other financial intermediaries to GDP
	The level of development of the banking sector	Bank Assets (BANK) - this is a measure of the relative degree to which the central bank and commercial banks allocate credit and is equal to the ratio of bank credit divided by bank credit plus central bank domestic assets.
	The depth of the banking sector	Private Credit (PC) - this is the ratio of claims on the private sector by deposit money banks and other financial institutions to GDP.
Control Variables	Openness (OPEN)	<i>Trade</i> measures the total volume of trade (export plus import) as a share of GDP.
	Government Consumption (GC)	<i>Government Consumption</i> equals the amount of government consumption as a share of GDP
	Investment or Gross Fixed Capital Formation (GFCF)	<i>Investment</i> equals the amount of private investment as a share of GDP
	Debt Service (DS)	This is the measure of debt service to GDP.
	Population Growth (POP)	This measure equals the annual rate of <i>population growth</i> .

4.4. Description of Data Used in Research Project

The empirical literature related to the finance-growth nexus was used to identify the type of data used in this research project. All data are numeric and continuous in nature, which allowed for the use of parametric statistical analysis. The data used in this research was organised in two dimensions that is, country-specific and time series. This is known as panel data. According to Dawson (2008, p.327) a panel data set consists of n individuals (countries) over T time periods (years). In this research, the panel data set of observations from 13 countries over a 19-year period. According to

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literature (Jaunky, 2012; Hassan et al., 2011; Dawson, 2008), panel data analysis offers a better alternative to cross-country and time series analysis.

4.4.1. Secondary Data

The research project uses secondary data. Secondary data is defined as data used for a research project that were originally collected for some other purpose (Saunders & Lewis, 2012, p.84). All data used in this research project was extracted from the World Bank data bank.

According to Saunders and Lewis (2012, p.90), the benefits of using secondary data are that data are often already in the public domain; data are often available in software compatible formats; it is an unobtrusive method of data collection; datasets can be readily combined; data are more open to public scrutiny and data can provide a contextual background. However, Saunders and Lewis (2012, p.94) lists the pitfalls of secondary data as it only meets the research needs partially; data are not always value-neutral and the researcher is unlikely to know precisely how the data were collected. The motivation for using secondary data in this research project was that the data was easily available and other authors who have previously investigated this research problem under different contexts commonly used this type of secondary data.

4.5. Unit of Analysis

The unit of analysis describes the level at which the research is performed and which objects are being researched (Blumberg et al, 2008, p.224). The unit of analysis for all three hypotheses for this research project was the country. That is, all 13 countries in the SADC region have been used as the unit of analysis.

4.6. Sampling Method and Size

According to Blumberg et al (2008, p.228), a population is the total collection of elements about which we wish to make inferences while Saunders and Lewis (2012, p.132) define a sample as a sub-group of the whole population. Furthermore, Saunders and Lewis (2012, p.133) stated that samples are used, as it may not be practical to collect data from the whole population. In this research project, the total population included all 13 out of 15 countries in the SADC region. However due to incomplete datasets for some of the countries, some of these countries were excluded from the experiment. The countries excluded were Angola and Seychelles. Hence the dataset included a sample of 12 countries within the SADC. This type of sample is known as a

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non-probabilistic purposive sample. A purposive sample is defined as a non-probability sample where the researcher's judgement is used to select the sample members based on range of possible reasons (Saunders & Lewis, 2012, p.134). In this research project, the sample was qualified by the exclusion of certain countries. The reason for the exclusion was the lack of available data for these countries.

4.7. Data Collection and Data Sources

All data used in this research project was extracted from the World Bank data bank. The World Bank data bank 'African Development Indicators' (ADI) series was used. The ADI database provided a collection of development indicators on Africa. These indicators included financial and macroeconomic data and these indicators were used in this research project.

4.8. Data Analysis and Types of Tests to be undertaken

The research project made use of panel data to investigate the relationship between economic growth and financial market development in the SADC. Therefore panel data analysis must be conducted. However this falls within the specialist field of econometrics. A detailed expansion on the econometrics test procedures used in this research study was beyond the scope of this research project however, this section describes the tests that were used and discusses the purpose of these tests in the context of this research project.

4.8.1. Descriptive Statistics and Correlations

The descriptive statistics and correlations between variables were carried out to investigate the variations in the data both from a cross-country and from a time series perspective, and to identify correlations between variables.

4.8.2. Panel Data Regression

According to Hassan et al (2011, p.91), panel data regression allows for the study of the association (and hence the relationship) between financial market development and economic growth. Each of the three financial market development indicators (Liquid Liabilities (LLY); Bank Assets (BANK) and Private Credit (PC) were included separately within the growth regression model so that three separate regressions were ran to study the relationship between financial market development and economic growth.

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Panel data which is also known as longitudinal or cross-sectional time series data, is a dataset in which the behaviour of entities can be observed over time (Torres-Ryna, 2003, p.2). Pooled regression models were generated for the Ordinary Least Squares (OLS) regressions, but it assumes that intercepts are the same for all countries (Kim, 2012, p.2). To overcome this, the Fixed Effects Model (FEM) is one of many models used to analyse pooled panel data (Torres-Ryna, 2003). The least squares dummy variable (LSDV) model is a good way to understand fixed effects. Dummy variables are used to represent country-specific effects in the model and are a way of controlling for heterogeneity. According to Kim (2012, p.2), this dummy technique is called the least-squares dummy variable (LSDV) technique because it is simply the OLS estimator with plenty of dummy variables.

The coefficients from the LSDV model were used to estimate statistically significant differences in the dependent variable and the three explanatory variables for the different country in the sample.

4.8.3. Test for Causality

According to Hassan et al. (2011, p.91); Kagochi et al. (2013, p.70) and Jaunky (2013, p.992), panel regressions do not test for causality between the dependent variable (economic growth) and independent variable (financial market development) although it studies the association between these two variables. For this reason, a panel Granger-type causality test was conducted. According to Kagochi et al. (2013, p.70), *“Given the standard definition of Granger causality, we say that the variable x_{it} is causing y_{it} if we are better able to predict y_{it} using all available information than if the information apart from x_{it} had been used”*

According to Jaunky (2013, p.993) and Hassan et al (2011, p.92) the Wald test is used to determine the direction of the causality between economic growth and financial market development within the Granger causality test.

4.9. Proxy Measure Effects on Economic Growth

Hassan et a (2011, p.91) used the forecast error variance decomposition (FEVD) to examine to which proxy measures are most important in economic growth over time and how much they contribute to economic growth. However, the method used in this research study was multiple linear regression tests. The results were compared to

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simple linear regression tests for each of the three explanatory variables when regressed against the dependent variable for each country.

4.10. Limitations to Research Methodology

The limitations to the research methodology are listed as follows,

- The availability of complete datasets for each of the cross sections was a limitation. For example, the Stock Market size to GDP ratio was omitted from the regression as well the proxy for human capital accumulation due to the lack of available data.
- Robust and advanced econometric treatment of data was not undertaken due to the scope of the research project.
- Source of data were all linked to the World Bank Development Indicators Series and therefore this data was not verified or validated by another party not linked to World Bank.

4.11. Conclusion

This section provided an overview of the methodology that used in this research report. The use of panel data required the use of econometric analyses to investigate the relationship between financial market development and economic growth.

5. Results

5.1. Introduction

This chapter provides a description of the data and the results from the econometrics test that were performed.

5.2. Summary of Data

5.2.1. Treatment of Data

Firstly, although the 'stock market capitalisation to GDP' measures the size of the stock market, this measure was omitted from the study. South Africa's Stock Market remains the largest but the number of stock markets in SADC remains and the level of stock market capitalisation is also low for most countries (Kagochi et al., 2013, p.62). Furthermore, there is lack of data on this variable. Hence stock market capitalisation proxy measure was not included in this study. Also the human capital accumulation data was removed from dataset due to the incomplete datasets for each country in the SADC region.

Secondly, countries like Angola and Seychelles lacked data for entire proxy measures and these two countries were excluded from study. These were excluded from regression analyses. Namibia had a good data set (that all data for each period was available for each proxy measure) however; it lacked data for the proxy measure 'debt service'. Namibia's economy can be compared to Botswana in terms of size; population and economic activity and hence Botswana 'debt service' data was used for Namibia. However all countries were considered in the descriptive statistics summary.

In cases where annual data was missing for one or two years, these were excluded as the regression used pooled panel data analysis. In this way, an unbalanced panel data set was used. Lastly, all data was converted to unit-free data and the natural log of data was used to remove trends in the data.

5.2.2. Descriptive Statistics for Economic Growth and Financial Development Indicators

Table 5.1 provides the summary for all variables used in the study. The average of the annual data for each country was calculated for the period of review (from 1993 to 2011). Significant variance is seen for GDP growth with a range of 8.1%.

