FINANCIAL DEVELOPMENT IN THE SADC: GROWTH AND CROSS-COUNTRY SPATIAL SPILL-OVER EFFECTS

BY

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DECLARATION

In accordance with Rule G4.6.3, I hereby declare that the above mentioned thesis is my own work and has not been previously submitted for assessment to another university or for another qualification.

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ABSTRACT

This study was prompted by the prevailing imbalance in financial development across SADC countries, which is not consistent with the linkages and interconnectedness of financial systems of these economies. South Africa is the most financially developed country in Africa, yet it is surrounded by economies with relatively small and underdeveloped financial systems, contrary to the spatial proximity theory in finance. The study performed a number of empirical estimations in respect of the spatiality of financial development, motivated by the intention to assess the growth and spatial spill-over effects of financial development in SADC. The study provides new information in spatial spill-over dynamics of financial development, which could inform policy development particularly in view of the on-going financial integration in the SADC region. The study also contributes to regional economic development in SADC from a finance perspective.

The analysis was performed using annual data for all the 15 SADC countries, spanning for the period 1985 to 2014. Using the Generalised Method of Moments approach, the study finds that financial development does not support economic growth in SADC. Financial reforms were found to be insufficient to drive growth. A bi-directional causality between financial development and economic growth was established with causality being strong when flowing from economic growth to financial development. The extended Aghion, Howitt and Mayer-Foulkes Model, estimated by an Autoregressive Distributive Lag approach, established that financial innovation has a positive relation to economic growth in SADC, particularly in the long-run. There is no causality, in either direction, between financial innovation and economic growth in both the short and long-run.

The Spatial Durbin Model reveals a presence of positive spatial effects on financial development in the region and that proximity to South Africa yields consistent effects of spatial externality in money markets and inconsistent spatial externality in credit markets. The monetary union has no influence on spatial dynamics of financial development in SADC. The generalised impulse response analysis of a Bayesian VAR model indicate that shocks in South Africa's financial sector has positive, but constrained and in some cases weak, financial spill-over effects on both economic growth and financial development of other SADC countries.

The study established, using the Herfindahl-Hirschman Index, a high level of financial market concentration for SADC, cantered in South Africa, and a fair distribution when South Africa is excluded. Dynamic panel models established that financial market concentration reduces financial development in SADC. South Africa's financial development has mixed and opposing effects on financial market concentration in SADC.

The findings also show that international finance has a positive, but currently weak, effect on financial development in SADC and countries with international financial centres contribute more to financial development than countries without.

Proximity to South Africa creates huge potential for increasing financial development in SADC through spill-overs and more benefits of spatial proximity are realised in the long-run. Given the strong spatial effects in money markets and significant positive spill-overs in credit markets in the region, countries closer to South Africa need to link their money and credit markets to the South African markets and possibly benchmark to the Rand so as to benefit from proximity and spill-overs from South Africa.

The results also suggest that SADC countries need to capitalise on their proximity to South Africa to enhance financial development by promoting economic growth, financial innovation, opening and diversification of financial sectors and linkages to global financial markets. Financial innovation supports financial inclusion, cross-border flows of funds, remittances and trade in SADC and has effects of enabling integration with developed markets and facilitating economic activity. Opening financial sectors enhances diversification of financial systems, increases competition and efficiency. To enhance access to international finance, the study suggests the creation of information centres in South Africa with SADC countries as economic hinterlands, commercialisation of solutions to SADC countries financial challenges, financial integration and support for deepening of financial systems in these countries. Strengthening economic growth could also increase financial development given a strong demand-following causality.

The major challenge, however, is that some of the SADC countries have underdeveloped and highly concentrated financial systems characterised by high financial intermediation inefficiencies, high financial exclusion, weak financial infrastructure and regulations. Consequently, countries suffer financial leakages, are not receptive to spatial externalities and financial spill-overs from South Africa and often generate financial spillbacks to South Africa.

SADC countries should, however, first address the issue of financial exclusion, financial infrastructure and regulation as well as efficiency in the financial markets. The SADC countries need mechanisms to attract financial development from South Africa to benefit from positive spill-overs and instruments to deal with negative externalities of financial shocks in South Africa.

Overall, there is potential for increased financial development in SADC by consolidating absorption of positive financial spill-overs and externalities of proximity to South Africa - particularly in the medium to long term. Heterogeneity among SADC countries and the varying levels of financial development, however, dictates that the region should promote financial integration in order to enhance development of underdeveloped financial systems through spatial spill-over gains.

DEDICATION

To my daughters, Ruvarashe Alvina and Waishe Gracious; my wife Patricia; my mother Grace and my late father Torerai Stockers.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ANNEXURES

ABBREVIATIONS AND ACRONYMS

AfDB	African Development Bank
AHM	Aghion, Howitt, Mayer-Foulkes
ARDL	Autoregressive-Distributed Lag
BRICS	Brazil Russia India China and South Africa
COMESA	Common Market for Eastern and Southern Africa
DBSA	Development Bank of South Africa
DFE	Dynamic Fixed Effects
DRC	Democratic Republic of Congo
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GFDD	Global Financial Development Database
GMM	Generalised Method of Moments
HHI	Herfindahl–Hirschman Index
IDCSA	Industrial Development Corporation of South Africa
IMF	International Monetary Fund
LIC	Low Income Country
MIC	Middle Income Country
MMA	Multilateral Monetary Agreement
OECD	Organization for Economic Co-operation and Development
RBZ	Reserve Bank of Zimbabwe
SA	South Africa
SACU	Southern Africa Customs Union
SADC	Southern African Development Community
SAR	Spatial Autoregressive
SDM	Spatial Durbin Model
SEM	Spatial Error Model
SSA	Sub-Saharan Africa
UNCTAD	United Nations Conference on Trade and Development
UNITAR	United Nations Institute on Training and Research
USD	United States Dollar
VAR	Vector Auto Regression

CHAPTER ONE
INTRODUCTION AND BACKGROUND TO THE STUDY

1.1   Introduction

Economic variables tend to display discrepancies not only over time, but also across space. Space influences the way an economic system works and is a cause of economic advantage or disadvantage. The role of spatiality has gained significance in economic thinking both in terms of the geographical aspects of economic development and the spatial dimension of economic activities (Zoltan 2015). Where space and time are involved, proximity matters. Proximity brings agglomeration to industries and enhances knowledge spill-overs and transfers. In trade, it promotes integration, enhances cross-border trade, reduces transport costs and removes non-economic barriers. In development, it has a pulling effect. The question that arises is whether proximity matters in services, more-so in finance?

Services, including financial, are intangible and technological advancement has enabled the provision of services globally, presumably, overcoming space limitations. Two critical issues stand out: firstly, whether being close and connected to a financially developed country is advantageous for financial and economic development. Secondly, whether financially less developed economies realise any externalities and spill-overs from their proximity to, and linkages with, a financially developed economy. Specifically, does the theoretical argument on spatial proximity hold true in the Southern African Development Community (SADC) in terms of financial development?

Of the SADC countries, as well as in Africa, South Africa is the most financially advanced economy with a financial sector that competes on a global scale (Canales-Kriljenko, Gwenhamo & Thomas 2013). South Africa's financial sector is well-developed by emerging market standards, has a high degree of integration with international capital markets, and a world-class payments system (OECD 2010). Mauritius, Botswana and Namibia have fairly developed financial markets whilst Mozambique, the Democratic Republic of Congo (DRC), Madagascar and Malawi have the least developed financial markets (KPMG 2014). South Africa is, however, surrounded by countries with relatively small and even underdeveloped financial sectors in some of these countries compared to South Africa.

This notwithstanding, there are significant linkages between South Africa and other SADC countries in respect of trade, cross-border investment flows, cooperation in monetary policies

and exchange rates that should enhance cross-country flow of financial development (Canales-Kriljenko, *et al*. 2013). The expectation is that as funds and investments move across borders, financial institutions provide lines of credit and institutions expand into the region, financial spill-overs and externalities should be realised by countries closer to South Africa, in line with the spatial proximity theory.

The spatial proximity theory states that externalities increase with proximity and in finance, countries closer to a relatively more developed country benefit more from spill-over effects than those far away (Capello 2009). Financial systems naturally influence the allocation of resources across space and time (Levine 2005). Financial systems are sensitive to the geographical environment and not immune to spatial externality (Mobolaji 2008). The emergent financial externalities and spill-overs are therefore expected to enhance development of financial sectors and economic growth of recipient smaller economies.

The prevailing financial development imbalance across SADC countries is, however, not consistent with spatiality, linkages and interconnectedness of financial systems of these economies, creating a paradoxical situation that validates the need to conduct an empirical investigation. Also, when there are elements of imbalance in financial development in the region, there is bound to be financial concentration. How this concentration affects financial development across SADC countries relate to the spatiality or geography of finance and need to be put into perspective. Furthermore, the spatiality or geography of finance also relates to how global finance moves across regions in the world. In the SADC, South Africa for example, due to its developed financial sector, is highly linked to global financial markets whilst most of the other SADC countries are not. This again, sets out a challenge on the applicability of the spatiality theory in terms of how global finance affects financial development in the SADC.

Relating this imbalance in financial development to growth, a preliminary comparative analysis of data on SADC (2016) indicators shows that countries, such as Mozambique, Seychelles and the DRC with predominantly underdeveloped financial systems, registered growth rates of 7.2%, 15.6% and 7.2% respectively in 2014; significantly higher than the 1.5% of South Africa. This puts to test the finance-growth relationship, particularly the role of finance in enhancing this growth in the SADC. Already in 1911, Schumpeter suggested that finance and growth are known to have a relationship (Demirguc-Kunt & Levine 2008, 2009). Regardless of the nature and direction of the causal relationship between finance and growth, spatially driven

externalities of finance across countries are bound, and have an impact on growth and financial development of these countries.

The highlighted disproportionate levels of financial development and resultant discrepancy in growth in SADC justify an empirical investigation on the interactive effects of financial development on growth and spatial spill-overs across countries. Predictably, the imbalance in financial development in relation to connectedness of countries in SADC calls for an analysis of the economic effects and behaviour of finance across countries when it is affected by space. The resultant financial concentration and the uncertain effects of global finance on financial development in such an imbalanced regional financial system also justify an empirical analysis.

This chapter presents the background to the study, the problem statement, study objectives and research questions. The chapter also outlines the research hypotheses, describes the research questions and discusses the relevance of the study. The final section of this chapter outlines the organisation of the study.

1.2   Background to the study

Financial development occurs either as a result of economic growth or it could precede growth in line with the inconclusive debate on the casual relationship between finance and growth. Financial spatial spill-overs across countries can be transmitted through a number of direct and indirect mechanisms, including economic development channels in the real sector (economic growth). The study, therefore, sets the foundation for the empirical investigation of the spatial dynamics of financial development in the SADC countries on the finance-growth nexus.

Early and renowned scholars such as Robinson (1952), Lewis (1955) and Levine (1997) confirmed the existence of a relationship between financial development and economic growth. Although studies on finance-growth nexus span across generations, debate on the direction of causality remains inconclusive. Since Schumpeter (1911), and subsequently McKinnon (1973) and Shaw (1973), the link between financial development and economic growth has been widely considered. Three possible relationships have emerged: finance-led growth or the supply-leading (Levine 1997; King & Levine 1993a, 1993b), growth-driven finance or the demand-following (Robinson 1952, Kuznets 1955 and Stem 1989), and the two-way causal relationship (Lewis 1955 and Luintel & Khan 1999).

In cross-country finance-growth relationships, country heterogeneity - in terms of different levels of financial development - has an effect on the relationship. Although empirical studies

using cross-country data agree that financial development enhances economic growth, the role of heterogeneity of the countries has not been considered in a number of studies (Yildirim, Öcal & Erdogan 2008). The significance of the relationship between financial development and economic growth depends on the level of financial development of a country (Rioja & Valev 2003, and Valverde, Del Paso & Fernández 2007).

As outlined in the introduction, the heterogeneity of countries, in terms of economic and financial development in the SADC is highly pronounced and distinct. This heterogeneity in financial development is bound to drive spatial financial spill-overs across countries in SADC, given the existing financial inter-linkages and cross-border financial flows in the region.

In line with the highlighted variation in financial development in the SADC, the following sections expands the background of the study to cover issues relating to determinants of finance-growth nexus; financial development in the SADC region; financial interconnectedness, spatial externalities and spill-overs in SADC; financial market concentration and global finance and financial development in SADC.

Determinants of the finance-growth nexus

Literature points to a number of determinants of the cross-country finance-growth mix (Akinlo & Egbetunde 2010). For example, Mckinnon (1973) considered investment as the major determinant, Greenwood and Jovanovic (1990) referred to information, Bencivenga and Smith (1991) considered technology whilst Patrick (1966) emphasised the stages of development. Demetriades and Law (2006) emphasised the role of institutional factors while Mobolaji (2008) looked at human capital and spatial impact. From these determinants, technology (financial innovation) has contributed to a significant reduction in financial exclusion in recent years and spatiality is the basis for interconnectedness between South Africa and regional countries.

The importance of spatial effects in financial development-economic growth analysis has been ignored and beta convergence analysis, which takes into consideration spatial dimension, claims that rates of economic growth may be interdependent across regions due to spill-over effects (Yildirim *et al.* 2008). Whilst these authors made these observations in a country, simulations could be made across countries. In that respect, financial development in one country is anticipated to have spill-over effects on neighbouring countries.

As for technology, financial innovation has over the years been revolutionising financial development through new products, process and institutions, which subsequently affects

economic growth. The technological interdependence manifests itself through spatial externalities, which allows the technology level of a country to depend on technology levels of its neighbours (Dogan & Taşpınar 2013). Financial innovation is generating increased economic activity in most SADC countries through promoting financial inclusion, mobile money and enabling remittances, which in turn has an impact on economic growth. Substantial progress has been made over the past two decades in terms of financial inclusion and financial innovation, as well as cross-border banking in Africa's banking systems (Beck, Senbet & Simbanegavi 2015).

The effects of spatiality and financial innovation are expected to enhance the spread and distribution of financial development across SADC countries. However, financial development in recipient countries remains relatively low compared to that of South Africa (Canales-Kriljenko *et al.* 2013 and Basdevant et al. 2014). This justifies the need to assess the role of spatiality and financial innovation in enhancing in the financial development and economic growth dynamics in the SADC.

1.2.1 Financial Development in the SADC

Financial systems in most other SADC countries remain relatively small when compared to that of South Africa and the evidence is revealing. A comparative evaluation, using the World Bank (2015) data, indicates that South Africa, Mauritius and to some extend Namibia have relatively deeper financial sectors when compared to the other countries (see Table 1.1).

The data in the table indicate that the South African and Mauritian domestic ratio of credit to private sector to GDP is over 100 per cent, with Namibia and Botswana following at a distance below 50 per cent. Usage of financial services was high in South Africa, in 2011, although lower than in Mauritius, Swaziland and Malawi. Although South Africa is dominant, Table 1.2 shows that in 2013 access to financial services was better in Seychelles, Namibia, Angola and Mauritius than in South Africa. Mobile phone used to send money as percentage of people above 15 years of age in South Africa, in 2011, was relatively high compared to other countries than Angola Mauritius and Tanzania.

Table 1.1: Financial structures of SADC countries (2013)

	Access	Depth	Efficiency	Stability	Usage	Mobile

Country	Bank branches per 100,000 adults	Domestic Credit to Private sector to GDP (%)	Credit to government to GDP (%)	Bank capital to total assets (%)	Loan from a financial institution in the past year (% age 15+) (2011)	Mobile phone used to send money (% age 15+) (2011)
Angola	12.8	23.5	10.9	-	7.94	11.70
Botswana	9.3	32.0	1.4	-	5.60	5.09
DRC	0.7	5.2	0.4	-	1.52	1.53
Lesotho	3.7	20.2	3.1	9.4	3.04	5.68
Madagascar	1.7	11.9	3.5	-	2.29	0.83
Malawi	3.3	18.5	6.2	-	9.19	0.52
Mauritius	21.6	108.1	16.1	8.8	14.27	6.81
Mozambique	3.9	28.9	11.2	8.7	5.87	0.96
Namibia	12.7	47.0	6.2	8.6	-	-
Seychelles	51.2	21.9	19.9	9.2	-	-
South Africa	10.3	149.5	9.7	7.9	8.87	5.36
Swaziland	7.3	25.3	4.6	11.9	11.51	16.23
Tanzania	2.6	13.1	7.2	10.6	6.61	14.02
Zambia	4.9	16.5	8.7	13.5	6.13	3.04
Zimbabwe	5.1	25.9*	-	-	4.88	1.48

<u>Source</u>: World Bank Data – GFDD (2015) and World Development Indicators (2015) *Reserve Bank of Zimbabwe

However, bank concentration is very high across most countries other than Zambia and Zimbabwe. This is indicative of the dominance of a few banks in these countries. Bank concentration comprises assets of the three largest commercial banks as a share of total commercial bank assets in the country (GFDD 2015). It is likely that South African banks are amongst the dominant banks in countries with high bank concentration.

Given the evident differential between South Africa and the rest of the countries in the SADC region, proximity to South Africa is expected to drive convergence in financial development. This is particularly so when there is evidence of spill-over enhancing interconnectedness of financial sector in the region as outlined in the next section.

1.2.2 Financial interconnectedness, spatial externalities and spill-overs in SADC

Notwithstanding South Africa's dominance, a high level of interconnectedness of economies and linkages of financial systems exist between South Africa and its neighbours (Canales-Kriljenko *et al.* 2013). South Africa's four largest banks, Absa, FirstRand Banking, Nedbank and Standard Bank, have a strong presence across Africa. Other financial firms also have significant and direct interests in other African countries. These include insurance and wealth management companies such as Sanlam, Liberty Holdings, Alexander Forbes and MMI

Holdings. South African financial firms have long held interests in SACU and SADC countries (Berkowitz *et al.* 2012).

Interconnectedness of financial systems in the SADC region is also reflected through investment from source countries other than South Africa into the regional countries including South Africa (feedback investments for South Africa). For example, Mauritius is emerging as an important investor in Madagascar, Seychelles, South Africa, Tanzania and Mozambique (AfDB 2013). Outward FDI from Mauritius to four African countries (Madagascar, Mozambique, Seychelles and South Africa) was US$46.1 million in 2011. Mauritian foreign portfolio investments for those four countries amounted to US$1.5 billion in 2010, with South Africa being the main host for these investments (AfDB 2013). Financial institutions in Swaziland, such as pension and insurance firms, channel their locally mobilised resources to the South African market for investment purposes (Mafusire & Leigh 2014). This interconnectedness is expected to have an impact on the finance-growth flow as well as spatial spill-overs on financial development from South Africa to the SADC countries.

South African firms have significant presence in the SADC countries, where they have considerably increased investments over the past decade (Berkowitz *et al*. 2012). South Africa's presence in the region is spread across the entire financial sector including banking, insurance, investment management, the stock market and non-financial sectors (Canales-Kriljenko *et al.* 2013). South Africa accounts for six per cent of the stock of total foreign direct investment in the SADC and over 10 per cent in Botswana, the DRC, Malawi, Mozambique, Swaziland and Zimbabwe (UNECA & SADC 2009). Additionally, South Africa's Development Bank (DBSA) and the Industrial Development Corporation of South Africa (IDCSA) have funded a number of projects in the SADC countries. The African Development Bank (2013) pointed out that that FDI in the SADC region has had a positive effect on several countries in terms of economic growth, infrastructure investment and the emergence of a middle class.

Related to that, in Southern Africa, attempts are being made to integrate the region in terms of trade and economic cooperation (SADC, SACU and COMESA for some countries) and monetary and financial integration (Common Monetary Area, and the envisaged SADC monetary union). All these efforts are meant to create an integrated regional block that promotes cross-country financial and economic development.

The interconnectedness in SADC presents opportunities for financial spill-overs from South Africa to the SADC countries. Financial development spill-overs from South Africa's advanced economy can be transmitted through trade, financial sector interconnectedness, flows of capital, labour movements and remittance flows (IMF 2012). The major issue then is whether any spill-overs from the dominant country to other countries exist, particularly in the financial sector. In this case proximity of the SADC countries to South Africa is supposed to generate financial spill-overs.

Given the strong economic linkages and the financial sector interconnectedness, on the back of South Africa's dominant financial sector in region, any shocks or changes to South Africa's financial sector are likely to affect other regional countries. Inexorably, changes in the financial sector in South Africa have an effect on economic growth or financial development of other SADC countries because of this interconnectedness. It is therefore imperative that the impact of financial spill-over effects from South Africa be assessed.

How finance relates to growth in most countries is also affected by the structure of the financial systems, including the level of financial market concentration given that high financial concentration hampers the growth (Cojocaru, Hoffman & Miller 2013). The imbalance in terms of distribution and depth of financial development within a country's cities or administration region or across countries in a region suggests existence of spatial financial concentration. Section 1.2.4 highlights issues of financial market concentration in the SADC region.

1.2.4 Financial market concentration and global finance in SADC

In SADC, the varying levels of financial development, with South Africa at the upper end and most other SADC countries at the lower end, as pointed by KPMG (2014), clearly reflects elements of concentration of financial development within the region. Concentration of financial development in a few countries only indicates inequality, which has a significant negative impact that could potentially hold back financial development in Africa (Gwama 2014).

The effects of financial market concentration on financial development in the SADC are not distinct. Given the dominance of South Africa in terms of financial development, *a priori* expectations are that the financial development is highly concentrated in South Africa. However, South African financial institutions are expanding into other countries impacting on the level of financial concentration in those countries. The level of concentration in the financial sector in SADC has not been empirically established, nor the concentration levels in

other SADC countries when South Africa is excluded. In addition, how financial market concentration within countries affects their capacity to develop their financial sector or how these effects vary with the country's level of income, has not been empirically examined. Also, it is not known how South Africa's financial institutions, which are spread across SADC countries, affect financial market concentration in those countries.

Related to that, the geography of finance also relates to how financial sectors of countries are directly and indirectly affected by global financial developments. Majority of SADC countries receive global finance in form of development finance which have not transformed the financial sectors of the recipient countries. Furthermore, the majority of SADC countries are not connected to global financial markets due to their size and underdeveloped financial systems. This is notwithstanding the fact that the region has the highest concentration of international financial centres compared to other regions in Africa. South Africa, Mauritius, Seychelles and Botswana have international financial centres. Among these centres, South Africa and Mauritius are rated among the world's global financial centres and are among the only three rated in Africa (Global Financial Centres Index 2015). An empirical investigation is needed to assess the effects of global finance and international financial centres on financial development in SADC and how other regional countries can be connected with global financial markets.

1.2.6 Problem statement

Spatial theory in finance suggests that proximity to South Africa should drive financial development in other SADC countries, given the discrepancy in financial development between South Africa and other SADC countries and the strong interconnectedness. As the South African financial sector provides funds and investments across borders, financial institutions provide lines of credit and as institutions expand further into the region, theory suggests that financial externalities and spill-overs should be realised. *A priori* expectations are that regional economies should realise economic growth and financial development benefits from their proximity to and linkage with South Africa.

The prevailing financial development imbalances across SADC countries are, however, not consistent with spatiality, linkages and interconnectedness of financial systems of these economies as outlined in the background of the study. This creates a paradoxical structure and flow of financial development in SADC that requires an empirical investigation to disentangle.

Related to that, South Africa has strong ties with its neighbours in the region. Close real and financial interlinkages are potentially important transmission mechanisms for financial spill-overs in the region (Canales-Kriljenko, Gwenhamo & Thomas 2013). Theoretically, for countries around South Africa, financial development spill-overs are inevitable. These are expected particularly in the face of increasing financial innovation and increasing regional and financial integration efforts, which come on the back of trade, financial and monetary integration in SADC. If spill-over effects are present globally, as evidenced by the Global Financial Crisis, they should also exist regionally, including the SADC region. How shocks and changes to South Africa's financial sector affect or resonate on economic growth and financial development of the regional countries and the magnitude of the resultant financial spill-over effects need to be determined empirically.

South Africa's financial dominance in SADC is indicative of financial market concentration in the region. However, the spreading of South African financial institutions into other countries and the development of financial sectors in those countries is likely to be diluting this concentration. It is not clear whether financial development is affected by the level of financial market concentration in the SADC countries and how the regional expansion of South African financial institutions affects this concentration.

In addition, the influence of global finance in enhancing financial development that drives growth in SADC has been marginal. The question that arises is how can South Africa connect the region to global financial markets, given that most other countries have underdeveloped systems?

Connecting the financial imbalance to growth, in the SADC region, growth has over the years increasingly become more widespread across countries, regardless of level of financial development (Schaffnit-Chatterjee 2013). Countries, such as Mozambique and the DRC, with low levels of financial development, are registering higher growth rates than countries that have relatively more developed financial sectors. In addition, most SADC economies managed to introduce financial reforms in the 1980s and 1990s to enhance the development of their systems (Kasekende 2010). Most of the countries have embraced financial innovation, which assisted in developing and transforming their financial systems and also in transmitting financial development from financially advanced countries. Growth however remains more linked to resources than financial development. This puts to question the role of finance in

growth. This inconsistent relationship between growth rates and financial development levels in SADC countries requires empirical investigation and testing.

The outlined issues, emanating from significant disparities in levels of financial development in the SADC region, are contrary to the spatial proximity theory. Empirical considerations are therefore critical in order to provide answers to the broad questions below:

a) What is the nature of the causal relationship between financial development and economic growth in the SADC and the impact of the key determinants of financial development on the relationship?

b) Are there spatial externalities in financial development of other SADC countries through proximity to South Africa?

c) What is the nature and magnitude of the financial spill-over effects from South Africa on economic growth and financial development of other SADC countries?

d) What is the level of financial market concentration in the SADC countries and how does financial market concentration affect the level of financial development in the SADC?

e) What is the effect of global finance on financial development in the SADC?

1.3   Research objectives

The primary objective of this study is to analyse growth and spatial spill-over effects of financial development in SADC countries. The specific objectives of the study are to:

a) Analyse the causal relationship between financial development and economic growth in the SADC and the impact of the key determinants of financial development on the relationship;

b) Empirically evaluate the effects of spatial proximity to South Africa on the financial development of other SADC countries;

c) Analyse the spatial spill-over effects of financial development in South Africa on economic growth and financial development of other SADC countries;

d) Analyse the reciprocal effects between financial market concentration and financial development in the SADC region; and

e) Evaluate the effects of global/international finance on financial development in the SADC region.

1.4   Research hypotheses

$H1_0$:   Financial development supports economic growth in SADC countries.

$H1_1$:   Financial development does not support economic growth in SADC countries.

H2$_0$:   Spatial proximity to South Africa has a positive effect on financial development in SADC countries.

H2$_1$:   Spatial proximity to South Africa has a negative effect on financial development in SADC countries.

H3$_0$:   There are positive financial development spillovers from South Africa on economic growth and financial development in the SADC countries.

H3$_1$:   There are negative financial development spillovers from South Africa on economic growth and financial development in the SADC countries.

H4$_1$:   Financial market concentration has a negative effect on financial development in SADC.

H4$_2$:   Financial market concentration has a positive effect on financial development in SADC.

H5$_0$:   Global finance supports financial development in SADC.

H5$_1$:   Global finance does not support financial development in SADC.

1.5   Justification and significance of study

This study is justified and highly significant in respect of gaining new information that fuses geography, finance and economics in a unique but complex set up of middle and low income countries. The study provides new knowledge on the economic effects and behaviour of finance across countries in the SADC region when it is affected by space. Furthermore, the unique approach to the ordinary financial development- economic growth issues makes the study important as outlined below:

Research on finance-growth in Africa is focussed primarily on Sub-Saharan Africa, particularly on establishing the relationship between financial development and economic growth in the region. Several studies, which include those of Adebola and Dahalan (2011), Atindehou *et al.* (2005), Odhiambo (2008), Baliamoune-Lutz (2008), Ghirmay (2004), Abu-Bader and Abu-Qarn (2008), Mobolaji (2008) and Agbetsiafe (2004) were conducted for various SSA countries. Studies on SADC remain few and isolated (Phakedi 2014, Allen and Ndikumana 1998 and Aziakpono 2004), particularly those that consider structural peculiarities of the region.

Cross-country studies on SSA, including that of Mabolaji (2010), have displayed the weakness of including regions with highly heterogeneous characteristics in one study. These studies treated regions with different experiences in both economic growth and financial development, as homogenous entities. Combining different regions in studying the financial development

would produce over-generalised recommendations. Demetriades and Hussein (1996) argued that empirical results are sensitive to the type of estimator used, the sample periods and country subgroups included.

Adopting a regional approach, that recognises the variation in the level of financial development of the countries in the region, provides an alternative dimension that produces new evidence to the finance-growth nexus debate. Also, combining elements of finance, growth and the spatial-effect makes this current study unique.

Literature regarding the finance-growth nexus in Sub Saharan Africa by (Odhiambo 2008; Abu-Bader and Abu-Qarn (2008) and Agbetsiafe (2004) focuses mainly on establishing the relationship between financial development and economic growth, as well as establishing the direction of causality effects of these phenomena. A few studies examined aspects of the effects of reforms (Le Roux & Moyo 2015) and spatiality (Mobolaji 2008). Although Mobolaji (2008) studied spatiality, the focus was on Sub-Saharan Africa. This current study empirically tests the effects of spatiality, spill-overs and innovation on financial development and economic growth in the SADC region. The analysis in the study enhances an understanding of the role and impact of spatial proximity and financial innovation as determinants of financial development. This study also brings to the fore any growth redistributive effects and transmission mechanisms of financial development from South Africa to other countries in the region. The effect of financial reforms on the finance –growth nexus is also tackled in this study.

In addition, the role of finance in economic growth in SADC has not been extensively researched in most literature and policy initiatives given that financial sectors of SADC countries, with the exception of South Africa, are regarded as less developed (KPMG 2014). Literature on regional economic development in SADC gives prominence to trade, production, employment and factor endowments and devotes limited attention to the role of the financial sector in regional development. This notwithstanding, the role of finance in development of the region is gradually gaining importance, particularly as most countries embrace financial innovations, microfinance, wholesale and retail finance to SMEs and mobile money. This study contributes to regional economics research from a financial perspective.

Evidence based policy formulation is critical for sustainable economic development, especially in respect of regional financial integration in developing countries. Regional financial

integration could potentially address several of the issues associated with small, fragmented financial markets in Africa (Wakeman-Linn & Wagh 2008). The study provides evidence of financial externalities and spill-overs from South Africa into SADC. This may inform pace and direction of the SADC regional financial integration. Countries are also informed of the derived benefits, opportunities and costs of being close to and interlinked with a financially developed country.

Knowledge about depth and strength of spatial spill-overs in financial markets and systems within a region assists countries to make necessary projections regarding the likely impact that a crisis in the anchor country has on their economies. Affected economies are also able to make the necessary intervention policy measures when such conditions arise. As such, this study provides policy makers with the necessary information on the relative impact of shocks in South Africa's financial sector on their economies.

This study also analyses the effects of financial concentration on financial development. Such an analysis would reveal whether there is need to improve on concentration once a relationship with financial development is ascertained. The study also aims to highlight the options for enhancing the flow of global finance into the region. Countries are informed by the results of the study on the impact of global finance and international financial centres in enhancing financial development in the region.

Generally, three broad reasons can be cited as justification for this study:

a) Firstly, this study is justified in that, based on the researcher's knowledge, there are no known studies that have attempted to look at i) the causality relationship of finance and growth in SADC including the effects of reforms, space and financial innovation; ii) the geography of finance in SADC, particularly spatial spill-over effects of financial development; iii) the effects of financial concentration on financial development in SADC, and iv) the effects of international financial centres and of global finance on financial development in SADC. This study intends to contribute new knowledge in these areas.

b) Secondly, this study is important as it could assist in identifying new growth areas for regional countries. Small economies have high levels of financial inclusions, low savings and a low capital base. Their proximity to South Africa has potential to generate financial spill-overs and externalities for economic growth and financial development. Technology drives innovation and this could be new growth opportunities for small economies. Financial innovations have the capacity to increase the reach of financial services to the

unbanked, increasing financial inclusion, encourage savings, and ultimately growth for the financial sector and the economy. Through technology, smaller countries are able to "leapfrog" the economic development cycle by taking advantage of increasing technology transfer, capital movement and cross-border movement of credit from South Africa.

c) Thirdly, the study also bridges the gap between sources of financial development and the need to have it in SADC. It spells out the key areas that can drive financial development in SADC, and clear sources of this financial development. The findings of this study could also enable countries to pursue the right policies and to identify areas of intervention, in respect of their financial sectors or economic activity when informed on the linkage between finance and growth.

1.6 Organisation of the study

This study is organised as follows: Chapter One consists of the introduction, background to the study, the problem statement, objectives, hypotheses, significance and organisation of the study.

Chapter Two comprises a comparative analysis of financial systems in SADC countries. The study reveals the different levels of financial development in SADC countries, in particular the dominance of South Africa vis–à–vis other regional countries. This chapter also discusses the interconnectedness and linkages of financial sectors of SADC economies.

Chapter Three presents a review of theoretical and empirical literature on financial development and economic growth as well as the spatiality and spill-overs of financial development. The literature reviewed also includes financial concentration and the underlying issues around financial centres and global finance.

Chapter Four outlines the research methodology by presenting a review of literature on a number of models and methodologies applied to analyse financial development, financial innovation and economic growth, spatial effects, financial spill-overs, spatial financial concentrations as well as issues of global finance. The review provides criticisms or support of the methodologies used in previous studies and guidance on the ultimate methodologies used in this study. Specifically, the chapter discusses the dynamic panel model to be used in the finance-growth assessment as well as the empirical model derived from the AMH model to assess the impact of financial innovation on economic growth. The spatial models for investigating spatial effects in financial development of SADC countries are also discussed.

This chapter also presents the dynamic models for assessing spill-overs and VAR models for impulse response analysis. It also reviews the Herfindahl Hirschman Index used to measure financial concentration and the empirical models for estimating the effects of financial market concentration and global finance on financial development.

Chapter Five describes the empirical analyses of the finance-growth relationship in SADC countries using Dynamic Panel Model and Granger causality tests. Included in the ordinary finance-growth model is a dummy variable to capture the effect of financial reforms.

Chapter Six extends the finance –growth framework by zeroing in on the relationship between financial innovation and economic growth. The empirical analysis is prompted by the fact that innovation is one of the key determinants that have enhanced financial development in SADC.

Chapter Seven reports the results of estimates of a spatial autoregressive model. It considers the impact of spatial proximity to South Africa on financial development in other SADC countries. The underlying assumption is that proximity to a financially developed country has positive externalities on the financial development of other SADC countries.

Chapter Eight assesses the response of economic growth and financial development of other SADC countries to shocks in South Africa's financial development. This chapter is based on the assumption that spill-over effects of financial development in South Africa, enabled by cross-border flows of capital, investment and institutions, directly affect growth and financial sectors of the recipient countries.

Chapter Nine examines concentration in the financial industry in the SADC as a regional trade bloc and how it affects financial development. The assumption is that South Africa's dominance influences financial concentration in the region. However, as financial sectors become more connected and financial institutions cross borders from South Africa into the region, financial concentration is diluted. As such, the chapter also evaluates the relationship between South Africa's financial development and financial concentration in the SADC region. Chapter Ten evaluates the effects of International Financial Centres and global finance on financial development in SADC.

Chapter Eleven concludes the study and proffers recommendations based on the research findings.

1.7   Summary and conclusion

This chapter introduced the study by stating that economic variables are affected by space and time and raises the question whether finance is also affected by space. The study primarily investigates how the financial development and economic growth across countries are affected by proximity to a financially advanced country.

This chapter also described the background to this study, the problem statement, research objectives, research hypotheses and justification or significance of the study.

In respect of the background, it emphasised the underlying relationship between financial development and economic growth, the causality of which the debate has apparently not been conclusive since Schumpeter (1911), McKinnon (1973) and Shaw (1973).

The chapter highlighted the weakness of most studies that ignored the heterogeneity of countries. Where country heterogeneity is considered, spatial theory holds that countries that have a high level of financial development in their proximity are more likely to have spill-overs than relatively less developed countries. In this case, in the SADC region, South Africa is financially the most advanced country in the region. Other SADC countries are expected to benefit from positive externalities from South Africa. However, countries in the SADC region, except for a few (such as Mauritius and distantly, Namibia) have relatively small, underdeveloped and weak financial sectors in spite of being closer to South Africa. As such, this became the basis for an empirical evaluation of spatial spill-over benefits from South Africa into the SADC region.

The role of financial innovation and spatial proximity to South Africa as determinants in financial development were also highlighted. This chapter emphasised that financial innovation became highly dynamic in recent years and spatiality is the basis for interconnectedness between South Africa and regional countries. The chapter also pre-empts the need to evaluate the spill-over effects of South Africa's financial development on the economic growth of other SADC countries.

 The chapter further outlined the need to investigate the relationship between financial concentration and financial development in the SADC region and how it is affected by country income. Theoretically, expansion of financial institutions from South Africa into the region dilutes the concentration of financial sectors. Furthermore, South Africa's financial system is

connected with global financial markets and there is need to review how global finance and international financial centres affect financial development in the SADC region.

In addition to introducing the issues under investigation, the study needs to give a comprehensive review of the financial sectors, level of financial development and economic growth in SADC countries. The next chapter analyses the financial systems of the SADC countries. Chapter Two discusses the financial and economic dominance of South Africa in the region and also makes a comparative analysis of the levels of financial development in the region. The chapter also reviews financial and interconnectedness and linkages of SADC countries, which form the basis of spatial spill-overs of financial development.

CHAPTER TWO
FINANCIAL SYSTEMS DEVELOPMENT, INTERCONNECTEDNESS AND ECONOMIC GROWTH IN SADC

2.1   Introduction

This study is focused on the SADC and as outlined in chapter one, one of the objectives is to depict the interconnectedness between South Africa's financial sector and other SADC countries. As such, it is necessary to review in particular the structures of financial sectors of the SADC countries, levels of financial development and their interconnectedness. This chapter presents a comparative analysis of financial systems and economic growth in the SADC (see Annexure 1 for the history of SADC). Firstly, in section 2.2 an overview of the macroeconomic

indicators of SADC countries is provided. Section 2.3 reviews financial sectors of all SADC countries and section 2.4 comprises a comparative analysis of financial systems in the SADC with reference to banking, insurance and other financial sectors. In section, 2.5, an analysis of the inter-connectedness of financial systems in Southern Africa is given. Section 2.6 presents a review of financial integration in SADC. Section 2.7 then discusses economic growth in the SADC region and section 2.8 provides the summary and conclusion.

2.2   Macro-economic indicators of countries in the SADC

The SADC region has one of the most diverse economies. The region comprises Africa's second largest economy, South Africa, some of the poorest small economies, Lesotho, Swaziland, Malawi, and small island economies such as the Seychelles, Madagascar and Mauritius (UNECA & SADC 2009). The differences in incomes are also significant, ranging from middle-income countries, Angola, Botswana, South Africa, Namibia and Mauritius, to low-income countries, Madagascar, Malawi, Mozambique, Tanzania and Zambia. There are also states facing challenges such as the Democratic Republic of Congo and Zimbabwe, and oil exporter, Angola (UNECA & SADC 2009). South Africa accounted for 50 per cent of the total GDP in the SADC region followed by Angola and Tanzania in 2014 (see Table 2.1).

Table 2.1: Selected indicators for SADC countries (2014)

SADC Member States	GDP Current Market Prices (US$ Million)	% of Total SADC GDP	Real GDP Growth Rate (%)	Per capita GDP (US$)	Annual Average Inflation (%),	Exports - US$ Million (% of SADC)*	Imports- US$ Million (% of SADC)*
Angola	147,750	20.9	4.2	6,060	7.7	69,762 (28.5%)	47,891 (18.9%)
Botswana	15,813	2.2	4.4	7,365	5.9	8,149 (3.3%)	8,856 (3.5%)
DRC	35,910	5.1	7.2	514	1.3	9,321 (3.8%)	11,027(4.3%)
Lesotho	2,174	0.3	3.5	1,135	5.0	946 (0.4%)	2,363 (0.9%)
Madagascar	10,674	1.5	2.0	453	5.8	3,025 (1.2%)	4,347 (1.7%)
Malawi	5,990	0.8	6.0	379	27.3	1,503 (0.6%)	2,984 (1.2%)
Mauritius	12,631	1.8	3.7	10,017	3.5	6.487 (2.75)	7,944 (3.1%)

Mozambique	17,449	2.5	7.2	697	3.5	4,748 (1.9%)	6,349 (2.5%)
Namibia	11,881	1.7	6.4	5,309	5.6	5,528 (2,3%)	7,399 (2.9%)
Seychelles	1,559	0.2	15.6	16,922	4.3	1,102 (0.5%)	1,264 (0.5%)
South Africa	350,227	49.6	1.5	6,485	5.7	108,696 (44.5%)	118,509 (46.7%)
Swaziland	4,548	0.6	2.7	4,112	5.6	2,000 (0.8%)	2,800 (1.1%)
Tanzania	48,057	6.8	7.0	1,013	7.9	8,724 (3.6%)	13,725 (5.4%)
Zambia	26,976	3.8	5.6	1,796	7.0	10,982 (4.5%)	10,639 (4.2%)
Zimbabwe	14,197	2.0	3.8	1,056	1.6	3,507(1.4%)	7,704 (3.0%)
SADC Total/ Average	**705,835**	**100.0**	**3.4**	**2,374**		**244,481**	**253,801**

Source: SADC (2016)

*2013

The rest of the countries have a combined GDP nearly equal to that of South Africa alone with South Africa, at US$350,227 million constituting about 49.6 per cent of total SADC GDP, followed by Angola at 20.9 per cent. However, in terms of real GDP growth, low income countries such as Mozambique and DRC register growth rates that are higher than levels of relatively financially developed countries such as South Africa and Mauritius. South Africa, recorded the lowest real GDP growth in the region in 2014. Growth in the SADC region is increasing across countries, even in non-resource rich countries. The per capita GDP of Seychelles (US$16,922), Mauritius (US$ 10,017), and Botswana (US$7,365) are the highest in the region. These economies are driven by large mineral resources production against low populations. South Africa dominates trade in the region, accounting for 44.5 per cent and 46.7 per cent of total exports and imports respectively with Angola following closely at 28.5 per cent (exports) and 18.9 per cent (imports), whilst Seychelles contributes the lowest, at 0.5 per cent in both imports and exports. Apart from Malawi, all countries have single digit inflation, with inflation rates in DRC, Mauritius, Mozambique, Seychelles and Zimbabwe below five per cent.

Beyond economic indicators, SADC countries also have varying financial sectors, with varying institutional levels, financial systems and financial regulation. The following section analyses the financial sectors for SADC countries.

2.3 Financial sectors of SADC countries

Financial sectors of SADC countries are regarded as less developed with the exception of South Africa, Mauritius, Namibia, and Botswana. Most SADC countries experience high levels of

financial exclusion for example Namibia 27 per cent, Tanzania 56 per cent, Malawi 51 per cent and Zimbabwe 23 per cent (Finmark 2014 and Allen, Otchere & Senbet 2011). Initiatives to enhance financial development - mainly anchored in reforms, innovation and institutional development - have over the years managed to help increase financial reach, access and depth in these countries. As a result of the reform programs introduced in the 1980s and 1990s, the depth and coverage of financial systems have gradually increased over the past decade (Kasekende 2010). Banks moved to strengthen their capital bases and improve risk management and there has been significant development of non-bank financial sectors (Mlachila, Park & Yabara 2013). However, in their own right, and given the sizes of their economies, the bank and non-bank sectors are increasingly becoming significant in SADC countries. Resource and macro-economic driven economic growth has managed to pull with it financial development in these countries (AfDB 2013).

In SADC countries, financial systems comprise formal and informal sectors. The formal sector consists of central banks, commercial banks, insurance companies, capital markets, as well as stock exchange markets. The informal sector includes cash loan operators, rotating savings schemes and money lenders, among others (KPMG 2014). The level of financial development is diverse, with South Africa as the most advanced, Mauritius, Botswana and Namibia fairly developed and Democratic Republic of Congo (DRC), Madagascar and Malawi the least developed (KPMG 2014). The following sections provide an overview of the financial sectors of each SADC country.

2.3.1 Angola

Angola's financial sector is highly concentrated, with the top five banks accounting for 77 per cent of total assets. The banking system in Angola has been heavily controlled by the government, although some reforms have taken place in the 1990s (Mowatt n.d.). Banking coverage, although still highly concentrated in Luanda, expanded from 22 per cent in 2010 to 51 per cent of the country's land area in 2012 (Muzima & Mazivila 2014). The International Monetary Fund's 2012 Financial Stability Assessment Program, however, highlighted significant weaknesses in Angola's financial sector. These include constraints in banking supervision and the existence of structural and operational risks. It also highlighted inadequate bank corporate governance, high dollarization and concentrated liquidity around the oil sector transactions (Muzima & Mazivila 2014).

2.3.2 Botswana

The financial system in Botswana registered significant growth since 1995 and is now diversified with an array of financial institutions (World Bank 2008). The structure of Botswana's financial sector reveals a small but thriving industry dominated by commercial banks and pension funds (Kariuki, Abraha & Obuseng 2014). Botswana's banking system is profitable and well-capitalised with relatively low non-performing loans (IMF 2013).

The country has a stock exchange as well as sound microfinance institutions to support the development of small and medium-sized enterprises. The level of financial intermediation, however, remains lower with private sector credit at about 31.2 per cent of the country's GDP in 2014 (World Bank Indicators 2015). Capital market operations are largely conducted through the Botswana Stock Exchange (BSE). The capital market is reasonably capitalised, at approximately 28 per cent of GDP, although the major drawback is a lack of long-term private assets (Kariuki, Abraha & Obuseng 2014). Products listed on the BSE include equities, corporate bonds, government bonds, exchange trade products and commercial papers (ASEA 2014). The Government of Botswana launched a Financial Sector Development Strategy (2012-2016) aimed at maintaining financial sector stability, promoting competitiveness and financial inclusion, and supporting intermediation of long-term financing (Kariuki, Abraha & Obuseng 2014).

2.3.3 Democratic Republic of Congo (DRC)

The financial system in the DRC is shallow, underdeveloped and does not have a stock market or a debt capital market (IMF 2014a). Banks account for the bulk of the financial sector with total bank assets constituting about 95 per cent of the total assets in the financial system. Bank deposits account for the bulk of total deposits (95 per cent of the financial sector's deposits) and the balance is held in microfinance institutions (IMF 2014).

The microfinance sector has been growing rapidly since 2001, but remains undeveloped (IMF 2014a). The economy is highly dollarised as nearly 90 per cent of the banking sector deposits and lending are in U.S. dollars and prices of financial services indexed to the dollar (IMF 2014a). The dollarisation of the economy has contributed to a weak monetary policy transmission mechanism and increased the system's exposure to liquidity shocks as the central bank has a limited capacity to provide dollar liquidity (IMF 2014a).

2.3.4 Lesotho

Lesotho's financial sector is not developed and is controlled by the banking system, which is dominated by three South African banks that account for over 95 per cent of total loans and deposits (IMF 2014b). The sector is profitable, well-capitalised, liquid and non-performing loans (NPLs) are moderate and well provisioned (Coppock *et al.* 2009). Non-banking financial services in Lesotho comprise eight registered insurance companies, seven credit-only micro financing institutions, and a number of registered and unregistered moneylenders (Nseera & Bhatia 2014). Financial intermediation is still limited in Lesotho with credit below 23 per cent of GDP in 2014. The non-bank financial system continues to be dominated by pension plans and insurance companies, with assets amounting to 17 per cent and 14.5 per cent of GDP respectively (IMF 2014b).

The Lesotho financial system has a regulatory and supervisory regime for banks and non-bank financial institutions that is consistent with international standards (Nseera & Bhatia 2014). The government is implementing the Financial Sector Development Strategy (FSDS) to improve access to finance, sound financial intermediation and financial sector deepening (IMF 2014b). Commercial banks have introduced new technology, including electronic and cashless payment systems and mobile money services, improving accessibility countrywide (Nseera & Bhatia 2014). Lesotho is gradually developing and modernising its payments infrastructure. This includes establishing a real-time gross settlement (RTGS) system to handle high-value transactions, an automated cheque clearing house, and electronic funds transfers (EFTs) (Jefferis & Manje 2014). The SADC Interbank Regional Settlement System (SIRESS) also commenced operating in July 2013 and handles cross-border interbank payments (Jefferis & Manje 2014).

Lesotho is a member of the Common Market Area (CMA) in Southern Africa, which effectively integrates its financial and capital markets with those of South Africa (Coppock *et al*. 2009). Lesotho's monetary policy is conducted within the confines of its membership in the Common Monetary Area (CMA). Lesotho has cross-border payments and remittances that constitute a substantial portion of the value and volume of transactions in Lesotho. These are driven by high levels of trade and financial integration with South Africa, a high level of emigration for employment to South Africa and a shared currency with South Africa (Jefferis & Manje 2014).

2.3.5 Madagascar

Madagascar's financial sector is small, shallow and with limited access (IMF 2015). The sector has a limited number of formal institutions and only about five per cent of the population use

banks (Dabire & Bi 2014). The financial sector is dominated by foreign owned banks that offer basic savings instruments and credit to a limited customer base (IMF 2015). Domestic credit, as a share of GDP remains low, access to credit is expensive and limited and the economy is largely cash based. There is no stock exchange or debt market outside of government paper (IMF 2015). Madagascar does not belong to any monetary union. The insurance sector is the only non-bank financial sector and is doing well in Madagascar (Dabire & Bi 2014).

2.3.6 Malawi

Malawi's financial sector has limited outreach and is relatively small and concentrated (African Economic Outlook 2014). Banks are dominant in the financial system, accounting for nearly 80 per cent of the total of financial sector assets. The banking sector is, however, concentrated around two banks that hold slightly more than half of the banking industry's total assets and deposits (Mwanakatwe 2014). The financial sector offers a limited range of financial services and products. The country's financial sector registered growth following a reform programme that was launched in 1988 (Mowatt n.d.). The reform process has resulted in the entry of several new banks into the market, new products, interest being paid on demand deposits and extended banking hours (Mowatt n.d.).

While the financial sector has experienced growth after the reforms and in recent years supported by innovation, access to financial services remains limited. Only 19 per cent of the population have access to banking services, while a mere three per cent use insurance products (Mwanakatwe 2014). Non-banking financial institutions are emerging, including micro and savings institutions. The government is pursuing reforms to promote financial inclusion through the use of regulation (Mwanakatwe 2014).

2.3.7 Mauritius

Mauritius has a relatively large and well-developed financial system with a modern and efficient financial sector infrastructure. Access to financial services is high, with more than one bank account per capita (IMF 2008). The Global Competitiveness Report (2014) ranked Mauritius 26th worldwide on financial market development. The banking system is highly concentrated and dominated by two long-established domestic, and two international banking groups. The financial sector is predominantly bank based with commercial bank assets amounting to 278 per cent of GDP (Kalumiya & Kannan 2015). The distinction among bank types is associated with differences in performance and strength, with the four largest banks (Type 1) dominating the system (IMF 2008). The Mauritian banking and financial systems are

well-capitalised and sound, with nearly 17 per cent of Regulatory Tier I capital to risk-weighted assets well above Basel III requirements (Kalumiya & Kannan 2015). The 2014 IMF Article IV Report on Mauritius stated that the Mauritian banking system is healthy and resilient to a range of shocks on their credit portfolios.

Despite a relatively well-developed financial system, Mauritian securities markets are shallow and insurance and pensions much smaller (IMF 2008). Alternative sources of finance, such as the Stock Exchange of Mauritius (SEM) are, however, increasing their presence on the financial stage, indicative of financial depth and efficiency (Kalumiya & Kannan 2015). Currently, there are 42 companies listed on the SEM representing a market capitalisation of nearly US$8.4 billion or 81 per cent of GDP in 2014 (Kalumiya & Kannan 2015).

2.3.8 Mozambique

The Mozambican financial sector continues to be underdeveloped, although it has the potential to expand rapidly in line with the country's decentralised growth (Almeida-Santos, Roffarello & Filipe 2014). The financial sector is dominated by foreign banks that hold 95 per cent of total financial system assets of which, three of their largest banks account for 85 per cent of total banking assets (IMF 2010a).

Non-bank financial intermediaries and corporate debt and equity markets remain small and underdeveloped (IMF 2010a). The insurance sector, leasing companies, the stock and bond exchange, and private pension funds are not very dynamic (USAID 2007). The insurance sector is also small, with claims less than one per cent of GDP, consisting of five private and one majority state-owned company (AfDB 2011a). The stock market is in its infancy, with just 13 securities, including government and corporate bonds listed on the Mozambique Stock Exchange (BVM); although the bonds represent just three per cent of GDP (Almeida-Santos *et al.* 2014). Microfinance institutions (MFIs) and micro-banks are small and not systemically important, although they have expanded rapidly in recent years (IMF 2010a).

Approximately 90 per cent of Mozambicans do not have access to formal financial institutions and credit is only available to an estimated three per cent of the population (Almeida-Santos *et al.* 2014). The limited progress in financial deepening is attributable to economy-wide structural impediments to financial intermediation and the lack of competition in the banking system (IMF 2010a).

The government is pursuing programs to develop the financial sector, including holding regular Treasury bond auctions at the BVM to stimulate domestic capital market development. The government approved the Mozambique Financial Sector Development Strategy 2012-2021 in 2013, to accelerate the pace of financial reforms in Mozambique. The strategy led to the approval of the legal framework for the creation of a private credit registry bureau, the establishing of a collateral registry, and a new Anti-Money Laundering/ Combating the Financing of Terrorism law (Almeida-Santos *et al.* 2014).

2.3.9   Namibia

Namibia has one of the most sophisticated and developed financial systems in Southern Africa, and was ranked 46th out of 144 countries by the Global Competitiveness Report for 2014/2015. It comprises a diverse range of institutions, which are mostly private. The banking sector is mature, very profitable, and well-capitalised whilst the non-bank financial institutions sector is also well-developed (IMF 2007). There are also developmental finance institutions such as the Development Bank of Namibia, the Agricultural Bank of Namibia and the SME Bank of Namibia (Shifotoka 2014). The financial system is dominated by South African banks (Shifotoka 2014). Namibia's banking institutions remain sound, profitable, and adequately capitalised due to the country's ties with South Africa (AfDB 2014). The ratio of credit to GDP in Namibia is among the highest among the SADC countries, approaching those of South Africa and Mauritius (Shifotoka 2014).

Non-banking financial institutions are also well capitalised and manage a total asset base of about 100 per cent of GDP (AfDB 2014). Namibia's financial system is highly liquid as 35 per cent of all pension fund assets are supposed to be invested domestically (Honde & Odhiambo 2014). Namibia also has a stable insurance industry which has provided the foundation for a competitive and efficient industry (KPMG 2013).

Although better than in most African countries, the financial sector is characterised by deficiencies, including limited competition and a high concentration of banks. The sector is also characterised by insufficient financial products in the bond market, a relatively illiquid secondary market, and, limited trading on the Namibian Stock Exchange (AfDB 2014). In addition, weak financial literacy, lack of collateral and limited effective demand for financial services limit access to finance (Honde & Odhiambo 2014).

Namibia is a member of the Southern African Customs Union (SACU), and the Common Monetary Area (CMA), effectively ceding monetary, exchange rate and trade policies discretion to South Africa (UNDP 2010). Circulation of the South African Rand (ZAR) in Namibia alongside the Namibian dollar limits Namibia's discretion in monetary and exchange-rate policies (Honde & Odhiambo 2014).

2.3.10 Seychelles

The financial sector in Seychelles is largely bank based, with a simplified banking model that is focused on deposit-taking and lending. The sector is sufficiently liquid and financed primarily through deposits (IMF 2011). The capital market in Seychelles remains shallow. The stock exchange, in existence since 2013, had only two listings as of 2014.

The country is continuously introducing reforms in the financial sector. In 2014 Seychelles created a Financial Services Agency (FSA) with a mandate of supervising and regulating non-bank financial institutions that are not within the ambit of the central bank (Mpande & Kannan 2014). In addition, the country approved a Financial Sector Development Implementation Plan (FSDIP) in 2014 to facilitate reforms in the financial sector through the adoption of a coherent vision and strategy for financial sector development (Mpande & Kannan 2014).

2.3.11 South Africa

South Africa has a large sophisticated and well-developed financial sector with assets worth over US$500 billion in 2014 (Kumo, Rieländer & Omilola 2014). The banking sector accounted for US$320 billion of these assets and contributes about 10.5 per cent to South Africa's GDP (Kumo, Rieländer & Omilola 2014). South Africa was ranked 7th out of 144 countries in terms of financial market development by the 2014/15 Global Competiveness Report (World Economic Forum 2014). Financial sector assets amount to 298 per cent of GDP, a ratio exceeding that of most emerging market economies. Non-bank financial institutions (NBFIs) hold about two thirds of these assets (IMF 2014c). Banking assets are about 112 per cent of GDP, pension funds 110 per cent, insurance 64 per cent and unit trusts 42 per cent of GDP (IMF 2014c).

The capital market is large, supported by NBFIs and foreign investor participation. The market capitalisation of the bond and equity markets, at 57 per cent and 288 per cent of GDP, respectively, is comparable to that of advanced economies (IMF 2014c). The liquidity and depth provided by NBFIs make these markets attractive to foreign investors, whose holdings

of government bonds and equities, both at 34 per cent of the total, are among the highest in emerging market economies (IMF 2014c). South Africa was ranked 1st out of 185 countries in the World Bank's Doing Business report for 2013 in respect of obtaining credit (Kumo *et al.* 2014).

The banking sector in South Africa is dominated by five major financial conglomerates that have extensive interest in primary banking, asset management, insurance and the securities sectors (Financial Stability Board 2013). Most banking assets are domestic, although banks have net foreign assets and an expanding presence in Africa (IMF 2014c). The sector is characterised by a high degree of concentration with four banks (ABSA, Standard Bank, First Rand, and Nedbank), accounting for 84 per cent of total sector assets as of year-end 2011 (Financial Stability Board 2013). Two of these banks, ABSA and Nedbank, are foreign owned.

The insurance sector in South Africa, while smaller than the banking sector, plays an important role in credit intermediation and is also dominated by four large conglomerates (Financial Stability Board 2013). These internationally active conglomerates are listed on either the Johannesburg Stock Exchange, the London Stock Exchange or have a dual listing (Financial Stability Board 2013).

South Africa also has a developed stock market, with Johannesburg Stock Exchange (JSE), ranked the 18th largest stock exchange in the world. The JSE anchors private sector investment and growth both within South Africa and across the region (Kumo *et al.* 2014). The number of companies with shares listed on the JSE is about 400 companies (JSE website 2015). The market capitalisation of all listed securities amounted to R12,207.7 billion (approximately US$1.02 trillion) in April 2015. In 2013, the JSE was ranked the 20th largest stock exchange in the world in terms of market capitalisation (Financial Stability Board 2013).

The financial sector has a high degree of concentration and interconnectedness (IMF 2014c) (see Figure 2.1). The level of concentration in the South African banking sector measured, using the Herfindahl–Hirschman Index (H-index), was at 0,187 in 2011 (SARB 2011). The high concentration prevalent in the South African banking sector is attributable to the high concentration of banking-sector assets among the four largest banks (SARB 2011).

Figure 2.1: Interconnection between banks and non-bank financial institutions in SA
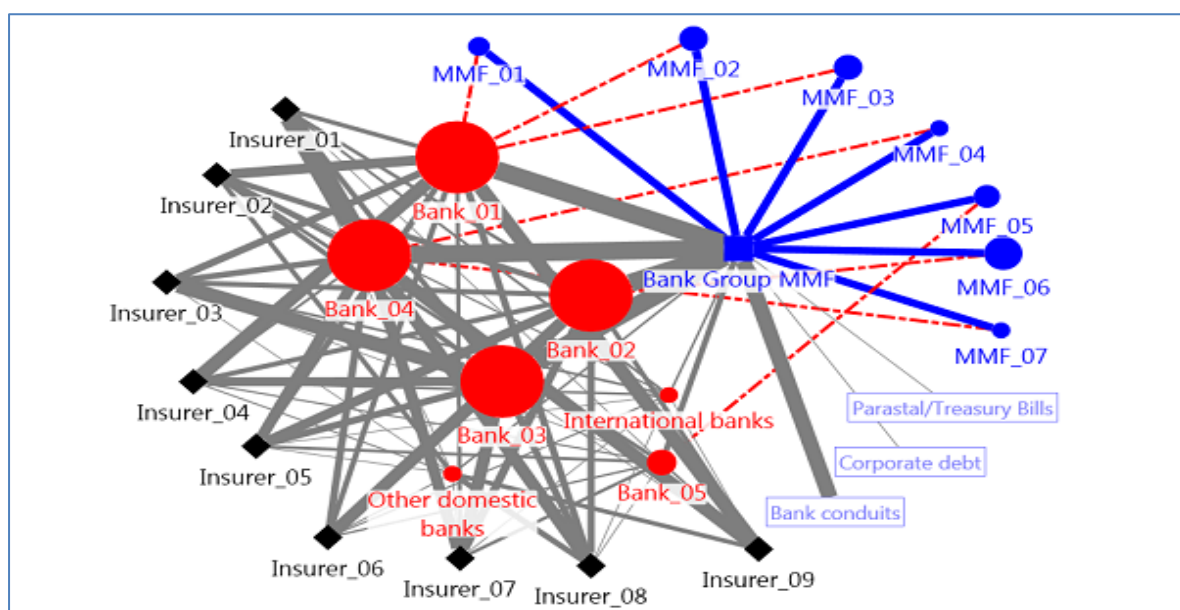
In Figure 2.1, the broader the band the stronger the connection between a bank (Bank_01 to Bank_05) and non-bank financial institutions (Insurer_01- Insurer_09 and Money Market Funds –MMF managers MMF_01 – MMF_07). The Bank Group Money Market Funds (MMF) manages 73 percent of MMF industry asset (IMF 2014c). Bank conduits are securitisation vehicles set up by banks that issue asset-backed commercial paper (IMF 2014c). The sector has conglomerates that are structured under bank controlling companies and have interests in banking operations insurance, asset management and securities (Financial Stability Board 2013). The top five banks hold 90.5 per cent of banking assets, the top five insurers account for 74 per cent of the long-term insurance market, and the seven largest fund managers control 60 per cent of unit trust assets (IMF 2014c). All major banks are affiliated with insurance companies through holding companies or direct ownership (IMF 2014c). NBFIs hold substantial assets in the four largest banks, partly through money market funds, which invest more than half of their assets in the largest banks through deposits and other short-term instruments (IMF 2014c).

Domestic banks are already capitalised above the new Basel III levels and South Africa was amongst the first ten of the 27 Basel Committee member countries to have adopted Basel III on schedule by January 2013 (Kumo *et al.* 2014). In spite of this, the country still has significant levels of financial exclusion with about one-third of the adult population without a bank account and limited access to formal financial services (Kumo *et al.* 2014).

2.3.12 Swaziland

Swaziland's banking system is relatively shallow and dominated by foreign banks. Of the four banks operating in Swaziland, three are subsidiaries of South African banks (Coppock *et al.* 2008). The commercial banking system largely concentrates on export financing with credit highly concentrated in the sugar industry while under serving a large portion of the adult population (Mafusire & Leigh 2014). This limited access to financing has reduced the amount of growth-enhancing investment projects in the country. The non-bank financial institutions (NBFIs) that developed to fill the financial need have been inadequately regulated and supervised (Coppock *et al.* 2008). Swaziland's stock market was established in July 1990 as an over-the-counter market (Hearn & Piesse 2009).

Swaziland is a member of the Common Monetary Area (CMA) and has no independent monetary and exchange rate policies as its currency is fixed at par to the South African Rand (Mafusire & Leigh 2014). The Central Bank of Swaziland, however, has supervisory and regulatory authority over the financial sector. Its monetary policy has largely been accommodative and tracks that of the South African Reserve Bank (Mafusire & Leigh 2014). Given the limited local market size, other financial institutions, such as pension and insurance companies, channel their locally mobilised resources to the South African market for investment purposes (Mafusire & Leigh 2014). It is estimated that 37.5 per cent of the population continues to be excluded from any form of financial services, limited by the lack of access to collateral (Mafusire & Leigh 2014).

2.3.13 Tanzania

Tanzania's financial sector is stable and efficient with the banking sector being profitable, liquid and adequately capitalised (Charle & Dhliwayo 2015). The banking system in Tanzania remains relatively small and dominated by a top tier of larger domestic legacy and foreign banks (IMF 2010b). The banking sector accounts for about 70 per cent of total assets of its financial system (Charle & Dhliwayo 2015). Growth of the banking sector is supported by the introduction of agency banking, expansion of mobile banking and the integration of mobile financial services to the banking system. Government ownership in banks is limited although concentration in the banking sector remains high (IMF 2010b). Access to financial services in Tanzania has increased significantly, with about 73 per cent of the population using financial services (Charle & Dhliwayo 2015).

2.3.14 Zambia

Zambia's financial sector is relatively small and mainly comprises banking. The sector, however, has one of the most liberal banking systems in Southern Africa. KPMG views Zambia's banking sector as relatively well developed in the African context. The financial sector remains concentrated with the largest four banks holding approximately two-thirds of the total banking assets by 2013 (KPGM 2014). Financial sector reforms, initiated in 1992 in Zambia, brought competition to the banking system which resulted in reduced intermediation spreads and improved access to financial services (Simpasa 2013). The sector is, however, still characterised by low financial intermediation, with limited access to financial services for the rural population and low-to-middle income earners, high costs of funds and an undeveloped money and capital market (Rasmussen, Munkoni & Lwanda 2014).

The stock market, driven by the Lusaka Stock Exchange (LuSE) of Zambia had a total of 22 listings in 2013 and a market capitalisation of US$10.5 billion, corresponding to 52 per cent of Zambia's GDP (Rasmussen *et al.* 2014).

2.3.15 Zimbabwe

Zimbabwe's financial sector is diversified and structurally resembles a developed financial system. The Zimbabwean financial sector is 'relatively more developed, compared to a number of countries in the SADC region' (Zimbabwe Stock Exchange 2013, Lyton Edwards Stockbrokers 2012 and Makina 2009). The financial sector comprises banks, insurance companies, pension funds, venture capital companies, asset management companies, developmental financial institutions, the Zimbabwe Stock Exchange, and microfinance institutions.

Due to the fragile state of the Zimbabwean economy, the financial sector faced two phases of crisis in the banking sector, with the first happening in the pre-multicurrency period of 2009. During this period, more than 12 financial institutions closed down due to macro-economic challenges that resulted in a decade long economic decline.

In 2009 Zimbabwe introduced a multicurrency system comprising a basket of hard currencies that are legal tender in the country. During the multicurrency period the financial sector continued to experience structural vulnerabilities that arose from under-capitalisation, liquidity challenges and high non-performing loans. This was compounded by a lack of confidence by depositors, liquidity constraints; rising non-performing and insider loans, high lending rates and low deposit rates, as well as the absence of an active inter-bank market and effective lender

of last resort (Manyau & Bandara 2014). Vulnerability further increased and resulted in five more banking institutions failing between 2009 and 2014 marking the second phase of the crisis in the sector. In a bid to strengthen the financial sector, the central bank and government intervened by introducing a number of reforms to make the sector less vulnerable. There has been a shift toward implementation of a strong regulatory monitoring of the sector, especially the banking sector (Ndhlovu 2013).

Activity on the Zimbabwe Stock Exchange (ZSE) remained subdued, as most investors adopted a cautious approach while concerns over the implementation of the indigenisation policy persisted (Manyau & Bandara 2014). The Zimbabwe stock exchange introduced electronic trading in June 2015. The development was envisaged to bring efficiencies in the trading of shares and, thus, increasing the volume of trade in the long-run.

The preceding analysis provided a comprehensive country by country perspective of financial development in SADC. This, however, needs to be augmented by a cross-country sectorial analysis of financial sector development in SADC in order to have comparative positions across countries. Section 2.5 presents a comparative analysis of financial systems in SADC on sectorial dimensions.

2.4   Comparative analysis of financial systems in SADC: A sectorial approach

This section presents a sectorial comparative analysis of the financial systems in SADC. The sectors are banking, stock market, insurance and non-bank financial sectors. The analysis, though descriptive, indicate the varying levels of financial development across SADC countries. It also demonstrates the dominance of South Africa in the region in terms of financial sector development. The next sub-section carries a comparative analysis on the banking systems.

2.4.1   Banking systems

The banking systems in SADC countries consist of local banks, regional banks (with the exception of South Africa) and branches or subsidiaries of foreign banks (Allen *et al.* 2011). In-terms of depth and efficiency, South Africa has the largest level of domestic credit to private sector to GDP, followed by Mauritius, Namibia and Botswana as shown in Table 2.2.

Table 2.2: Financial depth and efficiency in SADC countries (2013)

	Bank Concentration (%)	Liquid Liabilities	Bank Credit to private sector (%)	Foreign Bank Assets to total bank assets
Angola	69.4	34.2	23.5	57.0
Botswana	74.0	40.2	31.6	78.0
DRC	51.8	16.0	5.7	-
Lesotho	100.0	35.0	21.7	-
Madagascar	93.3	23.3	11.9	100.0
Malawi	95.8	23.8	17.7	33.0
Mauritius	57.5	97.4	108.1	59.0
Mozambique	78.0	43.1	28.9	94.0
Namibia	100.0	51.7	47.6	47.0
Seychelles	100.0	48.4	20.1	27.0
South Africa	98.0	41.5	67.4	25.0
Swaziland	100.0	28.7	27.1	100.0
Tanzania	42.6	29.0	12.8	46.0
Zambia	61.0	18.2	12.2	99.0
Zimbabwe	66.8	48.5*	28.1*	-

<u>Source</u>: World Bank WDI and GFDD (2015); *Reserve Bank of Zimbabwe

The banking sector of most SADC countries are highly concentrated with the three largest banks controlling more than 97 per cent of the banking market in South Africa, Seychelles, Lesotho, Namibia and Swaziland. Tanzania and DRC have the lowest levels of bank concentration. Liquid liabilities, as a measure of the overall size of the financial intermediation sector, as pointed out by King and Levine (1993a), are high in Mauritius and Namibia, at 97.4 per cent and 51.7 per cent respectively. Zambia, DRC and Malawi have the lowest levels of liquid liabilities indicating limited depth of the financial intermediation in these countries. Mauritius has the highest level of bank credit to private sector at 108.1 per cent of GDP followed by South Africa at 67.4 per cent of GDP; this is indicative of the robustness and strength of the Mauritian banking sector in supporting growth. Eleven of the SADC countries have bank credit to private sector of below 30 percent of GDP, which naturally creates a limited effect or influence of finance on growth. Foreign banks dominate the banking systems of Madagascar, Mozambique, Zambia and Swaziland, with domestic banks dominating in South Africa and the Seychelles.

Botswana, Mauritius, Namibia and South Africa are the most banked countries in the SADC region in terms of usage and access to banking services (see Table 2.3) (Schoombee 2011).

Table 2.3: Measure of access and usage of banking service in SADC

	Access		Usage	Mobile
	Account at a formal financial institution (% age 15+)*	**ATMs per 100,000 adults****	**Loan from a financial institution in the past year (% age 15+)***	**Mobile phone used to pay bills (% age 15+)***
Angola	39.2	18.5	7.9	13.6
Botswana	]30.3	27.6	5.6	2.2
DRC	30.3	0.7	1.5	0.1
Lesotho	18.5	9.2	3.0	4.6
Madagascar	5.5	1.7	2.3	0
Malawi	16.5	4.3	9.2	0.8
Mauritius	80.1	42.8	14.3	1.8
Mozambique	39.9	6.9	5.9	1.3
Namibia	-	47.7	-	-
Seychelles	-	51.2	-	-
South Africa	53.6	58.9	8.9	4.4
Swaziland	28.6	25.2	11.5	4.7
Tanzania	17.3	5.2	6.6	5.5
Zambia	21.4	8.6	6.1	2.4
Zimbabwe	39.7	4.6	4.9	2.6

Source: GFDD (2015)   *2011   **2012

Mauritius and South Africa dominate the access to financial services in SADC in respect of proportion of adult people who have accounts at financial institutions and have access to Automated Teller Machines, it being above 50 percent. At the tail end are Malawi, Madagascar, Lesotho and Tanzania, with proportions that are lower than 20% for both accounts at financial institutions and access to Automated Teller Machines. Countries with low levels of people with bank accounts also have the least levels in terms of usage of financial services. Use of mobile phones for financial transactions is seemingly not related to a country's financial development level, since countries such as Angola, Lesotho, Tanzania and Swaziland, with the lowest scores in other areas have better levels of mobile usage than that of South Africa and Mauritius. This paradoxical situation on mobile phones usage indicates that mobile financial services could be pursued without being limited by the level of financial development.

Nonetheless, the banking sector in the SADC region has experienced significant growth in the past decade. Even though this has gone hand-in hand with positive credit expansion in most cases, credit remains low by international standards (KPMG 2014). Banks in Botswana, Namibia, Mauritius and South Africa are relatively well capitalised, dynamic and pursue innovative banking practices (Allen *et al.* 2011). Botswana, Namibia, Mauritius and South Africa also represent four of the top five middle-income members of SADC which, based on

their level of development, would be expected to be the most banked countries (South African Reserve Bank 2014). Botswana, Swaziland and Zambia had mostly government owned commercial banks in the past decade and privatisation and other forms of restructuring of state-owned banks have improved the quality of the banks (South African Reserve Bank 2014). The banking sector has been at the centre of economic development for most SADC countries (Allen *et al.* 2011).

South Africa has a significant influence on banking activities in the region as indicated by a large number of South Africa banks in most of the regional countries. South African banks have a significant share of assets in Swaziland (65 per cent, representing 29 per cent of GDP) and Lesotho (97 per cent, representing 47 per cent of GDP) and a sizable presence in Botswana, Seychelles, Zambia and Zimbabwe (IMF 2014). A number of South African lenders have extended their activities to other countries in the region (Africa Housing Finance 2013).

The significant presence of South African banks in neighbouring countries implies that they could be financial spill-overs to, and spill-backs from SADC (IMF 2014). The spill-overs are likely to be particularly significant in countries that use the Rand, where the share of assets of South African banks' subsidiaries in the local banking system is high (IMF 2014). In 1998 SADC established the SADC Banking Association, intending to coordinate banking related activities throughout the region to ensure acceleration of development. South Africa was given the responsibility to manage the SADC sub-committees that would deal with regional integration of the financial sector due to its advanced financial system (Africa Housing Finance Yearbook 2013).

2.4.2   Stock markets in the SADC region

Driven mainly by South Africa, the SADC region has a relatively average developed capital market compared to other regions in Africa (see Table 2.4).

Table 2.4: Stock markets in SADC 2013

Country	Stock Exchange	Date Established	Number of Counters	Annual Mkt Cap (US$Bln)	Turnover Velocity (%)*	Market Cap/GDP (%)
South Africa	JSE	1887	386	1,102.37	55.25	30.91 (2011)
Zimbabwe	ZSE	1896	67	5.20	9.34	44.75
Namibia	NSX	1992	34	134.01	0.34**	1,184.0 (2012)
Botswana	BSE	1989	35	47.78	6.6	24 (2012)
Mozambique	BVM	1999	4	0.55	1.54	0.01 (2012)
Zambia	LuSE	1994	21	10.5	0.73**	52.79 (2012)

Swaziland	SSX	1990	10	0.2	-	-
Tanzania	DSE	1998	18	3.8	4.22	6.72 (2012)
Malawi	MSE	1995	14	16.6	2.52	28.6
Mauritius	SEM	1988	91	8.8	5.33	73.34

Source: African Securities Exchanges Association Yearbook (2014) and Stock Market websites
* Turnover velocity = Monthly value trade of listed shares/month-end market capitalisation x12

Stock markets in SADC were first established in South Africa and then Zimbabwe in the 1800s, before expanding to other countries. South Africa, due to its strong and developed financial sector, has the largest market capitalisation at US$1.1 trillion followed by Namibia at US$134 billion in 2013. The underdeveloped non-bank financial systems contribute to constraints in the development of stock markets in Swaziland, Mozambique and Tanzania. In terms of listing, South Africa and Mauritius have the highest number, 386 and 91 respectively, with Mozambique having only 4 listings. Stock market capitalisation constitutes more than 50 percent of GDP in Namibia, Mauritius and Zambia but remains small to GDP in Mozambique and Tanzania.

The Johannesburg Stock Exchange (JSE) dominates the region, representing 38 per cent of all listed companies and 83 per cent of total market capitalisation in SSA in 2012 (Masetti, Mihr, Lanzeni & Hoffmann 2013). With the exception of the Johannesburg Stock Exchange (JSE), Africa's stock markets are small, illiquid, lack the necessary infrastructure and offer a limited range of tradable instruments (Hearn & Piesse 2009).

In the SADC market operational efficiency is gradually improving as a number of participants use electronic trading and clearing systems (Table 2.5).

Table 2.5: Operational efficiency of stock markets in SADC

Country	Clearing and Settlement	Foreign Participation	Trading System
Botswana	Manual	Yes	Manual
Namibia	Manual	Yes	Electronic
Malawi	Manual	Yes	Manual
Mauritius	Electronic	Yes	Electronic
Mozambique	Electronic	Yes	Manual
South Africa	Electronic	Yes	Electronic
Swaziland	Manual	Yes	Manual
Tanzania	Electronic	Yes	Electronic
Zambia	Electronic	Yes	Electronic
Zimbabwe	Electronic	Yes	Electronic (2015)

Source: Allen *et al.* (2011)

Most SADC countries now have electronic trading and settlement systems and are allowing for foreign participation. The manual systems that used to dominate the markets impeded operational efficiency and liquidity, as they caused bottlenecks in terms of slowing down trading and information dissemination of the stock markets (Allen *et al.* 2011).

There exists some interconnectedness between stock markets in the SADC region. Some companies in SADC countries are listed on a number of these stock exchanges. Counters have primary listing in their countries and have secondary listings mostly on the Johannesburg Stock Exchange. The dual listing allows for fungibility of counters and for investors to arbitrage across markets. In addition, regional financial integration initiatives also enhance interconnectedness of these markets. For example, all countries with stock markets are active members of the SADC's Stock Exchange Committee (SADCSEC), and are affiliated to the Committee of Southern African Development Community Stock Exchanges (CoSSE). The Committee of Southern African Development Community Stock Exchanges was established in 1997 with the aim to increase cooperation and links among stock exchanges in the SADC region. The Committee (CoSSE) also aims to supervise the launch of a hub and inter-connectivity platform, driven by the JSE, which is expected to enable stocks to be traded across member stock exchanges (ZEPARU 2011).

2.4.3 Insurance in SADC

The insurance industry in Africa (more so in the SADC) is still in its infancy and is relatively underdeveloped compared to other emerging economies and developed countries (Allen *et al.* 2011). Swiss Re reported that in 2012, Africa's total premiums amounted to US$71.9 billion, which represents a penetration rate of 3.65 per cent (Table 2.6).

Table 2.6: Size of the insurance industry in selected SADC countries, 2012

Country	Premiums (US$ million)	Nominal GDP US$ Billion	Penetration Rate (%)	Population (Million)	Density (Premiums per capita, US$)
South Africa	54,871.0	384.3	14.28	52.4	1,047.4
Angola	1,140.0	114.1	1.00	20.8	54.8
Namibia	980.0	13.1	7.50	2.3	433.7
Mauritius	655.0	11.3	5.78	1.2	528.4
Botswana	459.9	14.5	3.17	2.0	229.5
Tanzania	254.2	28.2	0.90	47.8	5.3
Zimbabwe	166.6	9.8	1.70	13.7	12.1

These premiums fall below the global average of 6.5 per cent, but are higher than the average of 2.65 per cent for emerging markets (KPMG 2014). The insurance penetration ratio, which is the gross value of insurance premiums as a percentage of GDP, is often used as a measure of depth of a country's insurance market. The low insurance penetration in other countries can be attributed to a lack of trust of financial service providers, limited investment in the sector, the lack of reliable information to enable assessment and shallow financial markets, among others (KPMG 2014).

South Africa dominates the insurance market in SADC with the country receiving more than 93 per cent of the premiums, the amount contributed by the insured, in 2014, with Angola and Namibia getting a combined 3.6 per cent, and Zimbabwe the least, among the selected countries. This translates into the highest premium per capita for South Africa, although the low population for countries such as Namibia and Mauritius increased their premiums per capita to nearly half that of South Africa. South Africa has a well-developed insurance market with a penetration rate of 14.2% and accounts for 72% of Africa's US$71.9 billion worth of insurance premiums in 2012 (KPMG 2014). Namibia, Mauritius and Botswana were the only other SADC countries with penetration rates above 3% in 2012 (KPMG 2014). The insurance companies in the region offer property, vehicle, health, life and casualty, with vehicle insurance sector representing the largest portion of the market share in most countries.

2.4.4   Other Financial Markets

Other non-bank financial markets in SADC have a variety of financial products including microfinance, corporate bonds and derivatives. Initiatives of Namibia, Botswana and Seychelles led to the establishment and growth of derivative markets that were non-existent outside South Africa (Allen *et al.* 2011). Microfinance is also established in most regional countries, mainly due to aggressive initiatives intended to address high levels of financial exclusion. The microfinance institution began as a developmental initiative with the intention to extend financial services, mostly credit, to those who were financially excluded. Commercialisation of the microfinance institutions triggered significant growth in provider institutions, as well as the establishment of Microfinance Banks in some countries. In addition, existing commercial banks diversified into the sector through establishing stand-alone microfinance entities in their holding companies or as departments within existing structures.

The impact of microfinance in the regional countries, in terms of enhancing financial inclusion and improving access to credit by individuals and SMEs, however, vary across countries.

2.5   Interconnectedness of financial systems in Southern Africa

Financial systems' interconnectedness between South Africa and other SADC countries are evident through the large number of South African financial institutions in these countries. South Africa's presence in the SADC region is across the entire financial sector (Table 2.7).

Table 2.7 shows that South African banks are spread across SADC countries, with the Standard Banking Group having the widest spread, in nearly all countries. In most countries South African banks control a significant share of deposits; a combined total of more than 40 per cent in most cases Basdevant *et al.* (2014). The non-bank financial institutions of South Africa are also present across SADC, although distribution is largely biased toward countries in the SACU area and those relatively better financial systems, such as Zimbabwe, Tanzania and Zambia. In addition to institutional presence, cross-border banking within the region is also significant. Lesotho, Namibia, and Swaziland residents hold cross-border deposits in South Africa despite the presence of South African subsidiaries in their countries (Canales-Kriljenko *et al.* 2013).

Table 2.7: Financial linkages and Cross-border banking with South Africa (2011)

	Banking (Share of deposit in 2010)				Insurance			Investment Management			
	Standard Banking Group/Stanbic	ABSA[1]	Nedbank[2]	First Rand	Sanlam	Standard Banking	First Rand	Sanlam	Standard Banking	First Rand	Nedbank[2]
South Africa	27	18	21	13	x						
Angola	x	x	x	x	x						
Botswana	16			x	x			x		x	
DRC	5										
Lesotho	x		30	x				x			
Malawi	20		x		x						
Mauritius	7									x	
Mozambique	20	7		3							
Namibia	x	7	x	x	x	x	x	x	x	x	x
Swaziland	43		23	21				x			
Tanzania	5	11	x	x	x				x		
Zambia	15			x					x		x
Zimbabwe	14		x						x		x

<u>Source</u>: Adapted from Canales-Kriljenko *et al.* (2013)
[1]ABSA is a South African subsidiary of the British Barclays group
[2]Nedbank is a South African subsidiary of a British financial group Old Mutual

Presence of South Africa financial institutions is indicative of financial linkages and cross-border banking in the region; particularly with South Africa and that the banks are regional Pan African banks.

South Africa is a prominent source of foreign direct investment (FDI) in the region and in other African countries (Grant *et al.* 2013) (Table 2.8). South African companies have over the years been diversifying their operations internationally (UNCTAD 2005). Consequently, South Africa has become one of the emerging global investors, accounting for an average of 0.35 per cent of global outward investment between 2006 and 2010 (Nkuna 2014). South Africa's FDI was quite significant in Mozambique, Swaziland and Zimbabwe in 2010, accounting for more than 10 per cent of the respective countries' GDP. In addition, South Africa received a substantial amount of FDIs from Swaziland. Over the period 2001-2010, Mauritius was the recipient of the largest investments from South Africa, on average 44 per cent, followed by Tanzania 12 per cent, and Mozambique at seven per cent (Nkuna 2014). South Africa's FDI presence in its neighbouring countries remains minimal, below two per cent of its total FDI reflecting that FDIs from South Africa does not significantly respond to geographical proximity. Good governance, a stable macro environment, efficient infra-structure and in some cases land resources were critical factors in attracting South African investors (Nkuna 2014).