Table 5.1: Descriptive Statistics for Data used for all Countries

	GDP	LLY	BANK	PC	OPEN	GC	GFCF	POP	DS
Mean	3.86	33.39	79.44	25.22	92.26	39.78	13.25	1.99	5.13
Median	3.80	24.70	80.53	13.09	83.54	34.75	11.59	2.26	2.79
Std Dev	2.09	22.04	18.70	31.97	35.96	16.72	5.56	0.86	6.21
Min	-0.70	6.62	40.33	1.54	52.76	20.25	7.99	0.78	1.13
Max	7.40	84.70	99.20	125.74	169.78	73.08	29.64	3.04	25.32
N	15	15	13	13	15	15	15	15	14

Tables, 5.2, 5.3, 5.4 and 5.5 show the longitudinal data for each country.

Table 5.2: Descriptive Statistics for GDP Growth for all Countries

GDP Growth Descriptive Statistics						
	Mean	Median	Standard Deviation	Min	Max	N
Angola	7.30	6.80	10.07	-24.70	22.59	19
Botswana	4.97	5.14	3.40	-4.83	10.57	19
DRC	1.07	2.83	5.99	-13.47	7.80	19
Lesotho	3.67	4.20	1.63	0.40	5.70	19
Madagascar	2.75	3.93	4.84	-12.67	9.78	19
Malawi	4.50	4.35	5.70	-10.24	16.73	19
Mauritius	4.44	4.14	1.79	1.24	9.03	19
Mozambique	7.40	7.28	2.52	1.09	11.90	19
Namibia	4.11	4.11	3.10	-2.01	12.27	19
Seychelles	3.33	4.20	5.11	-6.33	11.97	19
South Africa	3.16	3.12	1.75	-1.54	5.60	19
Swaziland	2.56	2.46	0.95	1.16	4.83	19
Tanzania	5.47	6.02	2.00	1.21	7.83	19
Zambia	3.80	5.34	4.11	-8.63	7.62	19
Zimbabwe	-0.70	0.16	8.17	-17.67	10.36	19

The first look at the data was done using descriptive statistics tool in Microsoft Office Excel ® (MS Excel). Mozambique and Angola are shown to have the highest mean GDP growth rate for this dataset while Zimbabwe and the DRC are seen to have the lowest GDP growth rate. It is also seen that Angola and Zimbabwe (the two extremes have the highest standard deviation in the data.

Table 5.3 shows the descriptive statistics summary for the proxy measure LLY. Countries like South Africa, Mauritius, Seychelles and Namibia are seen to have the highest mean liquid liabilities ratio which is the measure of size of the banking sector in relation to economy (King & Levine, 1993). For the period under review, Angola has a lowest mean liquid liabilities measure in comparison to other countries but the highest

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GDP growth, while Mauritius has the highest mean liquid liabilities but a moderate economic growth when compared to other countries in SADC.

Table 5.3: Descriptive Statistics for LLY for all Countries

Liquid Liabilities Descriptive Statistics						
	Mean	Median	Standard Deviation	Min	Max	N
Angola	17.62	14.28	7.62	10.17	32.32	16.0
Botswana	29.86	25.90	10.60	18.28	54.03	19.0
DRC	6.62	5.85	3.06	3.29	12.50	10.0
Lesotho	33.05	32.46	3.04	28.47	38.72	17.0
Madagascar	22.03	22.17	1.59	19.20	24.82	19.0
Malawi	19.21	18.34	3.85	15.01	30.34	19.0
Mauritius	84.70	79.05	14.74	67.32	112.83	19.0
Mozambique	24.70	24.27	7.20	13.43	39.16	19.0
Namibia	44.37	38.53	11.10	35.91	64.17	10.0
Seychelles	76.50	73.43	18.11	46.77	108.55	19.0
South Africa	50.26	46.97	10.44	39.76	76.16	19.0
Swaziland	22.09	21.19	3.18	19.26	29.78	19.0
Tanzania	21.09	19.57	5.85	11.45	32.47	19.0
Zambia	18.01	18.32	2.51	12.51	21.40	18.0
Zimbabwe	30.81	28.82	7.53	20.99	43.76	13.00

Table 5.4: Descriptive Statistics for BANK for all Countries

Bank Descriptive Statistics						
	Mean	Median	Standard Deviation	Min	Max	N
Botswana	99.20	99.45	0.43	98.56	99.69	11
DRC	56.46	50.60	26.48	6.10	99.44	15
Lesotho	84.33	86.12	6.94	70.49	92.66	19
Madagascar	68.45	62.93	12.31	52.92	86.43	19
Malawi	63.64	61.31	10.94	52.45	92.56	19
Mauritius	97.98	98.03	1.42	93.74	99.79	19
Mozambique	91.46	94.80	9.37	66.78	99.97	19
Namibia	97.58	99.95	4.77	87.17	100.00	19
Seychelles	76.74	79.43	6.97	62.52	82.98	19
South Africa	97.66	98.12	1.68	93.21	99.52	19
Swaziland	97.87	98.82	1.97	92.23	99.83	19
Tanzania	74.70	81.02	11.88	55.66	88.70	19
Zambia	40.33	21.08	28.47	12.42	83.82	19
Zimbabwe	65.78	62.36	15.20	47.65	88.44	16

BANK is a proxy measure for the level of banking development within a country (King & Levine, 1993). Most countries in the SADC region appear to have a high level of banking development. Zambia, Zimbabwe and DRC have the lowest mean BANK

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measures but while Zimbabwe and DRC appear to have the lowest GDP, Zambia (with the lowest mean BANK measure in the group) has a moderate GDP growth.

Table 5.5: Descriptive Statistics for PC for all Countries

PC						
	Mean	Median	Standard Deviation	Min	Max	N
Angola	6.62	4.03	6.24	1.14	19.12	16
Botswana	16.60	15.45	5.47	9.12	28.01	19
DRC	1.54	1.02	1.44	0.24	4.85	10
Lesotho	13.09	13.15	4.30	5.98	20.05	17
Madagascar	9.83	9.24	1.90	7.88	14.94	19
Malawi	8.08	7.43	3.58	3.98	17.83	19
Mauritius	60.19	55.69	15.24	37.74	86.72	19
Mozambique	12.69	11.53	5.07	6.15	24.23	19
Namibia	46.88	47.28	2.15	42.10	50.24	10
Seychelles	22.52	25.10	5.95	10.55	30.11	19
South Africa	125.74	121.97	16.03	99.38	149.78	19
Swaziland	16.60	15.64	4.34	10.92	24.31	19
Tanzania	7.89	6.27	4.35	3.09	15.79	19
Zambia	7.61	6.69	2.48	3.69	12.45	19
Zimbabwe	22.43	25.56	7.77	8.56	32.65	13

PC is a proxy measure for the contribution of financial institutions in funding private sector investments. South Africa which has the most advanced economy in terms of economic institutions and infrastructure has the highest mean PC for the SADC countries for the period under review. Once again for the period under review, Angola and Mozambique which experienced the highest mean GDP growth under the period of review have the lowest mean PC measure.

However, in comparing the average growth rates in the dependent variable (GDP growth rate) and the explanatory variables (financial market development indicators) for the SADC countries, it is important to test if the comparisons are statistically significant. These results from this test are shown in section 5.3.