Table 2.8: South African FDI stock in selected SADC countries US$ million (% of SA total FDI)

	2001	2003	2004	2007	2008	2009	2010	Average	% Share
Botswana	47.4	64.0	71.9	108.7	178.6	309.6	333.2	159.1	2%
Lesotho	20.6	23.7	29.7	24.5	20.4	35.7	48.4	29.0	0%
Mauritius	769.9	476.9	942.7	3,847.3	5,115.4	5,727.8	6,201.4	3,297.3	44%
Mozambique	478.2	589.0	510.6	664.1	903.6	743.4	892.2	683.0	7%
Namibia	93.6	133.7	97.6	84.3	59.6	81.2	155.1	100.7	1%
Malawi	124.7	98.2	110.8	93.6	149.7	158.9	180.9	131.0	1%
Swaziland	18.1	108.8	97.7	97.6	135.2	204.0	312.6	139.1	1%
Tanzania	415.7	608.5	979.5	1,307.0	1,389.7	2,330.3	1,891.1	1,274.5	12%
Zambia	10.3	48.2	47.9	40.5	87.6	65.9	162.5	66.1	1%
Zimbabwe	68.2	236.1	74.9	120.3	80.1	319.3	659.4	222.6	2%
Africa	2,046.7	2,387.2	2,963.3	9,800.9	11,719.1	13,437.6	14,143.3	8,071.2	
TOTAL SA OUTWARD	**24,762**	**20,966**	**25,558**	**52,110**	**53,993**	**62,219**	**68,905**	**44,073**	

Source: Nkuna (2014)

2.6.1 Linkages between South Africa and the neighbouring SADC countries

South Africa has stronger interconnectedness with its neighbouring countries driven mainly by the customs union (SACU), the Multilateral Monetary Agreement, use of the Rand in other countries and trade linkages. South Africa is the largest source of FDI for most neighbouring countries accounting for at least 5% of their total inward FDI (see Figure 2.2) (World Bank 2016). Botswana, Lesotho, Namibia, and Swaziland, received nearly 80 percent of their total inward FDI from South Africa. Remittances from South Africa to neighbouring countries are also significant. South Africa-based banks (Standard Bank, First Rand Bank, Nedbank) are active and systemically important in neighbouring countries, as measured by share of deposits and assets in these countries (World Bank 2016). These banks constitute more than 20% of domestic deposits in Lesotho, Namibia, Swaziland, Botswana, Malawi, Mozambique and Zambia, in 2013. The mentioned South African banks also had assets that are more than 10% of GDP in most of these countries, in 2013 (World Bank 2016).

The existing monetary union in Southern Africa and the use of the Rand in a number of SADC countries facilitate inter-connectedness of financial systems. South Africa, Lesotho, Namibia and Swaziland form the Multilateral Monetary Area, with the Rand circulating freely (Canales-Kriljenko *et al* 2013). The multilateral agreements delineate the movement of funds within the Multilateral Monetary Area, access to South African financial markets, foreign exchange transactions and compensation payments (Thamae 2013, citing Wang *et al.* 2007). Botswana's currency has traded closely to the Rand and Zimbabwe uses the Rand as one of the currencies of its multicurrency system. As a result the South African monetary policies could potentially have important effects on economic activity in the region (Canales-Kriljenko *et al.* 2013).

Figure 2.2: Linkages between South Africa and the neighbour SADC countries

a. Exports to South Africa, 2011

b. FDI inflow from South Africa, 2011-2013

c. Selected South African banks: share of deposits by country , 2013

d. Selected South African banks: share of assets by country, 2013
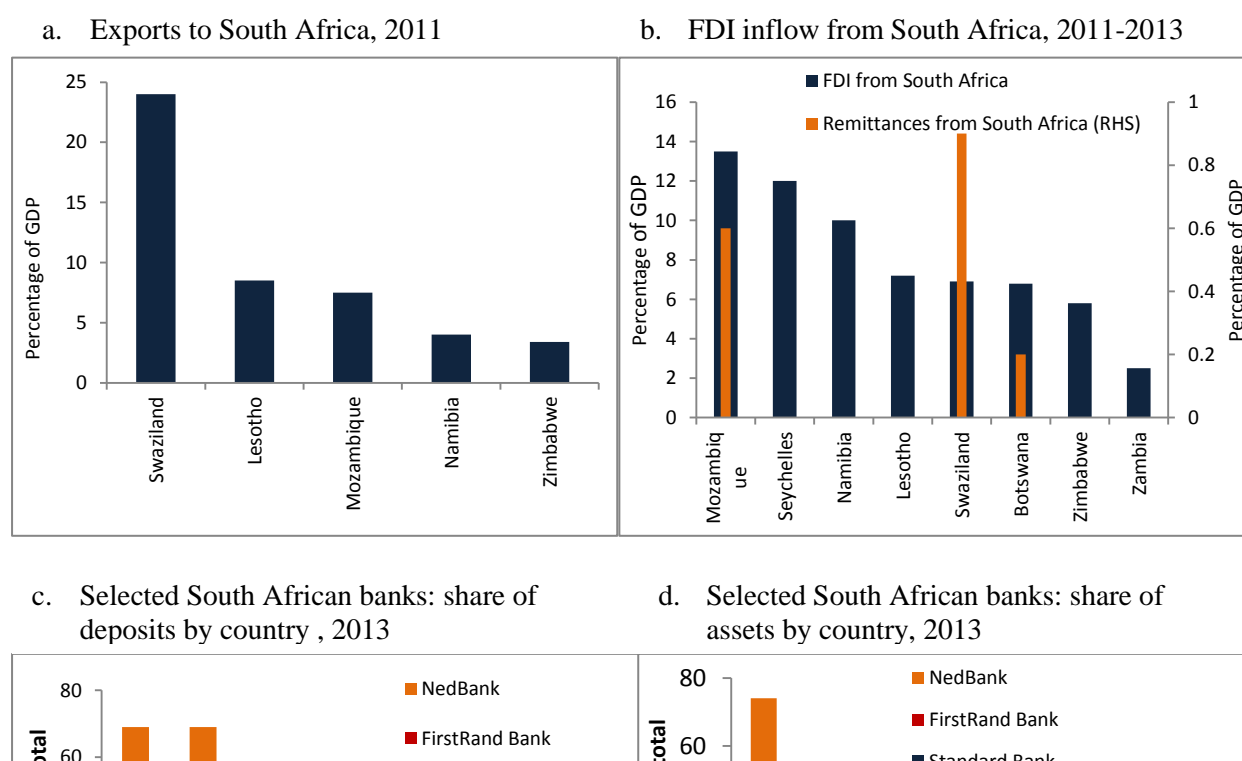
Source: Adapted from World Bank 2016

Financial interconnectedness between South Africa and its neighbours is also driven by economic ties and dominance of South Africa in the region. South Africa's economy account for 85 to 90 per cent of the total GDP at market price of Botswana, Lesotho, Mozambique, Namibia, Swaziland, and Zimbabwe, increasing possibilities of co-movements in business cycles between South Africa and these countries (Basdevant *et al.* 2014). South African foreign direct investment is not limited to financial firms only, but also includes non-financial firms (Canales-Kriljenko *et al.* 2013). Furthermore, the existing trade agreements, SADC, SACU and the COMESA in Southern Africa enhance interconnectedness of financial systems of the member countries. Apart from promoting regional trade and economic integration, the SADC has been lobbying for monetary and financial integration.

2.6   Regional financial integration in SADC

Spatial spill-overs are enhanced where countries are financially integrated. Regional financial integration refers to a market or institutional process that broadens and deepens financial links within a region (Linn & Wagh 2008). Financial integration in SADC is gradually taking shape and is currently focused on formulating integration frameworks. Notable efforts are in the establishment of the SADC Finance and Investment Protocol (FIP); the Committee of SADC Stock Exchanges; the Committee of Central Bank Governors; the Committee of Insurance, Securities and Non-Banking Financial Authorities; the Committee of Senior Treasury Officials and the SADC Association of Banks. The SADC also established a centre for Development Financial Institutions, the SADC DFRC.

In the SADC a firm foundation for deeper financial integration has been laid. For example, financial integration is already profound among the Common Monetary Area (CMA) members (South Africa, Lesotho, Namibia and Swaziland), with a highly synchronised monetary policy among them (UNECA & SADC 2009). Beyond the CMA, South African banks have a significant presence in the rest of the region (UNECA & SADC 2009). Furthermore, large numbers of unskilled and semi-skilled workers from Botswana, Lesotho, Malawi, Mozambique, Swaziland and Zimbabwe seek employment in South Africa, resulting in remittances being a major source of foreign earnings for these countries (UNECA & SADC 2009).

2.7   Economic growth in the SADC region

Economic growth in the SADC region differs substantially from country to country, although on average, the per capita gross domestic product (GDP) increased by three per cent per year over the past decade (South African Institute of International Affairs 2015). The SADC countries are at different stages of development, ranging from the poorest states of the world, Malawi, to stable and prospering middle income countries, South Africa and Mauritius (Central Bank of Lesotho 2014).

The Southern Africa region has been registering significant growth rates in the past decade with annual real GDP growth rates averaging about 4.3 per cent from 2001 to 2012 (African Economic Outlook 2013). Growth has over the years increasingly become more widespread across countries, including non-resource-rich countries. For example, growth in Southern Africa was estimated at 3.8 per cent in both 2012 and 2013 – but 6.3 per cent in 2012 and 5.8 per cent in 2013 if South Africa is excluded (Schaffnit-Chatterjee 2013). In SADC, for the period 2003 to 2013, economies grew by an average of 4.7 per cent annually (South African Institute of International Affairs (2015). This growth was driven by natural resources, improved macroeconomic policies, institutional capacity and financial sector performance, among others (Mlachila, Park & Yabara 2013). In some small SADC countries growth has been driven by the services sector; primarily a rapidly expanding tourist sector.

For the period 2008-2015, countries with predominantly small and underdeveloped financial sectors and economies, such as Mozambique, Zambia, Malawi and Tanzania, have registered higher growth rates, the period average was 7 percent, 7.1 percent, 5.8 percent and 6.88 percent respectively (Table 2.9).

Table 2.9: Real GDP growth rates in SADC countries (2008-2015)

	2008	2009	2010	2011	2012	2013	2014	2015	Period Average
Angola	11.2	2.4	3.4	3.9	5.2	6.8	4.8	3.0	5.09
Botswana	3.9	-7.8	8.6	6.2	4.3	5.9	3.2	-0.3	3.00
DRC	6.2	2.8	7.2	6.9	7.2	8.5	9.0	6.9	6.84
Lesotho	5.1	4.5	5.6	4.3	6	5.7	3.6	3.6	4.80
Madagascar	7.2	-3.5	0.1	1.5	2.5	2.4	3.1	3.0	2.04
Malawi	8.6	7.6	9.5	3.8	2.1	6.1	5.7	3.0	5.80
Mauritius	5.5	3.1	4.2	3.9	3.2	3.2	3.6	3.5	3.78
Mozambique	6.8	6.5	7.1	7.4	7.1	7.4	7.4	6.3	7.00
Namibia	2.6	0.3	6	5.1	5.2	5.1	6.3	5.7	4.54
Seychelles	-2.1	-1.1	5.9	7.9	6	6.6	3.3	3.5	3.75
South Africa	3.2	-1.5	3	3.2	2.2	2.2	1.5	1.3	1.89
Swaziland	2.4	1.3	1.9	-0.6	1.9	3	2.5	1.7	1.76
Tanzania	7.4	6	7	6.4	6.9	7.3	7.0	7.0	6.88
Zambia	7.8	9.2	10.3	7.6	6.3	6.7	5.8	3.2	7.11
Zimbabwe	-17.7	5.3	11.4	11.9	10.6	4.5	3.8	1.1	3.86
SADC Avg.	**3.87**	**2.3**	**6.08**	**5.29**	**5.11**	**5.43**	**4.71**	**3.50**	**4.54**

Source: World Bank (2016)

These growth rates compare favourably to oil rich countries like Angola (5.09 per cent) and financially better off countries such as South Africa (1.89 per cent), Mauritius (3.78 per cent) and Namibia (4.54 per cent). This indicates that growth has been spread across all countries driven mainly by resources. South Africa controls the biggest proportion of total GDP in the region, with a share of 55.5 per cent of the region's total GDP, followed by Angola at 13.6 per cent, in 2013(see Figure 2.3). Lesotho and Seychelles have the smallest share of regional GDP, at 0.4 per cent and 0.2 per cent, respectively. The varying economic sizes reflect the diversity in factor endowments, different geographical land sizes, connections to international trading routes and population sizes (South African Institute of International Affairs 2015).

Figure 2.3: Regional GDP country share in SADC, 2013
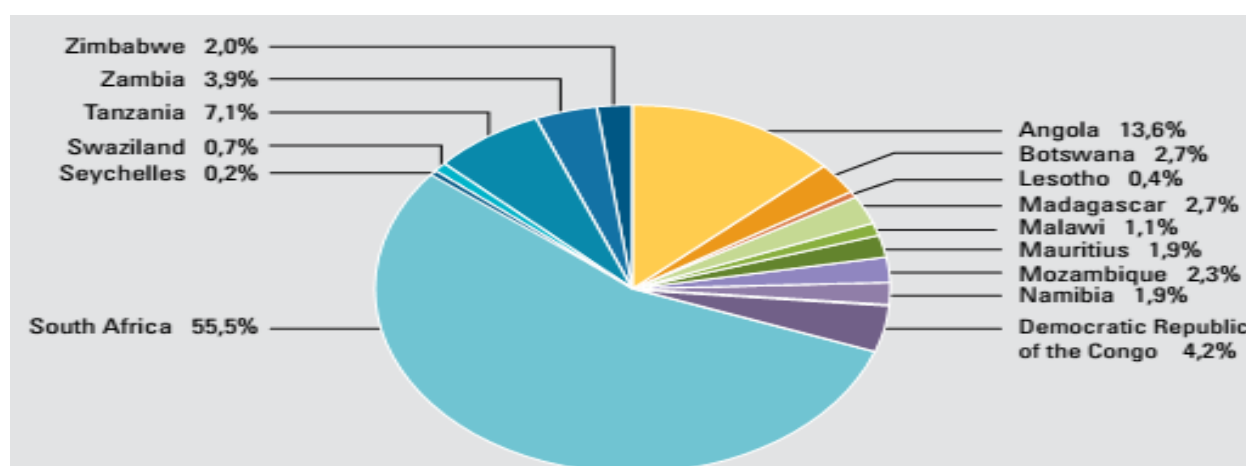
Over the period 2004-2013, growth in Southern Africa and growth in South Africa has been following a similar trend, indicative of the connection in factors that affects growth in the region (see Figure 2.4).

Figure 2.4: Real GDP growth (%) in South Africa, Southern Africa and Africa
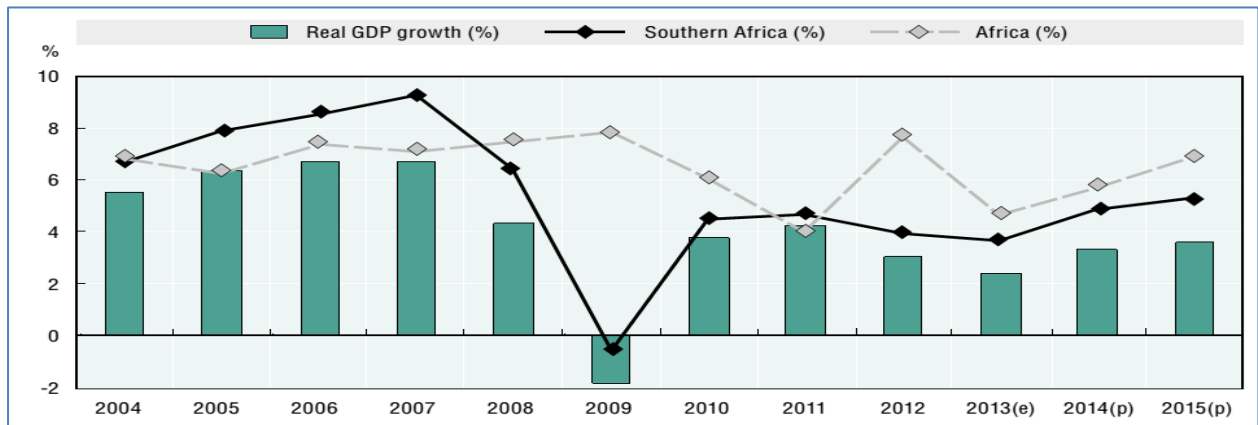
However, the fact that growth rates for Southern Africa are above those of South Africa over the period under consideration, indicate that growth in other countries remains higher than that of South Africa. The higher regional growth rates than that of South Africa confirms that growth is increasingly becoming more widespread across countries (African Economic Outlook 2013).

The SADC region, similar to other regions in developing countries, is linked to the global economy. Economic performance in the region is equally affected by factors that influence developments in the global economy (see Figure 2.5).

Figure 2.5: Growth in SADC compared to SSA and the world
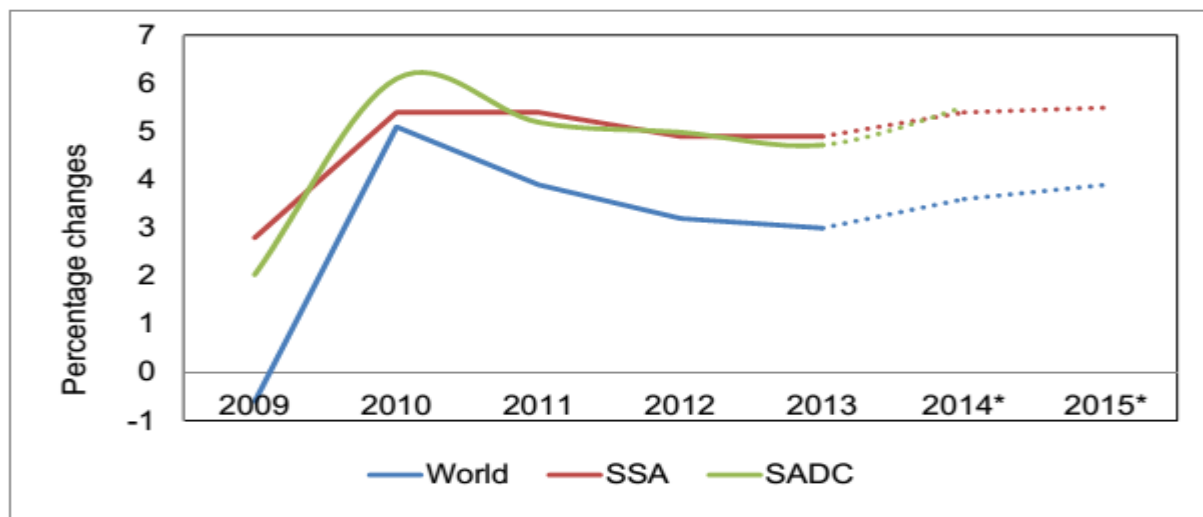
From 2009-2010 growth was recovering rapidly from the down triggered by the global financial crisis. Thereafter it gradually declined from 2010 to 2013 as the global economy struggled to recover in the post crisis period and as commodity prices softened. The trend shows that SADC economies are linked to the world economy, most probably due to a high dependency on commodities, of which the prices vary with global markets (Central Bank of Lesotho 2014). It also may reflect the linkage of the dominant economy in the region (South Africa) to the world market.

2.8 Summary and conclusion

Chapter Two provides an overview of the financial systems development, interconnectedness and growth in SADC countries. SADC is a 15 member bloc, established initially as a Coordination Committee (SADCC) in 1980 and transformed into a development community (SADC) in 1991. The major objective of the SADC is to spearhead economic integration of Southern Africa.

In the SADC region, Botswana, Mauritius, Namibia and South Africa are the most banked countries in the region in terms of usage and access to banking services. South Africa's financial sector is the most developed compared to the rest of the SADC, with strong money and capital markets, insurance and mutual funds. There have been marked improvements in banking development, as well as the emergence of non-bank finance, particularly in the form of stock markets, which have proliferated across Africa.

The region's developed capital market, which is mainly driven by South Africa, is relatively average; particularly the stock market compared to regions such as East and West Africa. Operational efficiency of markets in SADC remains mixed, although the majority of the markets now use electronic trading and clearing systems. Most financial sectors of SADC countries, with the exception of South Africa and Mauritius, are shallow and dominated by banks. Non-bank financial sectors, especially the stock markets, are currently well developed.

Financial systems' interconnectedness between South Africa and other SADC countries is evidenced by the presence of South Africa's financial and non-financial institutions in other SADC countries. South Africa is a leading source of foreign direct investment (FDI) in the region. The existing monetary union in Southern Africa and financial integration in the SADC region facilitates inter-connectedness of financial systems of the member countries.

In respect of growth, the SADC region has been registering significant growth rates in the past decade. Growth has over the years increasingly become more widespread across countries, including the non-resource-rich countries.

Chapter three presents a review of the secondary literature pertaining to the key issues of this study. The review specifically discusses theoretical and empirical literature on the financial development-growth relationship, financial innovation, spatial spill-overs, financial concentration and global finance.

CHAPTER THREE
LITERATURE REVIEW

3.1   Introduction

The primary objective of this study is to review the growth and spatial spill-over effects of South Africa's financial development in the SADC region. Chapter One outlined the broader conceptual issues under consideration in this study. These are financial development and economic growth; financial innovation and economic growth; spatial effects in financial development; spatial spill-over effects of financial development; spatial financial concentration and global finance and financial development. Whilst the broader concepts have been introduced, this chapter comprise a review of the literature on these concepts.

The chapter carries a comprehensive review of theoretical and empirical literature as well as methodologies used in previous researches. The chapter presents a review of theoretical literature concerning basic concepts, definitional issues, theoretical models on these concepts and empirical literature for each of the concepts. The chapter also comprise of a brief analysis of the models and methodologies used in empirical studies reviewed.

The rest of this chapter is divided into two sections, namely theoretical and empirical perspectives, and is organised as follows: Section 3.2 discusses the theoretical literature and begins with the finance-growth relationship followed by financial innovation and its relationship to economic growth. The section also presents theory of the spatial and spill-over effects as well as their interaction with financial development. It also presents theory on financial concentration, international financial centres, global finance and how these concepts relate to financial development. Section 3.3 presents the empirical literature on the issues discussed in the theoretical literature review. This chapter ends with a summary and conclusion highlighting key observations and identifying knowledge gaps from the reviewed literature.

3.2   Theoretical literature

This section presents a review of literature on financial development and economic growth; financial innovation and finance-economic growth; spatial effects in financial development; spatial spill-over effects of financial development; spatial financial concentration and global finance and financial development from a theoretical perspective.

3.2.1   Financial development basics

Financial development is defined as an improvement in the quality, quantity or efficiency of financial systems (Maskay 2012). Conceptually, financial development is a process of reducing the costs of acquiring information, enforcing contracts and making transactions (World Bank 2015). The World Economic Forum (WEF) (2012) defined financial development as the factors, policies, and institutions that lead to effective financial intermediation and markets, as well as deep and broad access to capital and financial services.

The World Bank measures financial development on the basis of depth, access, efficiency and stability of financial institutions and markets (World Bank 2015). Financial development can also be measured on the basis of the characteristics of its institutional business and political environment (Krishnan 2011). The WEF Financial Development Report (2012) measures of

financial development are captured across the seven pillars of the Financial Development Index (see Figure 3.1).

Figure 3.1: Composition of the financial development index
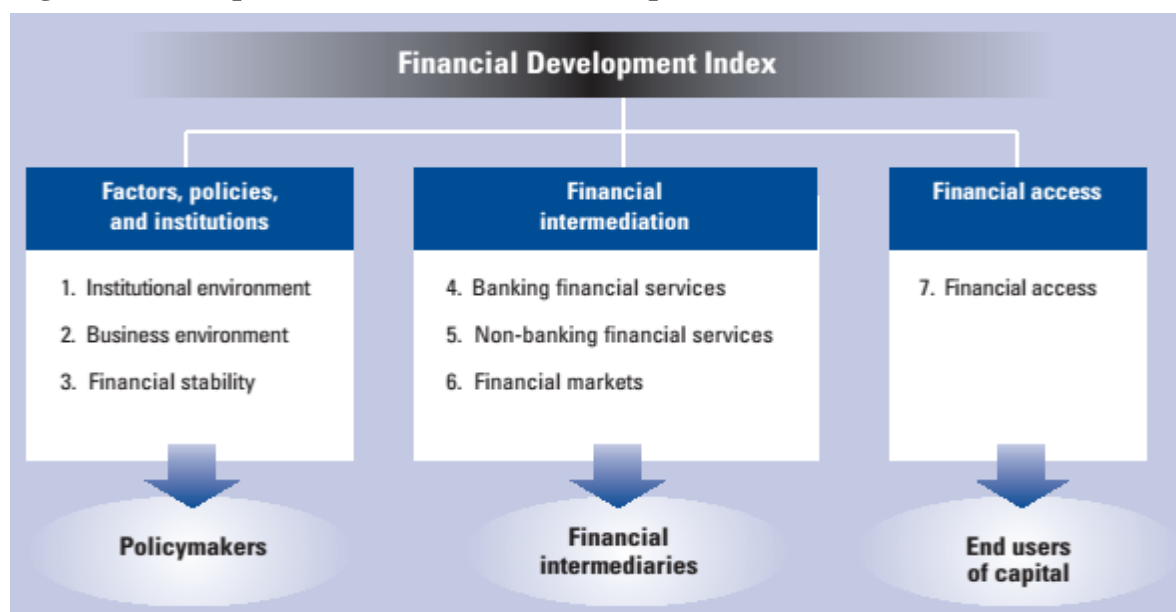
The pillars are grouped into three categories that reflect key areas of financial development, namely factors policies and institutions; financial intermediation and financial access. The Financial Development Index analyses drivers of financial systems development that support economic growth and the overall competitiveness of financial systems (World Economic Forum 2012). The World Bank, however, acknowledges that it is challenging to empirically measure financial development directly. A financially developed country should exhibit depth (size and liquidity of markets) and efficiency (ability of institutions to provide financial services at low cost) in its financial sector. There should be low levels of financial exclusion, where people encounter difficulties accessing or using financial services in the mainstream market due to non-availability, unaffordability or limited knowledge and information asymmetry (European Commission 2008).

3.2.2 Determinants of financial development

Determinants of financial development are the main source of the differences in performance across countries (Voghouei, Azali & Jamali 2011). These authors identified five categories of determinants of financial development as the legal tradition, institutions, government intervention, openness policy, and political economic factors. Huang (2010) identified

institutional factors, and policy (macroeconomic factors), geography and other variables (economic growth, income level, technology and population, among others).

Generally, geography applies mainly at the demand side of financial development, although it may affect its supply side by influencing the quality of institutions (Huang 2010). Openness to international trade (trade openness) and capital flows (financial openness) have a bi-directional effect on a country's financial and product markets. On the one hand, a well-developed financial sector can stimulate exports and imports by providing low cost financing, and assist in overcoming liquidity constraints (Voghouei *et al.* 2011). On the other hand, with efficient technology, an open trading regime and high volume of trade increases the pay-off to financing entrepreneurs and fosters the formation of active capital markets (Ginebri *et al.* 2001).

Gwama (2014) observed that the traditional endowments theory and financial openness do not explain financial development in African countries. Inequality is also detrimental to financial development, while trade openness and remittances are both individually positively linked to financial development (Gwama 2014). For remittances, the impact could be understated as research shows that a large volume of remittances is not channelled through the formal sector (Gupta *et al.* 2009).

The ultimate goal of all economies is to have high economic growth that drives sustainable development. How financial development is linked to economic growth has always been a highly debatable issue. Whilst general observations are that countries that are financially developed have high economic growth, the same cannot be said about countries with low financial development. Besides, even for financially developed countries, it does not necessarily follow that growth is driven by financial development. The finance-growth relationship in any country remains ambiguous until empirically proven. The following section describes the theoretical basis of the finance-growth relationship.

3.2.3 Theoretical literature on financial development and economic growth

Literature on the relationship between finance and economic growth dates back to the early twentieth century and can be traced back to Schumpeter, 1911 (Nyasha & Odhiambo 2014). The Schumpeterian perspective is that entrepreneurs require finance to be able to adopt new production techniques (Ang 2008). Schumpeter also observed that financial markets channel funds to the most efficient investors that foster entrepreneurial innovation for economic growth (Kagochi, Nasser & Kebede 2013). Notable early works on finance and development that

follow the Schumpeterian argument include Gurley & Shaw (1955), Goldsmith (1969) and Hicks (1969). They argued that development of a financial system is crucially important in stimulating economic growth. Financial development improves the efficiency of resource allocation, promoting productivity growth and long-run economic growth (Kim, Lin & Suen 2012). The development of the financial sector in developing countries is a development strategy that can stimulate economic growth and reduce poverty (Kagochi *et al.* 2013).

A different strand of the theory that positively links finance and growth emerged in the early 1990s. These models postulated that financial development reduces informational frictions and improves resource allocation efficiency (Ang 2007). Literature on these endogenous growth revealed that the increase in growth rates can be sustained and the rate of technological progress is endogenously determined (Eschenbach 2004). Whilst the McKinnon-Shaw models highlight the role of financial development in the process of economic growth, the endogenous models show reciprocal interactions between financial development and growth (Ang 2007).

The following subsections present a review of the causality and criticism of the finance-growth relationship, as well as literature on the impact of financial reforms.

a)   Causality link between financial development and economic growth

The theories reviewed in the section above confirmed the existence of a relationship between financial development and economic growth but not the direction of causality. The direction of causality between financial development and economic growth has significantly different implications for the development of policy (Nyasha & Odhiambo 2014). Economists hold different views about the impact of finance on long-run economic growth. There are three possible causal relationships between financial development and economic growth: supply-leading or finance-led growth, the demand-following or growth-driven finance and the two-way causal relationship.

Proponents of the finance-led growth hypothesis, including King and Levine (1993), Rajan and Zingales (1998) postulated that financial development has a stimulating impact on the economy. This view was supported by Schumpeter who emphasised the role of financial institutions as necessary for economic development. Goldsmith (1969), McKinnon (1973) and Shaw (1973), also emphasised the proactive role of financial services in promoting economic growth. The hypothesis holds that financial development promotes growth through efficient allocation of capital, mobilisation of savings and lowering of cost of information gathering (Akinlo & Egbetunde 2010). The supply-leading finance transfers resources from non-growth

sectors to high-growth sectors and exerts a positive influence on capital by efficiently allocating new investments among alternative uses (Nyasha & Odhiambo 2014).

Initiatives towards enhancing financial intermediation, promoting financial inclusion and increasing finance to SMEs in SADC strengthen the role of finance in economic activity. These developments lend support to this hypothesis, justifying the need for a review of the finance-growth nexus in SADC.

In contrast to the finance-led growth hypothesis, Robinson (1952), Kuznets (1955) and Stem (1989) argued that an increase in growth generally leads to increased financial development. The demand-following hypothesis suggests that demand for financial services resulting from economic growth supports financial development (Chowa & Fung 2013). Robinson theorised that finance responds to economic growth as a result of higher demand for financial services (Ang 2007). The rationale is that economic growth generates increased demand for financial instruments and financial markets grow as they respond to this demand (Akinlo & Egbetunde 2010). Economic progress makes any existing financial system less effective (Michalopoulos, Laeven and Levine 2013). Without continuous development of the financial system, the quality of financial services declines, thus slowing down economic growth (Levine 2010).

Fundamentally, in some countries of the SADC, growth has been driven by resources, which in turn could be driving financial development, supporting this hypothesis. However, the developments in the financial sectors of SADC countries in the past decade could be contrary to this theory.

The two-way causal relationship recognises the bi-directional causality relationship between finance and growth. Financial market develops in response to economic growth, and financial markets in turn generate feedback effects that propel real growth (Lewis 1955). Studies by Abu-Bader & Abu-Qarn (2008), Wolde-Rufael (2009) and Kara, Nazlıoğlu & Ağır (2010) acknowledged the existence of this type of relationship. The bi-directional relationship theory is supported by a number of endogenous growth models (Chowa & Fung 2013). The direction of causality between financial development and economic growth changes over the course of development (Patrick 1966). Financial development induces real capital formation in the early stages of economic development but gradually diminishes and eventually becomes responsive to economic growth (Calderón & Liu 2003). Nyasha and Odhiambo (2014) concluded that the supply-leading pattern precedes the demand-following pattern in the different stages of economic development.

Most finance-growth studies, including those of Levine (2005), Chowa and Fung (2013), Odhiambo (2008), Zhuang, Gunatilake, Niimi, Khan, Jiang, Hasan, Khor, Lagman, Martin and Huang (2009), however, followed a Schumpeterian view of financial intermediaries being agents that drive investment and growth. Financial systems ameliorate market frictions, thereby influencing saving rates, investment decisions, technological innovation, and hence long-run growth rates (Levine 2005). Conventional knowledge has been in favour of the supply-leading response, where the development of the financial sector is expected to lead the development of the real sector (Odhiambo 2008).

The level of financial development of a country matters for the finance-growth nexus and the relationship may depend critically on the level of a country's development (Cheng, Ho & Hou 2012). Economic literature supports the premise that performance, long-run economic growth and welfare of a country are related to its degree of financial development (World Economic Forum 2011). Theoretically, the finance-growth relation tends to be weaker in the early stage of development than in the later stage (Acemoglu & Zilibotti 1997). A higher level of financial development ensures availability of financial services that allows the diversification of risks, increasing the long-run growth trajectory of a country (World Economic Forum 2011).

b)   Criticism of the positive finance-growth relationship

The positive role of financial development in economic growth has been questioned and not all researchers are convinced of the importance of financial systems. Lucas (1988) dismissed the importance of financial development as a precondition for economic growth. McKinnon (1973) and Shaw (1973) criticised the role of financial intermediaries and financial markets in the development process. The McKinnon model assumes that investment in a typical developing economy is mostly self-financed (Ang 2008). Shaw (1973) postulated that financial intermediaries promote investment and raise output growth through borrowing and lending.

Modigliani and Miller (1958) postulated that real economic decisions are independent of financial structures. However, the 2008 financial crisis had a negative impact on economies, a development that exposes deficiencies of the Modigliani & Miller (1958) theory. Pan and Wang (2013) cited the U.S. financial crisis of 2007-2009 as an example of financial system malfunctions where growth-retarding impacts of financial development exist. The level of financial development also affects the extent of negative effects of financial crises on economic development. Research findings of Lartey & Farka (2011) revealed that countries with better

developed financial systems are more adversely affected by crises than those with underdeveloped financial systems.

c)   Financial reforms and economic growth

McKinnon (1973) and Shaw (1973) are among the first renowned scholars to raise an argument against financial repression, putting forward a case for financial reforms. They pointed out that financial repression is a major source of financial sector under-development, which in turn hinders growth. Reforms of financial markets include policies aimed at supporting higher economic growth (Bumann, Hermes & Lensink 2012). Financial reforms have had double edged effects on economies, of either supporting financial development or spreading financial crises (Tyavambiza & Nyangara 2015).

In the SADC region, the major financial reforms implemented in the 1980s and 1990s were mostly financial liberalisation. Financial liberalisation was part of economic structural adjustment programs prescribed by the IMF for purposes of driving growth through private sector development in most SADC countries. Financial liberalisation includes official government policies that focus on deregulating credit as well as interest rate controls, removing entry barriers for foreign financial institutions, privatising public financial institutions and removing restrictions on foreign financial transactions (Bumann *et al.* 2012).

Debate on the impact of financial reforms or financial liberalisation on development is as inconclusive as the debate on finance-growth relationships. There are arguments for and against the positive role of financial liberalisation on economic growth. Reforms enhance growth by promoting financial innovation and efficiency and competition in the banking industry (Moyo *et al.* 2014). Liberalisation holds that it increases the amount of resources, reduces the cost of debt; create competition that brings in efficiency, leading to a rise in investment and growth. On the contrary, financial liberalisation may worsen asymmetric information in the financial sector and create competition that increases financial fragility of financial intermediaries such as banks (Moyo *et al.* 2014).

3.2.4   Financial innovation

Conceptually, innovation is the use of technological or market knowledge to offer a new product or service that the customer wants (Utterback & Afuah 1998). Financial innovation refers to technological advances that facilitate access to information, trading and means of payment (Solans 2003). Financial innovation is thus primarily defined as product and

organisational innovation, which allows cost or risk reduction for the single bank and/or an improvement of the services for the financial system as a whole (Arnaboldim & Rossignoli 2009). The Bank of International Settlement developed a three-fold classification system for financial innovations: namely risk-transferring innovations; liquidity-enhancing innovations and equity-generating innovations (Mishra 2007). Financial innovation can be broadly classified into, process innovation, organisational innovation and product innovation (Vargas 2007).

Financial innovation, as a component of financial development, has a linkage with economic growth. Whether the linkage has related or varying effects on economic growth such as that of financial development is worth exploring. The following section presents theoretical arguments on the relationship between financial innovation and economic growth.

3.2.5   Theoretical literature on financial innovation and economic growth

Financial innovation has been an integral component of economic activity for several millennia (Laeven *et al.* 2015). Joseph Alois Schumpeter, in his seminal work 'Theory of Economic Development' in 1912, highlighted the crucial role of financial intermediaries in innovation and economic development (Mishra 2008). Models of economic growth, however, generally ignore financial innovation and instead regard the financial system as given and inert (Michalopoulos *et al.* 2009). The New-Growth Theory regards innovation merely as a function of capital, labour and knowledge inputs (Block 2002). Michalopoulos *et al.* (2009) developed a model that explained the financial innovations-growth relationship. Their model deduced that economies without financial innovation will stagnate, irrespective of the initial level of financial development.

Innovation is a key element for sustaining economic growth and institutions, laws, regulations and policies that impede financial innovation slow technological change and economic growth (Laeven, Levine & Michalopoulos 2015). Available literature confirms that financial innovation drives economic growth (Lumpkin 2010 and Sekhar 2013). Laeven, Levine and Michalopoulos *et al.* (2015) stated that financial innovation has been a driving force behind financial deepening and economic development over the past centuries. Innovation is a double edged-sword (Arnaboldi & Rossignoli 2013) with a 'good' and a 'bad' side (Beck *et al.* 2014). Arguments on the good and the bad side of financial innovation are detailed below:

- *The good side of financial innovation*

The right kind of innovation spurs banks on to invest in new technologies that would enable the financial system to fulfil its intermediation role and, consequently, deliver growth (Arnaboldi & Rossignoli 2013). Financial innovation can contribute significantly to infrastructure investment; financial inclusion (for example, mobile banking in Kenya and Philippines); mobilisation of funds; and the strengthening of overall financial regulation that support economic growth (Morgan 2010). Product and service delivery innovations contribute positively to regional GDP, investment and gross savings growth (Valverde, Del Paso & Fernández 2007).

Financial innovation creates structures of financial markets that can promote economic growth by enabling economic agents to diversify their portfolios and meet their liquidity requirements (Ho 2006). Finance influences long-run growth by affecting the risk of investing in high-return projects (Michalopoulos *et al.* 2011). Financial innovations mobilise financial surpluses from ultimate savers and channel it to the most productive investment avenues thereby raising capital accumulation, and hence economic growth (Mishra 2007).

The World Economic Forum (2012) argued that 'leapfrog" (financial) innovation is the key to success in driving broad economic growth. Beddoes (2010), moderating an online debate organised by *The Economist* on whether financial innovation can boost growth or not, argued that the past few centuries demonstrated that financial innovation is crucial and indispensable for sustained economic growth. Arguing for the motion, Levine (2010) added that the adaptation of corporate financing techniques had greased the wheels of technological inventiveness underlying economic growth.

Financial innovations serve two purposes, to increase the variety of products offered by financial intermediaries and to foster the rate of technological progress (Chou & Chin 2004). Financial innovation is therefore critical if economies are to enjoy rapid rates of economic progress in the coming century (Lavine 2010). Figure 3.2 illustrates how financial and real technological innovations are linked to economic growth.

Figure 3.2: Levine's (1997) theoretical approach to finance and growth

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│  ┌─────────────────────┐    ┌─────────────────────┐   ┌──────────────────────┐ │
│  │ Market Frictions    │    │ Financial Markets and│   │ Financial Functions  │ │
│  │ -Information costs   │───▶│ Intermediaries      │──▶│ -mobilise savings    │ │
│  │ -Transactions costs  │    │                     │   │ -allocate resources  │ │
│  └─────────────────────┘    └─────────────────────┘   │ -exert corporate     │ │
│                                                        │  control             │ │
│                                                        │ -facilitate risk     │ │
│                                                        │  management          │ │
│                                                        │ -ease trading of     │ │
│                                                        │  goods,              │ │
│                                                        │  services and        │ │
│                                                        │  contracts           │ │
│                                                        └──────────────────────┘ │
│          ┌─────────────────────┐          ┌──────────────────────┐              │
│          │                     │◀─────────│ Channels to growth   │              │
│          │      Growth         │          │ -capital accumulation│              │
│          │                     │          │ -technological       │              │
│          └─────────────────────┘          │  innovation          │              │
│                                            └──────────────────────┘              │
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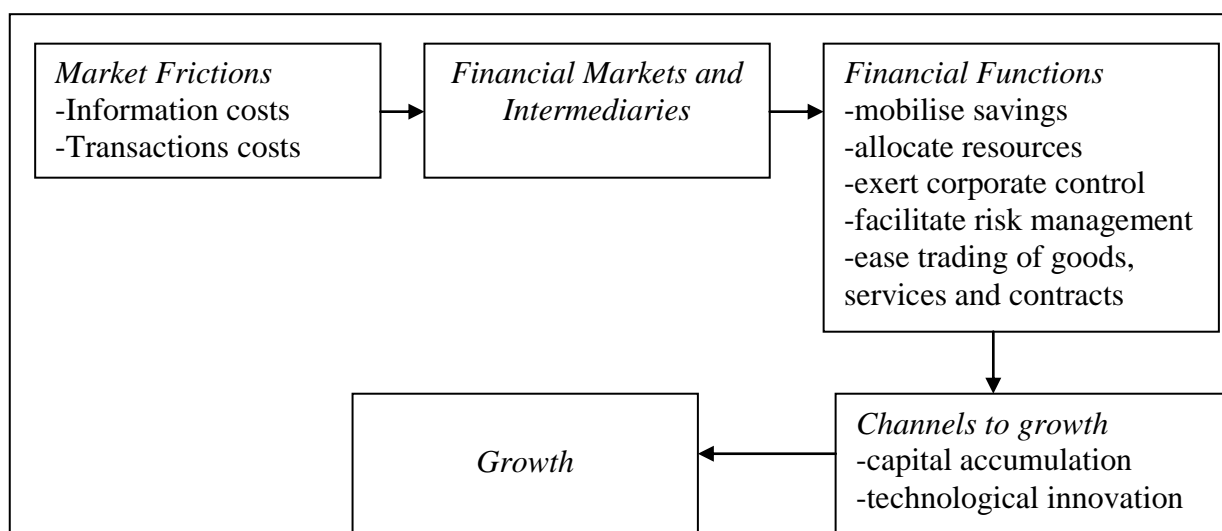
Source: Chou & Chin (2004)

Financial innovation raises the efficiency of financial intermediation by increasing the variety of financial products and services resulting in capital accumulation, from improved matching of the needs of individual savers with those of firms, leading to economic growth (Chou 2007).

- *The "Dark side" of financial innovation*

Financial innovation is, however, associated with higher growth volatility among industries that are highly dependent on external financing and innovation (Beck *et al.* 2012). Too much of innovation or innovation that is not properly used can have serious consequences for the overall economy (Stiglitz 2010; Beck *et al.* 2012). Allen (2012) and Llewellyn (2007) believed that the Global Financial Crisis of 2007 was caused by financial innovation. Allen (2011) stated that securitisation and sub-prime mortgages may have exacerbated the problem. Llewellyn (2007) added that financial innovation is the 'ultimate' cause of the crisis.