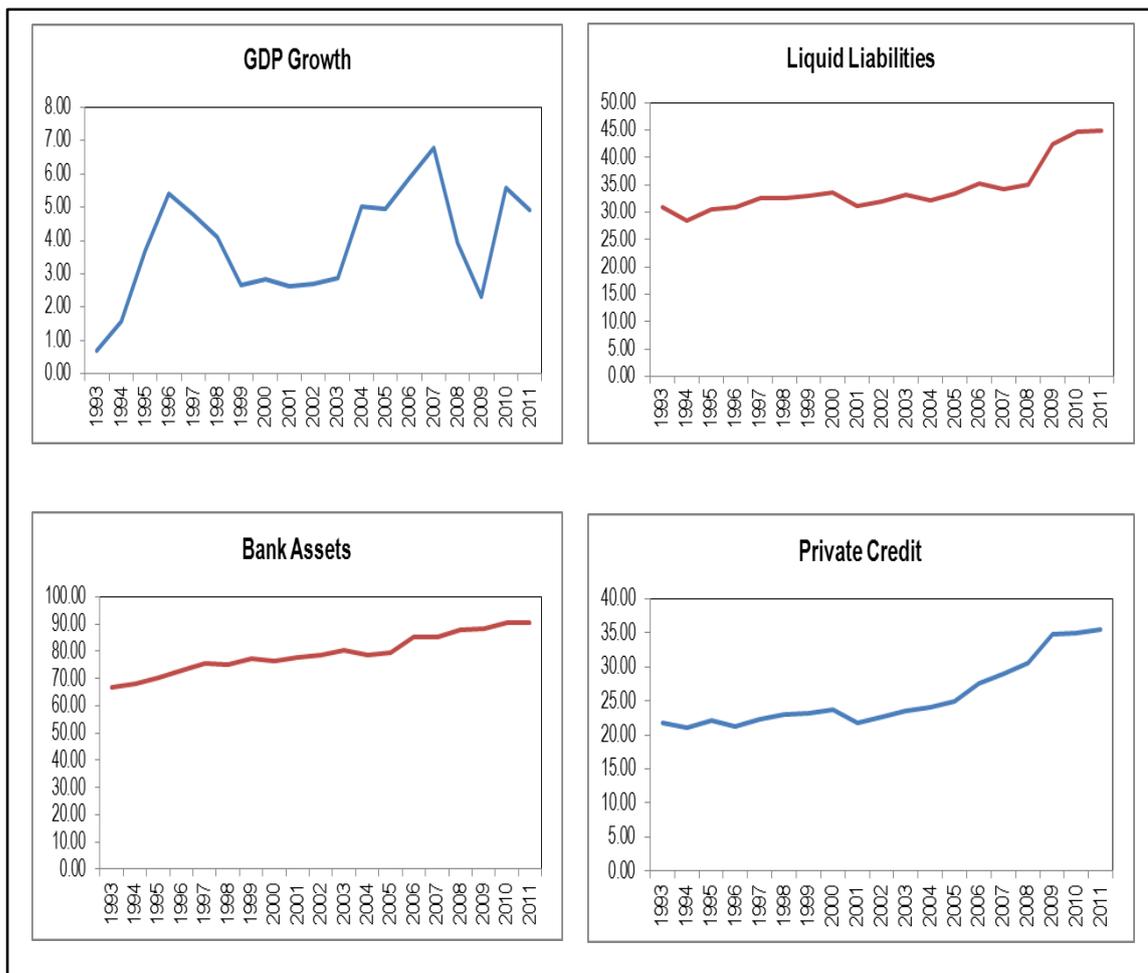
5.2.3. Time Series Look at Data

The averages of all countries combined were taken for each year in order to get a time series look at the data. Figure 5.1 shows the times series movement of the dependent variable (economic growth) and the explanatory variables (financial market development indicators). Appendix I shows the times series of conditioning variables. It can be seen from figure 5.1 that although GDP growth does appear to fluctuate, there

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is an upward trend in growth. The impact of the GFC on the GDP growth within the SADC region is seen in figure 5.1, where there is a sharp decrease in economic growth between 2007 and 2009. There also appears to be a drop in GDP growth between 1996 and 1998 which ties in to the Asian Financial Crisis in the late 1990's.

Figure 5.1: Time Series Look at Dependent Variable and Explanatory Variables



However, by looking at the average times series trend, all variables display an upward movement and appear to be moving in the same direction as GDP growth.

5.3. Comparison of Mean Growth rate of Variables within SADC

In order to identify relationships and make inferences about variables and relationships between countries, it is important to ensure that results are statistically significant. In the preceding section, the means and time series trends within the data were reviewed to get a first level look at data and identify common patterns.

In this section, statistical tests were undertaken to evaluate the relationship between the dependent variable and the explanatory variables. This was done to ensure that differences in means are statistically significant. Regression analysis was conducted in order to determine statistically significant differences. Dummy variables were created for all countries (13 no.) from D_1 to D_{13} . The following Table 5.6 shows the dummy variable for each country.

Table 5.6: Dummy Variables used in Mean Comparison

D_1	Botswana
D_2	Democratic Republic of Congo (DRC)
D_3	Lesotho
D_4	Madagascar
D_5	Malawi
D_6	Mauritius
D_7	Mozambique
D_8	Namibia
D_9	South Africa
D_{10}	Swaziland
D_{11}	Tanzania
D_{12}	Zambia
D_{13}	Zimbabwe

A matrix was set up for the dependent variable, GDP growth and for each of the explanatory variables. Natural logs of the data were taken in order to remove time series trends in the data. Hence, 13 regressions were run for each of the four variables in order to get intercept-values which were then taken as the country mean value for that variable. In this way, statistically significant mean comparisons can be made.

Appendix II shows the dummy variable matrix for GDP growth and each of the explanatory variables. The diagonal represents the intercept and the remainder of the values represent the coefficient for the dummy variables. Table 5.7 ranks the GDP growth means from highest to lowest and matches to explanatory variable for that country. In this way, a comparison between mean GDP growth and mean growth rates for explanatory variable (LLY, BANK or PC) can be made.

Table 5.7: Mean Values for Dependent and Explanatory Growth Rates Based on Statistically Significant Tests

	GDP	LLY	BANK	PC	Country
D13	0.021	3.400***	4.161***	3.042***	Zimbabwe
D2	0.021	1.797***	3.878***	0.057	DRC
D5	0.055*	2.938***	4.140***	2.009***	Malawi
D4	0.060*	3.090	4.211***	2.270***	Madagascar
D10	0.061*	3.086***	4.583***	2.778***	Swaziland
D9	0.063*	3.899***	4.581***	4.827***	South Africa
D3	0.067**	3.487***	4.431***	2.558***	Lesotho
D6	0.069	4.426***	4.585***	4.067***	Mauritius
D1	0.079**	3.343***	4.597***	2.757***	Botswana
D8	0.082**	3.768***	4.579***	3.847***	Namibia
D11	0.096***	3.012***	4.301***	1.923***	Tanzania
D12	0.098***	2.881***	3.455***	1.980***	Zambia
D7	0.102**	3.167***	4.510***	2.473***	Mozambique

NB: *significant at 10% **significant at 5% ***significant at 1%

Tables 5.8, 5.9, 5.10 and 5.11 show the difference in mean values of growth rates for the dependent variable and the explanatory variables. A '0' sign indicates that statistically two means are no different from each other, '+' sign indicates that statistically the mean value of the country in the first column is higher than the mean value of the variable for the country in the other columns and '-' sign indicates that statistically the mean value of the country in the first column is lower than the mean value of the variable for the country in the other columns.

A comparison between countries can be made to determine if the difference in GDP growth rates can be observed with differences in explanatory variables. Overall, Table 5.8 and Appendix II show that for the GDP growth rates, only D2 and D7 can be said to have statistically different mean values from each other, which are DRC and Mozambique respectively. According to Table 5.8 and Appendix II, the means for all other country interactions are statistically similar. This implies that for all 13 countries, with the exception of DRC and Mozambique, each country is statistically similar to all the other countries. The DRC is statistically different from Mozambique but statistically similar to all other countries. Similarly, Mozambique is statistically different from DRC but statistically similar to all other countries. Therefore, given the results from the data statistically significant inferences cannot be made for all countries but only between Mozambique and DRC.

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Table 5.8: Difference in mean values of growth rates for GDP growth

GDP	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	1**												
D2	0	1											
D3	0	0	1**										
D4	0	0	0	1*									
D5	0	0	0	0	1*								
D6	0	0	0	0	0	1**							
D7	0	+	0	0	0	0	1**						
D8	0	0	0	0	0	0	0	1**					
D9	0	0	0	0	0	0	0	0	1*				
D10	0	0	0	0	0	0	0	0	0	1*			
D11	0	0	0	0	0	0	0	0	0	0	1***		
D12	0	0	0	0	0	0	0	0	0	0	0	1***	
D13	0	0	0	0	0	0	0	0	0	0	0	0	1

NB: *significant at 10% **significant at 5% ***significant at 1%

+ Increase; - Decrease; 0 – no change

This indicates that only Mozambique and DRC are statistically different and comparison in the differences in financial market development indicators.

Table 5.9: Difference in mean values of growth rates for LLY

LLY	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
D ₁	1***												
D ₂	-***	1***											
D ₃	+	+***	1***										
D ₄	-*	+***	-***	1***									
D ₅	-*	+***	-***	-***	1***								
D ₆	+***	+***	+***	+***	+***	1***							
D ₇	-**	+***	-***	0	+***	-***	1***						
D ₈	+***	+***	+***	+***	+***	-***	+***	1***					
D ₉	+***	+***	+***	+***	+***	-***	+***	0	1***				
D ₁₀	-***	+***	-***	0	+***	-***	0	-***	-***	1***			
D ₁₁	-***	+***	-***	0	0	-***	-***	-***	-***	0	1***		
D ₁₂	-***	+***	-***	-***	0	-***	-***	-***	-***	-***	-*	1***	
D ₁₃	0	+***	0	+***	+***	-***	+***	-***	-***	+***	+***	+***	1***

NB: *significant at 10% **significant at 5% ***significant at 1%

+ Increase; - Decrease; 0 – no change

From Table 5.9, it is seen that there is a statistically significant difference between mean values for LLY for most countries in relation to the other countries. Therefore, in

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most cases, there is statistically different mean value and hence inferences can be made with regard to these differences. The same is true for BANK and PC variables as shown in Tables 5.10 and 5.11.