Financial innovation can introduce complexity to exploit uninformed investors (Henderson & Pearson 2011). Modern financial innovation process results in increased product and institutional complexity, and increased market fragility (Gubler 2011). While financial innovation is often beneficial, in many occasions structured equity products are significantly overpriced in order to extract money from investors (Allen 2012). Paul Volcker, former chairman of the Federal Reserve and an advisor to President Obama, claimed that there is 'very little evidence' that massive financial innovation in recent years has done anything to boost the economy. Beddoes (2010), in *The Economist* online debate, mentioned that the last few years demonstrated that financial innovations can be used as tools of economic destruction. Stiglitz

(2010) noted that some recent financial innovative products have increased problems of information asymmetry, including moral hazard and contributed to the current economic crisis.

The next section of the reviewed literature considers the role of space in the finance-growth relationship. Introducing geography in financial development, particularly across countries or regions, brings a dimension of spatiality and spill-overs in financial development. The next section presents the theory on spatiality and spill-overs and their linkage to financial development.

3.2.6 Theory of spatial and spill-over effects

Economists interested in economic geography have sought to develop and explain spatial implications of economic activity (Clark 2001). The role of spatiality should be viewed in terms of the geographical aspects of economic development, as well as the spatial dimension of economic activities (Gál 2015). Spatial proximity refers to the geographical distance between entities and it stimulates personal contact, fosters knowledge transmission and collective learning processes (Grote, Harrschar-Ehrnborg & Lo 2000).

Space can be a source of economic advantage (or disadvantage) such as high (or low) endowments of production factors and easy (or difficult) accessibility. Spatial proximity also generates economies of scale that reduces production and transaction costs (Capello 2011). Proximity takes many forms including spatial, cultural, organisational and vocational (Grote, Harrschar-Ehrnborg & Lo 2000). Diffusion of ideas depends on physical proximity, technological specialisation, the stage of economic development and labour mobility among other factors (Benos, Karagiannis & Karkalakos 2015).

There are overlaps between the disciplines of economic geography and finance (Clark 2001). Financial geography demonstrates the importance of location in the conduct of financial transactions and markets. It also shows dispersion, concentration of financial decision-making and the allocation of finance across markets (Zoltán 2013). Location decisions for financial markets have a deliberate geographical rationale (O'Brien & Keith 2009). The implication is that regions and locations that do not have globally accepted financial centres and that are remote from them are at a disadvantage in accessing finance (Zoltán 2013).

One of the salient features of a country's financial development is its ability to generate positive spatial externality to neighbouring countries (Mobolaji 2010). The financial sector has a contagion effect beyond a country to other economies (Baltagi *et al*. 2007). Inefficiencies in

the financial sector (including imperfect competition, high transaction costs, asymmetric information between investors and savers), pervasive risk and uncertainty justify spatial consideration in the financial markets (Klagge & Martin 2005). Geographical closeness to a more financially developed country may generate positive and negative spatial externalities to the neighbours (Mobolaji 2010). Positive externalities are in the form of technology transfer, information sharing, efficiency, reduction of transaction cost, risk sharing, and enhancement of liquidity (Mobolaji 2010). Negative spatial externalities include crowding-out of the domestic financial sector of the recipient country due to competition (Mobolaji 2010).

There are, however, arguments that trivialises the importance of geography in finance. Zoltán (2013) pointed out that technology and innovation are reducing the role of spatiality in finance. The central hypothesis of 'The End of Geography' formulated by O'Brien (1990), states that geographical location no longer matters in finance or matters much less than hitherto (O'Brien & Keith 2009). Globalisation and new ICTs are creating spatially unbounded financial flows, increasingly rendering geography and location irrelevant in financial markets (Zoltán 2013). The revolution in information and communications technology and of deregulation makes geography less important in finance. O'Brien & Keith (2009) added that despite the fact that many location decisions have a deliberate geographical rationale, money, being fungible, will continue to avoid the confines of geography.

- *Spill-overs*

Related to the concept of spatiality is the issue of spill-overs. Regional economists and economic geographers popularised the concept of spatial spill-overs in acknowledgement of the dynamics and strategic role played by locally bounded and territorially rooted interactions (Capello 2009). Spill-overs are important for growth, as they exist not only within but also across economies (Benos *et al.* 2015). Cross-border spill-overs occupy an important place in the international finance literature (Gębka & Serwa n.d.). A large variety of spatial spill-overs has been identified by the literature, including knowledge, industrial and growth spill-overs. Spatial spill-overs represent pure externalities, producing non-compensated advantages for receivers (Capello 2009).

Shinagawa (2014) defined financial market spill-overs as the co-movement between two countries' financial markets. An alternative, less standard definition of financial spill-overs encompass the direct impact of country-specific developments on financial markets elsewhere (IMF 2016). Financial market spill-overs can also be thought of as the correlation between two

countries' financial market returns (Shinagawa 2014). Beaton & Desroches (2011) suggested that increased trade and financial liberalisation have resulted in pronounced co-movement of output, inflation, and interest rates across countries. Although the real linkages between countries, particularly through trade, are well understood, there is need to develop a complete understanding of the financial linkages across countries (Beaton & Desroches 2011).

The transmission mechanisms through which fundamentals in one financial market affect other markets are dependent on the inter-linkages of markets. The IMF (2016) acknowledges that financial market integration strengthens the importance of financial factors in explaining spill-overs relative to trade linkages. Spill-overs increase between countries that have similar macro-financial fundamentals and are strongest within sectors (IMF 2016). Possible channels through which financial market spill-overs occur include bilateral portfolio investment, bilateral trade, geographical preference of portfolio investment, and country concentration (Shinagawa 2014). Nissanke (2009) indicated that the transmission channels of the global financial crisis of 2007 for emerging market economies were mainly currency depreciation, stock market prices, bond and debt financing, syndicated loans and private debt and equity capital flows. For low-income developing countries, the global financial crisis transmitted through price movements on commodity markets, availability and cost of trade finance and a marked reduction in remittance flows (Nissanke 2009).

For individual countries, monetary policy transmits through interest rates, the exchange rate and credit (Christensen 2014). Inefficiencies in financial intermediation by banks, imperfect competition and improper intermediation of funds in low income countries lead to the impairment of these transmission channels (Mishra, Montiel & Spilimbergo 2010).

Financial development in one region/province may have spill-over effects for neighbouring regions/provinces (Yildirim *et al.* 2006). A deterioration of financial conditions may affect the economy through a decline in consumption and investment, or through credit rationing (Ciccarelli, Ortega & Valderrama 2012). Financial linkages, as measured by exposure to a financially developed economy, also seem to exert an effect on cross-country correlation as trade or macroeconomic linkages (Baldacci, Dell'Erba & Poghosyan 2011). Cross-border market linkages increase the likelihood for shocks in a financially developed country to be transmitted internationally (Angkinand *et al.* 2009). The channels which create macro-economic and financial linkages can enhance spill-overs across economies (Ciccarelli *et al.* 2012).

The 2007/2008 global economic crisis generated increased interest in understanding the extent to which the interdependencies in trade and financial linkages among countries contribute to spill-over effects (Angkinand *et al.* 2009). The time structure of spill-overs sheds new light on the assimilation of shocks and time-varying patterns of cross-country return causality (Gębka & Serwa n.d.). Macroeconomic policy makers and investors are equally concerned about the existence of the inter-market linkages as they are about sudden breaks in these linkages, caused for example, by currency crises (Gębka & Serwa n.d.). These cross-border market linkages have increased the likelihood for shocks in an economically and financially important country to be transmitted internationally (Angkinand *et al.* 2009).

Beyond spatiality and spill-overs, when geography and space are introduced in finance, the issue of distribution becomes critical. The distribution of financial development within a country or across countries has an element of spatiality. Different levels of financial development in different SADC countries imply the presence of concentration. The next section reviews the theory of financial concentration as one of the factors affecting financial development in the SADC.

3.2.7 Theory on financial concentration

Financial market concentration is the degree to which the financial sector is controlled by the bigger institutions in the market, as defined by market share (IMF & World Bank 2005). For example, the three bank concentration ratio, measures the market share of the top three banks in a financial system in terms of assets, deposits, or branches (IMF 2004). Concentrated financial markets have a few large suppliers (Cetorelli, Hirtle, Morgan, Peristiani, and Santos, 2007).

Financial market concentration also has a spatial dimension as indicated by differences in terms of focus and levels of sophistication of financial institutions across a country's cities (or administrative regions) and across countries within a regional economic bloc. Geographical or spatial concentration measures the geographical distribution of a sector in a territory (Ceapraz 2008). A specific industry is considered to be concentrated if a greater part of the production (or service) is carried out in a reduced number of areas/countries within the same country/region (Ceapraz 2008). Spatial concentration, in the sense of geographical space, is highly used in urban economics, economic geography and international trade (Campante & Do 2008). Factors that determine the spatial concentration in the financial industry revolves around

agglomeration effects, externalities and the benefits of clustering of an industry. Spatial concentration in the financial sector emphasises the importance of local embeddedness, networks, face-to-face communication, knowledge spill-overs, and spatial proximity (Palmberg 2012). Expansion of banks into other financial activities also contributes to concentration in the sector (D'Arista 2009).

Financial market concentration could also be viewed in-terms of the structure of the financial system where the system could be dominated by one type of financial system (that is either bank or market based). In most SADC countries, the financial systems are dominated by banks, with minimal development of non-bank financial institutions. Furthermore, within the banked based financial systems, the sector is again dominated by a few banks, mostly foreign banks. As such, in the SADC context, and for purposes of this study, financial market concentration could be viewed in tandem with or as analogous to bank concentration.

In the financial sector, concentration can be institutional concentration, where a few institutions account for a high proportion of the resources of any given financial sector, or asset concentration (D'Arista 2009). Concentration in the financial industry has implications for financial sector efficiency, bank stability, industrial competitiveness, and the policies, regulations (Demirguc-Kunt & Levine 2000).

Financial market concentration comprises of benefits as well as costs in the development of the financial sector and this dilemma provoked contrasting opinions regarding effects of concentration in financial sectors. On one hand, financial concentration intensifies market power and thereby stalls competition and efficiency (Demirguc-Kunt & Levine 2000). Concentration in the credit market introduces inefficiencies that reduce access to credit, thus hindering growth (Law & Abdullah 2006). Failure to curb concentration undermines systemic efficiency through reduction in credit availability, uneven distribution of credit, decline in support for small innovative companies and the negative implications for the conduct of monetary policy (D'Arista 2009).

On the other hand, economies of scale drive bank mergers and acquisitions, so that increased concentration goes hand-in-hand with efficiency improvements (Demirguc-Kunt & Levine 2000). Some degree of monopoly power in banking, brought by institutional concentration, is natural and beneficial (Law & Abdullah 2006).

Globally, financial concentration is evident. The world over, financial sectors are characterized both by globalisation and by spatial relationships and local embeddedness (Agnes 2000). In 2009, the ten largest stock exchanges in the world accounted for 86 per cent of the total value of shares traded (World Federation of Exchanges). This spatial concentration of the financial activity can also be seen in financial sectors of trade blocs and economic unions as well as in in-country financial sectors (Palmberg 2012).

All countries are directly and indirectly affected by development in the global financial markets. As such, a review of theory on global finance and international financial centre becomes apparent. The discussion on global finance and international financial centres is in line with the last objective of the study where the study intends to evaluate the effects of global finance on financial development in the SADC region and the impact of international financial centres on financial development in the SADC region. The next section provides theory on global finance and international financial centres.

3.2.8 Theory on global finance and financial development

The role of global finance on financial development of developing countries is well documented. Global non-bank financial markets and institutions can drive competitiveness of banking sectors in developing countries (Obstfeld 2007). Investment structures and financial intermediation available in IFCs help domestic and foreign investors in developing countries access efficient institutions, which are often unavailable locally (Sharman 2009). For foreign investors, IFCs ease the path of entry into developing countries. The City of London (2011) reported that firms located in eight major International Financial Centres account for the bulk of financial service provision in the EU.

Domestic financial development makes capital inflows from abroad more productive and over the longer term, an internationally open financial system is likely to be more competitive, transparent, and efficient (Obstfeld 2007). Although African (SADC included) countries are known for poor regulatory systems, there has been increased participation in anti-money-laundering and combating the financing of terrorism and increased adoption of Basel global banking standards (Adam, Laydjiev, Jones & Zeitz 2015). Regional and pan-African banks have expanded rapidly, presenting opportunities to increase financial depth, banking efficiency and availability of long term finance (Adam, Laydjiev, Jones & Zeitz 2015). Financial globalization can lead to huge benefits in the long-run, particularly to the development of the financial system (Obstfeld 2007).

The downside of global finance to developing countries is that it exposes the countries to financial crises, volatilities and contagion of global financial markets (Schmukler 2004). Developing countries do not have absorption mechanisms to deal with effects of crises and volatility of markets. International standards on anti-money laundering and combatting financing of terrorism is leading to a withdrawal of correspondent banking and having a dampening effect on capital flow and remittances (Adam, Jones and Woods 2015). African regulators fall under the risk of being pressured to implement standards too quickly and in ways they consider suboptimal (Adam, Jones & Woods 2015). Growth in regional banks also carries the risk of being an additional channel for contagion in case of crises and pauses regulatory concerns on systemic risk and money laundering (Adam, Laydjiev, Jones & Zeitz 2015).

3.2.8.1 International global financial centres

Access to global finance, outside development assistance, is normally through financial centres. Financial centres are geographical locations with agglomeration of branches and subsidiaries of financial intermediaries (Gehrig 2000). Financial centres provide an interface between banks across time, space, currency and risk (Michie 2012). Financial centres have existed throughout history from ancient, nearly legendary, entre-ports such as Babylon, Samarkand, Constantinople, Marrakech or Timbuktu through to London, New York, Paris, Tokyo or Shanghai (Yeandle, Mainelli & Berendt 2005). The hierarchical structure of the financial sector is an important characteristic of financial centres (Palmberg 2012). Reed (1981) identified five distinctive categories from centres that serve a city, province, and nation to those that provide international services to contiguous countries (regional centres) to global financial centres.

An International Financial Centre (IFC) is a country or jurisdiction that provides financial services to non-residents on a scale that is incommensurate with the size and the financing of its domestic economy (Thomas, Panesar & Makris 2013). International financial centres (IFCs) are countries and territories with low tax rates and other features that make them attractive investment locations (Hines 2009). A global financial centre is a place (city) where a business is conducted between organisations from all over the world, using financial instruments from all over the world (Yeandle, Mainelli & Berendt 2005).

The first precondition for financial centre development is to form information hinterland and heartland in which financial firms can find the most accessible point for the exploitation of

information flows (Zhao 2003). Developing a financial centre involves building sophisticated human and institutional infrastructure, management of demand and supply of financial services, support of the entire range of financial institutions and participation of domestic and international entities (Thomas, Panesar & Makris 2013). Scale of economies, economic development, international trade, history, transportations and communications all contribute to the development of international financial centres (Michie 2012).

Zhao (2010) identified three strands of theories to explain development of financial centres. First is the geography of finance theory that deals with the location of transactions (information centres) instead of economic production (economic hinterland) (Gordon 2002). Second is the law and finance theory that explains financial centre development from the Anglo-American and the Continental European legal systems (Zhao 2010). Third is the time zone theory that defines the segmentation of global markets along time zones (Poon et al. 2003 and Wójcik 2009). The International Financial Centres Development (IFCD) Index for 2014 reports that technology, especially emergence of real-time telecommunications networks, is bringing challenges to the traditional financial system.

3.3   Empirical Evidence

The empirical literature reviewed in this section comprises studies conducted on the major conceptual issues outlined under theoretical review. The section concludes with the observations by the researcher which reveals the knowledge gap that the study attempts to fill.

3.3.1   Financial development and economic growth

Empirical evidence shows that a more developed financial system is associated with higher rates of economic growth, although the nature of any causal relationship is disputed (Lawrence & Longjam 2003). Studies based on industry or firm level data found a positive impact of financial sector development on economic growth (Morgan 2010). The depth of the financial sector has a positive and statistically significant effect on economic growth and is greater for developing countries than for developed countries (Zhuang *et al.* 2009).

Calderón and Liu (2003), employing the Geweke decomposition test on 109 developing and industrial countries, showed that financial development leads to economic growth and that a bi-directional Granger causality exists. Cojocaru, Hoffman and Miller (2013) applied the difference-GMM estimation and found a positive effect of credit to the private sector on growth in former Communist countries of Central and Eastern Europe and the Commonwealth of

Independent States. Caporale *et al.* (2009) found that causality ran from financial development to economic growth in ten new EU members by estimating a dynamic panel model over the period 1994-2007.

A number of studies on the finance-growth mix have been conducted for various Sub Saharan African countries. Research by Ghirmay (2004), Abu-Bader and Abu-Qarn (2008) and Agbetsiafe (2004) provided evidence in support of finance-led growth, whilst Baliamoune-Lutz (2008) obtained mixed results for North African countries. Odhiambo (2007) found evidence in support of demand-following hypothesis in Kenya and South Africa and in support of a supply-leading hypothesis in Tanzania. Adusei (2013) found a positive relationship between finance and economic growth and a bi-directional causal relationship between finance and economic growth in 24 African countries (1981-2010) using a dynamic GMM Model.

Country size and the level of development of the financial sector matter in the finance-growth nexus. There is no positive correlation between financial depth and economic growth in countries with very large financial sectors but a positive and robust correlation for countries with small and intermediate financial sectors (Arcand 2013). Barajas, Cham & Yousefi (2012) established that the effect of financial deepening on economic growth is generally smaller in certain regions (such as the Middle East and North Africa) and in low-income countries.

The choice of proxy variables also has a bearing on the direction of causality. Adam and Siaw (2010) showed that causality ran from economic growth to financial sector development for credit to private sector, and bi-directional causality for bank liquid reserves (asset ratio) and liquid liability in Ghana between 1970 and 2007. Ayadi *et al.* (2013) found that credit to the private sector and bank deposits are negatively associated with growth, whilst stock market size and liquidity play a significant role in the growth of northern and southern Mediterranean countries for the years 1985 to 2009.

In the SADC, studies on the finance growth are few, more so those that consider the role of financial reforms. In the following sections the empirical literature on SADC as well as the impact of financial reforms on growth is reviewed and a summary analysis of models used in the finance-growth empirical analysis is provided.

a)   Financial development and economic growth in SADC

There is limited empirical evidence on finance-growth relationships in the SADC countries. Phakedi (2014), using Fixed-Effects; GMM, and Seemingly Unrelated Regression Estimators

(SURE) found that money supply and credit are negatively related to economic growth in 14 SADC countries (1990-2012).

Le Roux and Moyo (2015) investigated the relationship between financial liberalisation, a key driver of financial development, and economic growth in SADC countries using GMM estimates. The results revealed a short-run positive relationship between financial liberalisation and economic growth in SADC countries, a result that is in contrast to Phakedi (2014).

Allen and Ndikumana (1998) investigated the role of financial intermediation in stimulating economic growth for members of SADC using the fixed-effects model and the two-stage least squares (2SLS). The results shows a long-run positive correlation between financial intermediation and economic growth for SADC members, lending some support to the hypothesis that financial development is positively correlated with economic growth as obtained by Le Roux and Moyo (2015).

Aziakpono (2004) studied the SACU area focusing on the relevance of domestic financial institutions in promoting economic growth after integration of financial markets, using the seemingly unrelated regression equations (SURE). The study found strong evidence of the relevance of domestic financial intermediation in promoting growth in South Africa, but weaker for Botswana and Lesotho.

b)   Financial reforms and the finance-growth nexus

Empirical evidence on the impact of reforms on growth produces equally mixed results. Tswamuno, Pardee and Wunnava (2007) found that liberalisation of capital accounts is necessary but not sufficient for economic growth in Sub-Saharan Africa (SSA). Misati and Nyamongo (2012) recognised the growth reducing effects of financial liberalisation dominance, and recommended institutional reform measures and managed financial openness for SSA countries. With liberalisation, the bank based nature of financial systems in SSA makes them vulnerable to systemic bank failures that would have a contagious effect on the economy (Moyo *et al.* 2014). Most SADC countries introduced financial reforms in the 1980s and 1990s through financial liberalisation, which enhanced development of their financial sectors (Kasekende 2010). Le roux and Moyo (2015) stated that financial liberalisation supports economic growth in SADC.

c)   Models used in financial development-economic growth analysis

Empirical literature shows that most studies on finance-growth in SSA either use the time series framework (Ghirmay 2004; Akinlo & Egbetunde 2010 and Ajakaiye 2005), or the panel data framework (Ishola 2008 and Hassan *et al.* 2011). Time series is more suitable for examining the general relationship between financial development and economic growth of one country. The panel data framework is more suitable for cross-country analyses. Use of panel data in estimating common relationships across countries is particularly appropriate because it allows the identification of country-specific effects that control for missing or unobserved variables.

Variation in the results of finance-growth studies is, to an extent, caused by the different models and estimation approaches used by researchers. Models used in the studies in SADC include the Fixed Effect Model, Generalised Method of Moments (GMM), Seemingly Unrelated Regression Estimators (SURE) and two-stage least squares (2SLS).

Le Roux and Moyo (2015) used the Fixed Effect Model (FEM), Generalised Method of Moments (GMM) as well as the Fully-Modified OLS (FMOLS) co-integration to get a short-run positive relationship between financial liberalisation and economic growth in SADC. Phakedi (2014) employed used the FEM; (GMM), and Seemingly Unrelated Regression Estimators (SURE) for SADC member states and established that the financial sector is important for growth generally and specifically in SADC. Allen and Ndikumana (1998) utilise the fixed effect model and the two-stage least squares (2SLS) to get a long-run positive correlation between financial intermediation and economic growth in SADC countries. Aziakpono (2004) used the Zellner's SURE model in five SACU countries and established that domestic financial intermediation is still relevant in such financially integrated markets. In studies for other areas, Adusei (2013), Caporale *et al.* (2009), Beck *et al.* (2000) and Levine (1999) (1998) also used the GMM, Christopoulos and Tsionas (2004) employed the Fully modified OLS, whilst Akinlo and Egbetunde (2010) used the Vector Error Correction Model (VECM).

The review above shows extensive use of the GMM model to estimate dynamic panel models in finance-growth studies. The GMM has become an important estimation procedure in many areas of applied economics and finance since Hansen introduced the two step GMM in 1982 (Chausse 2010). Arcand (2012) observed that the GMM technique is increasingly applied to macro panel data, and in the area of financial development and growth. This current study follows suit in the use of GMM estimations. A full discussion of the finance-growth estimation model and an elaborate discussion of GMM are presented in Chapter Four.

3.3.2 Financial innovation and economic growth

Empirical evidence on the relationship between financial innovation and economic growth is limited despite the increasing importance of innovation in financial services. The available empirical evidence shows existence of a relationship between financial innovation and economic growth. Financial innovation can lead to a higher level of savings, capital accumulation and hence a higher level of economic growth (Mishra 2007). Valverde *et al.* (2007) found a positive relationship between product and service innovations and regional gross domestic product, investment and gross savings in Spain.

Laeven, Levine and Michalopoulos (2015), extended the Aghion, Howitt, Mayer-Foulkes Model, to allow financial and technological entrepreneurs to interact to shape economic growth. The authors highlighted the vital role of financial innovation. They concluded that innovation is a key element for sustaining economic growth and that institutions, laws, regulations and policies that impede financial innovation slowdown technological change and economic growth (Laeven, Levine & Michalopoulos 2015).

Amore, Schneider and Zaldokas (2013) showed that exogenous increases in bank credit across the states of the United States spurred innovation in non-financial firms. Bassa (2013) acknowledged that financial innovation has a clear incidence on highly financially dependent economies. In contrast to the above findings, Beck *et al.* (2012) using bank, industry and country level data from 32 (mostly high income) countries for 1996 and 2006, found that financial innovation is associated with higher growth volatility among industries that are more dependent on external financing and innovation.

In Sub Saharan Africa, the few studies on the relationship between financial innovation and economic growth are confined to individual countries. Idun and Aboagye (2014) found that a negative relationship exists between financial innovation and economic growth in the long-run, and a positive relationship in the short-run in Ghana. The results also show a bi-directional Granger causality between financial innovation and economic growth. Mwinzi (2014) in a study on Kenya established that financial innovation has a significant, positive impact on economic growth with mobile transactions having a major impact. Attempts have also been made to relate financial innovation to money demand (Kasekende 2013 and Mannah-Brankson *et al.* 2004) and to savings (Ansong, Marfo-Yiadom & Asmah 2011). In both cases financial innovation was found to have had a positive relationship to the variables.

Notwithstanding the evident relationship between financial innovation and economic growth, there is deficiency of such empirical evidence for SADC countries. There are no studies, known to the researcher, that have attempted to assess the relationship between financial innovation and economic growth in SADC.

d)   Models used in financial innovation-economic growth analysis

Perusing the models used in the empirical literature reviewed shows that studies used the General Methods of Moments (Valverde *et al.* 2007), ARDL co-integration procedures (Idun & Aboagye 2014), and coded questionnaires (Mwinzi 2014). Of note is that, apart from Laeven, Levine and Michalopoulos (2013), studies were stemming from generic models that do not specifically isolate financial innovation. Laeven, Levine and Michalopoulos (2013) tested the role of financial innovation on endogenous growth by extending the model developed by Aghion, Howitt and Mayer-Foulkes (AHM model). The key strengths of the extended AHM model are two fold, firstly the model focuses on the role of financial innovation in economic growth and secondly, the model separates the impact of financial innovation from that of financial development. As such, the extended AHM model captures the required impact of financial innovation and economic growth and would be adopted for this current study. Extensive discussion of the AHM model is contained in Chapter Four. The following section reviews empirical literature on the spatial effect, spill-overs and financial development.

3.3.3   Spatial effect, spill-overs and financial development

Studies on spatial analysis have focused primarily on beta convergence of economic growth across countries or regions/states within a country with no consideration of the financial sector. Fernandez (2011) noted that although spatial phenomena has been extensively studied in various fields of research, the study of spatial linkages has essentially been overlooked in other sub-fields of economics and in the field of finance as a whole. The importance of spatial effects in convergence analysis has been ignored in financial development-economic growth literature (Yildirim *et al.* 2006). In the literature on finance development, emphasis is placed on the correlation between financial variables and the degree of development of the financial system. The issue of regional or geographical aspects of the financial system development have virtually been neglected (Crocco, Santos & Amaral 2010).

Mobolaji (2008) analysed the impact of spatial externality on financial development in SSA for the period 1970 to 2005 in a dynamic panel data framework. The study suggested that the

financial system is geographically sensitive and not immune to spatial externalities. Benos, Karagiannis & Karkalakos (2015) found that proximity has an effect on the capital and labour markets driven by dynamic interactions within and across economies of the European regions. Further, they found that spill-overs are enhanced as individuals learn from each other and when they live and work in close proximity. Crocco, Santos & Amaral (2010) using a GMM estimator for a spatial panel model, with an endogenous spatial lag and spatial moving average errors, find negative spatial association between the Brazilian municipalities' financial system. Putnam (2011) examined effects of externalities generated by institutions on the economic performance of neighbouring countries. The findings suggested that neighbouring institutions influence home growth rates, although the transmission channels of the spill-overs remained largely unobserved. Below is an exploration of empirical literature of spill-overs and a summarised examination of models used in the spatial spill-over empirical analysis contained in the literature reviewed.

a) Spill-overs

Globally, the impact of spill-overs in the financial area has mostly been analysed in stock and financial markets. Spill-over effects are highly pronounced during crises such as the recent global financial crisis. Spatial proximity, inter-connectedness of markets and financial linkages were the central transmission channels of the global financial crisis that also contributed to the spread of these financial stresses across borders (IMF 2013). Dell'Erba, Baldacci & Poghosyan (2013) used Spatial Autoregressive (SAR) model to explore spill-overs in the sovereign bond market for 24 emerging economies during the period 1995 to 2010. The study found strong evidence of spill-overs from both sovereign spreads and macroeconomic fundamentals in neighbouring emerging economies.

Fic (2013) examined spill-over effects of unconventional monetary policies adopted in developed countries and BRIC countries. The study found that the impact of quantitative easing on the developing economies varied across countries depending on scale of exposure to the developed countries and the stability of their financial systems (Fic 2013). Brugal (2012) finds higher connectedness among Latin America's Stock markets that produced volatility spill-overs with jumps in fragile periods and return spill-overs that are evolving gradually. Beaton & Desroches (2011) showed that shocks to U.S. financial conditions and output have financial spill-overs that are rapidly transmitted to Canada, with important implications for financial conditions. Ciccarelli Ortega & Valderrama (2012) investigated heterogeneity and spill-overs

in macro-financial linkages across developed economies and found evidence of spill-overs across countries and between real and financial variables.

There are no studies, known to the researcher, which attempted on assessing financial spill-over effects in the SADC region. In the absence of studies on financial spill-over effects, parallel will be drawn from studies on real spill-overs. Canales-Kriljenko, Gwenhamo & Thomas (2013), using panel estimations and vector auto regressions, found substantial spill-overs from South Africa into other SACU members, reflecting sizeable real and financial inter-linkages. The study also found that shocks to real GDP growth in South Africa do not systematically affect growth developments of all the SACU countries.

Kabundi & Loots (2007) used a Generalised Dynamic Factor model to investigate the nature and extent of co-movement of the South African business cycle with those of eleven of the SADC countries. The results showed evidence of strong and significant co-movement of the South African business cycle with those of Swaziland, Botswana, Zimbabwe, the DRC, Lesotho and Angola; moderate with Mozambique, Mauritius and Namibia and no significant co-movement with Malawi and Zambia. The results also indicated a high degree of correlation between South Africa's common GDP component and the common components of other countries (with correlation coefficients ranging from 0.59 to 0.99).

Basdevant et al. (2014) found no evidence of real growth spill-overs from South Africa to the rest of the continent over the period 1960 to 2009. Ruch (2013) pointed out that the South African economy was significantly affected by the financial crisis of 2008 through spill-overs. Arora & Vamvakidis (2005), using standard panel growth regressions, found positive and statistically significant spill-overs in long-term growth rates. The authors concluded that a one percentage point increase in South Africa's long-term growth rate is associated with a 0.5 to 0.75 per cent increase in long-term growth rates in the rest of Sub-Saharan Africa (Basdevant et al. 2014). The next section covers models used the models used in the spatial spill-over empirical analysis.

b)   Models used in financial spatial spill-over analysis

The reviewed empirical evidence reveals that estimations in spatial spill-over analysis require use of spatial models, as these have the capacity to include spatial variables. Ordinarily spatial analysis utilises spatial autoregressive models which examine the extent to which regional growth rates depend on the growth rates of adjacent regions (Yildirim *et al.* 2006).

Generally spatial models include the Spatial Autoregressive Model, the Spatial Error Model (SEM), the Spatial Panel Model (the Moving Average-Error Process) and the Spatial Durbin Model.

In the reviewed literature, Dell'Erba, Baldacci and Poghosyan (2013) used Spatial Autoregressive (SAR) models; Crocco, Santos and Amaral (2010) used GMM estimation on the Spatial Panel Model, and Spatial Moving Average Errors. Mobolaji (2008) used the Dynamic Panel Data framework. The major weaknesses of the three spatial models used in the reviewed literature is that they ignore spatial externalities working through the explanatory variables and that spatiality dependence is only in the dependent variable or in unobservable variables. The Spatial Durbin Model developed by Anselin (1988) addresses some of the weaknesses and criticisms of the SAR and SEM models. Although Mobolaji (2008) used a dynamic panel data framework on studies for Sub Saharan Africa, the results remain robust as elements of spatiality were retained in the model. The only shortcoming in the model used is that the researcher did not link the model to a spatial dynamic model.

This current study derives the estimations model from a spatial model in order to capture elements of spatiality in the explanatory variable. Also, spill-over analysis largely utilises Vector Auto Regressive (VAR) models to enable executing impulse response analysis and variance decomposition, as will be done in this study. Detailed analysis of the spatial models and the VAR models used in the current study is contained in Chapter Four. In Section 3.3.4 follows a discussion of empirical literature on financial concentration.

3.3.4   Financial market concentration

Within economic regions, financial concentration could be indicative of the degree of spread and distribution of financial services across countries, reflecting the extent to which the financial sector is dominated by a few financially developed countries in the region. Studies on concentration are mainly confined to bank concentration and mostly for individual countries. Studies on concentration in the financial sector are focused more on its effect on financial stability, efficiency and competiveness of the banking sector.

D'Arista (2009) observed that in the USA the top ten banks accounted for 26 per cent of total assets in 1984 but in 2008 five banks were controlling 97 per cent of the total amount of assets. Law and Abdullah (2006) examined the effect of bank concentration on financial development, using a cross-country analysis on 68 economies. The results suggested that concentration in the

banking industry is positively associated with financial development in lower middle-income and low-income countries. Beck, Demirgüç-Kunt and Levine (2004) found no support for the view that concentration increases the fragility of banks and concluded that banking system concentration is associated with a lower probability that the country suffers a systemic banking crisis. The study evidence suggested that concentrated banking systems have larger and better diversified banks. Fiordelisi and Cipollini (2009) did find a positive effect of bank concentration on financial distress of commercial banks in 25 EU countries. Findings by Bikker and Groeneveld (1998) on competitive structures in the banking industry in the EU supported the conventional view that concentration impairs competitiveness, and may eventually result in undesirable exercising of market power by banks.

Kassim (2010) assessed the link between banking systems concentration and banks' credit risk exposure for 138 commercial banks in SADC countries for the period 1999 to 2005. The results showed no significant influence of concentration on four measures of credit risk-taking behaviour. Okeahalam (2002) found that the banking sector in the Common Monetary Area (CMA) of Southern Africa is highly concentrated.

The majority of studies on spatial financial concentration in SADC are focused on banking concentration of individual countries. Literature, such as that of the OECD 2010, Okeahalam 2009; and Beck, Kunt and Levine (2003), on concentration in SADC countries, however, are mainly centred on concentration of the banking service in South Africa. For example, the banking sector in South Africa was found to be highly concentrated (Ben-Zekry 2007, Okeahalam 2002 and Beck, Kunt & Levine 2003). The IMF estimated that the level of bank concentration in South Africa was 77 per cent in 2011. The OECD (2010) found that in South Africa the commercial and retail banking industries have been highly concentrated since the early 1990s. Okeahalam (2009) found that aggregate income in a municipal area is a significant indicator of the spatial distribution of bank branches in South Africa.

Falkena *et al.* (2004) used the Herfindahl-Hirschman Index to determine the concentration in the sector in South Africa and found that the sector is highly concentrated. The same in-country approach used to empirically evaluate bank concentration can also be applied on assessing financial concentration in the SADC as a bloc. Given the dominance of South Africa in terms of financial development, *a priori* expectations are that the financial sector is highly concentrated around South Africa. However, South African financial institutions are spreading into other countries and concentration in the financial sectors of these countries is affected. In the process financial concentration is likely to be diluted. The Herfindahl-Hirschman Index

remains the index that is highly used to indicate concentration; this current study employs this model.

Beyond the issues of concentration, and in line with the last objective, this current study also empirically reviews literature on global finance and financial centres in Section 3.3.5.

3.3.5 Empirical literature on global finance and financial development in SADC

African countries registered a number of positive accomplishments in the last decade including, large-scale non-FDI cross-border capital inflows, rapid growth of regional and pan-African banks and expansion of mobile banking (Adam, Laydjiev, Jones & Zeitz 2015). The World Bank (2010) indicated that the financial boom in high income countries from 2000 to 2007, together with financial innovation, generated a reduction in the price of risk, expansion in domestic credit and a rise in foreign capital inflows in developing countries.

The consequent fall in the price of risk resulted increased net capital inflows, a fall in spreads on foreign debt by 488 basis points, a 5 per cent increase in domestic credit as a share of GDP and a fall in domestic interest rates (World Bank 2010). These developments were subsequently followed by tripling in the valuation of equities traded on developing-economy stock markets, increase in the supply of finance available to entrepreneurs, influx of new investments and adoption of newer financial technologies (World Bank 2010). For the Sub-Saharan Region, the World Bank (2010) reported that positive effects were registered mostly in countries connected to global financial markets. The financial boom triggered a seven percentage points increase in bank credit (relative to GDP), mainly reflecting a 12 percentage point rise in South Africa (World Bank 2010).

A number of SADC countries have accessed global finance through multilateral lending institutions; governments, aid and investment agencies as development finance (SADC-DFRC n.d). Development finance has created a problem of debt overhang in most developing countries. Debt has a negative impact on economic and financial development. Government debt growth weakens private credit growth as public debt 'crowds out' private debt (Ayadi, Naceur & Groen 2013). In countries with lower financial depth, public borrowing has adverse effects on financial development and macroeconomic outcomes (Ismihan & Ozkan 2010).

Mahembe and Odiambo (2014) found that privatisation, liberalisation, economic structural-adjustment programmes and regulatory reviews led to an increase in FDI inflows into SADC countries post 2000. Mingiri, Ikhide and Stegaye (2016) revealed that Foreign Direct

Investment, cross-border flows and remittances have a positive impact on economic growth in the region, whilst Official Development Assistance is not. Flows of official development assistance and development finance have had mixed effects on SADC. The SADC DFRC (n.d.) found that official development assistance to SADC countries (1978-1997), did not correlate with growth and investment performance. Rather, in five SADC countries (Malawi, Namibia, Tanzania, Zambia and Zimbabwe) a negative correlation between official development assistance and domestic saving was found, suggesting that official development assistance substituted domestic public savings (SADC-DFRC n.d).

Empirical literature on financial centres in SADC

In SADC there are international financial centres in South Africa, Mauritius, Seychelles and Botswana (Waris 2014). Of these centres, South Africa and Mauritius are rated among the world's global financial centres and are among the only three globally rated centres in Africa as rated by the Global Financial Centre Index (2015).

a) South Africa - Johannesburg

Johannesburg is South Africa's largest city, the centre of South Africa's economic hub and is located in the world's largest gold mining area. Johannesburg generates 16 per cent of South Africa's GDP and attracts international banks from all over the world (Harlow 2013). The Global Competiveness Report 2010-11 rated South Africa's securities exchange regulation as the best in the world in terms of regulatory standards, corporate governance practices, adherence to world-class accounting and auditing standards and a well-developed insurance sector (World Economic Forum 2012). The Xinhua-Dow Jones International Financial Centre Development (IFCD) Index for 2014 rated Johannesburg 40 out of 45 cities.

The Xinhua-Dow Jones also compared financial centres in the BRICS countries. Johannesburg fared well against other cities in almost all measures except in confidence index of financial centres and currency international recognition. Confidence analysis investigates interviewees' confidence for the city to become a global financial centre. The degree of currency international recognition compares interviewees' recognition of currencies of these BRICS countries. Investors and market participants do not have strong confidence in Johannesburg becoming a global financial centre. In terms of currency, the South African Rand has the lowest popularity among other BRICS currencies, indicating that the currency is still a regional currency. The rating on currency is in line with the findings of this study, in Chapter Eight, that South Africa's

money side is positively affected by spatiality, implying its dominance in neighbouring countries.

Significant progress has been made by South Africa to enhance participation of other countries in its financial sector through its 'financial centre for Africa' strategy (Creamer 2006). Johannesburg Securities Exchange (JSE) established the Africa Board to facilitate dual listings to firms outside South Africa. The Africa Board provides an opportunity for companies to gain a second listing on the JSE to complement the one they already have on their domestic exchange. In supporting investment in Africa, South Africa relaxed foreign-currency-asset limits on South African banks. It also allowed foreign based companies to access local institutional and retail investors on both the Johannesburg Securities Exchange (JSE) and the South Africa Bond Exchange (Creamer 2006). In addition, the Industrial Development Corporation and the Development Bank of Southern Africa are additional sources of debt capital for regional projects (Creamer 2006).

b) Mauritius

Mauritius is increasingly being recognised as a platform for investment into African countries due to its location in servicing and linking African markets to Asia (TMF Mauritius Limited 2015). Mauritius has a substantial network of treaties and double-taxation avoidance agreements, making it a gateway for routing funds into Africa and India (UNCTAD 2013). Mauritius instituted a vast array of financial and legal reforms among them the establishment of a Global Business sector in 1988, whose growth has been attributed to timely fiscal incentives, a flexible regulatory framework and investment promotion and protection (Jankee 2013). The global business sector of Mauritius supported by a growing banking sector and profitable Stock Exchange, gave a strong impetus to the Mauritius IFC (Mauritius International Financial Centre 2011). There has been increased cooperation between Mauritius and South Africa in recent years as South African companies are now looking at other financial centres closer to home (Matutu 2014).

c) Botswana

Botswana International Financial Services Centre (IFSC) is a government agency established in 2003 to develop Botswana as a hub for cross-border financial and business services into Africa and the region (OECD 2010). Botswana's IFSC supporting regulatory framework provides regional and international banks, international business firms, insurance companies and investment funds an advantageous platform to penetrate new markets (www.bitc.co.bw).

The attraction of the IFSC is the generous tax benefits that are granted to IFSC entities (OECD 2013).

d) Seychelles

Seychelles, as an offshore financial centre was established in December 1994, following the enactment of legislation providing for international business companies and international trusts (Mitchell n.d.). The rise of Seychelles as an international financial centre has been driven by sound regulation (Fanny 2009). The Seychelles International Financial Centre offers favourable tax structures, low government fees, and an international trade zone, all created and supported by favourable legal and regulatory regimes (Axis 2015).

Having reviewed literature on the issues under discussion, there are a number of observations on the literature in relation to the current study, which point to knowledge gaps that the current study intends to fill. The said observations are presented in the following section.

3.4   Identified gaps in the reviewed literature

The reviewed literature clearly describes all conceptual issues from definitions to their interactive relationships. However, the researcher observed that the reviewed literature have knowledge gaps that this study intends to fill as explained below.

Cross-country studies on Sub Sahara Africa ignore the heterogeneity of regions and countries involved, specifically in-terms of the levels of financial development. These studies bring together regions without considering the characteristic dynamics of financial development in these regions. However, for regions such as the SADC, where there is significant differentiation in the levels of development, financially developed countries become crucial and more-so the closeness to such countries. Proximity to a financially developed country is a determining factor for financial development of other countries. A few studies that considered spatial proximity to South Africa, did not factor in the role of monetary unions in their analyses. This current study aims to bridge this knowledge gap by examining not only the role of spatiality on financial development of SADC countries but also isolating the influence of the monetary union on financial development.

The cross-country finance-growth studies in SADC did not consider the role and impact of financial reforms and financial innovation in the finance-growth relationship. An empirical

evaluation on the causality hypothesis for SADC and the emerging nature of the finance-growth relationship post reforms and effects of financial innovation contribute new knowledge to the finance-growth nexus.