Table 5.10: Difference in mean values of growth rates for BANK

BANK	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	1***												
D2	_-***	1***											
D3	0	+***	1***										
D4	_-***	+***	_-**	1***									
D5	_-***	+***	_-***	0	1***								
D6	0	+***	0	+***	+***	1***							
D7	0	+***	0	+***	+***	0	1***						
D8	0	+***	0	+***	+***	0	0	1***					
D9	0	+***	0	+***	+***	0	0	0	1***				
D10	0	+***	0	+***	+***	0	0	0	0	1***			
D11	_-***	+***	0	0	+*	_-***	_-**	_-***	_-***	_-***	1***		
D12	_-***	_-***	_-***	_-***	_*	_-***	_-***	_-***	_-***	_-***	_-***	1***	
D13	0	+***	_-***	0	0	_-***	_-***	_-***	_-***	_-***	-	+***	1***

NB: *significant at 10% **significant at 5% ***significant at 1%

+ Increase; - Decrease; 0 – no change

Table 5.11: Difference in mean values of growth rates for PC

PC	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	1***												
D2	_-***	1***											
D3	0	+***	1***										
D4	_-***	+***	_-**	1***									
D5	_-***	+***	_-***	_-**	1***								
D6	+***	+***	+***	+***	+***	1***							
D7	_-**	+***	0	+*	+***	_-***	1***						
D8	+***	+***	+***	+***	+***	0	+***	1***					
D9	+***	+***	+***	+***	+***	+***	+***	+***	1***				
D10	0	+***	+*	+***	+***	_-***	+**	_-***	_-***	1***			
D11	_-***	+***	_-***	_-***	0	_-***	_-***	_-***	_-***	_-***	1***		
D12	_-***	+***	_-***	_-**	0	_-***	_-***	_-***	_-***	_-***	0	1***	
D13	+**	+***	+***	+***	+***	_-***	+***	_-***	_-***	+*	+***	***	1***

NB: *significant at 10% **significant at 5% ***significant at 1%

+ Increase; - Decrease; 0 – no change

5.3.1. Correlations Matrix

Table 5.12: Correlation Matrix for Financial Market Development and Economic Growth Indicators

	LLY	BANK	PC
R ² =coefficient of Correlation	R ²	R ²	R ²
Botswana	0.525**	0.145	0.712***
Lesotho	0.392*	0.053	0.282
Madagascar	0.562	0.229	0.435*
Malawi	0.598***	0.093	0.292
Mauritius	0.434*	0.114	0.283
Mozambique	0.707***	0.014	0.314
Namibia	0.314	0.062	0.493
South Africa	0.283	0.154	0.215
Swaziland	0.205	0.213	0.065
Tanzania	0.292	0.057	0.009
Zambia	0.653***	0.207	0.105
Zimbabwe	0.199	0.642***	0.254

NB: *significant at 10% **significant at 5% ***significant at 1%

Table 5.12 shows the coefficient of correlation when each of the explanatory variables were regressed with the dependent variable, GDP Growth only, for each country. Pooled panel data was used for this test. From the results, it is seen that Botswana; Malawi; Mozambique and Zambia show statistically significant moderate correlation with the liquid liabilities indicator (the size of the banking sector). With regard to the level of banking development, as measure by BANK proxy measure, there is statistically significant moderate correlation only for Zimbabwe for the time period under investigation. Finally with regard to the depth of the bank sector, there is statistically significant correlation for Botswana and Madagascar.

Table 5.13 shows the regression results for all three financial market development indicators when regressed against GDP growth. Based on the statistical significance of the coefficients, it is seen that BANK proxy measure has is most effective in explaining variance in the economic growth for this sample of countries for the period under investigation.

Table 5.13: Regression Results for all Financial Market Indicators

Multiple R	0.203				
R ²	0.041				
Adj R ²	0.026				
Std Error	0.136				
Observations	201				
ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>p-value</i>
Regression	3	0.156125	0.052042	2.813187	0.040481
Residual	197	3.644336	0.018499		
Total	200	3.800461			
	<i>Coefficients</i>	<i>Std Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	0.057	0.012	4.871	0.000	
LLY	0.042	0.027	1.542	0.125	
BANK	0.072	0.028	2.619	0.010	
PC	-0.018	0.021	-0.817	0.415	

5.4. Regression Analysis

5.4.1. Panel Regression Models

Least Squares Dummy Variable (LSDV) model was used in the regression to understand the fixed effects. By adding the dummy of each country, the pure effect of the explanatory variable (financial market indicators) is estimated and each dummy is absorbing the effects specific to each country (Torres-Ryna, 2003). Panel data regression models were run on E-Views. The output of the regression models are shown below.

5.4.1.1. Model 1: Size of Banking Sector, Liquid Liabilities, LLY

The results of the regression for LLY are shown in Tables 5.14 and 5.15

Table 5.14: Output of LLY Regression Model

R-squared	0.166093	Mean dependent var	0.074853
Adjusted R-squared	0.018933	S.D. dependent var	0.135115
S.E. of regression	0.13383	Durbin-Watson stat	1.732751
Sum squared resid	3.044758		
Log likelihood	135.8766		
F-statistic	1.128656		
p-value	0.30776		

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The R^2 value is low and the p-value is more than α ($\alpha = 0.05$), which indicates that the model is not a good predictor of economic growth. Although the model is not a good predictor of economic growth the coefficients are shown in Table 5.15.

Table 5.15: Regression Coefficients for Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	0.007776	0.051638	0.150591	0.8805
D ₁	0.044931	0.058277	0.77099	0.4418
D ₂	-0.02796	0.144901	-0.19293	0.8472
D ₃	0.025785	0.070633	0.365058	0.7155
D ₄	-0.04626	0.066577	-0.69482	0.4881
D ₅	-0.07625	0.082589	-0.92319	0.3572
D ₆	0.081371	0.076281	1.066728	0.2876
D ₇	0.014075	0.118173	0.119104	0.9053
D ₈	0.050477	0.081527	0.61914	0.5367
D ₉	0.091719	0.059485	1.541887	0.125
D ₁₀	0.078457	0.058111	1.35011	0.1788
D ₁₁	0.011787	0.122581	0.096154	0.9235
D ₁₂	0.156749	0.13281	1.180251	0.2395
lnLLY	-0.07202	0.144847	-0.49719	0.6197
D ₁ lnLLY	0.039633	0.177616	0.22314	0.8237
D ₂ lnLLY	-0.03664	0.17623	-0.20788	0.8356
D ₃ lnLLY	0.034124	0.387116	0.08815	0.9299
D ₄ lnLLY	-0.54452	0.478177	-1.13874	0.2564
D ₅ lnLLY	-0.47092	0.257501	-1.82881	0.0692
D ₆ lnLLY	0.024651	0.254601	0.096824	0.923
D ₇ lnLLY	-0.08198	0.214067	-0.38294	0.7022
D ₈ lnLLY	0.132	0.252703	0.522353	0.6021
D ₉ lnLLY	0.033635	0.223524	0.150477	0.8806
D ₁₀ lnLLY	0.291862	0.282214	1.034188	0.3025
D ₁₁ lnLLY	-0.02678	0.215099	-0.1245	0.9011
D ₁₂ lnLLY	-0.2093	0.351918	-0.59475	0.5528
lnOPP	-0.24258	0.130121	-1.86423	0.064
lnPOP	0.005024	0.020729	0.242372	0.8088
lnGOVC	0.205595	0.096804	2.123824	0.0351
lnGFCF	0.082245	0.030103	2.732107	0.007
lnDEBTS	-0.04025	0.018299	-2.19947	0.0292

5.4.1.2. Model 2: Level of Banking Development, Bank Assets, BANK

Table 5.16: Output of LLY BANK Model

R-squared	0.174885	Mean dependent var	0.066293
Adjusted R-squared	0.026661	S.D. dependent var	0.14524
S.E. of regression	0.143291	Durbin-Watson stat	1.819398
F-statistic	1.179869	Sum squared resid	3.42888
p-value	0.253296	Log likelihood	120.5975

Table 5.17: Regression Coefficients for Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.01034	0.085799	-0.12056	0.9042
D ₁	0.053762	0.102954	0.522194	0.6022
D ₂	-0.81712	0.288938	-2.82803	0.0053
D ₃	0.134077	0.13434	0.998041	0.3197
D ₄	-0.01274	0.117307	-0.10859	0.9137
D ₅	-0.00029	0.131135	-0.0022	0.9982
D ₆	0.062624	0.090054	0.695406	0.4878
D ₇	0.215088	0.205679	1.045743	0.2972
D ₈	0.11988	0.155316	0.771845	0.4413
D ₉	0.113223	0.101349	1.117151	0.2655
D ₁₀	0.063419	0.086268	0.735136	0.4633
D ₁₁	0.075998	0.125679	0.604701	0.5462
D ₁₂	0.056191	0.094647	0.593695	0.5535
lnBANK	-0.06201	0.235747	-0.26305	0.7928
D ₁ lnBANK	-5.64488	11.22764	-0.50277	0.6158
D ₂ lnBANK	0.527376	0.291035	1.812071	0.0718
D ₃ lnBANK	-0.47743	0.542679	-0.87976	0.3803
D ₄ lnBANK	0.377048	0.353056	1.067956	0.2871
D ₅ lnBANK	0.311026	0.33364	0.932221	0.3526
D ₆ lnBANK	2.939322	2.437514	1.205868	0.2296
D ₇ lnBANK	-0.6898	0.603008	-1.14393	0.2543
D ₈ lnBANK	-0.47892	1.02919	-0.46533	0.6423
D ₉ lnBANK	2.123758	2.152128	0.986818	0.3252
D ₁₀ lnBANK	-2.04655	1.80741	-1.13231	0.2591
D ₁₁ lnBANK	-0.30897	0.343966	-0.89826	0.3703
D ₁₂ lnBANK	0.107499	0.243523	0.441432	0.6595
lnOPP	-0.36427	0.152581	-2.38737	0.0181
lnPOP	-0.00163	0.022601	-0.07217	0.9426
lnGOVC	0.212661	0.114388	1.859122	0.0648
lnGFCF	0.044399	0.034784	1.276423	0.2036
lnDEBTS	-0.02163	0.017866	-1.21045	0.2278

5.4.1.3. Model 3: Depth of Banking Sector, Private Credit, PC

Table 5.18: Output of PC Regression Model

R-squared	0.216685	Mean dependent var	0.073758
Adjusted R-squared	0.08006	S.D. dependent var	0.135018
S.E. of regression	0.1295	Durbin-Watson stat	1.888722
F-statistic	1.585986	Sum squared resid	2.884484
p-value	0.036141	Log likelihood	143.7223

Table 5.19: Regression Coefficients for Model 3

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-0.00362	0.051308	-0.070538	0.9438
D ₁	0.033158	0.058212	0.569611	0.5697
D ₂	0.066094	0.125044	0.52857	0.5978
D ₃	0.038753	0.069607	0.556739	0.5784
D ₄	-0.13093	0.128896	-1.015792	0.3112
D ₅	-0.06991	0.089917	-0.777438	0.438
D ₆	0.104355	0.08697	1.199909	0.2318
D ₇	0.048151	0.102162	0.471322	0.638
D ₈	-0.22546	0.192126	-1.17348	0.2422
D ₉	0.12007	0.096405	1.245482	0.2146
D ₁₀	0.084966	0.059759	1.421808	0.1569
D ₁₁	-0.03181	0.084077	-0.378355	0.7056
D ₁₂	0.219696	0.107485	2.043979	0.0425
lnPC	0.090842	0.148353	0.61234	0.5411
D ₁ lnPC	-0.17102	0.190775	-0.896464	0.3713
D ₂ lnPCPC	0.010287	0.155364	0.066214	0.9473
D ₃ lnPC	-0.25274	0.178071	-1.419295	0.1576
D ₄ lnPC	-0.34235	0.280732	-1.219495	0.2243
D ₅ lnPC	-0.30495	0.172337	-1.769463	0.0786
D ₆ lnPC	-0.14841	0.215722	-0.687955	0.4924
D ₇ lnPC	-0.24497	0.183002	-1.33859	0.1825
D ₈ lnPC	2.061251	1.537366	1.340768	0.1818
D ₉ lnPC	-0.10388	0.338557	-0.306816	0.7594
D ₁₀ lnPC	0.121918	0.199316	0.611681	0.5416
D ₁₁ lnPC	-0.16401	0.160321	-1.022979	0.3078
D ₁₂ lnPC	-0.32115	0.200679	-1.600337	0.1114
lnOPP	-0.23137	0.137321	-1.6849	0.0938
lnPOP	-0.00175	0.021106	-0.082795	0.9341
lnGOVC	0.126399	0.107359	1.177354	0.2407
lnGFCF	0.084904	0.030351	2.797422	0.0057
lnDEBTS	-0.06034	0.017586	-3.431306	0.0008

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Table 5.16 and 5.17 show results for Model 2 where BANK is used as the proxy for financial market development. The R^2 value is low and the p-value is more than α ($\alpha = 0.05$), which indicates that the model is not a good predictor of economic growth. Although the model is not a good predictor of economic growth the coefficients are shown in Table 5.17.

Table 5.18 and 5.19 show results for Model 2 where PC is used as the proxy for financial market development. The R^2 value is low and the p-value is less than α ($\alpha = 0.05$), which indicates that the model may be a good predictor of economic growth. The coefficients of the growth model are shown in Table 5.19. Openness, GFCF and Debt Service are seen to be statistically significant estimator of economic growth. While GFCF and Debt Service appear to have the expected sign, Openness has a sign in the opposite direction than expected.

The Durbin-Watson statistic for the regression as shown in Tables 5.14; 5.16 and 5.18 indicates that there is a lack of autocorrelation as the Durbin-Watson statistic is close 2.

5.4.2. Granger Causality Tests

Granger Causality tests were run for each of the three regression models. The results are shown in Table 5.20 below.

Table 5.20: Results of Granger Causality Tests

Null Hypothesis:	F-Statistic	p-value
GDPG does not Granger Cause LLY	0.31681	0.7288
LLY does not Granger Cause GDPG	0.87879	0.4169
BANK does not Granger Cause GDPG	1.09342	0.3372
GDPG does not Granger Cause BANK	2.61628	0.0757*
GDPG does not Granger Cause PC	2.88925	0.058*
PC does not Granger Cause GDPG	2.695	0.07*

NB: asterisks indicate rejection of the null hypotheses that there is no causal relationship between the two variables. *significant at 10% **significant at 5% *significant at 1%**

The rejection of the null hypothesis would indicate Granger causality. The p-value must be less than the confidence level, α , for rejection of the null hypothesis. Therefore, it is seen in Table 5.20, that for the relationship between GDP Growth and LLY, there is no Granger causality in either direction. Hence for the country data used for the time period under consideration, GDP growth does not Granger cause LLY and LLY does not Granger cause GDP growth.

When considering the causality between the level of banking development and economic growth, it is seen that BANK does not Granger cause GDP growth yet GDP growth does Granger cause BANK. This indicates that the indicator BANK follows GDP growth for country data used for the time series under consideration.

Finally, in terms of the causality between economic growth and the depth of the banking sector, it is that economic growth does Granger cause PC and that PC does cause economic growth. Hence for country data used for the time series under consideration, there is bi-directional Granger causality between GDP growth and PC.

5.5. Conclusion

Based on the tests that were run and the results that were received, it is seen that the relationship between economic growth and financial market development is weak for the SADC region for the time period between 1993 and 2011.

Descriptive statistics did in fact indicate that the GDP growth and the financial market indicators were growing in the same direction in an aggregate basis, that is by average all country data, however when statistically significant tests were run, it could not be concluded that differences between countries' economic growth rates could be explained by difference in their financial market indicators.

In determining if a country's legal origins influenced its economic growth, t-Tests were conducted to compare country GDP growth means. Countries were grouped into categories (British origin vs Non-British origin). It was found that for this dataset, the legal origin did not have an influence on its economic growth.

Least Square Dummy Variable (LSDV) regression models were run. Each of the three indicators of financial market developed was run individually in the LSDV model. The LLY and BANK model results showed that the model was not a good predictor of economic growth, while the PC model was seen to be a good predictor of economic growth for country data for the time period under consideration.

6. Discussion of Results

6.1. Introduction

This section uses the results presented in Chapter 5 to answer the research questions proposed in Chapter 3 following the methodology described in Chapter 4. As outlined in Chapter 2, the literature indicates that a large volume of research has been undertaken within the finance and economic growth nexus. There has not been conclusive evidence both theoretically and empirically showing the presence and direction of the relationship between economic growth and financial market development. This research attempted to investigate this relationship in a regional context, that is to investigate the relationship between the SADC region. This chapter provides a discussion on findings of this investigation.