Mobolaji (2010) empirically studied the impact of spatiality on financial development in SSA, in particular the closeness to South Africa, a financially developed country. To the researcher's knowledge, no study has contextualised the spatial effects of financial development in SADC, despite the strong financial and economic interconnectedness of economies in the region. The resultant knowledge deficiency can be overcome through empirical estimations, which this study is attempting to do.

Related to that, it was also noted that proximity enhances spill-overs in financial development. Empirical literature also revealed that studies on spill-overs, globally, are mostly focused on financial markets and on contagion effects caused by interconnectedness of markets. Studies on spill-overs in the SADC region are confined to real GDP growth spill-overs. Literature is not specific on how changes in the financial sector of South Africa affect other SADC countries. The structural set up of financial systems in SADC indicate that financial spillovers are bound and this needs to be empirically tested. This current study would contribute to the literature by empirically evaluating the nature and magnitude of financial spill-over effects from South Africa on growth or financial development of other SADC countries.

Empirical evidence indicates the existence of high bank concentration in most SADC countries, although not for SADC as a bloc. Financial sectors of most SADC countries are dominated by banks and have high levels of bank concentration. However, studies available do not indicate the level of concentration in the financial market of SADC as a bloc. Furthermore, the literature does not indicate how financial development is affected by financial market concentration in SADC countries and how country income matters in the relationship. This study aims to bridge the identified knowledge gap through empirical tests.

Literature explains the importance of international financial centres and global finance in driving financial sectors of developing economies by attracting capital from the developed economies. Literature also indicated that SADC countries are recipients of global finance through developmental assistance. However, the literature does not indicate the impact of global finance and significance of international financial centres in enhancing financial development in SADC. In that regard the current study is relevant in revealing the effects of

global finance on financial development of SADC countries and strategies that can be used to link SADC countries to global financial markets.

3.5   Chapter summary and conclusion

The chapter reviewed the theoretical and empirical literature on the issues under investigation. Theory indicated that financial development has a relationship with economic growth that dates back for centuries. The impact of financial development on economic growth is captured through the role of capital investment in growth models. The causality relationship between financial development and economic growth also has a theoretical dimension. Empirical literature indicates that the debate on the causality between financial development and economic growth is still inconclusive. The reviewed literature on finance-growth in SADC is devoid of the causality hypothesis that best describes the finance-growth relationship in SADC and does not consider the role of reforms.

The literature also revealed that financial innovation has an impact on economic growth although there are not many empirical studies to ascertain the relationship. Financial innovation has both positive and negative effects on economic growth. Countries in the SADC region have embraced financial innovation and these are transforming their financial sectors. This notwithstanding, no studies have attempted to determine the causal relationship between financial innovation and economic growth in SADC.

The reviewed literature also indicates that geography matters in financial development and the spatiality theory states that countries benefit from proximity to a financially developed country. Empirically, a few studies have attempted to evaluate the impact of spatiality on financial development in SSA, in particular closeness to South Africa, a financially developed country. There are no studies that have contextualised the spatial effects of financial development in SADC.

Related to that, it was also noted that proximity enhances spill-overs in financial development. Empirical literature revealed that studies on spill-overs in the SADC region are confined to real GDP growth spill-overs. For example, how growth spill-overs in South Africa affect other SACU countries. Given the high level of financial development in South Africa and the interconnectedness between South Africa and other SADC countries; financial spill-overs are inevitable and the current study attempts to establish that.

Secondary literature reviewed indicates that concentration in the financial or banking sector affects stability and efficiency of a financial sector. Empirical evidence indicates the existence of high bank concentration in most SADC countries, although not for SADC as a bloc. South Africa's dominance in the region is indicative of financial concentration in the region. However, South Africa's financial institutions are expanding into the region and literature does not indicate whether the expansion is resulting in the reduction of financial concentration in recipient SADC countries.

The chapter identified that geography, regulation, time differences, connectedness with other markets affected the growth and development of financial centres. Literature also indicated that SADC has the highest concentration of international financial centres, but most SADC countries remain disconnected to global financial markets. Literature did not empirically evaluate the role of global finance on financial development in SADC countries as well as identify strategies of linking SADC countries to global financial markets.

The current study acknowledges that a review of theory around concepts, their relationship and the results of empirical studies alone is not sufficient to provide a complete and in-depth understanding of the issues under study. Fundamentally empirical estimations are apparent. However, before carrying out the empirical estimations, the study need to critically analyse the research methodologies that the study would use. Whilst this chapter has detailed the literature on conceptual issues, the following chapter presents a review of literature on methodologies and the empirical methodologies to be used in the study.

Chapter Four reviews literature on the methodologies for estimations used in analysing the major conceptual issues under study as outlined in Chapter One. The review provides a range of arguments that either criticise or support some of the methodologies; in the process determining the methodologies ultimately used in the study. After appraising the theoretical models, the chapter develops the empirical models for each of the broad conceptual issues under study. It also outlines the estimation approach used in this study as well as a discussion of the variables to be used and the sources of data.

CHAPTER FOUR
RESEARCH METHODOLOGY

1.1 Introduction

The literature reviewed in Chapter Three indicates that empirical studies use different models and methodologies and that there is more than one model that can be used in analysing a particular concept. Different models emphasise different aspects and may use different assumptions from other models, even when used on the same conceptual issue. Fundamentally, some models are built on weaknesses of other models whilst some are merely an extension of existing models.

Estimation approaches vary from one study to the other, and have a bearing on the results. Most cross-country studies employ panel estimation models and variation relates to whether the models are static or dynamic panel models. As such, there is need for a comprehensive review of the methodologies used in analysing the concepts under study before deciding on a particular methodology. The reviewed methodological approaches provided a basis for justification of methodologies for the current study.

This chapter presents a review of literature on methodologies used in previous studies and outlines the empirical models and estimation approaches used in this current study. The review provides arguments in support of as well as criticising the models and methodologies, before ultimately determining models and methodologies used in this current study. In each case, an appropriate model for the study is identified by contrasting the weaknesses of the other models against the strengths of the identified model.

This chapter is organised as follows:
Section 4.2 builds a model for the finance-growth nexus, and provides the empirical framework of the study's dynamic panel regression model for the finance-growth analysis.

Section 4.3 reviews the Aghion *et al.* (AHM) model and the extended AHM model as expanded by Laeven *et al.* (2013). It also presents the empirical model for the financial innovation-growth nexus derived from the extended AHM model.

Section 4.4 reviews the Spatial Autoregressive (SAR) Model, the Spatial Error Model, the Spatial Panel Model (Moving Average - MA-Error Process) and the Spatial Durbin Model (SDM) used in spatial affect analyses. A dynamic panel model for empirically estimating spatiality in financial development is then derived from the Spatial Durbin Model.

Section 4.5 discusses spill-over analysis by examining, first, the indices for measuring spill-overs. Thereafter, the section reviews the Global VAR model, the Generalised VAR model and the Bayesian VAR used in spill-over analysis. The section also presents the empirical panel model for estimating the impact of financial development spill-overs in SADC.

Section 4.6 reviews two indices of measuring concentration in financial development. These are the k-bank Concentration Ratio (kCR) and the Herfindahl-Hirschman Index (HHI). The section also presents the indices for measuring financial market concentration in SADC and outlines the empirical model for assessing the impact of concentration on financial development.

Section 4.7 highlights the empirical models used in assessing the impact of global finance and international financial centres on financial development.

Section 4.8 comprises discussion on panel data estimation approaches, namely the Panel Fixed and Random Effects and the GMM estimations as well as the variables to be used in the study.

4.2 Finance-Growth Framework

One of the objectives of this study is to analyse the relationship between financial development and economic growth in SADC countries. Different methodologies have been used in various studies that produced varying results. As such, there is need for a detailed review of the methodologies used in finance-growth studies, particularly for cross-country studies. The finance-growth nexus is anchored in endogenous growth models. Kenourgios and Samitas (2007) outlined the following endogenous growth model, which takes into account the level of financial development, with growth rate at time $t = 1$ outlined as equation (4.1):

$$g = A\frac{I}{Y} - \delta = A\emptyset s - \delta \tag{4.1}$$

where, Y is the output, I is the gross investment, A is a parameter representing the productivity of capital, δ is the rate of depreciation if the good is invested, S is the gross saving and $(1 - \emptyset)$ is the part lost in the process of financial intermediation. Kenourgios and Samitas (2007) added that financial development could improve the efficiency accumulation (increase in $\emptyset$); it could contribute to a raising in the savings rate; and it could directly affect the marginal productivity of capital (A). If the rate of depreciation of the good invested is ignored, then equation 4.1 becomes:

$$g_{t+1} = A\emptyset s_t \text{ or simply } \Delta y_t = A\emptyset_t s_t \tag{4.2}$$

Equation 4.2 is a production function and if this function is assumed to be dependent on only capital stock $y_t = Af(k_t)$ and by differentiation, it becomes:

$$\Delta y_t = A\frac{dk_t}{y_t}f'(k_t) = A\emptyset_t s_t \tag{4.3}$$

Equation 4.3 is an endogenous model also known as the AK model of growth with financial intermediation (Mankiw 1995). The model reflects a production function that relates output to capital and other determinant variables (often denoted by 'Labour' in an ordinary production function) and can be expressed as a Cobb Douglas production function:

$$Y_{i,t} = A_{i,t}C_{i,t}^{\beta}K_{i,t}^{\gamma} \tag{4.4}$$

where i and t denotes country and time respectively. Y, C, and K represent real per capita GDP, determinant (control) variables and capital respectively. The function is expanded by introducing the conversion of it to a linear form by taking logarithms. The literature often implicitly models equation 4.4 as a linear function of a number of structural variables (Hassan *et al.* 2011). Hence the growth regression can be specified as:

$$y_{i,t+k,k} = -\rho Q_{i,t} + \gamma'X_{i,t} + \varepsilon_{i,t+k,k} \tag{4.5}$$

where $X_{i,t}$ are determinant variables controlling for different levels of long-run per capita GDP across countries (Hassan *et al.* 2011). Equation 4.5 is similar to the model $G(j) = \alpha + \beta F(i) + \gamma X + \varepsilon$ used by Levine (1997) to run 12 regressions on a cross-section of 77 countries to establish some finance-growth relationship. Equation 4.5, however, is a panel data model that considers both the cross-section and time elements of the data set. Equation 4.5 represents what Coporale *et al.* (2009) estimated as an augmented Barro growth regression with financial development variables and has the following form:

$$GROWTH_{i,t,} = \alpha_i + \beta_i[FINANCE]_{i,t} + \gamma_i[CONDITIONINGSET]_{i.t} + \varepsilon_{i,t} \tag{4.6}$$

or

$$g_{i,t} = y_i - y_{i,t-1} = \alpha_i + \beta_i f_{i,t} + \gamma_i C_{i,t} + \mu_i + \varepsilon_{i,t} \tag{4.7}$$

where y is real GDP per capita, $g_{i,t}$ its growth rate, $f_{i,t}$ is an indicator of financial development, $C_{i,t}$ a set of control variables, μ_i and $\varepsilon_{i,t}$ error terms, i the country, t the time period, while ε is a white noise error and μ a country-specific component of the error term. The parameter α_i is the country-specific intercept (Coporale *et al.* 2009). This study estimates the panel model in equation 4.7 as outlined in the next sub-section.

4.2.1 The Empirical Finance-Growth Framework

This study's dynamic panel regression model for the finance-growth analysis in SADC becomes:

$$g_{i,t} = \beta_0 + \alpha_{i,t} g_{i,t-1} + \sum_{F=1}^{3} \beta_F FD_{i,t} + \beta_4 GCF_{i.t} + \beta_5 GEX_{i.t} + \beta_6 CPI_{i.t} + \beta_7 TO_{i,t} +$$

$$\varepsilon_{i,t} \tag{4.8}$$

where β_0 represents the initial real GDP per capita proxy, $g_{i,t}$ is real GDP per capita growth, $g_{i,t-1}$ is the lagged values of growth for each country and $\sum_{F=1}^{3} FD_{i,t} = \{LL_{i,t} + DC_{i,t} + BCP_{i,t}\}$ represents proxies for financial development and are entered individually in each regression as LL = liquid liabilities to GDP; DC = total domestic credit to GDP and BCP = bank credit to private sector/GDP. GCF is gross fixed capital formation, GEX is government expenditure to capture and control the varying size of countries, CPI is the level of consumer price index reflecting inflation, and TO measures trade openness of a country. $\alpha_{i,t}$ is the coefficient which estimates the dynamic effect of the model and β is the coefficient for the independent variables to be estimated.

Equation 4.8 is a dynamic panel model suitable for the study given its ability to combine time series and cross-sectional features and also to address the simultaneous issues of the regressors. The panel co-integration framework provides long-run estimates, short-run adjustments, and addresses the endogeneity issues by formally treating all variables as part of a vector auto-regression (Christopoulos & Tsionas 2003). Furthermore, panel estimates address problems of biased estimates when the dynamics are heterogeneous across the cross- section units. The most appropriate estimation techniques for panel data regressions are discussed in section 4.8. The next sub-section presents a finance-growth model with financial reforms.

- *Model with financial reforms*

A number of countries in SADC introduced reforms in the 1990s that enhanced development of their financial sectors. The expectation was that reforms, which in most cases were in the form of financial liberalisation, would have a positive effect on economic growth. The rationale is that financial liberalisation enhances financial development through the removal of restrictions and interest rate controls, increasing access to credit as well as broadening the array of institutions that provide financial intermediation. The enhanced financial development was expected to have a positive effect on growth. To capture the effects of financial reforms a dummy variable was introduced. The estimated model for the financial development-economic growth analysis that captures the effect of financial reforms in SADC becomes:

$$g_{i,t} = \beta_0 + \alpha_{i,t}g_{i,t-1} + \beta_1 BCP_{i,t} + \beta_2 DC_{i,t} + \beta_3 LL_{i,t} + \beta_4 GEX_{i.t} + \beta_5 CPI_{i,t} + \beta_6 TO_{i,t} +$$
$$\beta_7 RINT_{i,t} + \beta_8 FR_{i,t} + \varepsilon_{i,t} \tag{4.9}$$

$$t = 1,2 \dots . T; \ i = 1,2 \dots . N$$

where FR is a dummy variable, which takes a value of one from the year a country introduced financial reforms and going forward, otherwise, zero. The dummy variable is also interacted with all the proxy variables for financial development (Equation 4.10). The resultant interactive dummy variable represents financial development in the post liberalisation/reform period.

$$g_{i,t} = \beta_0 + \alpha_{i,t}g_{i,t-1} + \beta_2 GEX_{i,t} + \beta_3 CPI_{i,t} + \beta_4 TO_{i,t} + \beta_5 RINT_{i,t} + \beta_6(FR_{i,t} * BCP_{i,t}) +$$
$$\beta_7(FR_{i,t} * DC_{i,t}) + \beta_8(FR_{i,t} * LL_{i,t}) + \varepsilon_{i,t} \tag{4.10}$$

$$t = 1,2 \dots . T; \ i = 1,2 \dots . N$$

4.2.2 Granger causality tests

In this study a panel Granger causality test was performed to ascertain the direction of causality between economic growth and financial development. The Granger causality means that the knowledge of past values of one variable (X) helps to improve the forecast of another variable (Y). Panel data dimension improves the efficiency of Granger causality tests by increasing the degrees of freedom and reducing the collinearity among explanatory variables (Greene 2008; Baltagi 2005 cited in Töngür 2013).

Testing for the Granger causality in panel data requires control for a possible cross-sectional dependence across the members of the panel and consideration of heterogeneity in estimated parameters for each individual member of the panel in order to impose a restriction for the causal relationship (Kara, Nazlıoğlu & Ağır 2011). The rationale for considering cross-sectional dependence is due to the fact that a shock affecting one country may also affect other countries

because of interconnectedness and linkages. Following Caporale *et al.* (2009), the set of equations for testing the causality is shown in Equation (4.11).

$$g_{it} = \alpha_0 + \sum_{n=1}^{N} \alpha_i^n g_{i(t-j)} + \sum_{n=1}^{N} \beta_i^n FD_{i(t-n)} + u_{it}$$

$$FD_{it} = \alpha_0 + \sum_{n=1}^{N} \alpha_i^n FD_{i(t-k)} + \sum_{n=1}^{J} \beta_i^n g_{i(t-n)} + u_{it} \quad \text{with } n \in \mathbb{N}^* \text{ and } u_{it} \text{ i.i.d.} \quad (4.11)$$

Equation 4.11 is an autoregressive (AR) model that can be converted into an AR(2) by setting N equal to two. The inclusion of the lagged dependent variable under explanatory variables, as the case in most autoregressive models, is to capture self-propelling causality affects. A test for Granger causality in a panel model tests the significance of $\beta_1 = \beta_2 = 0$ using a χ^2 with two degrees of freedom. To establish if there is a long-run linkage between financial development and economic growth, this study tests the restriction $\beta_1 + \beta_2 = 0$, under the null hypothesis that there is no long-run effect (Caporale *et al.* 2009).

4.3 Financial Innovation and Finance-Growth Nexus

The financial innovation and economic growth study is analogous to the finance-growth nexus and most empirical models also stem from the AK model of growth with financial intermediation. Valverde *et al.* (2007) used a General Methods of Moments (GMM) estimation technique in a cross-country/region study. For single country studies on financial innovation in SSA, methodologies used include bound testing ARDL co-integration procedures (Idun & Aboagye 2014) and coded questionnaires (Mwinzi 2014). Laeven *et al.* (2013) tested the role of financial innovation in endogenous growth by extending a model by Aghion, Howitt, and Mayer-Foulkes (AHM model). Below is a review of the Aghion, Howitt, and Mayer-Foulkes model and the extended AHM model regression framework by Laeven *et al.* (2013).

4.3.1 The Aghion, Howitt, and Mayer-Foulkes (AHM) model

The AHM Model is based on testing convergence in economic growth driven by the level of financial development. It states that some critical level of financial development will converge to the growth rate of the world technology frontier, and that all other countries will have a strictly lower long-run growth rate (Laeven *et al.* 2013). The AHM theoretical model can be approximated by the following growth regression:

$$g - g_1 = b_0 + b_1 F + b_2(y - y_1) + b_3 F(y - y_1) + b_4 X + \mu \tag{4.12}$$

where $g - g_1$ is the average growth rate of per capita income relative to USA growth over the period 1960-1995, F is financial development in 1960, which is measured as credit to the private sector as a share of GDP, $y - y_1$ is the log of per capita income relative to USA per capita income, X is a set of control variables, and μ is an error term. AHM estimate this regression model using cross-sectional data on 63 countries over the period 1960-1995. A detailed review of the derivation of the AHM model can be found in Aghion *et al.* (2005) and Laeven *et al.* (2012).

4.3.2 The Extended AHM model

In contrast to the AHM Model, the extended model by Laeven *et al.* (2013) stresses the importance of financial innovation. Laeven *et al.* (2013) tested the role of financial innovation on endogenous growth in a model with a key feature, which states that economies without financial innovation will stagnate irrespective of the initial level of financial development. Laeven *et al.* (2013) extended the AHM regression framework to include measures of both financial development and financial innovation. In the extended model, the level of financial development in any period is regarded as an outcome of previous financial innovations. Building on Equation 4.12, Laeven *et al.* (2015) amended the AHM regression framework as follows:

$$g - g_1 = b_0 + b_1 F + b_2(y - y_1) + b_3 F(y - y_1) + b_4 X + b_5 f + b_6 F(y - y_1) + \mu$$
(4.13)

where f denotes financial innovation measured as the average growth rate of financial development over the sample period. The panel cross-country GMM regression Laevean *et al.* (2013) estimated was:

$$g_{i,t} - g_{1i,t} = b_0 + b_1 F_{i,t} + b_2\left(y_{i,t} - y_{1i,t}\right) + b_3 F_{i,t}\left(y_{i,t} - y_{1i,t}\right) + b_4 X_{i,t} + b_5 f_{i,t} +$$
$$b_6 f_{i,t}\left(y_{i,t} - y_{1i,t}\right) + \delta_i + \mu_{i,t}$$
(4.14)

where the t subscripts indicate the particular five-year period, so that $t = 1, 2, \ldots 7$, for each country i, data permitting, δ_i is the coefficient of a country-specific effect, and where they also control for a time-specific effect in each period in the panel.

The key strengths of the extended AHM model are two fold, first the model focuses on the role of financial innovation in economic growth and secondly, the model separates the impact of financial innovation from that of financial development. As such, with some adjustments, the extended AHM model captures the required impact of financial innovation and economic growth for the current study.

4.3.3 Empirical Model- Financial Innovation and Finance-Growth Nexus

The study estimates a reduced form of Equation 4.14 by dropping comparative variables such that interpretation of coefficients becomes that of responsiveness rather than speed of convergence. The study, however, introduces additional variables for financial innovation for comparison purposes. Given the controversy that surrounds the true measures of financial innovation, two models are estimated. The first model has proxies for financial innovation that are widely used in literature (growth in Banking Sector Credit to Private sector-GGBCP and ratio of Broad to narrow Money (M2/M1). The second model introduces Mobile Money/Banking, a variable that captures direct and recent innovation in the financial sector. The rationale for separating the models is that financial innovation variables in Model 1 has data over the entire period whereas Mobile Money, in Model 2, has data that starts in 2003. Besides, separating models enables comparison of the variables.

The dynamic regression to be estimated under Model 1 becomes:

$$\overbrace{GGDPPC_{it}}^{Y} = [\overbrace{GEXP_{it}, GCF_{it}, CPI_{it}, TO_{it}}^{X} + \overbrace{GGDPPC_{it-1}}^{y_{t-1}} + \overbrace{DCP_{it}}^{F} + (\overbrace{GBCP_{it}, M2M1_{it}}^{fi})]$$

(4.15)

where Y is economic growth; X are control variables; F is the financial development variable; and *fi* are financial innovation variables. The dynamic regression to be estimated under Model 2 becomes:

$$\overbrace{GGDPPC_{it}}^{Y} = [\overbrace{GEXP_{it}, GCF_{it}, CPI_{it}, TO_{it}}^{X} + \overbrace{GGDPPC_{it-1}}^{y_{t-1}} + \overbrace{DCP_{it}}^{F} + (\overbrace{GBCP_{it}, M2M1_{it}, MM_{it}}^{fi})]$$

(4.16)

where Y is economic growth; X are control variables; F is the financial development variable; and *fi* are financial innovation variables, including the new variable Mobile Money-MM.

Regarding estimations of the models in equations 4.15 and 4.16, the current study uses the ARDL, given the financial innovation is largely a microeconomic phenomenon measured by variables that are often stationary in levels. As such, there will be varying levels of stationarity among variables to warrant the use of ARDL. The ARDL model is explained below.

4.3.4 The Autoregressive Distributed Lag (ARDL) model

The Autoregressive Distributed Lag (ARDL) model is appropriate where variables have different orders of integration or in mutually integrated data (Giles 2013). The ARDL-bounds testing approach involves two stages. First, the study estimates the ARDL model for the

existence of a long-run relationship among the relevant variables using the F-test version for bound-testing methodology. The study conducts a Wald test for the joint significance of the lagged levels of the variables (Owusu & Odhiambo 2014). The first set assumes that all variables are I (0) while the second category assumes that all variables are I (1). The bound testing procedure is that, iif (if and only if) the computed F-statistic exceeds the upper critical bounds value, then the null hypothesis of no long-run relationship can be rejected (Al-Malkawi, Marashdeh & Abdullah 2012). Conversely, if the test statistic falls below the lower critical values, then the null hypothesis cannot be rejected. However, if the F-statistic falls between the upper and the lower critical values, then the result is inconclusive (Owusu & Odhiambo 2013).

The second step is to estimate the coefficients of the long-run relationship and determine their values, followed by the estimation of the associated error correction model (the short-run elasticity of the variables) – in order to calculate the adjustment coefficients of the error correction term (Masih *et al*. 2008; Pahlavani *et al*. 2005). The autoregressive distributed lag ARDL technique based on Pesaran *et al*. (1999) incorporates the dynamic heterogeneous panel regression into the error correction model (Samargandi, Fidrmuc & Ghosh 2013). A simplified panel ARDL model (see Baltagi 2005) for variables X, Y and Z can be expressed as:

$$\Delta y_{it} = \beta_0 + \beta_1 \Delta y_{it-1} + \gamma_1 \Delta x_{it-1} + \delta_1 \Delta z_{it-1} + \theta_0 y_{it-1} + \theta_1 x_{it-1} + \theta_2 z_{it-1} + \varepsilon_{it} \qquad (4.17)$$

where $\theta_0; \theta_1 \ and \ \theta_2$ are long-run coefficients whose sum is equivalent to the error correction term of the Vector Error Correction Model. Based on Pesaran *et al*. (1999), the dynamic heterogeneous panel regression can be incorporated into the Error Correction Model using the Autoregressive Distributed Lag ARDL (p,q) technique and stated as follows (Loayza & Ranciere 2006):

$$\Delta(y_i)_t = \sum_{j=1}^{p-1} \gamma_j^i \Delta (y_i)_{t-j} + \sum_{j=0}^{q-1} \delta_j^i \Delta (X_i)_{t-j} + \varphi^i [(y_i)_{t-j} - \{\beta_0^i + \beta_1^i (X_i)_{t-1}\}] \in_{it} \quad (4.18)$$

where y is the GDP growth rate, X is a set of independent variables including the financial development indicator, γ and δ represent the short-run coefficients of lagged dependent and independent variables respectively, β are the long-run coefficients, and φ is the coefficient of speed of adjustment to the long-run equilibrium. The subscripts i and t represent country and time, respectively and p,q are the maximum lags for dependent and independent variables, respectively. The term in the square brackets contains the long-run growth regression. The generalised ARDL model for testing the relationship between financial innovation and economic growth in this study is:

$$\Delta GGDPPC_{it} = C_0 + \beta_1 \Delta GGDPPC_{it-1} + \gamma_1 \Delta GBCP_{it-1} + \rho_1 \Delta \frac{LM2}{M1}_{it-1} + \alpha_1 \Delta MM_{it-1} +$$

$$\delta_1 \Delta GEXP_{it-1} + \tau_1 \Delta GCF_{it-1} + q_1 \Delta CPI_{it-1} + w_1 \Delta TO_{it-1} + \delta_1 \Delta GCP_{it-1} + \theta_0 GGDPPC_{t-1} +$$

$$\theta_1 GBCP_{t-1} + \theta_2 \frac{LM2}{M1}_{t-1} + \theta_2 \Delta MM_{it-1} + \theta_3 GEX_{t-1} + \theta_4 GCF_{it-1} + \theta_5 CPI_{it-1} + \theta_6 TO_{it-1} +$$

$$\theta_7 GCP_{it-1} + \varepsilon_t \tag{4.19}$$

where Δ indicates differencing of variables, while ε_t is white noise or the error term $t-1$ is the lagged period and all other variables are as defined above. The long-run co-integration is assessed by testing significance of the θ coefficients, that is, the long-run multipliers that correspond to long-run relationships.

The ARDL model has a number of strengths. It is comparatively more robust in small or finite samples (Ghatak & Siddiki 2001) that consist of 30 to 80 observations (Afzal *et al*. 2013 citing Mah 2000). The approach can be used where variables have different orders of integration (Giles 2013). Modelling the ARDL with the appropriate lags will correct for both serial correlation and endogeneity problems (Pesaran *et al*. 2001). The ARDL model estimates short- and long-run relationships simultaneously and provides unbiased and reliable estimates (Pesaran *et al*. 1999). The ARDL model provides consistent and efficient estimates of the parameters in a long-run relationship regardless of order of integration of the variables (Samargandi, Fidrmuc & Ghosh 2013).

4.3.5 Causality tests

Just as is the case of financial development, the study also performs a Granger causality test to ascertain direction of causality between economic growth and financial innovation. Causality is tested for a selected financial innovation variable among the two used in the model. The set of equations in 4.11 will be used, with financial development (FD) being replaced by financial innovation.

4.4 Spatial Effect in Financial Development

Spatial statistics deal with the measurements or observations of a particular phenomenon associated with specific locations (Fernandez 2011). In spatial statistics there is a concept of spatial correlation that measures whether the incidence of an event at a specific point in space affects another in a different place (Fernandez 2011). Ordinarily spatial analysis utilises spatial autoregressive models which examine the extent to which regional growth rates depend on the growth rates of adjacent regions (Yildirim *et al*. 2006). Some studies employ beta convergence analysis, which by taking spatial dimension into account, claims that rates of

economic growth may be interdependent across regions due to spill-over effects (Yildirim *et al.* 2006). In spatial regression models the dependent variable at one location depends on the values of observations at neighbouring locations. Such dependencies can originate from spatial spill-overs stemming from contagion effects (Asgharian, Hess & Liu 2011).

Literature reviewed in Chapter Three showed that spatial models are used in spatial analysis and there is need for a brief review of these models used in previous studies before developing the empirical model for the current study. The next section presents the models used in spatial effect analysis, namely the Spatial Autoregressive Model, the Spatial Error Model, the Spatial Panel Model (the Moving Average-Error Process) and the Spatial Durbin Model.

4.4.1 Spatial Autoregressive (SAR) model

The Spatial Autoregressive model is also known as "spatial lag" model (Baldacci, Dell'Erba & Poghosyan 2011). The model tackles the problem of spatial correlation by including linear combinations of the dependent variable (spatial lags) as additional regressors (Asgharian *et al.* 2011). The standard SAR model is given by:

$$y_{i,t} = \alpha_i + \gamma f_t + \beta x_{i,t} + \rho \sum_{j=1}^{N} w_{ij} \, y_{jt} + \varepsilon_{i,t} \tag{4.20}$$

where $y_{i,t}$ is the (log of) dependent variable spread for country i ($i=1,\ldots,$N) at time t ($t=1,\ldots,$T); α_i is country specific fixed effect while f_t represents global factors that affect all countries simultaneously; $x_{i,t}$ is a matrix of control variables and $\varepsilon_{i,t}$ is an *i.i.d.* process. The "spatial" lag corresponds to the variable $\sum_{j=1}^{N} w_{ij} \, y_{jt}$ which is the sum of the dependent variable in all other countries j, weighted by the elements w_{ij}, which represent the degree of connectedness between countries i and j. The coefficient ρ is the spatial auto-correlation coefficient and it captures the feedback effect that arises from the level of the dependent variable spread in neighbouring countries (Baldacci *et al.* 2011).

4.4.2 Spatial Error Model (SEM)

The Spatial Error Model models spatial dependence in the disturbances, such that the units of observation are cross-correlated only through shocks in neighbouring units (Baldacci *et al.* 2011). The model implies existence of a complex interdependence between locations, so that a shock in any location is transmitted to all others or has a global effect. The Spatial Error Model can be stated as:

$$y_{i,t} = \alpha_i + \gamma f_t + \beta x_{i,t} + \lambda \sum_{j=1}^{N} w_{ij} \, \varepsilon_{jt} + \varepsilon_{i,t} \tag{4.21}$$

While the SEM model only corrects for the efficiency of the estimated coefficients, the SAR model also allows for indirect or 'spill-over' effects from neighbouring units (Baldacci *et al.* 2011).

4.4.3 Spatial Panel Model - Moving Average (MA)

Crocco, Santos and Amaral (2010) used a Spatial Panel Model with Moving Average error process developed by Fingleton (2008) to assess the spatial structure of financial development in Brazil. Fingleton (2008) assumed a moving average - error process, which implies that a shock in any location is transmitted only to its neighbours. Fingleton (2008) further extended the methodology to incorporate an endogenous spatial lag. Therefore, the spatial dependence is not restricted to the error process, but may occur via the dependent variable as well (Crocco *et al.* 2010). The Fingleton (2008) spatial panel model is based on generalisations of the Generalised Moments Method and assumes that in each period of time *t* the data are generated in accordance with the following model as shown in equation 4.22 below:

$$Y(t) = \lambda W Y(t) + H(t)\gamma + \mu(t) \tag{4.22}$$

in which *Y(t)* is an Nx1 vector of observation of the dependent variable in time *t*, W is an N x N matrix of constant weights independent of *t*, λ is a scalar parameter, H(t) is an N x K matrix of regressors with full column rank that can contain the constant term, γ is the K x 1 vector correspondent to the parameters of the regression, and *u(t)* denotes the N x 1 vector of the disturbances generated by a random error process (Crocco *et al.* 2010). The moving average - error process which considers local rather than global shock effects is

$$\mu(t) = (I - \rho W u)\varepsilon(t) \tag{4.23}$$

The disturbance of any locality is affected by the weighted disturbances of its neighbours; hence the spatial heterogeneities spill-over (Crocco *et al.* 2010).

4.4.4 Spatial Durbin Model (SDM)

This model was developed to address some of the weaknesses and criticisms of the SAR and SEM models. The Spatial Durbin Model developed by Anselin (1988) is a modification of a model originally developed by Durbin (1960) in the context of time series analysis. Most spatial econometric models and their applications model spatial dependence through spatial correlation between non-observable explanatory variables (SEM) and spill-over effects between the observations of the dependent variable (SAR) (Beer & Riedl 2010). This approach ignores spatial externalities working through the explanatory variables despite their central role in various fields of economics. Externalities are a spatial phenomenon since activities spread

over space as they affect the well-being of others. The Spatial Durbin Model includes a spatial lag on the dependent and independent variables and is thus suitable to capture externalities and spill-overs arising from different sources (Beer & Riedl 2010).

One of the key strengths of the SDM is that it is capable of reflecting interdependencies originating from a variety of economic channels. SDM performance remains good even in the case of spatially dependent omitted variables. Applying the SDM may mitigate the bias relative to OLS estimates when unobservable factors like location amenities or neighbourhood prestige exert an influence on the dependent variable (LeSage & Pace 2009). The Spatial Durbin Model has been solely applied to cross-sectional data, thereby ignoring individual heterogeneity.

Derivation of the Spatial Durbin Model (SDM) Model

An SDM model is created by including a spatial lag of independent variables in a regression in addition to the spatial lag of the dependent variable (LeSage & Pace 2009). Beer & Riedl (2010) derived the model as follows: Let w denote an $N \times N$ spatial weight matrix and y and ε vectors of dimension N including the dependent variable and the error term, respectively. Let X be an $N \times k$ matrix of independent variables; then the cross-sectional SDM can be written as follows:

$$y = \rho wy + X\beta + wX\gamma + \varepsilon$$
$$\varepsilon \sim N(0,1) \tag{4.24}$$

The SDM can be regarded as special cases of other spatial models through imposing certain restrictions (Beer & Riedl 2010). By restricting $\gamma = 0$ the remaining model will be a spatial autoregressive model (SAR) and by restricting $\gamma = -\rho\beta$ the SDM reduces to the spatial error model (SEM). To extend the model to the panel case the dependent variable is ordered as $y = (y_{11} \dots y_{1T}, \dots, y_{N1} \dots y_{NT})'$, where the slower index denotes the cross-sectional units $i = i, \dots, N$ and the faster index refers to the time dimension $t = 1, \dots, T$. The model can then be written as follows:

$$y = \rho Wy + X\beta + WX\gamma + Z\mu_1 + WZ\mu_2 + \varepsilon \tag{4.25}$$
$$\varepsilon \sim N(0, \sigma^2\Omega) \quad \Omega = \sum_N \otimes w_T \quad Z \text{ are individual effects collected in } Z = \iota_T \otimes I_N$$

where ι_T is a vector of order T containing ones with μ_1. WZ is included since in SDM each regressor enters in its spatial lag form (Beer & Riedl 2010).

Among the reviewed spatial models, the SDM model is more suitable for the current study. The SDM has a spatial lag on the independent variables which enable testing of the spatiality effect of any independent variables on the dependent variable. In addition, restrictions could be introduced on the model to allow for derivation of panel estimation regressions which suits the context of the current study. The rationale is that the transmission mechanism through which countries in SADC benefit from being close to South Africa is mainly through externalities and spill-overs arising from trade, financial systems interconnectedness and economic ties. The Spatial Durbin Model is able to capture these externalities.

4.4.5 Empirical Model-Spatial Effect in Financial Development

The Spatial Durbin Model (SDM) was identified as suitable for this study's analysis due to its ability to consider externalities. The spatial model in equation 4.25 can be transformed by adding a spatial component on a separate explanatory variable, while retaining the dependent variable as one of the explanatory variables. The spatiality component of the lagged dependent variable is set at one. This transformation is based on the assumption that the only spatial spill-overs under consideration are from South Africa. Financial development spill-overs from and among other SADC countries are not considered. As such, the study isolates the lagged variable of financial development in South Africa ($FDSA_{t-1}$) and interact it with spatial dependence parameter ρ. Equation 4.25 could be transformed to:

$$FD_{i,t} = \beta_1 WFD_{i,t-1} + \beta_2 X_o + \beta_2 W_s X_s + Z\mu_1 + WZ\mu_2 + \varepsilon \qquad (4.26)$$

where FD is an indicator for financial development in country i in period t, W is the spatial weight, X_o are other independent variables, X_s is the spatial interacted independent variable.

The underlying assumption in this model is that spatial effects of financial development are coming from South Africa to other SADC countries. Financial development of SADC countries other than South Africa is assumed to have no spatial effect as the countries' financial sectors are comparatively small, less developed and less interconnected. As such, W is set equal to 1 for $w_s \neq w$, to differentiate it from spatiality effects of the independent variable. This reduces the spatial factor on the lagged dependent variable to one, transforming the variable to an ordinary panel dynamic variable with no spatial autoregressive term. Following Beer & Riedl (2010) an estimator that eliminates the fixed effects Z and WZ in a first step is proposed in order to eliminate multicollinearity problems when estimating equation 4.27.

Further, set $X_s = FDSA_{t-1}$, the lagged variable of financial development in South Africa; $W_s = (1 - \rho)$ and X_o to be the other independent variable, GDP (and later it includes financial and trade openness and real interest rates). The transformed SDM model for this study becomes:

$$FD_{it} = \beta_1(1 - \rho_{it})FD_{it-1} + \beta_2 GGDPPC_{it} + \beta_3(1 - \rho_{SA})_i * FDSA_{t-1} + \varepsilon_{it} \quad (4.27)$$

where FD is an indicator for financial development in country i in period t; GGDPPC is growth GDP per capita which acts as a control variable for the demand for financial services and other economic factors; $1 - \rho_{it}$ is the spatial factor for SADC countries (which equals 1 when we ignore spatial effects between other countries in SADC), ρ_{SA} is the distance of country i from South Africa as a ratio of the distance of the furthest SADC country from South Africa, hence is the degree of closeness to South Africa. Thus $(1 - \rho_{SA})_i$ becomes the weight/degree of (financial) interconnectedness of country i with South Africa measured by the geographical distances.

The financial interconnectedness between other countries in the region than South Africa is assumed as weak and immaterial, hence is regarded constant at 1, that is, $(1 - \rho_{it}) = 1$. The variable $FDSA_{t-1} = \{dc_{SA_{t-1}}; ll_{SA_{t-1}}; bcp_{SA_{t-1}}; and\ bm_{SA_{t-1}}\}$ is the lagged financial development variables (dc-domestic credit, ll-liquid liabilities, bcp-private credit and bm-broad money respectively) in South Africa in year $t - 1$, included to allow for the partial adjustment of FD to its long-run equilibrium value.

Similar to the studies of Chin and Ito (2006), Baltagi *et al*. (2007) and Mobolaji (2008) this study also added trade and financial openness variables to Equation 4.27 on the assumption that openness enhances better trade, financial transactions, financial flows and impact more on the spatial variable. The inclusion of trade openness is on the basis that countries with trade arrangements with South Africa, bilaterally or otherwise, are more open to trading and this enhances financial flows. The finance openness (FO) variable is proxied by the Chin-Ito-Index in line with Chin and Ito (2006). Equation 4.27 is then further extended to:

$$FD_{it} = \beta_1(1 - \rho_{it})FD_{it-1} + \beta_2 GGDPPC_{it} + \beta_3 TO_{i,t} + \beta_4 FO_{it} + \beta_5 RINT_{it} +$$
$$\beta_6(1 - \rho_{SA})_i * FDSA_{t-1} + \beta_7 MMA_i \varphi_{it} * FDSA_{t-1} + \varepsilon_{it} \quad (4.28)$$

In addition, a dummy variable is introduced to control or capture the effect of monetary unions under the Multilateral Monetary Agreement. The variable is represented by a dummy MMA_i

which takes the value 1 if the country is in the Multilateral Monetary Agreement (monetary union) with South Africa or zero otherwise. The dummy is interacted with φ_{it} (the proportion of country i's central bank assets as a ratio of Reserve Bank of South Africa's assets in period t) to capture the proportion of financial development which is translated to that country from South Africa through the monetary agreement. The monetary union is expected to enhance better financial development and to impact more on the spatial variable. The equations were estimated using the GMM estimator.

4.5   Models for Estimating Spill-overs

In this sub-section, the indices for measuring spill-overs are briefly highlighted. The section also presents different Vector Auto Regressive (VAR) models used in spill-over analysis is pointed in the brief discussion of empirical literature on spill-overs in Chapter Three. Generally the VAR models used in spill-overs are the Global VAR, the General VAR and the Bayesian VAR models. The section also presents some discussion on impulse response and variance decomposition. The section ends by outlining the empirical model to be used in this study. However, given that the study adopts the Bayesian VAR, the section carries its elaborate derivation as well as that of impulse response analysis.

4.5.1   Determining spill-overs

There are many methods and indexes used to calculate spill-overs. Of interest, however, is the growth spill-over index calculated by Capello (2009) for European countries and the volatility spill-over indices developed by Diebold and Yilmaz (2010). These indexes take into account spatial effects in calculating the spill-over index. Annexure 2 has details on the two indexes. The spill-over indexes are normalisations of forecast-error variance decompositions from a General VAR model of volatility proxies, which exploit the generalized VAR framework of Koop, Pesaran and Potter (1996), and Pesaran and Shin (KIPSS) (1998). Below is a review of the VAR models, starting with the Global VAR.

4.5.2   The Global VAR model

The Global Vector Auto Regressive model provides an effective way of modelling interactions in a complex high-dimensional system such as the global economy (Chudik & Pesaran 2014). The Global VAR model is a multi-country framework, which allows the investigation of interdependencies among countries (Galesi & Sgherri 2009). It is generally composed by several country economies modelled by corresponding vector autoregressive (VAR) models (see Annexure 3(a)). Global vector auto regressions can help study cross-country spill-overs

from financial and macro-economic variables by taking into account international linkages (Canales-Kriljenko, Hosseinkouchack & Meyer-Cirkel 2014). The major weaknesses of the Global VAR model regarding applicability to this study are that it requires high levels of data, that is, both the cross-section and the time dimensions should be large (Chudik & Pesaran 2014). In addition, the model assumes that all countries are equally affected by "global developments", which is not the case in the current context.

4.5.3 Generalised VAR model

The Generalised VAR model facilitates analysis of potential volatility interactions between markets. The Generalised VAR model, unlike traditional VAR specifications, allows for non-orthogonalised impulses (Pesaran & Shin 1998). Annexure 3(b) has derivation of Generalised VAR Model. Orthogonalised impulse response function analysis of structural vector autoregressive (VAR) models is subject to the problem of ordering of variables. That is, different response functions are obtained when one changes the order of variables in a VAR system (Kim 2009). To address the problem, Pesaran and Shin (1998) proposed an ordering-invariant approach, the generalised impulse response function, based on the work of Koop *et al.* (1996). Duncan and Kabundi (2011) tested for spill-overs in South Africa through a Generalised VAR model by conducting Generalised Impulse Response and Generalised Variance Decomposition analyses.