6.2. Research Question 1

Can the relationship between economic growth and financial market development be explained by the differences in economic growth and financial market development within SADC countries?

6.2.1. Tests and Results

In order to answer this research question, descriptive statistics were run to calculate the mean values of the dependent variable and the explanatory variables. In addition, to make statistically significant inferences from the data, dummy variables for each country were used and regression tests were run for GDP growth and the three explanatory variables.

From descriptive statistics and time series trends, it was found that a GDP growth did move in the same direction as each of the three explanatory variables. Therefore for the countries in the SADC, there appeared to be a relationship between GDP growth and each of the three explanatory variables.

Dummy variables for each country were created and a dummy variable regression model was run for the dependent variable and each of the three explanatory variables. The output allowed for the comparison in the growth rate of variables between the countries used in the model. The results indicate that there only was a statistically significant difference in the mean rate of GDP growth between Mozambique and the

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DRC, where the mean rate of GDP growth for Mozambique is higher in relation to the mean rate of GDP growth for the DRC.

However, by running the same regression test for the three explanatory variables, it is seen that for the countries the SADC the mean rate of growth of the financial market development indicators is significantly different in relation to each other.

The conclusion here is that although the mean rate of GDP growth is statistically similar (except between DRC and Mozambique) for most countries in the SADC region, the mean rate of growth for each of the three explanatory variables are statistically different when comparing the mean values for each country.

As indicated, statistical significant inference can only be made Mozambique and the DRC. Table 6.1 shows the mean growth rates of GDP growth and the three explanatory variables.

Table 6.1: Mean Growth Rates for GDP Growth and Financial Market Development Indicators

	GDP	LLY	BANK	PC	Country
D2	0.021	1.797***	3.878***	0.057	DRC
D7	0.102**	3.167***	4.510***	2.473***	Mozambique

*significant at 10% **significant at 5% ***significant at 1%

It is seen that for these two countries, an increase in economic growth is correlated with a statistically significant increase in each of the three explanatory variables. It can therefore be concluded that the financial market development does in fact increase economic growth when comparing Mozambique to the DRC for the time period under investigation.

Both countries are endowed with natural resources, however the DRC has been and continues to be plagued with lawlessness in its eastern provinces (African Economic Outlook, 2013). In addition, it is known to have poor macroeconomic stability and political corruption (Ndikumana, 2001, p.10). This may have led to the lack of development in its financial markets especially in terms banking sector size, depth and development as measure by the three indicators used in this study. Therefore, for

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these countries, it is inferred that financial market development does influence economic growth.

However beyond the comparison between Mozambique and the DRC, what is present in the results is that countries that have statistically significantly different financial market development yet have statistically significantly similar economic growth. Hence for this data, it appears that financial market development does not influence economic growth when looking at two way country comparisons.

6.3. Research Question 2:

What is the relationship between economic growth and financial market development in the SADC region?

6.3.1. Tests and Results

Three LSDV regression models were used to establish if there is an association between economic growth and financial market development for the SADC region between 1993 and 2011. Each of the three indicators of financial market development was used in turn in the regression model. The LLY and BANK model were found not be significant but the PC model was found to be statistically significant (according to p-value of F test). However, the PC variable itself was not a statistically significant estimator of economic growth.

Overall based on the regression model results, a relationship between economic growth and financial market development could not be established for the dataset used, as the results showed mixed results when different proxies for financial market development were used.

6.3.2. Comparison with Literature

The findings from this study are similar to that of Allen and Ndikumana (2000, p.153) in that various indicators of financial market development was used to measure the relationship between economic growth and financial market development. Allen and Ndikumana (2000) found that some of the indicators of financial market development showed positive effect on economic growth and others did not. The size of the financial system was seen to have a positive effect while in this research study the depth of the financial system (measured are Private Credit) was seen to have a positive effect on economic growth (as seen in Regression Model 3). This study compares with Allen and Ndikumana (2000) as both studies show mixed result when different indicators of

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financial market development are used. Allen and Ndikumana (2000) attribute these mixed results to low efficiency of the financial markets in SADC. Furthermore, Allen and Ndikumana (2000) highlight that the weak results may be a result of small sample of countries and therefore not diverse enough to allow cross-country variation.

Lastly, Allen and Ndikumana (2000) highlight the work done Berthelemy and Varoudakis (1998) which studies the discontinuous nature of the relationship between financial market development and economic growth. Hence, economies must reach a threshold level of financial market development before the positive effect of financial market development on economic growth can be experienced. In support of this explanation, Shen and Lee (2006, p.1910) proposes that one possible reason for varying positions on the economic growth-finance nexus is different countries have different economic and financial conditions which may result in the non-linear relationship between financial market development and economic growth.

Another possible reason for weak results in this study could be the effect of inflation as proposed by Rosseau and Wachtel (2001) in Shen and Lee (2006). It was found that in countries that experienced high inflation, the effects of finance on growth has weakened. In the sample of SADC countries, countries have experienced high inflation with Zimbabwe experiencing hyperinflation in the last decade.

The results of this study also support the work of Narayan and Narayan (2013) who found weak results when considering regional panels and did not find any significant evidence of the finance sector-led growth hypothesis. Narayan and Narayan (2013) link this to the legal and macroeconomic environment of a country and that a country needs well developed policies in order to facilitate the proper functioning of financial and banking sectors. Allen and Ndikumana (2000) indicated that only South Africa and Botswana have well-designed and well-supported supervisory authority to support the financial sector on a political level. Hence, as most countries in the SADC region do not have well-supported financial systems, this could be another reason for the weak association between economic growth and financial market development in this study.

Finally, Kagochi et al (2013) proposes that the lack of reliable data for indicators in the region affects the viability and reliability of results which may be the case for this research study.

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6.4. Research Question 3

Does financial market development cause economic growth in the SADC region?

6.4.1. Tests and Results

In order to test the causality between financial market development and economic growth, Granger causality test were undertaken. The Granger causality also showed the direction of the causality if it existed.

It was found that for the Regression Model 1, where the relationship between economic growth and the size of the banking sector (LLY) was investigated, that LLY did not Granger cause GDP growth and also that GDP growth did not Granger cause LLY. Hence, a causal relationship between economic growth and the size of the banking sector could not be established.

It was found that for the Regression Model 2, where the relationship between economic growth and the level of development of the banking sector (BANK) was investigated, that BANK did not Granger cause GDP growth however GDP growth did Granger cause BANK. Hence, a one way causal relationship from economic growth to the level of the development of the banking sector was calculated.

It was found that for the Regression Model 3, where the relationship between economic growth and the depth of the banking sector (PC) was investigated, that PC did Granger cause GDP growth and that GDP growth did Granger cause PC. Hence, a two causal relationship between economic growth and the size of the banking sector was calculated.

6.4.2. Comparison with Literature

The results of the Granger causality are similar to the findings of Kagochi et al. (2013) where an investigation into the finance-economic growth nexus in SSA was undertaken. This study finds that there is one-way causality running from economic growth to the financial market development proxy measures of BANK and PC while Kagochi et al. (2013) found that there is one-way causality from economic growth to all three measures of financial market development, that is, LLY; BANK and PC. Furthermore, Kagochi et al. (2013) found two-causality between economic growth and PC, which is also one of the outcomes of this study.

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Therefore, the findings of this study support the demand leading phenomenon where finance follows economic growth. Patrick (1966) as cited in Kagochi (2013, p.73), suggested that increased economic growth leads to an increase in the need for various financial services and hence more financial services and products are introduced into the market due to this demand. Kagochi et al.(2013, p.73) that the such results of one way causality from economic growth to financial market development is an indication that the banking sector is not sufficiently developed to support economic growth in the region. This coincides with the findings of this study as SADC falls within SSA.

Furthermore Hassan et al. (2011) also found similar results supporting the one-way causality from growth to finance from economic growth to finance in the SSA region but did not find two-way causality between economic growth and a similar financial depth proxy measure for PC.

However, there is bi-directional causality between economic growth and PC, which a measure of the depth of the banking sector. It is intuitive therefore that increasing banking services especially to private sector for productive investment would therefore increase economic growth.

6.5. Research Question 4

Which proxy measures of financial market development have the greatest influence on economic growth?

6.5.1. Tests and Results

A correlation matrix was developed to show the relationship between economic growth and each of the three financial market development indicators for each country. For most countries, it is seen that the size of the banking sector (LLY) is statistically significantly correlated to the most countries in the SADC region (Botswana, Lesotho, Malawi, Mauritius, Mozambique and Zambia). However when all financial market development indicators were regressed against economic growth, only the level of banking development (BANK) was statistically significantly correlated to economic growth. LLY and PC are shown not to be statistically significant estimators of economic growth. Therefore the regression analysis shows that BANK is most significant estimator of economic growth.