4.5.4 Bayesian Vector Auto Regression (BVAR)

The Bayesian Vector Auto Regression (BVAR) model allows prior information about the variables of interest to be incorporated into the system of equations (Banbura *et al.* 2008). The use of prior information assists in mitigating the problem associated with estimations that are performed using a short time span of data. The prior distributions are set following the procedure developed in Litterman (1986a) with modifications proposed by Kadiyala and Karlsson (1997), and Sims and Zha (1998). The ordinary BVAR is specified, following Litterman (1998), and expressed as follows:

$$Y_{it} = c_1 + A_1 Y_{it-1} + \cdots \ldots \ldots A_p Y_{it-p} + \mu_{it} \tag{4.29}$$

Where Y_{it} a vector of endogenous variables with linear dynamics $A_1 \ldots \ldots A_p$ is a vector of autoregressive coefficients and μ_{it} is an n-dimensional Gaussian white noise with covariance matrix $E(\mu_{it}\mu_{it}^1) = \varphi$, $c = (c_1 \ldots c_n)$ is an n-dimensional vector of constants. The basic principle behind it is that all the equations are centred on the random walk with drift as shown by:

$$Y_{it} = c + Y_{it-1} + \mu_{it} \tag{4.30}$$

The prior distributions are based on the idea that recent lags provide more reliable information than the distant lags. The prior beliefs are also based on the facts that own lags explain a large proportion of the variation of a given variable rather than lags of other variables in the system (Banbura *et al.* 2008). The coefficients $A_1 \ldots \ldots A_p$ are assumed to be *a priori* independent and normally distributed. Under the baseline specification, prior beliefs are imposed by setting the coefficient restrictions for the mean and variance. The mean for the prior distribution is shown in equation 4.31.

$$E\left[\left(A_K\right)_{ij}\right] = \begin{cases} \delta_i, & j = i, k = 1 \\ 0, & otherwise \end{cases} \tag{4.31}$$

The prior mean δ is typically set to 1 in the traditional Minnesota prior to account for the persistence of the data, but if the VAR is estimated in first difference, δ should be set to 0. Similarly, the prior variance distribution is shown in equation 4.32:

$$V\left[\left(A_K\right)_{ij}\right] = \begin{cases} \dfrac{\lambda^2}{k^2}, & j = i \\ \varphi\dfrac{\lambda^2}{k^2}\dfrac{\sigma_i^2}{\sigma_j^2}, & otherwise \end{cases} \tag{4.32}$$

The shrinkage parameter φ in equation (4.35) measures the tightness of the prior when $\varphi = 0$, the prior is imposed exactly and the data do not influence the estimates, while as $\varphi = 1$, the prior becomes loose and the prior information does not influence the estimates, which will approach the standard OLS estimates. The parameter λ controls the tightness of the prior distribution around the random walk. The parameter λ also governs the relative importance of the prior beliefs in respect of the information contained in the data. The case where $\lambda = 0$ indicates that the posterior equals the prior. This scenario means that the data do not influence the estimates. However, the case where $\lambda = \infty$, suggests that the posterior expectations coincide with the Ordinary Least Squares (OLS) estimates. The factor σ_i^2 / σ_j^2 is a scaling parameter that accounts for the different scale and variability of the data.

a) Empirical VAR model.

Ordinarily panel VAR models should be used in analysing panel data models as they add a cross-sectional dimension to the representation of the ordinary VAR models (Canova & Ciccarelli 2013). Panel VARs are particularly suited to analysing the transmission of

idiosyncratic shocks across units and time (Canova & Ciccarelli 2013). Panel VARs are also used to examine whether shocks generated outside of a country (or an area) dominate the variability of domestic variables (Canova & Ciccarelli 2013). Following, Drakos and Konstantinou (2011) a panel VAR model with k lags is specified as follows:

$$y_{it} = \mu_0 + A_1 y_{it-1+\cdots+} A_k y_{it-k} + \alpha_i + \lambda_t + \mu_{it}, \quad i = 1, \dots, N; t = 1, \dots, T \qquad (4.33)$$

where A_j are a 5x5 matrices of estimable coefficients; α_i denotes unobserved country-affects; λ_t denotes time-effects; and μ_{it} is a 5x1 vector of well-behaved disturbances; $y_{it} = (GGDPPC_{it}, DCSA_t, BCPSA_t, LLSA_t M2SA_t)$ is a five-variable random vector, composed of economic growth and measures of financial development to be used for the finance-growth spillovers.

Similarly, the set of five-variable random vectors composed of measures of financial development for the finance-finance spillovers would be as follows:

$$FD_{it} = (DCxSA_{it}, DCSA_t, BCPSA_t, LLSA_t M2SA_t), \qquad FD_{it} = (BCPxSA_{it}, DCSA_t, BCPSA_t, LLSA_t M2SA_t)$$

$$FD_{it} = (LLxSA_{it}, DCSA_t, BCPSA_t, LLSA_t M2SA_t) \qquad FD_{it} = (M2xSA_{it}, DCSA_t, BCPSA_t, LLSA_t M2SA_t)$$

Where xSA denote variables for all other SADC countries excluding South Africa and FD is the financial development variable. The model in equation (4.33) imposes the restriction that the underlying structure is the same for each cross-sectional unit, that is, the coefficients in the matrices A_j are the same for all countries in the sample (Drakos and Konstantinou, 2011). To address possible violation of this restriction, the model allows for "individual heterogeneity" in the levels of the variables by introducing fixed effects, denoted by α_i in the model (Drakos and Konstantinou, 2011).

Panel VAR models have three important features: firstly, lags of all endogenous variables of all units enter the model for each unit (dynamic interdependencies); secondly, residuals are generally correlated across units and thirdly, the intercept, the slope and the variance of the shocks may be unit specific (cross-sectional heterogeneity). Apart from these features panel VARs, however, have the same structure as VAR models, in the sense that all variables are assumed to be endogenous and interdependent (Canova & Ciccarelli 2013).

This current study, however, uses a transformed panel VAR model due to the assumption that interdependencies across other units (countries), except with South Africa, are not being considered. Also, given the large number of parameters in panel VARs, without prior information, it becomes difficult to obtain precise estimates of the coefficients and, thus, features such as forecasts and impulse responses would be imprecisely estimated (Agudze 2013).

As such, the study applied a Bayesian VAR approach on a panel data framework to analyse the reaction of other SADC countries growth or financial development to shocks in South Africa's financial system. The Bayesian VAR model allows for prior information about the variables to be incorporated into the system of equations, mitigating the problem associated with short time span of data (Banbura *et al.* 2010). Ordinary VARs require estimation of a large number of parameters, often resulting in over-parameterisation of VAR models (too few observations to estimate the parameters of the model). A Bayesian VAR method solves this problem through shrinkage, by imposing restrictions on parameters to reduce the parameter set (Litterman 1986; Sims & Zha 1998). Bayesian priors provide a logical and consistent method of imposing parameter restrictions.

4.5.5   Generalised Impulse Response Functions (GIRF)

In analysing the results from a VAR model, the impulse response function (IRF) and forecast error variance decomposition (FEVD) can be used (Hassan *et al.* 2011). Generally, an impulse response function traces the effect of a one-time shock to one of the innovations on current and future values of the endogenous variables (Gil-Lafuente, Gil-Lafuente & Merigó-Lindahl 2012; Lada & Wójcik 2007). Generalised impulse responses fully incorporate the correlation structure between impulses and have the advantage (Duncan & Kabundi 2011). Annexure 3(c) contains detailed derivations of the Generalised Impulse Response Functions (GIRF). The GIRF has been employed in many studies, including Boyd *et al.* (2001), Cheung *et al.* (2004), Huang *et al.* (2008) and Diebold and Yilmaz (2010). The Generalised Impulse Response functions are uniquely determined and thus are invariant to reordering of the VAR (Lin 2006).

Forecast error variance decomposition permits inferences to be drawn regarding the proportion of the movement in a particular time-series due to its own earlier 'shocks' vis-`a-vis 'shocks' arising from other variables in the VAR (Enders 1995). The impact of a 'shock' in a particular variable in a VAR system is traced through the system of equations to determine the effect on all of the variables, including future values of the shocked variable (Shan & Jianhong 2006).

Breaking down the variance of the forecast errors for each variable following a shock to a particular variable makes it possible to identify variables that are strongly affected (Shan & Jianhong 2006). Derivations of the Generalised Forecast Variance Decompositions (GFVD) are shown in Annexure 3(d).

To estimate impulse responses, the current study uses Persaran and Shin's Generalised Impulse Response method to orthogonalise the shocks ahead of the Cholesky method. The Cholesky decomposition method is dependent on ordering of endogenous variables and there is no scientific way of determining the order of variables. It is not clear of the best order for the variables under study in terms of their exogenous significance to economic growth or financial development in SADC. The generalised impulse response function addresses the problem of dependence on ordering of variables (Lin 2006). The study also employs Generalised Forecast Variance Decompositions (GFVD). Below are the empirical models for estimating financial spill-over effects in SADC.

4.5.6 Empirical Model: Financial Development Spill-over effects in SADC

For the spill-overs on growth, the study uses a dynamic panel model of growth with financial development (Equation 4.34):

$$g_{i,t} = \beta_0 + \beta_1 g_{i,t-1} + \beta_F \sum_{F=1}^{4} FDSA_{i.t} + \beta_5 GEX_{i.t} + \beta_6 CPI_{i,t} + \beta_7 POP_{i,t} + \beta_8 TO_{i,t} + \varepsilon_{i,t} \tag{4.34}$$

The panel model in 4.34 tests the impact of a shock in South Africa's financial development on economic growth of other SADC countries. The study further tests spill-overs on financial development and employs the following dynamic panel model:

$$FD_{i,t} = \beta_0 + \beta_1 FD_{i,t-1} + \beta_F \sum_{F=1}^{4} FDSA_{i,t} + \beta_5 GGDPPC_{i,t} + \beta_6 TO_{i,t} + \beta_7 FO_{it} + \beta_8 RINT_{it} + \varepsilon_{i,t} \tag{4.35}$$

The dynamic panel model in equation 4.35 tests the impact of a shock in South Africa's financial development on financial development of other SADC countries. The study first determines the nature of the impact of financial spill-over effects by estimating equations 4.34 and 4.35 using GMM approach. The study then applies the Bayesian VAR on the equations to enable impulse response and variance decomposition analysis. When constructing and estimating VAR models all control variables, (GEX, CPI, TO, FO, RINT), are dropped from the model.

The impulse responses and variance decompositions give the impact of a shock in South Africa's financial development on economic growth and financial development of other SADC countries. The tests would enable determination of the nature and magnitude of financial spill-over effects in SADC. The estimates give indication of the reaction of other SADC countries' growth or financial development to shocks in South Africa's financial system.

4.6 Spatial Financial Concentration Framework

Concentration ratios are used in models explaining competitive performance in the banking industry and can reflect changes in concentration as a result of the entry or exist of a bank in the market (Bikker & Haaf 2002). There are many ratios used to measure concentration including the k bank Concentration Ratio (k-CR); the Herfindahl-Hirschman Index (HHI); the Hall-Tideman Index (HTI); the Rosenbluth Index (RI); the Comprehensive Industrial Concentration Index (CCI); the Hannah and Kay Index (HKI); the U Index (U); the multiplicative Hause Index (Hm); the additive Hause Index (Ha); and the Entropy measure (E) (Bikker & Haaf 2002). Of these ratios, the k-bank ratio and the HHI are discussed below.

4.6.1 The k-bank concentration ratio

$$CI_k = \sum_{i=1}^{n} s_i w_i \tag{4.36}$$

where $w_k = \begin{cases} 1 & \forall_i = 1, \dots k \\ 0 & \forall_i = k+1, \dots n \end{cases}$

is the sum of the k largest firms' market shares, which are given equal weights. CI_k is a mapping taking values in [0,1]; $CI_k \to 0$ if $s_i \to \frac{1}{n} \forall_i, n \to \infty$ and $k = 0(n)$. The k-firm concentration ratio has some limitations due to the arbitrariness in the choice of k and the bias induced by excluding the other $n - k$ firms (Ciapanna & Rondinelli 2011).

4.6.2 The Herfindahl-Hirschman Index (HHI)

The Herfindahl–Hirschman Index (H-index) is a widely respected indicator for measuring market concentration in a banking system (SARB 2011). Ceapraz (2008) used the Herfindahl-Hirschman Index to assess concentration in Brazil. The IMF (2013) also noted that a more sophisticated measure of concentration is the Herfindahl Index (HI), which is the sum of squares of the market shares of all firms in a sector. In the United States, the HHI plays a significant role in the enforcement process of antitrust laws in banking and is normally used to assess banks before any mergers are approved (Bikker & Haaf 2002). In this chapter, if S is the combined size of all of the banks (financial sectors) in the region, s_i is the size of

the ith country's banking sector, and there are n countries, then following Michelini and Pickford (1985), the index is defined as:

$$HHI = \sum_{i=1}^{n} \left(\frac{S_i}{S}\right)^2 \qquad \text{where } 1 \geq HHI \geq 1/n. \qquad (4.37)$$

The HHI is the sum of the squared sizes of all of the financial sectors in the region, where each country's financial sector size is expressed as a proportion of regional size. This approach of measuring financial concentration has elements of spatial distribution in it as bank assets for individual countries are used. As such, the concentration obtained by the method is not about the assets of the top three banks in SADC, but spread of top banking assets across countries in SADC. The HHI is the most popular measure; it represents the reference market power index in the antitrust authority guidelines when evaluating M&As (Ciapanna & Rondinelli 2011).

Although the HHI is the stronger of the two in assessing concentration, the lack of data on market shares of individual banks for each country makes the use of the HHI impossible. For this study, both methods are used with the k-bank ratio measuring concentration in individual countries whilst the HHI measuring concentration in SADC as a region. The HHI index is used to measure concentration in the SADC as a bloc in order to circumvent the weakness of the k-bank ratio in terms of arbitrariness in the choice of k, and bias of excluding $n - k$. Total bank deposits for each country are taken as their market share and the country as a firm. Since the index is static, it is calculated for each year over the entire study period (1985-2014) in order to assess a trend.

Beyond testing for the existence of concentration in SADC countries, the study also evaluates the relationship between financial market concentration and financial development. This study uses a Dynamic Panel Model with interactive dummies that differentiate country income levels. The empirical models are outlined below:

4.6.3 Empirical Model: Financial Market Concentration

The objective is to analyse whether financial market concentration affects the level of financial development in the SADC region. Financial market concentration is measured by bank concentration. The rationale is that in most SADC countries, the financial systems are dominated by banks, with minimal development of non-bank financial institutions. Furthermore, within banked based financial systems, the sector is dominated by a few banks, mostly foreign banks. It can thus be argued that since financial sectors for most SADC

countries are bank based, and the sector is dominated by a few banks, the use of bank concentration better reflects the level of financial concentration in these countries.

Below are empirical models for financial development- financial market concentration and for the impact of financial development in South Africa on financial market concentration in SADC.

i)   Financial Development – Financial Market Concentration Model

Equation 4.38 is the panel model to be used to assess the relationship between financial concentration and financial development.

$$FD_{it} = \beta_1 + \beta_2 FD_{it-1} + \beta_3 GGDPPC_{it} + \beta_4 TO_{i,t} + \beta_5 FO_{it} + \beta_6 RIR_{i,t} + \beta_7 FC_{it} +$$

$$+\varepsilon_{it} \qquad\qquad (4.38)$$

where FC is financial concentration (as measured by the k-bank concentration ratio), FD is financial development, RINT is real interest rate and TO and FO are trade and financial openness, respectively. The study further assesses the role of country income on the relationship between financial concentration and financial development following Law and Abdullah (2006). The effect of income is estimated by the interaction term between the measure of financial concentration and a dummy variable for country income. As such, equation 4.38 is expanded to:

$$FD_{it} = \beta_1 + \beta_2 FD_{it-1} + \beta_3 GGDPPC_{it} + \beta_4 TO_{i,t} + \beta_5 FO_{it} + \beta_6 RIR_{i,t} + \beta_7 (FC_{it} *$$

$$MIC) + \beta_8 (FC_{it} * LIC) + \varepsilon_{it} \qquad\qquad (4.39)$$

where MIC and LIC are the dummy variables of middle income countries and low income countries, respectively.

ii)   Financial Development in South Africa on other SADC countries financial market
*   concentration*

This study also performs empirical tests on the effect of financial development in South Africa in respect of financial concentration in the SADC region. The assumption is that as South Africa's financial sector grows and expands into the region, through branches and institutions, it dilutes the level of concentration of financial sectors in the recipient countries. The expectation is that financial development variables for South Africa are negatively related to financial concentration in SADC. The tests involve running panel estimations with financial concentration as the dependent variable.

Two new variables, foreign banks to total banks and bank returns on assets, are introduced as control variables in addition to growth in real GDP per capita and financial openness. The expectation is that more foreign banks, particularly fully fledged banks, imply a higher number of banks in that country and this dilute the country's financial concentration. With return on assets, high returns attract other players into the industry, thereby diluting the concentration. Real GDP per capita growth represents average income per person and reflects demand for banking services and is expected to have a negative effect on concentration. Financial openness, the more open an economy is to finance the more competition it generates in the market and the more investment and assets flow to the banking sector and more institutions could be established.

The empirical model estimate becomes:

$$FC_{it} = \beta_1 + \beta_2 FC_{it-1} + \beta_3 GGDPPC_{it} + \beta_4 FO_{it} + \beta_5 FB_{i,t} + \beta_6 ROA_{i,t} +$$
$$\beta_7 DCSA_{it} + \beta_8 LLSA_{it} + \beta_9 BCPSA_{it} + \beta_{10} M2SA_{it} + \varepsilon_{it} \qquad (4.40)$$

where FC is financial concentration, GGDPPC is growth in real GDP per capita and FO is financial openness. FB is the proportion of foreign banks and ROA is return on assets. DCSA is domestic credit in South Africa, LLSA is liquid liabilities in South Africa, whilst BCPSA is bank credit to private sector in South Africa and M2 is broad money in South Africa

4.7   Methodological Approach- Global Finance and International Financial Centres (IFC)

Generally studies on financial centres, including those of Seo (2011), Yeandle and Danev (2014) and Bourse Consult (2013), are qualitative and uses comprehensive review of literature and to an extent descriptive statistics approaches. Zhao (2010) reviews historical experiences of development of global financial centres based on their developmental conditions, pathways and determining factors. PricewaterhouseCoopers (2015) undertook a review of literature of over 60 secondary sources to consider the concept of a global financial centre, and suitability of London for social impact investment. Thomas, Panesar and Makris (2013) used Five Forces Industry Analysis to assess the competitive resources of Dubai as an International Financial Centre (IFC).

The current study also uses a qualitative approach particularly in strategies to enhance linkages of SADC and global financial markets. However, to prove the role and impact of international

financial centres and global finance on financial development in SADC, the study applied dynamic panel models as explained in the next section.

4.7.1 Empirical Model: Global Finance, International Financial Centres and Financial Development

The study tests the effects of international financial centres and global finance on financial development in SADC. The rationale is that financial centres attract global finance, which in turn, enhances development of the financial sectors of recipient countries. A dummy variable for international financial centres that takes a value of one when a country has an international financial centre and zero otherwise is introduced. The study only uses Random Effects to estimate a dynamic panel model on financial development, due to the presence of dummy variables. In line with that, the study chose the Wallace and Hussain estimator of component variances that uses only OLS residuals ahead of other methods such as that of Swamy and Arora, and Wansbeek and Kapteyn who used fixed effects residuals (Phiromswad 2007). Below is the empirical models on international financial centres and the financial development model and the global finance and financial development model.

i) *International Financial Centres and Financial Development Model*

The model used to analyse the effects of financial centres on financial development in SADC is stated in equation 4.41 below.

$$FD_{it} = \beta_1 + \beta_2 FD_{it-1} + \beta_3 GGDPPC_{it} + \beta_4 TO_{i,t} + \beta_5 FO_{it} + \beta_6 RIR_{i,t} + \beta_7 IFC_{it} + \varepsilon_{it}$$

$$(4.41)$$

where, FD is financial development (as measured by four variables namely Domestic Credit, Liquid Liabilities Bank Credit to Private Sector and Broad Money, (all proportionalised to GDP); RINT is real interest rate, and TO and FO are trade and financial openness respectively; IFC is a dummy for International Financial Centres. The IFC dummy variable takes a value of one when a country has a financial centre and zero otherwise.

ii) *Global Finance and Financial Development model*

The study again uses the Dynamic Panel Model to estimate the effects of international/global finance on financial development in SADC (Equation 4.42). Estimations were carried out using Fixed and Random effects.

$$FD_{it} = \beta_1 + \beta_2 FD_{it-1} + \beta_3 GGDPPC_{it} + \beta_4 TO_{i,t} + \beta_5 FO_{it} + \beta_6 RIR_{i,t} + \beta_7 FDI_{it} +$$
$$\beta_8 ODA_{it} + \varepsilon_{it} \qquad\qquad (4.42)$$

where FDI is Foreign Direct Investment and ODA is official Development Assistance.

4.8 Estimation Approaches

This section presents the approaches used in estimating the various empirical models outlined above. Fundamentally, variations in methodological approaches start from the type of data used in the analysis. This study, however, uses panel data for analyses. Annexure 4 contains an elaborate discussion on the type of data, in particular, justification for the use of panel data. Empirically, there are various approaches used to estimate panel data models. The techniques used in this current study include Fixed Effects, Random Effects and the GMM estimation approach - these are discussed below.

i)   Fixed Effects

Fixed Effects explore the relationship between predictor and outcome variables within an entity. Each entity has its own individual characteristics that may or may not influence the predictor variables (Torres-Reyna 2007). The Fixed Effects model controls for, or partial out, the effects of time-invariant variables with time-invariant effects (Williams 2015). The Fixed Effects model assumes that certain attributes within the individual may impact on, or bias the predictor or outcome variables and has to be controlled. If the error terms are correlated, then the fixed effects model is not suitable since inferences may not be correct (Torres-Reyna 2007).

ii)   Random Effects

The random effects model assumes that the entity's error term is not correlated with the predictors, which allows for time-invariant variables to play a role as explanatory variables (Torres-Reyna 2007). The individual-specific effect is a random variable that is uncorrelated with the explanatory variables (Torres-Reyna 2007). The difference between the random effects and fixed effects model is that the variation across entities is assumed to be random and uncorrelated with the independent variables included in the model. In other words, the distinction is on whether the unobserved individual effect embodies elements that correlate with the regressors in the model (Green 2008).

iii)   Generalised Method of Moments (GMM)

The Generalised Method of Moments (GMM) refers to a class of estimators that are constructed from exploiting the sample moment counterparts of population moment conditions (sometimes known as orthogonality conditions) of the data generating model (Hansen 2007). The GMM has become an important estimation procedure in many areas of applied economics and finance since Hansen introduced the two step GMM in 1982 (Chausse 2010). Arcand (2012) observed

that the GMM technique is increasingly being applied to macro panel data, including in the area of financial development and growth. The GMM dynamic panel methodology combines time as well as cross-country variation in the data. The GMM method assumes that the disturbance terms are independent, homoscedastic across countries and over time and prevents serial correlation (Le Roux & Moyo 2015 citing Baltagi 2005). The method can also be used in the presence of heteroscedasticity by making use of the orthogonality conditions.

GMM has been widely used in dynamic panel data models particularly in cross country analyses for the following reasons: GMM dynamic panel methodology provides unbiased estimators for the coefficients when explanatory variables in the regression are weakly exogenous (Barajas, Chami & Yousefi 2012). Weak exogeneity of variables implies that they are affected only by the present and past levels of economic growth and uncorrelated with future innovations in growth. GMM estimators have large sample properties that are easy to characterise in ways that facilitate comparison. The method also provides a natural way to construct tests that take account of both sampling and estimation error (Hansen 2007). GMM estimation is less likely to be mis-specified as it can be seen as a generalisation of many other estimation methods (Chausse 2010). In practice, researchers find it useful that GMM estimators can be constructed without specifying the full data generating process (Hansen 2007). Because GMM depends only on moment conditions, it is a reliable estimation procedure for many models in economics and finance (Chausse 2010).

The GMM technique, however, works well when the data feature a large number of countries (N) relative to the time period (T) to avoid asymptotic imprecision and biases (Roodman 2006 and Barajas, Chami & Yousefi 2012). When N is small and T is large, GMM captures only the short-run dynamics (Samargandi, Fidrmuc & Ghosh 2013). To circumvent this challenge, this current study augments the GMM with other estimation models for long term estimations.

4.9   Sources of Data

Data used in this study were obtained from the World Banks' World Development Indicators (2015) and the Global Financial Development Database (GFDD) (2015). Other data sources such as the IMF, Statistics South Africa and the Central Banks of countries under study were only utilised in cases of missing data. Financial Openness data was obtained from the Chin-Chin-Ito-Index website. Distances of SADC countries from South Africa were obtained from World Clock [Online]. The period of analysis is from 1985 to 2014. Data was processed using E-Views 8 and 9 econometric software packages. Descriptive statistics for the data used in this

study is contained in Annexure 5. The following section discusses the variables used in this current study.

4.10   Discussion of variables used in the Study

Given the absence of a distinct measure of financial development and the prominent use of proxies in most studies, it is import to identify and justify variables to be used in the study. This section also discusses variables for measuring financial innovation, economic growth, distance (spatiality) and openness (trade and financial). Below is an explanation of the variables to be used for measuring financial development.

4.10.1 Financial development

Variables used for measuring financial development require some justification. The rationale is that what represents an appropriate measure of financial development proved to be controversial in the literature (Ghirmay 2004). Literature generally used variables that capture the degree of financial intermediation, efficiency of the financial sector, monetisation of the financial system, the role of commercial banks in allocating funds, and the relative importance of the stock market (Lawrence & Longjam 2003). This study uses total domestic credit by the banking system relative to GDP, liquid liabilities of the financial sector (M3 to GDP), bank credit to private sector to GDP (private credit) and broad money to GDP as proxies for measuring financial development. Ideally, the study should have included stock market capitalisation, to capture the non-bank financial sector but lack of data and limited development of stock markets in most SADC countries renders the variable inappropriate. Below is a discussion of domestic credit, liquid liabilities, bank credit to private sector and broad money.

i)   Domestic credit

Domestic credit captures the full degree of intermediation in developing countries, including public borrowing as governments often borrow from the financial markets to finance provision of infrastructure for economic development (Adusei 2012). Government borrowing not only affects credit to other sectors in domestic markets but often also invite interference by government in the markets as well, which affects financial development.

ii)   Liquid liabilities of the financial sector

Liquid liabilities reflect the overall size of the financial intermediary sector in a country. Liquid liabilities are used as a measure of 'financial depth' and thus of the overall size of the financial intermediation sector (King & Levine 1993a). Ghirmay (2004), however, argued that a major

110

weakness of liquid liabilities ratios (M_3/GDP) serving as proxies of financial development is that it is likely to measure the extent to which transactions are monetized rather than the functions of the financial system.

iii)   Banking credit private sector

Credit to the private sector represents an accurate indicator (proxy) as it is a measure of the quantity and quality of investment (Beck *et al.* 2000). Credit to the private sector is often used as a proxy for measuring financial development in literature. It, however, does not include financial developments that occur outside the banking system. Most of the financial developments in the developing countries in general and African countries in particular, have occurred within the banking system (Ghirmay 2004). This measure isolates credit issued to the public sector, that is, it does not include credit issued to the government or governmental agencies (Cojocaru, Hoffman & Miller 2009).

iv)   Broad Money

Broad money consists of currency held outside the banking system plus interest-bearing total deposit liabilities of banks and other financial institutions. Broad money reflects the overall size of the financial intermediary sector in a country. Broad money is traditionally used as a financial deepening indicator (King & Levine 1993). Beyond financial development measures this study also discusses variables used to measure financial innovation, as outlined in the following section.

4.10.2   Financial innovation

Financial innovation is neither limited to the invention of new financial instruments, nor to innovation by financial institutions (Laeven *et al*. 2012). Financial innovation also includes more mundane financial improvements, such as the new financial reporting procedures, improvements in data processing and credit scoring that enhanced the ability of banks to evaluate borrowers, and the adoption and upgrading of private credit bureaus. As such, the choice of variables that captures financial innovation needs to be all inclusive beyond those that depict product innovation only.

Mannah-Blankson and Belnye (2004) and Ansong *et al.* (2011) used the volume of cash card transactions and the ratio of broad money to narrow money (M2/M1). Reinhart et al. (1995) used the log of the ratio of M2 to Ml as a proxy for financial innovation. Valverde *et al*. (2007)

applied the ratio of mutual fund business to GDP as proxy for product innovation, while ATM/Branches were also used for technical change for regional distribution channels. Michalopolous *et al*. (2009) employed the growth of financial development as a measure of financial innovation.

This study uses Growth in the Banking Sector Credit to Private Sector (GBCP) following Michalopolous *et al.* (2009, 2014) and Aboagye and Idun (2014); the ratio of Broad Money to Narrow Money (M2M1) in accordance with Ansong *et al*. (2011) and Mannah-Blankson and Belnye (2004); and Mobile Banking proxied by the 'mobile penetration' rate (in line with Asongu 2013, Ondiege 2010 and Aker & Mbiti 2010) as proxies for financial innovations.

GBCP is more likely to gauge improvements in financial services since it omits credit to the government or public enterprises (Laeven *et al.* 2014). In addition, increases in bank credit across states promote financial innovation in the non-financial sector (Amore *et al.* 2013).

In respect of M2M1, theory presented by Shaw in 1973 stated that savings deposits increases more rapidly than transaction balances as the financial system expands and helps growth by facilitating economic activity (Petkovski & Kjosevski 2014). M2M1 is often regarded as an adequate measure of the size of financial sector in developing countries in view of the predominance of the banking sector (Liu & Woo 1994).

Mobile banking is one of the key innovations that have managed to increase financial access and depth and in the process enhancing economic growth. Most mobile transactions in the developing world enable users to store value (currency) in an account accessible via a handset, convert cash into and out of the store value account and transfer stored value between accounts (Jonathan & Camilo 2009). This study measures mobile banking with the 'mobile penetration' rate, in line with Asongu (2012), Ondiege (2010) and Aker and Mbiti (2010). Caution, however, needs to be taken with the variable given that mobile penetration does not necessarily translate to mobile banking. In most SADC countries, mobile phone services were introduced in the early 1990s and finance was only integrated in mobile phones after 2011.

4.10.3 Economic growth

Economic growth is measured by real GDP per capita, as it goes beyond indicating a country's economic size through income stock but also captures distribution of this income in a country, enabling cross-country comparisons (King & Levine 1993).

4.10.4 Distance (spatiality)

The spatial variable involves issues of distance and ρ is the distance of country i from South Africa (SA) interpreted as the ratio of the distance of the furthest SADC country from South Africa. It, therefore, is the degree of closeness to South Africa. The furthest country is Seychelles, which is 3771 kilometres from South Africa. This country is assigned a value of zero, implying there is zero spatial externality due to the long distance, while South Africa is assigned 1, implying the maximum spatial externality. Thus the closer a country is to South Africa, the higher the potential for spatial externality. The distances used in this study are distances from the capital cities of the respective SADC countries to Johannesburg.

4.10.5 Openness (trade and financial)

Trade and financial openness are increasingly being acknowledged as channels through which financial development is promoted (Matadeen & Seetanah 2013). Trade openness is defined as the ratio of total exports of goods and services plus imports of goods and services relative to GDP. Openness increases a country's exposure to vulnerabilities from external shocks, which lower revenue and growth. The openness variable has a positive impact on economic growth (Berg & Krueger 2003). More open economies are, however, able to generate the trade surpluses needed to service external debt and are less likely to experience difficulties with external public debt (Daniel *et al.* 2003).

The financial openness is usually measured by the ratio of foreign direct investment to the GDP (Lim & McNelis 2014). Lane and Milesi-Feretti (2006) used the volume of a country's financial assets and liabilities as a ratio of GDP. Le Roux and Moyo (2015) used the Chinn-Ito-Index to proxy financial openness. The level of financial openness in the SADC region as a whole is low, although there are a few financially open countries such as Zambia, Seychelles and Mauritius (Le Roux & Moyo 2015). The current study uses the Chinn-Ito Index for financial openness. The Chinn-Ito-Index (KAOPEN) is an index measuring a country's degree of capital account openness. The index was initially introduced by Chinn and Ito (2006). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) (Chinn & Ito 2008).

Neo-classical models postulated that by liberalising the capital account results in efficient international allocation of resources (Henry 2007). Higher rates of returns in developing countries attract capital from developed countries, thereby reducing the cost of capital in

developing countries and increasing investment and economic growth (Fischer 2003). Through financial openness, subsidiaries or branches of foreign banks can enlarge the domestic banking system, serve neglected market niches and introduce financial innovation that broadens the scope of financial services (Voghouei, Azali & Jamali 2011). In addition, financial openness weeds out inefficient financial institutions, which usually increases efficiency of the financial system and promotes portfolio diversification (Chinn & Ito 2005).

4.11   Descriptive statistics and data diagnostic checks

Descriptive statistics for the variables used in each of the econometric estimations are carried out before regressions are run. The statistics include mean, median, standard deviation, maximum and minimum values, and these are presented in Table A1 in Annexure 5. Furthermore, data diagnostic tests are carried out including correlation tests, stationarity tests, Wald tests and Hausman tests as explained below.

- *Multi-collinearity:* Multi-collinearity arises from the perfect linear relation among regressors as these results in inflated standard errors and consequently inaccurate parameter estimations. The presence of multi-collinearity, indicated through high Pairwise correlation among regressors, inflates standard errors of the coefficients resulting in estimators with large variance and covariance. Increased standard errors in turn mean that coefficients for some independent variables may be found not to be significantly different from zero. Although best linear unbiased estimators (BLUE) are obtained, a large variance and covariance make precise estimation difficult. As a rule of thumb the pair wise or zero order correlation coefficient is said to be high if it exceeds 0.8 (Gujarati 2003). Cohen (1988), however, stated that a correlation greater than 0.5 should be regarded as large, 0.5-0.3 as moderate, 0.3-0.1 as small, and anything smaller than 0.1 as insubstantial.

- *Panel Unit root*: Panel data have components of time series as well as cross sectional dimensions, hence stationarity should matter. Since the appearance of the papers by Levin and Lin (1992, 1993), the use of panel data unit root tests has become very popular among empirical researchers with access to a panel data set (Maddala & Wu 1999). There has been much interest in testing for the presence of a unit root in panel data and many researchers have proposed statistics to test the hypothesis of a common unit autoregressive root (Moon, Perron & Phillips 2006). A number of panel unit root tests that allow for cross-section dependence have been proposed in the literature that uses orthogonalisation type procedures to asymptotically eliminate the cross-dependence of the series before standard panel unit root tests are applied to the transformed series (Moon, Perron & Phillips 2006).

- This study uses the Levin, Lin and Chu; Im, Persaran and Shin W-state; ADF-Fisher Chi-Square and the PP-Fisher Chi-Square tests to test for stationarity in the panel data. There is no dominant performance of one particular test as the models differ in terms of the assumptions regarding the null hypothesis and how the auto-correlation is removed. For example, the Fisher PP test removes the auto-correlation using an adjustment to the standard errors, as with the usual Phillips-Perron (PP) test. In respect of the size-adjusted power, the Fisher-type test out-performs the Im-Pesaran-Shin test, whilst the Levin-Lin-Chu test is powerful if the time dimension T is large (Kunst 2011). Where the variables are not stationary in levels, appropriate transformation including differencing or exponential smoothing is done until the variables become stationary.

- The Wald Test is used to verify the true values of different parameters. The statistical relationship between parameters is modelled and the values under verification are derived from samples of a population of these parameters.

- *Panel Random or Fixed Effects*: Where applicable, the Hausman Specification Test is carried out to determine the appropriate approach between fixed and random effects. The Hausman test basically tests whether the unique errors are correlated with the regressors.

4.12   Chapter summary and conclusion

Chapter Four presented the research methodology wherein it first reviewed literature on the various models and methodological approaches used in previous studies and then derived models for this current study.

The reviewed literature on methodologies indicates that endogenous growth models are the basis of the finance-growth nexus. The chapter indicated that an endogenous growth model with financial intermediation specified in a dynamic panel model would be used in the finance-growth analysis. The empirical model is extended by including trade and financial openness variables, and a financial reforms dummy variable.

For the financial innovation-growth analysis, Laeven *et al.* (2012) extended the AHM Model to stress the importance of financial innovation. The empirical model for financial innovation-growth analysis is derived from the extended AHM Model, developed by Laeven *et al.* (2012), which stresses the importance of financial innovation. This model is estimated using an Autoregressive Distributive Lag (ARDL) model.

Four models were reviewed for spatial effects analyses, namely the Spatial Autoregressive Model, the Spatial Error Model, the Spatial Panel Model - Moving Average Error Process and

the Spatial Durbin Model. The major weaknesses of the first three models outlined above are that they ignore spatial externalities working through the explanatory variables and that spatiality dependence is only in the dependent variable or in unobservable variables. As such, for the current study, the Spatial Durbin Model (SDM) was selected ahead of other models due to its ability to capture externalities, which form the basis of transmission of financial spatial spill-overs from South Africa into the SADC region.

The empirical model derived from the SDM for estimating spatial effects has a spatial lag on the dependent variable. The model would be extended by including openness variables and a dummy variable to capture the effect of monetary union under the Multilateral Monetary Agreement. The dummy is interacted with the proportion of a Multilateral Monetary Agreement country's central bank assets as a ratio of Reserve Bank of South Africa's assets to capture the proportion of financial development, which is translated to that country from South Africa through the monetary agreement.

Three VAR models for spill-overs, the Global VAR, the General VAR and Bayesian VAR were reviewed. The current study adopted the Bayesian VAR model due to its ability to mitigate the problem associated with the short time-span of data. The study also identifies the non-orthogonalised generalised impulse response function of Bayesian VAR models for use in impulse response and generalised variance decomposition for forecasting analysis. Empirically, spill-overs in the SADC region are first estimated by a dynamic panel model using the GMM approach. The study then applies the Bayesian VAR on the equations before applying the generalised impulse response function and forecast error variance decomposition for impulse response and variance analysis.

Regarding spatial financial concentration two methods of measuring concentration were reviewed, namely the k bank Concentration Ratio (k-CR) and the Herfindahl-Hirschman Index (HHI). Both methods are strong in assessing concentration; however, the study uses the HHI for estimating level of concentration in SADC.

The study uses dynamic panel models to estimate the relationship between financial concentration and financial development as well as between global finance and financial development. The chapter also discussed empirical estimation approaches used, mainly the Fixed and Random effects of panel dynamic models and the Generalised Method of Moments (GMM) model. In the final section the variables to be used in the study are described.

In the following chapter, the study reports on the empirical tests for the relationships highlighted in Chapter One. The results of the first empirical analysis, presented in Chapter Five, are on the causal relationship between financial development and economic growth. Presented are results on the nature of the relationship, the effect of financial reforms and the Granger causality between the two.

CHAPTER FIVE
FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH IN THE SADC

5.1   Introduction

The finance-growth nexus is the foundation of the empirical analysis of this study on the basis of the possible reciprocal causal relationship between financial development and economic growth as well as possibility of real sector transmitted financial spillovers. This chapter presents results of empirical estimations on the causal relationship between financial development and economic growth in the SADC countries, including the effects of financial reforms. The empirical estimations are carried out in three stages, first using GMM and Dynamic Panel Fixed effects; secondly, the models introduce financial reforms and lastly, the Granger causality tests. Interpretation of the results will be in two stages, with the first being on each variable used for measuring financial development. The second interpretation would be of the overall results, including the causality effects.

Presented first, in Section 5.2, are the variables used in the tests and the *a priori* expectations on each variable. Section 5.3 then provides descriptive statistics, correlation and unit root tests of the variables. Section 5.4 presents the results of the GMM estimations, whilst section 5.5 presents the results of the Fixed Effects estimations conducted for robustness checks of the GMM results. The results for each variable used as a proxy for financial development are discussed, comparing it to other studies. Section 5.5 introduces reforms to the models and the results of the effect on financial reforms on economic growth. Section 5.6 reports on the results of the Granger causality tests between financial development and economic growth. Causality is tested using an Autoregressive Model of order 2, estimated through Panel OLS and GMM estimations.

The study findings in this chapter contribute to the body of literature by revealing the nature of the finance–growth relationships in the SADC countries. The findings bring to the fore the role and effects of financial reforms on growth under the finance-growth nexus dynamics. The study also investigates the finance-growth causality contributing to the debate on finance-growth causality in the SADC context.

5.1.1 Observed relationship between finance and growth in SADC

The observed relationship between financial development and economic growth in SADC, based on descriptive analysis of data, shows that finance is positively related to growth in general (Figure 5.1).