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6.5.2. Comparison with Literature

Hassan et al. (2011) found that domestic savings had a significant impact on economic growth while the PC measure of financial market development had limited impact on economic growth. However, the finding from this study does not support findings of Hassan et al. (2011) although it is noted that different estimation techniques were used.

An important consideration with regard to the economic growth is that most of the economies in the region rely on foreign direct investment to support economic growth. According to Jenkins and Thomas (2002, p. iii), annual inflows to GDP for countries in the region are higher than for other developing countries. These countries include Angola, Mozambique, Lesotho and Seychelles. Hence, it can be concluded that although countries like Angola and Mozambique have experienced high GDP growth during the period under observation, this may be as a result of foreign direct investment into the natural resource sectors.

The structure of the markets in SADC region may be an alternative reason for the weak relationship between finance and economic growth in the region. The industrial sector which is defined as being made up mining, manufacturing and construction, is still relatively underdeveloped in the region (UNCTAD, 2011). According to UNCTAD (2011, p.14), Africa continues to be marginalised in global manufacturing and trade and for the Southern African region, the contribution of industry to GDP fell from 48.2 percent in 1980 to 34.5 percent in 2008. This indicates that there is a lack of capital intensive investment in the region directed toward industrial activity. Hence this could be another explanation for the weak relationship between economic growth and finance in the region.

6.6. Comparison of Results to Other Regions in the World

This study differs from Hetamsaria (2008), where it was found that financial market development follows economic growth in developed countries yet economic growth follows financial market development in developing countries, like those in SADC. One possible reason for the difference in results could be that the Hetamsaria (2008) study made use of stock market development indicators and it was found that stock market development is higher for countries with high economic growth than for countries with low economic growth; hence it was found that economic growth caused financial market development for developed countries.

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In a study done by Tang (2008) for the Asia-Pacific Economic Cooperation (APEC) region, it was found that there was no evidence to suggest that financial development did affect the overall finance-growth relationship. The results coincide with the results from this study. The APEC region is similar to the SADC region in that there is substantial trade integration between the countries. Similarly, Hassan et al. (2011) found in their study for the Asia-Pacific region that trade was most effective in promoting economic growth than financial market development and that the financial market development indicators used showed weak relationship to GDP growth.

Furthermore Hassan et al. (2011) found that for Latin America and Caribbean; High Income Organisation for Economic Development (OECD) countries and High Income non-OECD countries and the SSA region that financial market development had little impact on economic development. However, for Europe and Central Asia; South Asia and the Middle East there was causality from finance to economic growth. Therefore it can be seen that for high and low income countries there is a weak finance-growth nexus while for middle income countries there a relationship between finance and economic growth. Hence, this supports the view of a lower and upper limit threshold level of economic growth between which the finance-growth relationship holds. However, the results of this study are similar to Hassan et al. (2011).

6.7. Conclusion

Overall the findings from the research study do not conclude that there is a relationship between financial market development and economic growth for the countries within the SADC region for the time period 1993 to 2011. It was found that more robust econometric statistical testing would have yielded more conclusive results.

7. Conclusion

7.1. Overview of Findings

The aim of the research was to investigate the relationship between finance and economic growth within the SADC region. Four research questions were formulated for this purpose. The major findings for the research study are summarised below.

Can the relationship between economic growth and financial market development be explained by the differences in economic growth and financial market development within SADC countries?

For the research data used, it was found that on average, economic did move in same direction as the three financial market indicators. However, statistically significant relationship could only be established between Mozambique and the DRC where it was found that an increase in financial market development did result in an increase in economic growth for those countries. However, overall, it was seen that statistically significant differences in financial market development indicators did not result in statistically significant differences in economic growth.

Therefore, the difference in financial market development between countries in SADC did not in economic growth difference between countries.

What is the relationship between economic growth and financial market development in the SADC region?

Theory proposed that there may be a relationship between economic growth and financial market development for the countries in the SADC region. However, a relationship between financial market development and economic growth could be established for all indicators of financial market development.

Does financial market development cause economic growth in the SADC region?

The findings showed mixed results for the causality between economic growth and financial market development. When the size of the banking sector was used as an indicator for financial market development, no causality was found in any direction between economic growth and financial market development. When the level of development of the banking sector was used as a proxy for financial market development, it was found that economic growth did Granger cause financial market development. Therefore this supported a demand leading view that finance follows

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economic growth. However when the depth of the banking sector was used as an indicator for financial market development, it was found that Granger causality was bi-directional and that two way causality was found.

Which proxy measures of financial market development have the greatest influence on economic growth?

Overall, it was found that in terms of financial market development, the size of the banking sector and the level of development of the banking sector have the greatest influence on economic growth for the countries in the SADC for the time period under investigation.

Overall, the findings suggest a weak relationship between finance and economic growth within the SADC. Some of the reasons proposed for this weak relationship include,

- For most countries in Africa, entrepreneurs rely on private equity investment from friends and relatives to engage in economic activity, hence there is a substantial reliance on the informal financial intermediaries to provide capital needed for investment. This may not be captured by financial market indicators, which make use of formal measures for the financial sector. Therefore, the increased presence of informal financial intermediaries in the region may be a possible reason for the weak finance-growth relationship in the SADC region.
- For many of the resource-endowed countries in the region (Angola, Mozambique, Botswana and Tanzania), economic growth may have been led by the natural resource sector and generally, these sectors are supported by foreign direct investment. Hence, this may be a reason for the weak relationship between economic growth and financial market development, as economic growth may have been driven by other sources of capital.
- The structure of the economy in the region may be another reason for the weak relationship between finance and growth in the region. The level of industrial development may influence the need for financial services. It has been shown that within the region, there has been declining levels of industrialisation which therefore may have resulted in decreased demand for financial services. Furthermore, economic growth in certain countries may have been led by investment in resource driven sectors, where foreign direct investment may be the main source of capital.

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7.2. Limitations of the Research Study

After completing the research, the following limitations are noted,

- The study followed on the work of Allen and Ndikumana (2000), and hence the time series started at 1993. It would have been useful to have started the time series from 1980. However, the challenge would be the lack of available data.
- The study did not make use some of the more robust econometric statistical techniques which would have yielded more conclusive results on the relationship between financial market development and economic growth.
- Human capital accumulation indicator was removed as a conditioning variable due to the lack of adequate information on school enrolment or other proxy measures of human capital accumulation. The study therefore lacked an important conditioning variable.

7.3. Recommendations for Future Research

The research shows that the topic of the relationship between finance and economic growth has been extensively researched however; important areas of the topic would still require research. This include the following,

- The investigation into the threshold effect as proposed by Rioja and Valev (2004) where it is proposed that the relationship between economic growth and financial market development may only set in once a country reaches a certain level of financial market development (threshold level). It would be important for a country to investigate this level of financial market development and develop plans for the attainment of such a level.
- South Africa is the largest economy in SADC and accounts for approximately 70% of SADC GDP (Seleteng, 2010, Table 2 & Ndikumana, 2001, p.10). Hence, it would be worthwhile to investigate the impact of the South African economy on the other economies in terms of the relationship between trade and economic growth in the region.
- An investigation into the different estimation techniques applied to the nexus between economic growth and financial market development would provide a deeper understanding of the nexus. A GMM panel data estimation may yield more reflective results.
- The GFC of 2007/08 has had a significant impact on the financial markets. It is necessary to investigate the impact of economic growth in SADC before and after the GFC, to establish if there has been an impact and the level thereof.

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- An investigation into the informal financial sector within the SADC region would provide an alternate understanding on the relationship between finance and growth in the region.

7.4. Recommendations for Business and Government

Finally as proposed by Shen and Lee (2006) and Hassan et al. (2011), due to country specific conditions, it is worthwhile for countries to investigate the finance-growth nexus so that they may pursue effective financial market development policies. However, while financial development may be necessary, it is not sufficient to attain a steady economic growth rate in developing countries.

In terms of recommendations for business in SADC, it recommended that all businesses be aware of the level of financial market development in countries which they invest in. This may have an impact on the economic growth and subsequently the macroeconomic stability of a country.