Figure 5.1: Observed relationship between finance and growth in SADC
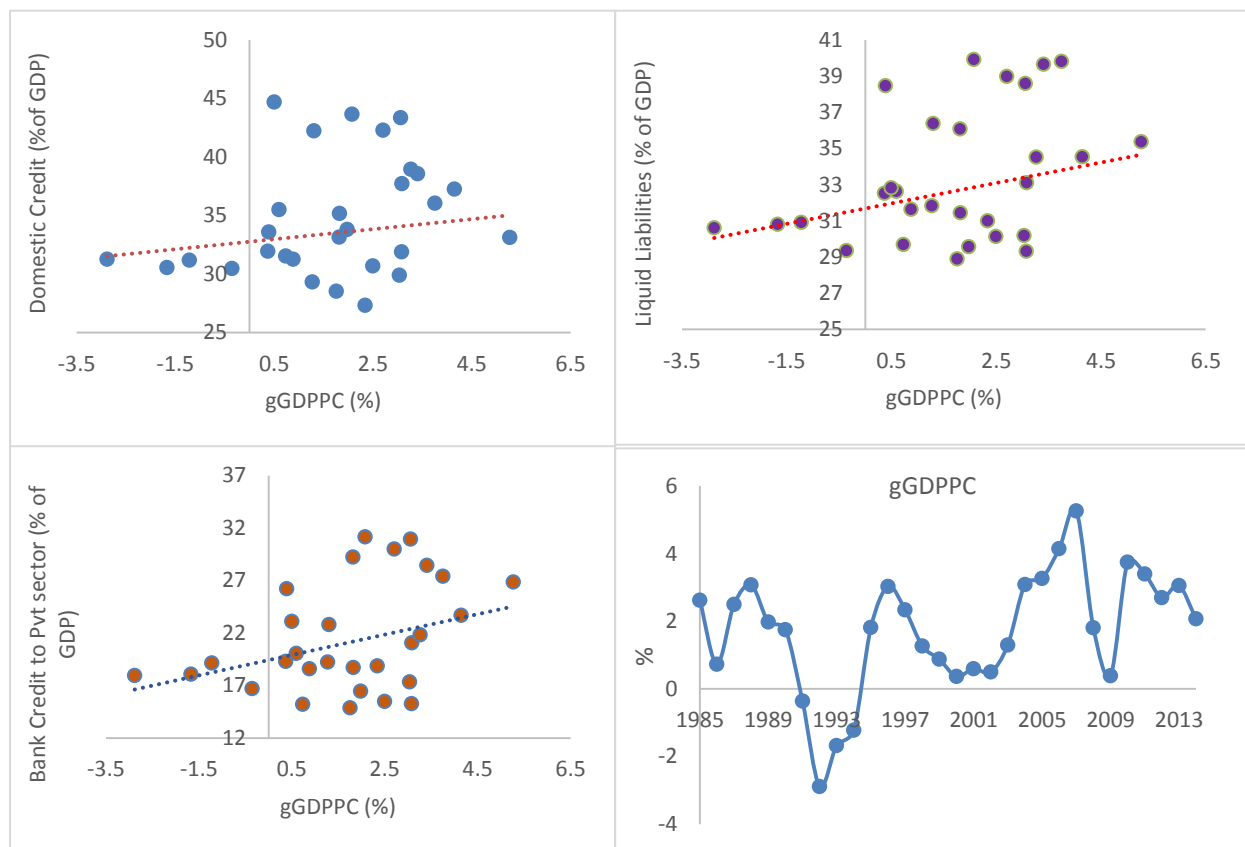
*gGDPPC-growth in Gross Domestic Product per Capita (GDPPC). The graph on gGDPPC is presented to show trend in average SADC growth rate over the study period

Data Source: World Development Indicators (2015)

The descriptive analysis of data reveals a trend that, in SADC, finance supports growth across three measures of financial development, namely Domestic Credit, Liquid Liabilities and Banking Sector Credit to Private Sector. Notwithstanding the observed generalised relationship, where finance trends together with economic growth in SADC caution needs to

be taken in that the observed trend is highly descriptive, based on averaged time series data. It therefore would be necessary to conduct empirical evaluations on the relationship based on econometric estimations. The following section describes the variables used in the estimations and their *a priori* expectations.

5.2   Variables description, *a priori* expectations and data diagnostics

The variables used in the finance-growth empirical testing and the expected signs on explanatory variables are illustrated in Table 5.1. In this chapter, Domestic Credit (DC), Liquid Liabilities (LL) and Bank Credit to Private Sector (BCP) were used as proxies for financial development.

Table 5.1: Variables description and expected sign

Variable Category	Variable	Description	Definition
Dependent Variable	GGDPPC	Growth in Real Gross Domestic Product per capita (GDPPC)	Growth in real Gross Domestic Product per capita
Financial Development	DC	Domestic Credit	Total credit by the financial sector
	LL	Liquid Liabilities (Money Supply)	M3/GDP
	BCP	Bank Credit to Private Sector	Total credit by banks to private sector
Control Variables	GCF	Gross Fixed Capital Formation	Gross fixed capital formation/GDP
	GEXP	Government Expenditure	Total Government expenditure/GDP
	CPI	Consumer Price Index (Inflation)	Growth in Consumer Price Index (Inflation rate)
	RINT	Real Interest Rate	Real interest rate
	TO	Trade Openness	(Exports + Imports)/GDP

Source: Author's own compilation

Gross fixed capital formation, government expenditure, consumer price index, real interest rate and trade openness are set as the control variables, with their effects as described below.

A priori expectations are that domestic credit and banking sector credit to the private sector have a positive impact on economic growth, with liquid liabilities having either a positive or negative impact on growth. It is expected that extending credit (both bank and domestic) to productive sectors should stimulate economic growth. Liquid liabilities are largely money supply and are expected to have either a negative or positive effect on growth. The rationale is twofold. On the one hand, excessive growth of money supply could be inflationary, given

production constraints in most SADC countries, which retards growth. On the other hand, growth of money supply, which does not trigger inflation, especially when there is no full employment of resources, could support an increase in production and output.

All control variables, except for inflation, real interest rates and government expenditure, are expected to have positive coefficients, implying a positive impact on economic growth. Capital is needed in production and is one of the channels through which financial development causes economic growth. Gross fixed capital formation is expected to be positive as it has a robust correlation with economic growth (Levine & Renelt 1992).

Government expenditure is normally financed through high taxes, which in turn reduces disposable income. Furthermore, when borrowing Government crowds out private sector and ultimately its effect on growth is anticipated to be negative. High real interest rates are anticipated to result in the reduction in output as the cost of capital becomes high. Increases in the interest rate, pushes agents to discount future output relative to current output at a higher rate resulting in capital moving toward the production of final goods and away from knowledge-based goods (Romer 1990). The consequence is a decline in economic growth (Kularatne 2002).

Trade openness enhances local production through exports and increases access to foreign technology, which drives local production. Inflation is generally detrimental to production and a negative sign is expected on the CPI coefficient. Inflation not only reduces economic activity in the region, but also weakens the importance of an institutional framework conducive to a stable macroeconomic environment (Bittencourt, van Eyden & Seleteng 2015). It is also expected that lagged values of the dependent variable (per capita growth in GDP) should have a positive effect on current values. Below are the diagnostic tests of the data used in this chapter, mainly the multi-collinearity and panel stationarity tests.

5.2.1   Multi-collinearity tests

Table 5.2 shows results of the multi-collinearity test for the variables used in the current estimation. There is high correlation of financial development variables and near moderate collinearity exists between Liquid Liabilities and Population, at 53%.

Table 5.2: Correlation matrix

	BCP	CPI	DC	GCF	GEXP	GGDPPC	LL	POP	RINT	TO
BCP	1.0000									

CPI	-0.0815	1.0000							
DC	0.7292	-0.0466	1.0000						
GCF	0.0561	-0.0958	-0.0933	1.0000					
GEXP	-0.0470	-0.0488	0.0254	0.4026	1.0000				
GGDPPC	0.063	-0.1572	-0.0949	0.2687	0.0517	1.0000			
LL	0.7135	-0.1155	0.6045	0.2694	0.2094	0.0948	1.0000		
POP	-0.4246	0.0917	-0.2850	-0.2378	-0.1755	-0.1295	-0.5269	1.0000	
RINT	0.0705	0.0149	0.0327	-0.2013	-0.2902	-0.2482	0.0727	-0.1862	1.0000
TO	0.1056	-0.0532	-0.0980	0.4391	0.5058	0.2053	0.3497	-0.3773	-0.1326	1.0000

Source: Author's own calculation

To address the challenge of multicollinearity, variables with high level of correlation would not be included in the same model.

5.2.2 Panel stationarity test

Table 5.3 shows the panel unit root test results of the variables.

Table 5.3: Panel unit root tests at level

Variable	Levin, Lin & Chu	Im, Persaran & Shin W-state	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
Bank Credit to Private Sector (BCP) to GDP	0.78716 (0.7844)	1.8571 (0.9684)	24.7337 (0.7379)	20.6174 (0.8995)
First Difference BCP	9.95172 (0.0000)***	-10.9436 (0.0000)***	170.364 (0.0000)***	277.427 (0.0000)***
Consumer Price Index (CPI)-Inflation	4.32753 (0.0000)***	-4.1884 (0.0000)***	87.4226 (0.0000)***	95.3842 (0.0000)***
Domestic Credit (DC) to GDP	-1.71063 (0.0436)***	-1.66284 (0.0482)***	48.8233 (0.0164)***	47.2156 (0.0237)***
Gross Fixed Capital Formation	-2.9040 (0.0018)***	-3.1336 (0.0009)***	54.0280 (0.0046)***	66.6563 (0.0001)***
Government expenditure to GDP	-4.0110 (0.0000)***	-3.9659 (0.0000)***	72.1170 (0.0000)***	69.2745 (0.0001)***
Real GDP growth	-6.0888 (0.0000)***	-6.3677 (0.0000)***	97.9346 (0.0000)***	187.059 (0.0000)***
Real GDP Per Capita growth	-6.1693 (0.0000)***	-6.4979 (0.0000)***	100.094 (0.0000)***	189.686 (0.0000)***
Liquid Liabilities (Money Supply) to GDP	-2.1033 (0.0177)***	-1.5908 (0.0558)**	50.2759 (0.0116)***	51.8866 (0.0078)***
Population	-9.6561 (0.0000)***	-9.8465 (0.0000)***	158.018 (0.0000)***	46.1173 (0.0303)***
Real Interest Rate to GDP	-4.0880 (0.0000)***	-4.9138 (0.0000)***	82.7977 (0.0000)***	108.684 (0.0000)***
Trade Openness	-3.5849 (0.0002)***	-2.8190 (0.0024)***	54.1696 (0.0044)***	46.4778 (0.0280)***

t-statistic (probability); ***, **, * stationary at 1%, 5% and 10% levels respectively

Source: Author's own calculations

All variables except for Bank Credit to Private Sector were stationary at level. Variables are stationary at level mainly because they are in ratios or in percentage form, which reduces trends

121

on unit root. Further, some of the variables are growth rates that technically are differenced already. Bank Credit to Private Sector was the only variable that was not stationary at level and remained so even after exponential smoothing. The variable was, however, stationary after first differencing.

5.3   Generalised Method of Moments (GMM) estimates

The study employs a dynamic panel model estimated using a Generalized Method of Moments (GMM) approach. Table 5.4 presents GMM estimation results across three models. Each model has a different variable for measuring financial development. The estimations retain the same instruments for each model with the only change being on the respective proxy variable for financial development.

Table 5.4: GMM estimation with Real GDPPC as the dependent variable

Variable	Model 1	Model 2	Model 3
Constant	0.7997 (0.3217)	0.6324(0.4117)	0.7163(0.3530)
Growth in GDPPC(-1)	0.2809 (0.0001)***	0.2880 (0.0000)***	0.3644(0.0000)***
Domestic Credit	-0.0014(0.7804)	-	-
Liquid Liabilities	-	0.0067(0.5892)	-
Bank Credit to Private Sector	-	-	-0.2111(0.0980)*
Gross Fixed Capital Formation	0.0082(0.7986)	0.0081 (0.7967)	0.0025(0.9385)
Consumer Price Index	-0.0011 (0.1897)	-0.0010(0.2565)	-0.0008(0.3056)
Real Interest	-0.0297 (0.0002)***	-0.0304 (0.0002)***	-0.0262(0.0022)***
Trade Openness	0.0155 (0.0234)***	0.0149 (0.0293)***	0.0165(0.0199)***
Government Expenditure	-0.0326(0.4111)	-0.0365(0.3425)	-0.0359(0.3690)
Diagnostic tests	*R-sqd 0.1831* *Adj R-sqd 0.1687* *J-statistic 0.5732*	*R-sqd 0.1965* *Adj R-sqd 0.1824* *J-statistic 0.1393*	*R-sqd 0.1952* *Adj R-sqd 0.1804* *J-statistic 0.5482*

Coefficient (t-statistic probability); ***; **; * stationary at 1%, 5% and 10% levels respectively

Source: Author's own calculation

Three models were estimated with Model 1 having domestic credit as the measure of financial development, Model 2 has liquid liabilities and in Model 3 financial development is measured by bank credit to private sector. The models were estimated by the Generalised Methods of Moments (GMM), where all other variables, including instruments (except on the financial development variable) were not changing. The J-statistics in all the three models were low, indicating that the instruments contained in the models are adequate.

5.3.1   Bank Credit to Private Sector

Results of the GMM estimations show that Bank Credit to Private Sector has a negative and significant impact on economic growth. Implicitly, the result is suggesting that banking sector credit to the private sector has an adverse effect on growth in SADC. This unexpected result is in line with findings of Allen and Ndikumana (1998) who observed that regressions with annual data produced negative coefficients on credit provided by banks in SADC. The negative relationship between credit and economic growth is also not uncommon in other studies. Arcand *et al.* (2012) found a negative relationship as the level of credit to the private sector approaches GDP levels. The result is also consistent with findings by Petkovski and Kjosevski (2014) and Caporale *et al.* (2009).

There are three possible explanations for the negative relationship between bank credit to private sector and economic growth. Firstly, there is a possibility that credit extended to the private sector by banks in some countries resulted in non-performing loans (Cojocaru, Hoffman & Miller 2013). There are SADC countries that recorded high non-performing loans over the period under study, including Zambia 26 per cent in 2000 and 23.6 per cent in 2001; Tanzania 25.2 per cent in 1999; Mozambique 23.4 per cent in 2001 and Madagascar 19.6 per cent in 2002 (World Development Indicators 2015). Non-performing loans discourage financial institutions from lending and this has a negative impact on economic growth (Romer 2012).

Secondly, the allocation of credit to private sector also has an impact on growth. Where credit is directed to non-productive private sectors, it does not drive production or economic growth. Beck, Bu yu kkarabacak, Rioja and Valev (2012) found that credit extended to enterprises has a correlation with economic growth and credit to households has no correlation with economic growth. Credit extension to the private sector in the SADC countries was probably crowded out by credit to government or to the household sector, which normally goes towards financing final consumption (Phakedi 2014). As such, increase in growth becomes demand driven (from increased household or government consumption) rather than supply pushed (private sector supply) hence the negative relationship.

 The negative association between credit to the private sector and growth confirms deficiencies in credit allocation and suggests weak financial regulation and supervision (Ayadi *et al.* 2013). Lending to enterprises through applying soft budget constraints may result in counterproductive investments and financial losses (Petkovski & Kjosevski 2014).

Thirdly, the negative relationship between bank credit to private sector and economic growth could be a result of a number of banking crises that countries experienced. Petkovski and

Kjosevski (2014) put forward this argument for countries in Central and South Eastern Europe that were affected by banking crises in the 1990s, 2008 and 2010. SADC has experienced a number of banking crises particularly in the late 1980s and early 1990s, with isolated cases beyond 2000s (Dembure 2014).

5.3.2   Liquid Liabilities

Liquid liabilities show a statistically insignificant relationship with economic growth. The variable, however, has a positive coefficient. The positive sign is in line with the findings of Allen and Ndikumana (1998), Phakedi (2014) and Petkovski and Kjosevski (2014). Allen and Ndikumana (1998) found a positive and significant relationship between economic growth and the size of the financial sector in Southern African countries. Phakedi (2014) obtained mixed results for the SADC countries, with money supply exhibiting a positive effect under the Fixed Effects Model, but negative under GMM estimation.

The positive coefficient is also consistent with *a priori* expectations and with theory presented by Shaw (1973) that savings deposits increase as the financial system expands and helps growth by facilitating economic activity (Petkovski and Kjosevski 2014). The coefficient sign is consistent with the idea that money supply encourages growth by facilitating economic activity (Caporale *et al.* 2009). Development of the financial sector offers more choices to the investors, allowing them to allocate resources to more productive activities. An increase in the size of the financial sector would provide a better framework for the channelling from financial development leading to economic growth (Andersen 2003). Although insignificant, the positive sign could imply that money supply has the potential to drive growth in SADC, assuming the money supply growth is not excessive to push up inflation, especially with existing production constraints in some SADC countries.

5.3.3   Domestic Credit

Domestic Credit has a negative, statistically insignificant, impact on economic growth (Model 1), a result inconsistent with *a priori* expectations. Although not significant, the negative sign implies an inverse relationship between domestic credit and economic growth. The relationship based on a negative sign is consistent with the findings of Phakedi (2014) and Le Roux and Moyo (2015). Le Roux and Moyo (2015) found, in respect of financial liberalisation and economic growth in the SADC, that domestic credit to the private sector is negatively related to GDP. The negative relationship between credit and economic growth is also found in studies for other regions. Samargandi, Fidrmuc and Ghosh (2014) found that financial development

has an adverse effect on economic growth in Middle Income Countries, consistent with similar findings by Arcand, Berkes and Panizza (2012). Loayza and Ranciere (2006) found a short-run negative and significant impact between financial development and economic growth in 75 countries.

The negative sign between domestic credit and economic growth can be explained by the possibility of crowding out of credit to the private sector, by credit to government in SADC countries. Most credit in SADC countries could be directed towards non-productive sectors through government borrowing to finance consumptive activities. Increases in credit to consumptive activities have a tendency to increase imports, especially given production constrains in most SADC countries, which inhibits growth. The negative relationship reflects distortions in the credit supply process (Gregorio & Guidotti 1991), inefficiencies in credit allocation (Allen & Ndikumana 1998), cross-country heterogeneity and higher volatility of business cycles (Loayza & Ranciere 2006). SADC countries are also susceptible to business volatility emanating from various sources including, internal conflicts (DRC, Zimbabwe, Mozambique, Angola); global developments (South Africa, Botswana) and internal economic instability, which affects production.

5.3.4 Control Variables

The lagged GDPPC has a positive impact on economic growth, which is indicative of self-propelling growth that is dependent on previous period levels. As overall income level and the share of middle class rises, economic growth also rises. Gross Fixed Capital Formation has an expected positive effect on growth consistent with Shaheen, Awan Waqas and Aslam (2013). The results are contrary to findings by Mbulawa (2015) who found that gross fixed capital formation has a negative effect on growth in the SADC. The Consumer Price Index (CPI) has an adverse effect on growth, confirming the *a priori* expectations. The results coincide with findings of Bittencourt, van Eyden and Seleteng (2015), who found that inflation not only reduces economic activity in the SADC region, but also weakens the institutional framework conducive to a stable macroeconomic environment. Mamo and Lin (2012) also established a negative relationship between inflation and growth for 13 Sub-Saharan African countries from 1969 to 2009.

Real Interest Rates have a negative effect on growth, given that high real interest rates worsen income distribution, increase inflation, and reduce the rate of economic growth if there is excess capacity in the economy (Odhiambo 2011). The results from a study by D'Adda and

Scorcu (1997) suggested that a one per cent increase in the real interest rate leads to a fall of one-fifth per cent in the average growth rate.

Trade openness significantly supports economic growth in SADC; this result is similar to those of Mbulawa (2015), Asiedu (2013) and Dava (2012). As the countries in SADC open their economies for trade, the rate of growth increased significantly. Dava (2012) found that trade openness, through liberalisation, had a positive and significant impact on the growth rate of the SADC countries. However, openness becomes less beneficial to growth when governments become unstable, have conflicts, have too much bureaucracy in the systems, and lack accountability (Mbulawa 2015).

Government expenditure has a negative effect on GDP, given that government spending directed toward non-productive expenditures could have a negative effect on economic growth (Gorlach & Le Roux 2013). Increased government expenditure, mostly funded by borrowing, increases interest rates, which in turn, crowds out investment and reduces the amount of credit flowing in the economy (Snowdon & Vane 2005). The negative effect of government expenditure is also supported by Le Roux and Moyo (2015) and Misati and Nyamongo (2012).

5.4   Panel Fixed Effects Results

This study performed Panel Ordinary Least Squares (OLS) estimations with Fixed and Random Effects for robustness checks on the GMM estimates. The Fixed Effects model controls for, or restricts, the effects of time-invariant variables with time-invariant effects (Williams 2015). In the random effects model, the individual-specific effect is a random variable that is uncorrelated with the explanatory variables (Torres-Reyna 2007). The fixed effects estimator also takes into account the unobservable country specific effects and corrects for omitted variable bias (Wooldridge 2002).

This study conducted a Hausman-test in order to differentiate between fixed and random effects, by testing the consistency of the random effects model (see Table 5.5).

Table 5.5: Hausman tests

Variable	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Decision
Model 1 Domestic Credit as Financial Development	15.3107	6	0.0180	Fixed Effects

Model 2 Liquid Liabilities as Financial Development	17.2466	6	0.0084	Fixed Effects
Model 3 Bank Credit to Private Sector as Financial Development	19.4632	6	0.0005	Fixed Effects

<u>Source</u>: Author's own calculation

The Chi-Squared Statistics in all the models are high, with p-values that are very low, meaning rejection of the Random Effects null hypothesis. Therefore the Hausman tests indicate that Fixed Effects are acceptable to Random Effects for all the models. As such, the chapter presents Fixed Effects results only.

5.4.1   Fixed Effects estimation

Table 5.6 shows the results of panel estimations with Fixed Effects. The results of panel estimations with Fixed Effects confirm outcomes of the GMM estimations.

Table 5.6: Panel regressions with Fixed Effects

Variable	Model 1	Model 2	Model 3
Constant	4.5560 (0.0008)***	4.9349(0.0005)***	3.8238 (0.0053)***
Domestic Credit	**-0.0327 (0.0020)***	-	-
Liquid Liabilities	-	**-0.0609 (0.0065)***	-
Bank Credit to Private Sector	-	-	-0.0361(0.3340)
Gross Fixed Capital Formation	0.0799 (0.0084)***	0.0849(0.0052)***	0.0805(0.0099)***
Inflation (Consumer Price Index -CPI)	-0.0004 (0.0134)**	-0.000464 (0.0098)***	-0.0005(0.0134)**
Real Interest	-0.0445 (0.0000)***	-0.0409 (0.0000)***	-0.00442(0.0000)***
Trade Openness	0.0200 (0.0304)**	0.02459(0.0099)***	0.0215 (0.0251)**
Government Expenditure	-0.2441(0.0000)***	-0.2462(0.0000)***	-0.2700(0.0000)***
Diagnostic tests	*R-squared 0.2547* *Adj R-squared 0.2199* *F-statistic 7.3288* *Prob(F-statistic)0.0000*	*R-squared 0.25086* *Adj R-squared 0.2159* *F-statistic 7.1830* *Prob(F-statistic) 0.0000*	*R-squared 0.2457* *Adj R-squared 0.2092* *F-statistic 6.7414* *Prob(F-statistic) 0.0000*

Coefficient (t-statistic probability); ***; **; * stationary at 1%, 5% and 10% levels respectively
<u>Source</u>: Author's own calculation

Banking Sector Credit to Private Sector's coefficient remains consistently negative under both estimations, indicating an unfavourable effect on economic growth. Domestic Credit has a negative statistically significant effect on economic growth, consistent with the results of GMM

estimates. Regarding Liquid Liabilities, the results under Fixed Effects show a negative and weakly significant effect on growth. This result is opposite of the positive effect obtained under GMM estimation. The reason for the variation could be difficult to ascertain except to note that the sign of the coefficient of the Liquid Liabilities is now consistent with those of other proxy variables. The overall observation is that the results obtained under Fixed Effects are largely in line with those obtained under GMM estimations, confirming the robustness of GMM estimations.

5.5   Financial reforms and the finance-growth nexus in SADC

The study tests the impact of financial reforms on growth and on the finance-growth relationship in the SADC region. Reforms of financial markets include policies in the financial sectors aimed at supporting higher economic growth (Bumann, Hermes & Lensink 2012). Reforms enhance growth by promoting financial innovation and efficiency and contrarily, reforms may increase financial fragility of financial intermediaries such as banks (Moyo *et al.* 2014). The expectation is that financial reforms, implemented by most countries mainly through financial liberalisation, should drive financial development that enhances economic growth. Reforms drive financial development through the removal of restriction and increasing access to credit as well as broadening the array of institutions that provides financial intermediation.

To capture the effects of financial reforms, a dummy variable was introduced which takes the value of one from the year when a particular country introduced reforms going forward or zero otherwise. The dummy also interacts with all the proxy variables for financial development. Table 5.7 shows the results.

There are three models with each model having a different measure of financial development. For example Model 1 has domestic credit, Model 2, liquid liabilities and Model 1, bank credit to private sector. Each model has a variable for financial reform, firstly introduced as a dummy variable in the column with the heading 'with dummy variable'. The financial reform dummy is then interacted with the receptive financial development variables, and is presented in the column titled 'with interactive dummy'.

The results in Table 5.7 show that the dummy variables for financial reforms are not significant across all the measures of financial development. The results suggest that financial reforms have no effect on growth in the SADC region. The dummy variables, however, are negative

suggesting that financial liberalisation is adverse to economic growth, indicative of growth reducing reforms. When the dummy variable is interacted with the measures of financial development to test the effects of post liberalisation financial development on growth, the dummy, causes coefficients for Domestic Credit and Liquid Liabilities to be positive. The implication is that in the post liberalisation period, expansion in domestic credit and liquid liabilities supported growth in SADC. The deduction from the results could be that financial reforms managed to remove restrictions and impediments that were inhibiting development of growth enhancing financial systems in SADC countries. The positive result is in line with the findings by Le Roux and Moyo (2015) that a positive long-run relationship exists between financial liberalisation and economic growth in SADC

Table 5.7: GMM estimates with financial reforms dummy and interactive dummy

Variable		Model 1		Model 2		Model 3	
		With Dummy Variable	With Interactive dummy	With Dummy Variable	With Interactive dummy	With Dummy Variable	With Interactive dummy
Constant		4.8786	5.0950	5.6395*	4.8955	3.9071	3.6692
GGDPPC(-1)		0.2509***	0.2699***	0.2451***	0.2619***	0.3250***	0.3327***
DC		-0.0025	-	-	-	-	-
LL		-	-	-0.0326	-	-	-
BCP		-	-	-	-	-0.2053	-
GCF		-0.0345	-0.0344	-0.0335	-0.0375	-0.0284	-0.0350
CPI		-0.0004	-8.55E-05	-0.0005	-0.0003	-0.0004	-0.0002
RINT		)0.0413***	-0.0434***	-0.0406***	-0.0428***	-0.0297**	-0.0342***
TO		0.0304	0.0241	0.0333	0.0252	0.0460	0.0297**
GEXP		-0.2434	-0.2832*	-0.2440*	-0.2537*	-0.1928	-0.2049
Dum-FR		-0.3037		-0.3148		-2.3674	-
DMDC		-	0.0228	-	-	-	-
DMLL		-	-	-	0.0117	-	-
DMBCP		-	-	-	-	-	-0.1931
Diag-nostic tests	R-sqd	0.2707	0.2473	0.2708	0.2693	0.2178	0.2656
	Adj R sqd	0.2287	0.2060	0.2288	0.2292	0.17096	0.2237
	J-stat	7.06E-24	0.383228	2.28E-23	0.072080	1.77E-23	0.1826

Coefficient (t-statistic probability); ***; **; * stationary at 1%, 5% and 10% levels respectively
Note:
  1. Dum-FR-Dummy variable taking a value of 1 from the year a country introduces financial reforms (financial liberalisation) going forward or 0 otherwise
  2. DMDC- interaction between Financial Reforms Dummy and Domestic Credit (representing domestic credit in the post liberalisation period)
  3. DMLL- interaction between Financial Reforms Dummy and Liquid Liabilities (representing liquid liabilities in the post liberalisation period)
  4. DMDBCP- interaction between Financial Reforms Dummy and the Differenced Bank Credit to Private Sector (representing bank credit to private sector in the post liberalisation period).

Given the negative relationship between credit and growth in SADC obtained earlier, the results could possibly suggest that financial reforms yielded limited effects on growth. It probably shows the inadequacies of the reforms implemented in sustainably driven growth, suggesting that liberalisation alone is not enough for finance to drive growth. Inherently, the financial sector is dynamic and there is need for continuous reforms in the sector. The dummy and interacted dummy variables remain insignificant, possibly implying a weak impact of financial reforms. The success of financial liberalisation in SADC are probably limited by other dependent factors, such as, the lack of well-established and secure property rights and a sound regulatory framework to monitor the financial system (Romer 2012).

The financial reforms dummy and interactive dummies did not modify the impact of financial development, specifically domestic credit and bank credit to private sector, except for liquid liabilities, on growth. These results could suggest that financial reforms are a necessary, but not sufficient condition for finance-growth analysis.

5.6   Panel Granger causality tests

Testing the nature of a relationship between financial development and economic growth in the SADC region is not exhaustive in establishing a causal relationship. Causality tests need to be performed to ascertain the direction of causality between financial development and economic growth. Causality tests in the study are done on a panel Autoregressive Model of order 2, using GMM estimation approach. Tests were done using the Wald-test Chi-Square statistic under the null hypothesis that the coefficients are individually (for the short-run) or jointly (for the long-run) equal to zero. Tables 5.8, 5.9 and 5.10 show results of the GMM estimation.

Table 5.8: Granger causality test between Real GDPPC and Domestic Credit

Dependent Real GDPPC		Dependent Domestic Credit	
Variable	**Coefficient (P-value)**		**Coefficient (P-value)**
C	1.6546(0.0009)	C	6.7162(0.0000)
GGDPPC(-1)	0.3007(0.0000)	DC(-1)	0.8081((0.0000)
GGDPPC(-2)	0.0954(0.0572)	DC(-2)	0.0058(0.9093)
DC(-1)	-0.0271(0.1628)	GGDPPC(-1)	0.3521(0.0073)
DC(-2)	0.0089(0.6487)	GGDPPC(-2)	-0.2640(0.0435)
R-squared	*0.2438*	*R-squared*	0.9421
Adjusted R-squared	*0.2085*	*Adjusted R-squared*	0.9394
J-statistic	*2.2597*	*J-statistic*	5.2687

	Prob(J-statistic)	0.3230	*Prob(J-statistic)*	*0.0717*
Short-run	*Dc(-1)=Dc(-2)=0*		*GGDPPC(-1)=GGDPPC(-2)=0*	
	Wald test Chi-square	3.2114(0.20007)	*Wald test Chi-square*	*8.6870(0.0130)*
Long-run	*Dc(-1)+Dc(-2)*	*-0.0182*	*GGDPPC(-1)+ GGDPPC(-2)*	*0.0881*
	Wald test Chi-square	2.2163(0.1366)	*Wald test Chi-square*	*0.3424(0.5584)*

Source: Author's own calculation

Granger causality between Domestic Credit and real GDP per capita flows from GDP to credit and is notable only in the short-run (see Table 5.8). Presence of causality is indicated by a statistically significant Wald test Chi-Square of 8.687, significant at 5 per cent. The model is robust with high levels of R-squared and a low j-statistic. The causality result implies a demand following finance in SADC. There is, however, no long-run causality between the two variables. Furthermore, there is no causality running from domestic credit to economic growth as the Wald test statistics for both short and long-run are statistically insignificant.

Table 5.9: Granger causality test between Real GDPPC and Liquid Liabilities

	Dependent Real GDPPC		**Dependent Liquid Liabilities**	
	Variable	**Coefficient (P-value)**		**Coefficient (P-value)**
	C	0.8003(0.3581)	C	4.6764(0.0000)
	GGDPPC(-1)	0.3239(0.0000)	LL(-1)	0.8113(0.0000)
	GGDPPC(-2)	0.0828(0.1002)	LL(-2)	0.0549(0.2813)
	LL(-1)	0.0579(0.2549)	GGDPPC(-1)	0.0861(0.0953)
	LL(-2)	-0.0523(0.2970)	GGDPPC(-2)	0.0092(0.8570)
	R-squared 0.2401 *Adjusted R-squared* 0.2046 *J-statistic* 0.5467 *Prob(J-statistic)* 0.7608		*R-squared* 0.9568 *Adjusted R-squared* 0.9547 *J-statistic* 5.3205 *Prob(J-statistic)* 0.0699	
Short-run	*LL(-1)=LL(-2)=0*		*GGDPPC(-1)=GGDPPC(-2)=0*	
	Wald test Chi-square	*1.3085(0.5198)*	*Wald test Chi-square*	*3.4868 (0.1749)*
Long-run	*LL(-1)+LL(-2)*	*0.0056*	*GGDPPC(-1) + GGDPPC(-2)*	*0.0953*
	Wald test Chi-square	*0.0508(0.8216)*	*Wald test Chi-square*	*2.6847(0.1013)*

Source: Author's own calculation

Table 5.10 shows that there is no causality, in either way between Liquid Liabilities and Real GDP per capita both in the short- or long-run. The Wald test statistics for both the short- and long-run, and in both causality estimations are insignificant.

Table 5.10: Granger causality test between Real GDPPC and Bank Credit to Private Sector

	Dependent Real GDPPC		**Dependent Bank Credit to Private Sector**	
	Variable	**Coefficient (P-value)**		**Coefficient (P-value)**
	C	1.0267(0.0000)	C	0.4946(0.1015)
	GGDPPC(-1)	0.2788(0.0000)	BCP(-1)	-0.0359(0.4631)

	GGDPPC(-2)	0.1447(0.0054)	BCP(-2)	-0.3420(0.0000)
	BCP(-1)	-0.1293(0.0010)	GGDPPC(-1)	0.2988(0.0000)
	BCP(-2)	-0.0316(0.4049)	GGDPPC(-2)	-0.1017(0.1163)
	R-squared 0.2537 *Adjusted R-squared* 0.2175 *J-statistic* 0.0253 *Prob(J-statistic)* 0.9873		*R-squared* 0.1966 *Adjusted R-squared* 0.1576 *J-statistic* 51.092 *Prob (J-statistic)* 0.0000	
Short-run	*BCP(-1)=BCP(-2)=0*		*GGDPPC(-1)=GGDPPC(-2)=0*	
	Wald test Chi-square	*11.348(0.0034)*	*Wald test Chi-square*	*21.822(0.0000)*
Long-run	*BCP(-1)+BCP(-2)*	*-0.1609*	*GGDPPC(-1) + GGDPPC(-2)*	*0.1971*
	Wald test Chi-square	*8.2552(0.0041)*	*Wald test Chi-square*	*7.3998 (0.0065)*

Source: Author's own calculation

In Table 5.10 empirical results suggest bi-directional causality between Real GDP per capita and Bank Credit to Private Sector. Wald test statistics for the short-runs estimations, at 11.348 and 21.822 are both significant at 1%. The long-run relationship is positive and significant when causality flows from Real GDP per capita to Bank Credit to Private Sector and it becomes negative when causality reverses.

Overall, the Granger causality tests, using Wald tests, suggest a bi-directional causality between financial development and economic growth. Causality generally flows from growth to financial development and the causality relationship is positive in both the short and long-run. Supply leading causality exists only in Bank Credit to Private Sector, where it has a long-run negative effect. Causality is, however, strong and positive (in the long-run) when flowing from economic growth to financial development. As such, a strong demand-following causality was confirmed as stronger and dominant to supply-leading in SADC.

The causality results of this study are consistent with findings by Mobolaji and Oluwatoyin (2014), Egbetunde and Akinlo (2014), Ngongang (2015) and Acaravci, Ozturk and Acaravci (2009) on the SSA region. Acaravci *et al.* (2009) found a bi-directional causal relationship between the growth of real GDP per capita and the domestic credit provided by the banking sector for the panels of 24 Sub-Saharan African countries. Mobolaji and Oluwatoyin (2014) indicated that most empirical works on SSA documented a reverse causality, from economic growth to finance, supporting the demand-following hypothesis, attributed largely to the level of financial underdevelopment. The research results of Egbetunde and Akinlo (2014) indicated a negative impact of financial development on economic growth in the Sub-Saharan Africa (SSA) region. Ngongang (2015) found that financial development has a weak effect on economic growth.

The demand-following causality relationship is highly expected for SADC countries given that the financial sectors of most countries have limited depth and efficiency, and countries experience high levels of financial exclusion when compared to other countries. Financial development initiatives such as microfinance and mobile money, though they are reducing financial exclusion, remain weak to drive growth in the financial sectors. The weak effects of financial development on growth in SADC support the 'demand-following finance' hypothesis in line with findings of Aziakpono (2004). Demand-following causality is also supported by the fact that growth in most Southern African countries has mainly been driven by commodities and natural resources (AfDB 2013). As such, when economies grow, they pull financial systems with them.

Whilst there are no studies that attempted to establish direction of causality between financial development and economic growth for SADC as a region, causality tests carried out for some individual countries had effects that could support the obtained results. For example, Sunde (2012) found a bi-directional relationship in South Africa and Namibia; Odhiambo (2010) found unidirectional causal flows in South Africa; Aziakpono (2004) found demand following finance in Botswana and Akinlo and Egbetunde (2010) found demand-following in Zambia and evidence of bi-directional relationships between financial development and economic growth in South Africa.

5.7   The finance-growth causal relationship in SADC

Empirical evidence shows that finance is adverse to growth in SADC and financial reforms are insufficient to drive growth. Given that the results indicate that finance is not supporting growth in SADC the results seem to support Lucas' (1988) argument that dismissed the importance of financial development as a precondition for economic growth. The results are seemingly not in line with theory by McKinnon-Shaw that emphasises the role of financial intermediation in economic growth. The results are inconsistent with the theory that positively links finance and growth. Evidence also shows existence of a bi-directional causality between financial development and economic growth, although the demand-following is stronger. The bi-directional result supports endogenous growth models that allow for reciprocal interactions between finance and growth (Ang 2007). Theory reviewed in Chapter Three indicated that there are three causality relationships, although bi-directional causality was obtained, and it turns out that the SADC region has a strong demand-following hypothesis.

Possible explanations for the study's overall findings of a negative relationship and bi-directional causality between finance and growth in SADC are fourfold. Firstly, the weak effect of financial development on economic growth is mainly due to a high level of financial exclusion and under-development of some financial systems that hinder growth (Ngongang 2015). The high levels of financial exclusions limit financial depth and efficiency, which is supposed to sustainably drive growth. Under-developed financial systems in some SADC countries result in low credit levels, poor institutional structure and lack of depth and access to finance (financial exclusion) which retards growth. The FinMark Trust survey report (2013) indicates that the majority of SADC countries have high levels of financial exclusion. Whilst there have been a number of initiatives to enhance development financial systems in SADC, weak institutions, inadequate infrastructure, lack of sustainable resources hinder development of financial sectors in most countries.

Secondly, inefficiencies in the financial intermediation process, especially crowding out of private credit in some SADC countries, may have contributed to the outcome. Generally, government debt or borrowing crowds-out the private sector in most SSA countries (Mbate 2013). As such, credit in these countries is not entirely supporting productive activities. Furthermore, in countries that experienced economic and internal conflicts (for example, Zimbabwe, Mozambique, Zambia, Madagascar, Angola and DRC, among others) credit is normally channelled towards financing such conflicts or resolutions of the crisis/conflicts.

Thirdly, the majority of countries in SADC managed to implement financial reforms, mostly through liberalisation of the financial sector. These reforms may not have been adequate or lacked support of well-functioning institutions, regulations and monitoring mechanism, for them to be effective. Besides, financial development is highly dynamic and countries need to implement regular reforms. Financial innovation through mobile money appears to be a key determinant in enhancing financial development in SADC. Lack of adequate resources to fully embrace financial innovation across all countries and all people could be delaying its impact on growth. The initiatives are probably too recent to have caused any major shifts in the finance-growth effect. Related to that, although not empirically tested, perhaps traditional drivers of growth in SADC countries, such as resources and tourism remain the transmission channels for impact of the financial sector on growth.

A fourth possible explanation, though not empirically tested, is that the results could still be affected by country heterogeneity despite the use of models which control for country

heterogeneity. Countries in the SADC region are highly heterogeneous in their financial sectors. Phakedi (2014) obtained mixed results for individual SADC countries despite using estimation methods that address cross-sectional dependence among countries.

5.8   Chapter summary and conclusions

This study empirically tested the relationship between financial development and economic growth for the SADC countries using GMM and Panel Fixed Effects estimations. Empirical evidence shows an inverse relationship between financial development and economic growth indicating that financial development does not support or is adverse to economic growth in SADC. This could be as a result of underdeveloped financial systems, inefficiencies in financial intermediation, limited financial reforms to enhance regulation and innovation and resource driven growth in SADC. Financial reforms were found to be insufficient to drive growth. A bi-directional causality between financial development and economic growth was established. Causality is, however, strong when flowing from economic growth to financial development. Although the results are consistent with findings of Phakedi (2014), Allen and Ndikumana (1998) and Le Roux and Moyo (2015), they are not consistent with *a priori* expectations and with Allen & Ndikumana (1998).

Given the negative relationship between growth and finance in SADC, it is difficult to prescribe recommendations to support either of the two as it would imply a decline in one or the other. Despite this, there is a need to address the underlying structural issues in financial systems of SADC countries. Firstly, the countries in SADC need to put in place measures to develop their financial sectors and enhance their depth and efficiency whilst addressing challenges of limited access. Countries should promote access to credit to the private sector in order to enable this sector to expand its productive capacity for future production and growth (Phakedi 2014). Performance of the financial system in the sub-region needs to be improved through strengthening weak financial systems and institutions by making use of cross-border financial institutions. Furthermore, smaller countries in the SADC region need to strengthen their financial regulation and improve the financial and regulatory infrastructure.

SADC countries need to enhance the process of credit allocation through the regulation of credit and reinforcement of competition in the banking sector. Policymakers in SADC economies should promote the use of non-conventional ways of providing financial services, such as mobile banking in order to improve on financial inclusion. Given the heterogeneity among SADC countries the region should promote financial integration to promote

convergence in financial development. Further to that, given a strong demand-following causality between finance and growth it is recommended that pro-growth policies should be intensified so that growth subsequently pulls financial development with it, in line with findings of Odhiambo (2010).

Financial development is affected by exogenous factors such as geography (Levine *et al.* 2000), technology (Merton 1995), legal systems (LaPorta *et al.* 1998) and fiscal policies (Bencivenga & Smith 1991). Most SADC economies embraced financial innovation, which has assisted in transforming their financial systems. The following chapter extends the discussion on the finance-growth nexus by analysing the importance of financial innovation (technology, as one of the key determinants on the financial development) on driving economic growth in SADC. Chapter Six presents results of an analysis of the relationship between financial innovation and economic growth.

CHAPTER SIX

FINANCIAL INNOVATION AND ECONOMIC GROWTH IN THE SADC REGION

6.1   Introduction

This chapter extends the finance-growth nexus debate in SADC by introducing financial innovation. Chapter Six discusses the results of the empirical test of the relationship between financial innovation and economic growth. The empirical analysis is motivated by the fact that innovation is one of the key determinants of financial development. Financial innovation is generating increased economic activity in most developing countries through increasing financial inclusion, mobile money and enabling remittances, which in turn has an impact on economic growth. Beck, Senbet and Simbanegavi (2015) observed substantial progress made over the past two decades in terms of financial inclusion and financial innovation, as well as cross-border banking in Africa's banking systems. Beyond the financial liberalisation implemented in the 1980s and 1990s, SADC countries are continuously reforming their financial sectors, accommodating innovations such as mobile money and mobile banking to increase financial inclusion (Moyo *et al.* 2014). Financial innovation presents opportunities for financial sector development in Africa (Napier 2010a).

The variables used in the tests, the *a priori* expectations on each variable and the data diagnostics are discussed in section 6.2. Thereafter, section 6.3 discusses the ARDL model estimations and section 6.4 describes the relationship between financial innovation and economic growth. This is followed by a discussion in section 6.5 of the panel Granger causality tests between financial innovation and economic growth. Causality tests are conducted on a panel Autoregressive Model of order 2, using the Wald Coefficient Restrictions approach. Section 6.6 comprises a summary of the chapter and conclusions.