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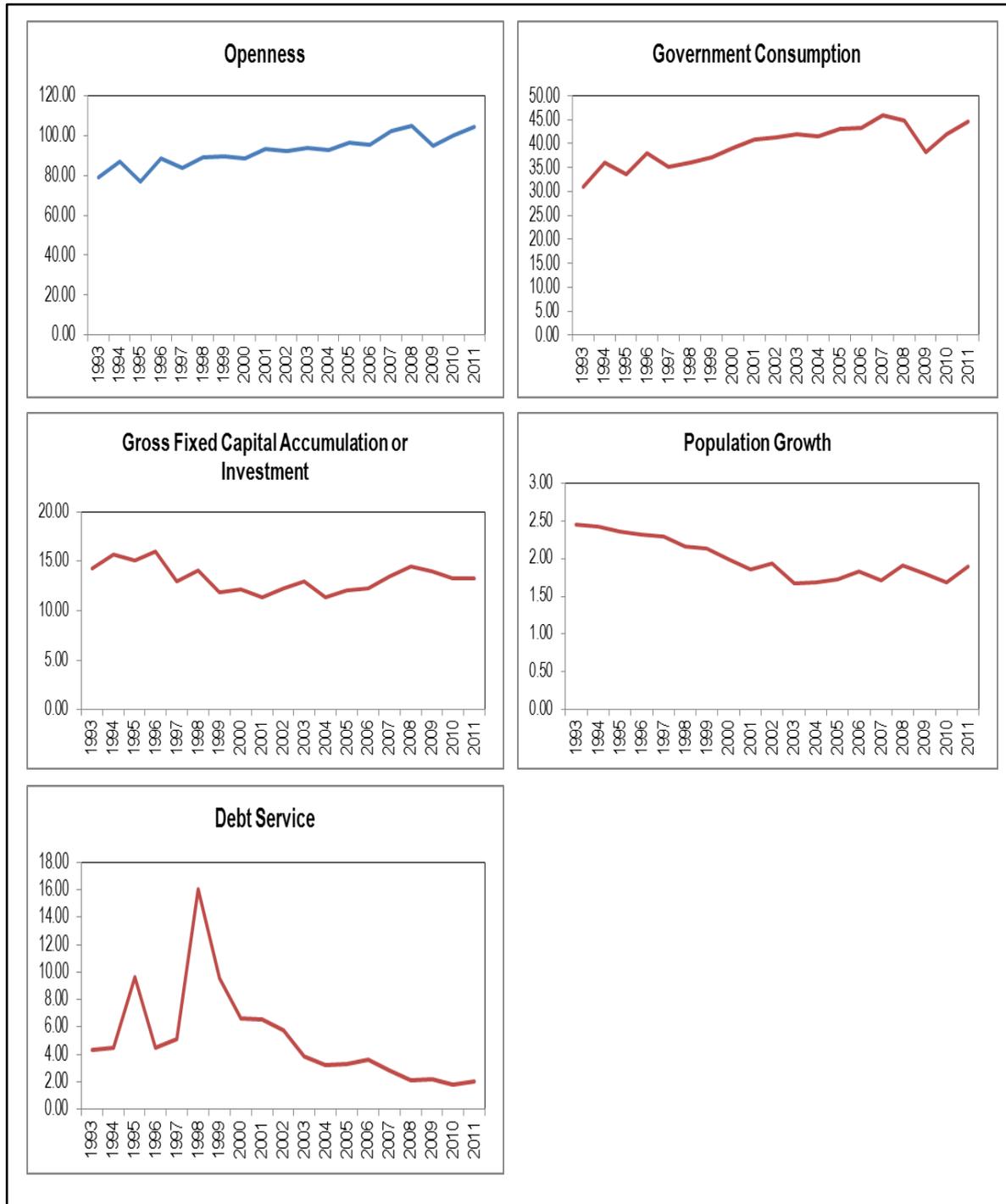
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Appendices

Appendices

Appendix I



Appendices

Appendix II: Dummy Variable Matrices for GDP Growth, LLY, BANK and PC

GDP	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	0.079**												
D2	-0.058	0.021											
D3	-0.012	0.046	0.067**										
D4	-0.019	0.039	-0.007	0.060*									
D5	-0.024	0.034	-0.012	-0.004	0.055*								
D6	-0.010	0.048	0.001	0.009	0.013	0.069**							
D7	0.023	0.081*	0.035	0.042	0.047	0.033	0.102**						
D8	0.003	0.061	0.015	0.022	0.027	0.013	-0.020	0.082**					
D9	-0.016	0.042	-0.004	0.003	0.008	-0.005	-0.039	-0.019	0.063*				
D10	-0.018	0.040	-0.006	0.001	0.006	-0.008	-0.041	-0.021	-0.002	0.061*			
D11	0.017	0.075	0.028	0.036	0.040	0.027	-0.006	0.014	0.032	0.034	0.096***		
D12	0.019	0.077	0.031	0.038	0.043	0.029	-0.004	0.016	0.035	0.037	0.003	0.098***	
D13	-0.058	0.001	-0.046	-0.038	-0.034	-0.047	-0.081	-0.061	-0.042	-0.040	-0.074	-0.077	0.021

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LLY	D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	D ₇	D ₈	D ₉	D ₁₀	D ₁₁	D ₁₂	D ₁₃
D ₁	3.343***												
D ₂	-1.546***	1.797***											
D ₃	0.145*	1.690***	3.487***										
D ₄	-0.253*	1.293***	-0.397***	3.090									
D ₅	-0.404*	1.141***	-0.549***	-0.152**	2.938***								
D ₆	1.083***	2.628***	0.938***	1.335***	1.487***	4.426***							
D ₇	-0.176**	1.370***	-0.321***	0.077	0.228***	-1.259***	3.167***						
D ₈	0.425***	1.971***	0.280***	0.678***	0.829***	-0.658***	0.601***	3.768***					
D ₉	0.557***	2.102***	0.412***	0.809***	0.961***	-0.526***	0.733***	0.132	3.899***				
D ₁₀	-0.256***	1.289***	-0.401***	-0.004	0.148**	-1.339***	-0.080	-0.681***	-0.813***	3.086***			
D ₁₁	-0.331***	1.215***	-0.475***	-0.078	0.074	-1.413***	-0.154***	-0.756***	-0.887***	-0.074	3.012***		
D ₁₂	-0.462***	1.084***	-0.607***	-0.209***	-0.058	-1.545***	-0.286***	-0.887***	-1.019***	-0.206***	-0.132*	2.881***	
D ₁₃	0.057	1.603***	-0.087	0.310***	0.462***	-1.025***	0.233***	-0.368***	-0.499***	0.314***	0.388***	0.519***	3.400***

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BANK	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	4.597***												
D2	-0.719***	3.878***											
D3	-0.166	0.553***	4.431***										
D4	-0.386***	0.333***	-0.220**	4.211***									
D5	-0.457***	0.262***	-0.291***	-0.071	4.140***								
D6	-0.012	0.706***	0.153	0.373***	0.444***	4.585***							
D7	-0.087	0.632***	0.079	0.299***	0.370***	-0.074	4.510***						
D8	-0.018	0.701***	0.148	0.368***	0.439***	-0.005	0.069	4.579***					
D9	-0.016	0.703***	0.150	0.370***	0.441***	-0.003	0.071	0.002	4.581***				
D10	-0.014	0.705***	0.152	0.372***	0.443***	-0.001	0.073	0.004	0.002	4.583***			
D11	-0.296***	0.422***	-0.131	0.090	0.160*	-0.284***	-0.210**	-0.279***	-0.281***	-0.283***	4.301***		
D12	-1.142***	-0.424***	-0.977***	-0.756***	-0.686*	-1.130***	-1.056***	-1.125***	-1.127***	-1.129***	-0.846***	3.455***	
D13	-0.436	0.283***	-0.270***	-0.050	0.021	-0.424***	-0.349***	-0.418***	-0.420***	-0.422***	-0.140	0.706***	4.161***

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PC	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13
D1	2.757***												
D2	-2.700***	0.057											
D3	-0.199	2.501***	2.558***										
D4	-0.487***	2.213***	-0.288**	2.270***									
D5	-0.748***	1.952***	-0.549***	-0.261**	2.009***								
D6	1.310***	4.010***	1.509***	1.797***	2.058***	4.067***							
D7	-0.284**	2.416***	-0.085	0.203*	0.464***	-1.594***	2.473***						
D8	1.090***	3.790***	1.289***	1.576***	1.838***	-0.220	1.374***	3.847***					
D9	2.070***	4.770***	2.269***	2.557***	2.818***	0.760***	2.354***	0.980***	4.827***				
D10	0.021	2.721***	0.220*	0.508***	0.769***	-1.289***	0.305**	-1.069***	-2.049***	2.778***			
D11	-0.834***	1.866***	-0.634***	-0.347***	-0.085	-2.143***	-0.549***	-1.923***	-2.903***	-0.854***	1.923***		
D12	-0.777***	1.923***	-0.577***	-0.290**	-0.028	-2.086***	-0.492***	-1.866***	-2.846***	-0.797***	0.057	1.980***	
D13	0.285**	2.985***	0.484***	0.772***	1.033***	-1.025***	0.569***	-0.805***	-1.785***	0.264*	1.118***	1.061***	3.042***