6.2   Variables description, *a priori* expectations and data diagnostics

The variables used in the financial innovation-growth empirical tests and the expected signs of estimated coefficients are presented in Table 6.1. Growth in Bank Credit to Private Sector (GBCP), the ratio of Broad to Narrow Money (M2/M1) and Mobile Money/Banking (MM) are the proxies for financial innovation. *A priori* expectations are that all the measures of financial

innovation have a positive impact on growth. The reasoning is that financial innovation reduces the cost of financial transactions, increases access to credit and enhances efficiency in the financial sector, which in turn drives economic activity and growth.

Table 6.1: Variables description

Variable Category	Variable	Description	Definition
Dependent Variable	GGDPPC	Growth in Real Gross Domestic Product per capita	Growth in real Gross Domestic Product per capita
Financial Innovation	GBCP	Growth in Bank Credit to Private Sector	Growth in total credit by banks to private sector
	M2M1	Broad to narrow Money	Broad Money (M2) divided by narrow money (M1)
	MM	Mobile Banking/Money	Mobile penetration rate
Financial Development	DCP	Domestic credit to private sector	Domestic credit to private sector as a proportion of GDP
Control Variables	GCF	Gross Fixed Capital Formation	Gross fixed capital formation/GDP
	GEXP	Government Expenditure	Total Government expenditure/GDP
	CPI	Consumer Price Index (Inflation)	Growth in Consumer Price Index (Inflation rate)
	TO	Trade Openness	(Exports+ Imports)/GDP

Source: Author's own calculation

Domestic Credit to Private Sector (DCP) is used as the proxy for financial development. It includes non-bank financial sectors' credit to the private sector but excludes lending to the public sector, including Government. In developing countries, domestic credit extended to the private sector is not significantly different from the credit extended by the banking sector. Gross Fixed Capital Formation (GCF) and Trade Openness (TO) are expected to have positive coefficients, implying a positive impact on economic growth. Consumer Price Index (CPI) and Government Expenditure (GEXP) are expected to have a negative effect on economic growth. The rationale for the expected impact of these control variables on economic growth is as outlined in Chapter Five.

Below are the diagnostic tests of the data used in this chapter, mainly the multi-collinearity and panel stationarity tests.

6.2.1   Multi-collinearity test results

The variables were tested for the existence of multi-collinearity using a correlation matrix (see Table 6.2). Applying Cohen's (1988) guideline, no significant correlation among variables to warrant any transformation of the variable or exclusion in some models was found.

Table 6.2: Correlation matrix

	CPI	DCP	GBCP	GCF	GEXP	GGDPPC	M2M1	MM	TO
CPI	1.0000								
DCP	-0.1052	1.0000							
GBCP	-0.0215	-0.0088	1.0000						
GCF	-0.0494	-0.0260	-0.1128	1.0000					
GEXP	0.1774	0.0053	-0.1047	0.4404	1.0000				
GGDPPC	-0.1254	-0.0670	-0.0059	0.2682	0.0678	1.0000			
M2M1	-0.0633	0.4173	-0.0768	0.2581	0.0285	0.0552	1.0000		
MM	-0.1358	0.3832	-0.0354	0.2452	0.1565	0.1261	0.1853	1.0000	
TO	0.0873	-0.1083	-0.0407	0.3876	0.6035	0.1274	0.1318	0.2714	1.0000

Source: Author's own calculation

6.2.2 Panel Stationarity Test

Table 6.3 shows the panel unit root test results for the variables. Panel unit roots tests establish difference stationarity for Domestic Credit to Private Sector (DCP), Broad Money to Narrow Money (M2M1) and Mobile Banking. All the other variables are stationary in levels. Given the small sample data set, and that the variables have different orders of integration, the Autoregressive Distributed Lag (ARDL) Model is more suitable for testing the relationship between financial innovation and economic growth.

Table 6.3: Panel unit root tests at level

Variable	Levin, Lin & Chu	Im, Persaran and Shin W-state	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
CPI	4.32753 (0.0000)***	-4.18841 (0.0000)***	87.4226 (0.0000)***	95.3842 (0.0000)***
DCP	0.8219 (0.7944)	2.2981 (0.9892)	21.1496 (0.8832)	19.4022 (0.9312)
D(DCP)	*-12.8807 (0.0000)****	*-13.0910) (0.0000)****	*209.181 (0.0000)****	*282.791 (0.0000)****
GBCP	-11.5212 (0.0000)***	-16.6741 (0.0000)***	268.504 (0.0000)***	278.349 (0.0000)***
M2M1	-0.0817 (0.4674)	1.1641 (0.8778)	22.8308 (0.8222)	27.2391 (0.6107)
D(M2M1)	*-8.3502 (0.0000)****	*-10.4926 (0.0000)****	*161.840 (0.0000)****	*332.072 (0.0000)****
MM	0.2851 (0.6122)	0.0218 (0.5087)	28.9690 (0.5192)	42.1354 (0.0697)*
D(MM)	*-5.1318 (0.0000)****	*-7.0212 (0.0000)****	*111.397 (0.0000)****	*426.667 (0.0000)****
GCF	-2.90409 (0.0018)***	-3.1336 (0.0009)***	54.0280 (0.0046)***	66.6563 (0.0001)***

GEXP	-4.01101 (0.0000)***	-3.96590 (0.0000)***	72.1170 (0.0000)***	69.2745 (0.0001)***
GGDPPC	-6.16933 (0.0000)***	-6.4979 (0.0000)***	100.094 (0.0000)***	189.686 (0.0000)***
TO	-3.58490 (0.0002)***	-2.8190 (0.0024)***	54.1696 (0.0044)***	46.4778 (0.0280)**

t-statistic (probability); ***. **, * stationary at 1%, 5% and 10% levels respectively

Source: Author's own calculation

6.3   ARDL model estimations

The Autoregressive Distributed Lag (ARDL) model that uses the bounds testing approach to assess relationships of variables is appropriate where variables have different orders of integration or in mutually integrated data (Giles 2013). The ARDL model estimates the short and long-run relationships simultaneously and provides unbiased and reliable estimates (Pesaran *et al.* 1999). In the current study, the ARDL model is estimated using the Pooled Mean Group as well as the Dynamic Fixed Effects methods. The Pooled Mean Group allows short-run coefficients, including the intercepts, the speed of adjustment to the long-run equilibrium values and error variances to be heterogeneous, while the long-run slope coefficients are restricted to be homogeneous across countries (Samargandi, Fidrmuc & Ghosh 2013).

Two models were estimated, Model 1 has Growth in Banking Sector Credit to Private Sector (GBCP) and ratio of Broad Money to Narrow Money (M2M1) as measures of financial innovation. Model 2 introduces Mobile Banking to Model 1. The estimations were separated for two reasons: first, there is always disagreement as to what constitutes financial innovation. Having a model that has a variable that is a direct financial innovation product would enable comparison across variables. Second, data for Mobile Banking only start from 1994 and there would be need for a model with variables that has data for a longer period (1985-2014).

6.3.1   ARDL Model- Without Mobile Banking (Model 1)

Table 6.4 shows the estimated long-run and short-run coefficients for Model 1. When estimated with Pooled Mean Group, before introducing mobile banking, Broad to Narrow Money (M2M1) is the only significant coefficient, with a negative effect on growth (-0.4188) in the long-run. The negative coefficient is in contrast with *a priori* expectations and against the findings of Petkovski and Kjosevski (2014). The negative effect is against theory presented by Shaw in 1973 that savings deposits increases more rapidly than transaction balances as the financial system expands and helps growth by facilitating economic activity (Petkovski & Kjosevski 2014). Shaw regarded these changes in the system of finance as financial deepening, which in the Keynesian and Structuralist view could be satisfied by actively applying financial liberalisation and financial reforms (Mohan 2006).

Table 6.4: Model 1-ARDL estimations without Mobile Banking/Money

Variables	Pooled Mean Group (PMG) Model 1, HQ Criteria (1,1,1,1,1,1, 0)	Dynamic Fixed Effect (DFE) Model 1, AIC (1,1,1,1,1,0)
Long-run Estimations		
C	-	3.8485(0.0218)**
GBCP	-0.3800(0.5038)	-0.1782(0.6924)
M2M1	-0.4188(0.0496)**	-0.6040(0.1016)
DCP	-0.0400 (0.0014)***	-0.0214(0.2363)
GCF	0.0078(0.5444)	0.1188(0.0002)***
GEXP	-0.1247(0.0039)***	-0.1911 (0.0001)***
CPI	-0.0638(0.0000)***	-
TO	0.0249(0.0317)**	0.0108(0.2876)
		R-sqd 0.2007 *Adj. R-sqd 0.1635* *F-stat 5.3874* *Prob(F-stat) 0.0000*
Short-run Estimations		
ECT (-1)	**-0.6751 (0.0000)***	**-0.9162 (0.0000)***
D(GGDPPC(-1))	-	0.1921(0.0056)***
D(GBCP(-1))	-0.0822(0.9206)	0.1758(0.5673)
D(M2M1(-1))	0.0710(0.9584)	-0.1153(0.8546)
D(DCP (-1))	-0.1630(0.1296)	-0.0381(0.2762)
D(GCF(-1))	0.0968(0.2022)	0.1773(0.0000)***
D(GEXP(-1))	-0.1366(0.1346)	-0.0234(0.7254)
D(TO)	0.0159(0.6381)	-0.0158(0.3284)
D(CPI)	-0.0160(0.6998)	-
C	3.5853(0.0000)***	-0.0220(0.9188)
	No. of Obs 4 35 *AIC 5.1601* *SC 6.4568* *HQ 5.6712*	*R-sqd 0.3705* *Adj. R-sqd 0.3343* *F-stat 10.2209* *Prob(F-stat) 0.0000*

t-statistic (probability); ***. **, * stationary at 1%, 5% and 10% levels respectively

<u>Source</u>: Author's own calculation

For SADC, the most probable explanation is that excessive increases in liquidity may trigger an increase in inflation or in imports, both of which hurt growth, given the production constraints in most countries. Growth in Bank Credit to Private Sector (GBCP) has a negative and a statistically insignificant effect in the long-run. In the short-run, broad money is positive and growth in private credit is negative, although both are statistically insignificant.

When estimated under Dynamic Fixed Effects, all financial innovation variables do not have significant coefficients although GBCP has a negative relationship with economic growth in the long-run and a positive relationship in the short-run across both models. Broad money consistently retains a negative sign in both the short and long-run. Although the variables are statistically insignificant, the interpretation of the persistent negative sign could be that the measures are picking effects of financial development. In addition, for credit, the negative sign could be indicative of non-performing loans which affected some SADC countries' distribution of credit and crowding out of credit to private sector (Cojocaru, Hoffman & Miller 2013).

6.3.2 ARDL Model with Mobile Banking/Money (Model 2)

Table 6.5 shows the results of the ARDL model with Mobile Banking added to the proxies for financial innovation.

Table 6.5: Model 2-ARDL estimations with Mobile Banking

Variables	Pooled Mean Group (PMG) HQ Criteria (1,1,1,1,1,1,1,0)	Dynamic Fixed Effect (DFE) AIC (1,1,1,1,1,1,1,0)
Long-run Estimations		
C	-	1.2282(0.5383)
GBCP	2.1247(0.0021)***	0.6731(0.4352)
M2M1	-0.4504(0.0189)**	-0.2697(0.4998)
MM	0.0099(0.0435)**	0.0186(0.0430)**
DCP	-0.0535 (0.0003)***	-0.0543(0.0463)**
GCF	0.0043(0.8286)	0.1354(0.0006)***
GEXP	0.0925(0.0368)**	-0.0832(0.1660)
CPI	-	-0.0020(0.0197)**
TO	0.0203(0.0010)***	0.0137(0.3389)
		R-sqd 0.2314 Adj. R-sqd 0.1712 F-stat 3.8466 Prob 0.0000)
Short-run Estimations		
ECT (-1)	**-0.8174 (0.0000)***	**-0.7316 (0.0000)***
D(GGDPPC(-1))	-	0.0769(0.1922)
D(GBCP(-1))	-2.0409(0.0305)**	-0.1980(0.7201)
D(M2M1(-1))	-2.4421(0.2800)	0.4147(0.4836)
D(MM(-1))	0.1550(0.1926)	0.0146(0.7014)
D(DCP (-1))	-0.1130(0.0781)*	-0.0104(0.7568)
D(GCF(-1))	0.1173(0.0554)*	0.0446(0.02999)**
D(GEXP(-1))	-0.2383(0.0879)*	-0.0192(0.8190)
D(TO)	-0.0018(0.9479)	-0.0048(0.7724)
D(CPI)	-0.1159(0.0480)**	-0.0003(0.6758)
C	1.1567(0.2493)	0.0532(0.0850)
	No. of Obs 289 AIC 4.4363 SC 6.3559 HQ 5.2042	R-sqd 0.3393 Adj. R-sqd 0.3141 F-stat 13.5041 Prob(F-stat) 0.0000

Source: Author's own calculation

When mobile banking is introduced to Model 1, Pooled Mean Group estimations show that Growth in Bank Credit to Private Sector and Mobile Banking have a positive (2.1247 and 0.0099, respectively) and statistically significant effects on growth, at 1 percent and 5 percent levels of significance in the long-run. Broad Money retains the negative effect at   -0.4504, significant at 5 percent in the long-run. In the short-run only growth in private credit (GBCP) has a negative statistically significant effect at -2.0409 and significant at 5 percent. When the same model is estimated under Dynamic Fixed Effects, only mobile banking has a positive statistically significant effect on growth (0.0186) in the long-run. Other variables are statistically insignificant in both the short and the long-run.

For credit, the long-run positive result is consistent with Michalopoulos, Laeven and Levine (2009, 2011), who found a positive relationship between Growth in Bank Credit to Private Sector to GDP and economic growth. The possible explanation for this result is that, over the long-run, given increased financial access and depth, innovation enhances access to credit and encourages savings that enhances economic activity.

The short-run result is consistent with Idun and Aboagye (2014), who found a negative impact of financial innovation on economic growth in Ghana. In the short-run, however, innovation driven by credit is not well spread and well developed to have an effect on growth.

Mobile banking generally has a positive effect on economic growth, both in the short and long-run, consistent with *a priori* expectations. The results support arguments that in SADC, innovation in financial services support economic activity across countries, including efficient financial transfers and increasing the volume of trade (Maimbo, Saranga & Strychacz 2010). Mobile money innovations, such as, the Shoprite Money Transfers Model enables remittances from South Africa to regional countries, efficient financial transactions across countries and efficient movement of investor funds across borders (Ramsamy 2014, Mochiko 2015). The results are in line with the findings of Napier (2010b) that mobile phone companies in Africa have been engaged in innovations that have a greater impact in Africa than traditional microfinance.

Broad Money remains consistently negative even after introducing Mobile Banking and the rationale is as explained in the Model 1. The introduction of mobile banking in the model results in private credit, dropping the element of financial development to assume net effects of financial innovation. Evidently, the Mobile Money variable has a strong effect in revealing

and isolating the effects of financial innovation on growth by pulling out the positive effects suppressed in other variables.

6.3.3 Control Variables

Domestic Credit to Private Sector (DCP) has a negative significant effect on growth in the long-run. This is consistent with earlier findings in Chapter Five and also of Allen and Ndikumana (1998), Phaledi (2014) and Le Roux and Moyo (2015) that a negative relationship exists between financial development and growth. Gross Fixed Capital Formation maintained an expected positive effect on growth in all cases, but significant only in DFE, consistent with results obtained by Shaheen *et al.* (2013) and Asiedu (2013). Consumer Price Index (CPI) displays negative effects on growth consistent with its detrimental effect to growth in the SADC region (Bittencourt, van Eyden & Seleteng 2015).

Government Expenditure (GEXP) reveals a negative in all cases but one when mobile banking is introduced under PMG estimations. Government expenditure has a reducing effect on growth if directed at non-productive sectors (Gorlach & Le Roux 2013) or is financed by taxation Barro (1989) or by borrowing (Snowdon & Vane 2005). The positive long-run effect could indicate the long-run effect that government expenditure has in aiding innovation, particularly countries with high research and development budgets or support of government owned financial institutions. Trade openness supports economic growth in SADC, mostly in the long-run, consistent with other studies by Mbulawa (2015), Asiedu (2013), and Mercan *et al.* (2013).

6.3.4 Long-run relationship

Innovations generally have a relatively long adoption cycle and a prolonged period before their impact on economic growth is realised. As such, the presence of a long-run relationship with growth becomes critical. In the estimated models, the Wald Test F-Statistic and the Error Correction Term tests the presence of a long-run relationship between financial innovation and economic growth. Wald Test, F- Statistic values are shown in Table 6.6.

All the Wald Test, F-Statistic values are higher than the critical values, indicative of existence of a long-term co-integrating relationship among the variables for both models and estimation techniques. The Error Correction Term (ECT) shows the speed of adjustment to restore equilibrium in the long-run after a one period shock in the short-run. Ideally, a model with a stable long-run relationship should have a statistically significant coefficient with a negative sign (Pahlavani, Wilson & Worthington 2005).

Table 6.6: Wald Test results (F-Values) for long-run- cointegration

		F-Value	Cointegration (using Pesaran)
Pooled Mean Group	**Model 1 - *(Without Mobile Banking)***		
	$\Delta GGDPPC_{it}[F_{GGDPPC}\left(GGDPPC_{it}\Big|_{DCP_{it},GCF_{it},GEXP_{it},CPI_{it},TO_{it}}^{GBCP_{it},M2M1_{it},}\right)$	7.8117	Present
	Model 2 - *With Mobile Banking*		
	$\Delta GGDPPC_{it}[F_{GGDPPC}\left(GGDPPC_{it}\Big|_{DCP_{it},GCF_{it},GEXP_{it},TO_{it}}^{GBCP_{it},M2M1_{it},MM_{it}}\right)]$	7.2361	Present
Dynamic Fixed Effect	**Model 1 - *(Without Mobile Banking)***		
	$\Delta GGDPPC_{it}[F_{GGDPPC}\left(GGDPPC_{it}\Big|_{DCP_{it},GCF_{it},GEXP_{it},CPI_{it},TO_{it}}^{GBCP_{it},M2M1_{it},}\right)$	16.775	Present
	Model 2, AIC(1,1,1,1,1,1,1) - *With Financial Development*		
	$\Delta GGDPPC_{it}[F_{GGDPPC}\left(GGDPPC_{it}\Big|_{DCP_{it},GCF_{it},GEXP_{it},CPI_{it},TO_{it}}^{GBCP_{it},M2M1_{it},MM_{it}}\right)$	11.2386	Present

Pasaran (2001) Critical Values	k	1%		5%		10%	
		I(0)	I(1)	I(0)	I(1)	I(0	I(1)
	6	3.15	4.43	2 45	3.61	2.12	3.23
	7	2.96	4 2 6	2.32	3.	2.03	3. 3
Unrestricted intercept and no trend							

Source: Author's own calculation

The Error Correction Terms for the estimated models are shown in Table 6.7. The Error Correction Terms for Model 1 are -0.6751 and -0.9162 for Pooled Mean Group and Dynamic Fixed Effects respectively, meaning that deviation from the long-run equilibrium following a short-run shock is corrected by about 67.5 percent and 91.6 percent respectively in one year. The Error Correction Terms are all negative and significant, confirming the existence of a long-run relationship between financial innovation and economic growth. When Mobile Banking is factored in, the Error Correction Terms increase to 81.7 per cent and 73.2 percent respectively (Table 6.5), indicating a relatively stronger correctional effect. The results suggest that financial innovation has an effect on growth in the long-run.

6.4   The relationship between financial innovation and economic growth

The test results show mixed effects of financial innovation on growth depending on the measure used, with a nearly balanced number of positive and negative coefficients. However, given that three out of the five statistically significant long-run coefficients on financial innovation variables are positive, suggests that the net effect could be positive. Furthermore,

the positive coefficients are statistically significant at high levels than the negative coefficients. This can be used as a basis for concluding that generally, financial innovation has a positive effect on economic growth in SADC. This position is supported by the fact that Mobile Banking, a variable that is closer at measuring financial innovation, consistently displays a positive effect on growth. The dominant positive effect is, however, diluted by the negative effects under some proxy variables weakening the net effect of financial innovation. The long-run estimations, however, show mixed effects on proxy variables other than mobile banking, confirming the importance of having appropriate measures for financial innovation.

There are no similar studies on SADC and results can therefore, only be compared to studies in other regions or countries. The obtained results are in line with the findings of Michalopoulos *et al.* (2009, 2011), Valverde *et al.* (2007), Amore, Schneider and Zaldokas (2013), Bassa (2013) and Mwinzi (2014) that a positive relationship exists between financial innovation and economic growth. The findings are not consistent with those of Idun and Aboagye (2014), who found that financial innovation, is negatively related to economic growth in Ghana.

The results support the role of financial innovation in growth in SADC and counter models and theory of economic growth, which generally ignore financial innovation and instead regards the financial system as a given (Michalopoulos *et al.* 2009). The result also emphasise that important innovation is not merely a function of capital, labour and knowledge inputs as regarded by a number of new-growth theories (Block 2002). Overall, the results obtained are consistent with theory, *a priori* expectations and recent developments in the SADC countries. Possible explanations are given below.

There are positives developments in the SADC countries in terms of financial innovations that are in support of the positive effect conclusion. Substantial progress was made over the past two decades in terms of financial inclusion and financial innovation, as well as cross-border banking in Africa's banking systems (Beck, Senbet & Simbanegavi 2015). SADC countries are continuously reforming their financial sectors, accommodating innovations such as microfinance, mobile money and mobile banking to increase financial inclusion. Financial sector reform engenders financial innovation and promotes efficiency in the financial system, potentially leading to higher economic growth (Moyo *et al.* 2014).

In the SADC, the introduction of mobile banking increased depth and access to financial intermediation, generating increased economic activity as the previously marginalised are given access to credit or savings products on their mobile platforms. GSMA (2015) indicated

that the SADC regional block hosts the most developed mobile markets in Sub-Saharan Africa and estimated that in 2014, the broader mobile ecosystem generated 5.7 per cent of GDP in Sub-Saharan Africa. The Boston Consulting Group (BCG) estimated that of about US$1bn in remittances that flow out of South Africa to other countries in the SADC annually, about 40 per cent is transacted through integrated financial systems, enabled by financial innovation (Mochiko 2015). Increased access and depth of intermediation also result in increased economic activity as the previously marginalised are given access to credit or saving products on their mobile platforms. This naturally explains the consistent positive relationship between mobile banking and economic growth.

Theory states that financial innovation increases the variety of products offered by financial intermediaries and fosters the rate of technological progress (Chou & Chin 2004). Napier (2010a) stated that financial innovation in Africa reveals that demand-driven products and services are being provided profitably at the low end of Africa's financial markets by a wide range of commercial financial service providers. Given that financial sectors in SADC countries are bank based, through reforms and increased competition, banks can potentially be the main source of financial innovation and efficiency (Moyo et al. 2014).

Innovation is a double edged-sword (Arnaboldi & Rossignoli 2013) with a 'good' side, which includes driving economic growth, and a 'dark' side (Beck *et al*. 2014). In as much as the good side of financial innovation could be assumed to have contributed to a positive effect on growth, it is not a given that the bad side of financial innovation has contributed to the negative effects. Rather the negative effect reflects the disconnection between increases in financial innovation and growth. It could probably also be indicative that financial innovation in these countries does not have a direct effect on growth; hence, the negative relationship.

It can be deduced that the effect of financial innovation on growth is weakened by the high level of financial exclusion and underdeveloped financial sectors of some SADC countries. It is important, however, to note that the SADC countries are different in terms of financial development and these results could vary when estimates are made for individual countries. Until recently, when financial innovations such as mobile money that do not entirely rely on the financial sector were introduced, financial innovations were dependent on the financial sector and would occur within the financial sector. As such, advancement in innovation in the financial sector would depend on the level of financial development. In addition, given that some of the financial innovation variables that have negative coefficients are derived from

variables that reflect financial development, it would be logical to assume that their negative effect on growth could be indicating the effects of financial development on growth. Given a negative relationship between financial development and economic growth in the SADC region obtained in Chapter Five, the relationship between financial innovation (as measured by these variables) and economic growth would also follow.

The lack of enabling conditions may also be affecting the development of financial innovation across countries. Mlachila, Park and Yabara (2013) observed that the development of mobile payment systems in some other sub-regions, such as Central Africa, has been less successful, due to a lack of "enabling" conditions. Chou and Chin (2004) indicated that financial innovations lead to long-run growth solely through the technological innovation channel. It is then logical to conclude that the low levels of technological innovation in the SADC region, is one of the conditions that could be weighing down the development of financial innovation that supports growth in SADC.

6.5   Granger Causality-financial innovation and economic growth

Granger causality exists when past values of one variable can help in explaining, or have the explanatory power for current values of another variable; then the first variable might be causing the second variable (Koop 2005). In this case the study seeks to ascertain if financial innovation causes growth or the reverse thereof.

Table 6.7 shows the results of the Granger causality estimations for the three measures of financial innovation. The Wald Test F-Statistics for testing short and long-run causality relationships are all statistically insignificant across the three measures of financial innovation. The results suggest that there is no causality, in either way, between financial innovation and economic growth in SADC in both the short and long-run. In other words, financial innovation and economic growth in the SADC region are independent of each other. The long-run effects of Growth in Bank Credit to Private Sector and Mobile Banking are, however, positive, a result consistent with the ARDL estimation results in Tables 6.4 and 6.5. The long-run net effect of Broad to Narrow Money on economic growth is negative when growth is dependent.

Table 6.7: Granger causality tests-Wald coefficient restrictions tests

	Dependent: Economic growth		Dependent: Financial Innovation	
	Real GDPPC and Growth in Bank Credit to Private Sector			
Short-run	GBCP(-1) = GBCP(-2) = 0		GGDPPC(-1) = GGDPPC(-2) = 0	
	Wald test Chi-square	0.4948 (0.7808)	Wald test Chi-square	2.3901 (0.3038)
Long-run	GBCP(-1) + GBCP(-2) = -0.4219		GGDPPC(-1) + GGDPPC(-2) = 0.0046	
	Wald test Chi-square	0.4048 (0.5246)	Wald test Chi-square	0.5223 (0.4698)
	Real GDPPC and Broad to Narrow Money			
Short-run	M2M1(-1) = M2M1(-2) = 0		GGDPPC(-1) = GGDPPC(-2) = 0	
	Wald test Chi-square	0.5354 (0.7651)	Wald test Chi-square	1.1893 (0.5518)
Long-run	M2M1(-1) + M2M1(-2) = -0.2458		GGDPPC(-1) + GGDPPC(-2) = 0.0043	
	Wald test Chi-square	0.4534 (0.5007)	Wald test Chi-square	0.9826 (0.3216)
	Real GDPPC and Mobile Money/Banking			
Short-run	MM(-1) = MM(-2) = 0		GGDPPC(-1) = GGDPPC(-2) = 0	
	Wald test Chi-square	3.6676 (0.1598)	Wald test Chi-square	3.8963 (0.1425)
Long-run	MM(-1) + MM(-2) = -0.2458		GGDPPC(-1) + GGDPPC(-2) = 0.0045	
	Wald test Chi-square	0.0145 (0.9041)	Wald test Chi-square	1.8182 (0.1775)

Source: Author's own calculation

The findings of no significant causal relationship between the defined measures of financial innovation and economic growth per capita, however, are possible, given that financial innovation is a micro-economic phenomenon that, at current levels, is not developed enough to affect growth in SADC. It shows that a plain improvement in macro variables or proxies of financial innovation is no indication of a favourable impact on economic growth. Rather the results show that a sole focus on macroeconomic aggregates is not sufficient for evaluating and determining the contribution of financial innovation to economic growth and development among SADC countries.

The no causality results are confirming earlier suggestions of a weak relationship between financial innovation and growth in SADC. The results are in support of theoretical arguments by (Chou & Chin 2004) that financial innovations lead to long-run growth solely through the technological innovation channel, which apparently is lacking in the SADC region. The results are contrasting the assertions by Moyo *et al*. (2014) that financial sector reform engenders

financial innovation, potentially leading to higher economic growth. Most SADC countries introduced financial reforms in the 1980s and 1990s but the reforms have not triggered innovations that can drive growth.

6.6   Chapter summary and conclusions

The empirical estimations carried out in this study show that financial innovation generally has a positive effect on economic growth in the long-run, although the effects vary with the variable used to measure financial innovation. The long-run estimations, however, show mixed effects in some proxy variables, confirming the importance of having appropriate measures for financial innovation. Introducing mobile banking, a specific measure of financial innovation, buttresses the role of financial innovation in enhancing growth.

In addition, the panel Granger causality test results suggest that there is no causality, in either direction, between financial innovation and economic growth in both the short and long-run. The possible explanation could be that financial innovation is a micro-economic phenomenon that may not be developed enough to affect growth in SADC and that financial innovations lead to long-run growth solely through the technological innovation channel. The results are in contrast to the models and theory of economic growth, which generally ignore financial innovation (Michalopoulos *et al*. 2009). Overall, the obtained results are consistent with *a priori* expectations and recent developments in most SADC countries.

The implication on causality findings is that the on-going innovation in financial sectors of most countries, though with positive effects, does not have a significant impact on economic growth. The results also suggest that growth in the SADC region does not influence or drive financial innovation. Implicitly, there is potential to increase financial innovation in SADC without being constrained by the country's growth.

Regardless of the no significant causality between financial innovation and growth, financial innovation remains critical for SADC. SADC countries need to develop their financial sectors in order to enhance financial innovations. In framing policies, SADC governments have to balance the distinctive priorities of promoting financial sector development, financial innovation, and financial inclusion; at the same time limiting risks to financial sector stability (Mlachila *et al.* 2013). Where SADC countries receive assistance for promoting access to financial services, the target should be towards enhancing innovation-based platforms (Napier 2010a). Financial innovation needs to be anchored in mobile banking as it has the net effect of

reaching out to the unbanked at the same time enhancing depth, access and convenience to the already banked. Most SADC countries, individually, are too small to support or attract significant investments in financial infrastructure that supports continuous financial innovations. As such, SADC countries should promote co-operation in the development of infrastructure under the regional financial integration framework.

The results and findings in this chapter imply that the majority of SADC countries experience a high level of financial exclusion and weak financial systems to support growth. Countries relying on each other would be a more realistic option to enhance development of each country's financial sector. As such, countries with relatively well-developed financial systems could assist other countries. In this case, South Africa, being the most developed amongst all the others, could support financial development of the other countries. The following chapter presents the results of the impact of closeness/proximity to South Africa on financial development of the other SADC countries.

CHAPTER SEVEN
SPATIAL EFFECTS ON FINANCIAL DEVELOPMENT IN THE SADC REGION

7.1   Introduction

One of the overlapping recommendations of the previous two empirical chapters is that SADC countries need to promote the development of their financial sectors through financial integration. Financial integration helps small countries benefit from financially developed countries. In that regard, the aspect of proximity to financially developed countries comes into effect. The underlying assumption is that proximity to, inter-linkage and integration with a financially developed country (such as South Africa) has positive externalities for financial development of other SADC countries. Spatiality is one of the key determinants of financial development under consideration in this study.

Spatiality influences the way an economic system works and is a source of economic advantage or disadvantage. Spatial proximity generates economies that reduce production and transaction costs; encourages agglomeration, enhances knowledge transfer and promotes spill-overs. The basis for the empirical test in this chapter is to ascertain whether being close to a financially developed economy is advantageous for financial sector development. In other words, the study tests whether a financially less developed economy gains any externalities from its proximity to, and linkages with, a financially developed economy.

This chapter presents the results of an empirical test of spatial effects on financial development in SADC. The results show the impact of spatial proximity to South Africa on financial development in other regional countries. In other words, the results reflect effects of spatial externalities on financial development in the region. Presented first are the variables used and the *a priori* expectations on each variable. The chapter then provides descriptive statistics, correlation and unit root tests of the variables. The following section presents results of the GMM estimations followed by Fixed Effects estimations carried out for robustness checks. The results for each variable used as a proxy for financial development are discussed and compared to other studies. The chapter also present results of GMM estimation controlled for monetary agreements in the region in order to test the effects of spatial externalities beyond the monetary union.

7.2 Spatial Variables description, *a priori* expectations and data diagnostics

The variables used in spatiality and financial development empirical tests are presented in Table 7.1.

Table 7.1: Variables description

Variable Category	Variable	Description	Definition
Dependent Variables	DC (xSA)	Domestic Credit (excluding South Africa)	Total credit by the financial sector as a proportion of GDP in other SADC countries excluding South Africa
	LL (xSA)	Liquid Liabilities (excluding South Africa)	M3/GDP for other SADC countries excluding South Africa
	BCP (xSA)	Bank Credit to Private Sector (excluding South Africa)	Total credit by banks to private sector as a proportion of GDP in other SADC countries excluding South Africa
	M2 (xSA)	Broad Money (excluding South Africa)	Broad Money to GDP in other SADC countries excluding South Africa
Control Variables	GGDPPC (xSA)	Growth in Real Gross Domestic Product per capita (GDPPC) (excluding South Africa)	Growth in real Gross Domestic Product per capita
	RINT (xSA)	Real Interest Rate (excluding South Africa)	Real interest rate for other SADC countries excluding South Africa
	TO (xSA)	Trade Openness (excluding South Africa)	(Exports+ Imports)/GDP for other SADC countries excluding South Africa
	FO (xSA)	Financial Openness (excluding South Africa)	Chinn-Ito Index* of Financial Openness for other SADC countries excluding South Africa
South Africa Financial Development Variables	DCSA	Domestic Credit in South Africa	South Africa's Total credit by the financial sector to GDP
	LLSA	Liquid Liabilities in South Africa	South Africa's M3 to GDP
	BCPSA	Bank Credit to Private Sector in South Africa	South Africa's Total credit by banks to private sector to GDP
	M2SA	Broad Money in South Africa	South Africa's Broad Money to GDP
Other Variables	SP	Spatial Variable	
	MMA	Common Monetary Area	Dummy for countries in Multilateral Monetary Agreement
	RMMA	Revenue proportion from the MMA	Revenue proportion from the MMA

* The Chinn-Ito Index (KAOPEN) is an index measuring a country's degree of capital account openness. The index was initially introduced by Chinn and Ito (Journal of Development Economics 2006). KAOPEN is based on the binary dummy variables that codify the tabulation of restrictions on cross-border financial transactions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) (Chinn & Ito 2008).

Source: Author's own calculation

In this chapter, all the variables indicated xSA are for other SADC countries excluding South Africa. The variables do not contain data for South Africa; however, for convenience going forward, the term 'excluding South Africa (xSA)' will be dropped. Domestic Credit (DC), Liquid Liabilities (LL), Bank Credit to Private Sector (BCP) and Broad Money (M2) are used as proxies for financial development. *A priori* expectations are that financial development in South Africa, as measured by the four variables, is expected to have a positive impact on financial development in SADC countries and this impact should be affected by spatiality.

All control variables, namely growth in GDP per capita, Trade Openness, Financial Openness and Real Interest Rates are expected to have positive coefficients, implying they support financial development in SADC. Financial openness enhances cross-border financial transactions and investment flows and is expected to impact more on the spatial variable. For trade, the fact that most Southern African countries have trade agreements, under SACU, SADC and for some COMESA trade blocs, gives more weight to the variable. The inclusion of trade openness is on the basis that countries, which have other trade agreements with South Africa outside SADC, whether bilaterally or otherwise, are more open to trading with South Africa and this enhances financial flows.

Per capita GDP growth should support financial development in line with the strong demand-pulling hypothesis confirmed in Chapter Five. Positive and high real interest rates support financial development through attracting capital, investment, new institutions, and savings. Economic activity, trade and interest rate parity are some of the transmission channels and mechanisms through which financial development in South Africa affect the financial sectors of the region; hence, inclusion of the variables in the model. Below are the multi-collinearity and panel stationarity tests, and diagnostic tests of the data used in this chapter.

7.2.1   Multi-collinearity test results

Table 7.2 indicates that, adhering to Cohen's (1988) guideline, there is significant correlation between domestic credit and liquidity (70 per cent), liquid liabilities and bank credit to private sector (76 per cent) and domestic credit and liquid liabilities. For variables depicting financial development in South Africa, reveals that substantial correlation exists between DCSA and BCPSA (88 per cent); BCPSA and M2SA (78 per cent) and DCSA and M2SA (76 per cent).

Table 7.2: Correlation matrix

	GGDPPC	DC	BCP	LL	M2	TO	FO	RINT	BCPSA	LLSA	DCSA
GGDPPC	1.0000										
DC	-0.0841	1.0000									
BCP	0.0800	0.5790	1.0000								
LL	0.1204	0.7009	0.7640	1.0000							
M2	0.0671	0.5102	0.5757	0.6875	1.0000						
TO	0.2030	0.0754	0.2893	0.4133	0.2493	1.0000					
FO	0.1935	0.2500	0.3117	0.4218	0.2798	0.1602	1.0000				
RINT	-0.1844	0.0916	0.0482	0.0631	-0.0325	-0.1759	-0.0300	1.0000			
BCPSA	0.1567	-0.0307	0.1869	0.1262	0.0156	0.1917	0.2093	0.1356	1.0000		
LLSA	-0.1509	-0.0539	-0.2156	-0.1429	-0.0761	-0.1546	-0.1394	-0.1474	-0.3748	1.0000	
DCSA	0.1428	0.0066	0.2330	0.1557	0.0371	0.2103	0.2236	0.1827	0.8865	-0.6964	1.0000
M2SA	0.2242	0.0088	0.2313	0.1504	0.0788	0.1760	0.1991	0.1026	0.7822	-0.6245	0.7648

Source: Author's own calculation

The correlation is low between the financial variables for other SADC countries and their corresponding variables for South Africa. As such, assessment of the impact of financial development in South Africa on other SADC countries is possible as there is no problem of multi-collinearity of variables included in the same model.

7.2.2   Panel stationarity test

Table 7.3 shows the panel unit root test results. All variables except for Bank Credit to Private Sector (for SADC and SA), Domestic Credit and Broad Money in South Africa, are stationary in levels under individual intercept. Both Bank Credit to Private Sector and Domestic Credit in South Africa are stationary in levels under individual intercept and trend. Variables are stationary in levels mainly because variables are in ratios or in percentages, which reduces trend on unit root. Further, some of the variables are growth rates that technically are already as good as differenced. The non-stationary variables were, however, stationary after first differencing.

Table 7.3: Panel unit root test results

Variable	Levin, Lin & Chu	Im, Persaran & Shin W-state	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
Domestic Credit	-1.7013 (0.0044)***	-1.8019 (0.0358)**	471571 (0.0132)**	46.7938 (0.0144)**
Liquid Liabilities (Money Supply)	-1.8894 (0.0294)**	-1.4185 (0.0780)**	46.7892 (0.0144)**	50.3279 (0.0059)***
Bank Credit to Private Sector	0.8419 (0.8001)	1.9478 (0.9743)	23.2115 (0.7224)	19.2101 (0.8915)
Bank Credit to Private Sector (-1)	-10.259 (0.0000)***	-10.622 (0.0000)***	159.961 (0.0000)***	255.076 (0.0000)***
Broad Money	-11.145 (0.0000)***	-7.3604 (0.0000)***	51.4937 (0.0046)***	66.6563 (0.0001)***
Growth in Real Gross Domestic Product per capita (GDPPC)	-5.8674 (0000)***	-6.2796 (0000)***	93.7712 (000)***	183.695 (0000)***
Real Interest Rate	-3.9916 (0.0000)***	-4.8805 (0.0000)***	79.6056 (0.0000)***	105.311 (0.0000)***
Trade Openness	-3.4445 (0.0003)***	-2.9879 (0.0014)***	53.3350 (0.0027)***	45.4330 (0.0199)**
Financial Openness	-1.9116 (0.028)**	-1.2742 (0.1013)	33.3079 (0.2246)	46.2805 (0.0163)**
Domestic Credit in South Africa	-4.2649 (0.0000)***	-2.7955 (0.0026)***	43.6206 (0.0303)**	43.7604 (0.0293)**
Liquid Liabilities in South Africa	-2.6368 (0.0042)***	-3.4727 (0.0003)***	51.476 (0.0044)***	24.7235 (0.6428)
Bank Credit to Private Sector in South Africa	1.7037 (0.9558)	-2.4873 (0.0064)***	40.5988 (0.0584)*	42.7177 (0.0371)**
Broad Money in South Africa	-0.8329 (0.2024)	1.4846 (0.9312)	10.7959 (0.9986)	5.507 (1.0000)
Broad Money in South Africa (-1)	-5.5740 (0.0000)	-5.6767 (0.0000)	80.2846 (0.0000)	124.265 (0.0000)
Revenue proportion from the MMA	-2.2842 (0.0122)**	-2.1555 (0.0156)**	17.6914 (0.0237)**	14.0073 (0.0816)**

t-statistic (probability); ***. **, * stationary at 1%, 5% and 10% levels respectively, I(0)[†] means the variable is level stationary under individual intercept and trend.

Source: Author's own calculation

7.3 Generalised Methods of Moments Estimates

Table 7.4 presents GMM estimation results for the effect of financial development in South Africa on financial development of other SADC countries, without spatial effect. The GMM estimates in Table 7.4 do not include spatial variables. The rationale is to assess the general effect of South Africa's financial development to regional countries regardless of proximity. Each of the four measures of financial development in SADC is used as a dependent variable

and its equivalent for South Africa as the independent variable together with other control variables.

Table 7.4: GMM estimation: financial development in SA on SADC -without spatial effects

Variable		Dependent Variables			
		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Financial Development in SADC (-1)		0.9532 (0.0000)***	0.9871 (0.0159)**	0.9600 (0.0000)***	0.8428 (0.0000)***
GGDPPC		0.8366 (0.0265)**	0.2429 (0.1300)	0.7897 (0.0002)***	0.0031 (0.2857)
Trade Openness		-0.0084 (0.6186)	-0.0107 (0.0075)***	-0.0118 (0.2499)	0.0003 (0.0911)*
Financial Openness		0.2364 (0.6601)	0.2486 (0.2290)	-0.0900 (0.7697)	0.0115 (0.0133)**
Real Interest Rates		0.1127 (0.0027)***	0.0077 (0.0122)**	0.0152 (0.4266)	0.0002 (0.3799)
Domestic Credit in SA(-1)		-0.0035 (0.7859)			
Liquid Liability in SA(-1)			0.0313 (0.0148)**		
Bank Credit to Private Sector in SA(-1)				0.0122 (0.4734)	
Broad Money in SA(-1)					0.0439 (0.0732)*
Diagnostics tests	R-sqd	0.8712	0.9450	0.8447	0.8397
	AdjR-sqd	0.8695	0.9442	0.8427	0.8375
	D-W stat	2.0820	2.2783	1.9296	2.0240
	J-stat	1.7841	2.9277	0.0145	1.0446
	Prob(J)	0.1817	0.0871	0.9041	0.3068

*SA- South Africa; t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

The results show that South Africa's liquid liabilities and broad money have positive and statistically significant effects, at 5 per cent and 10 per cent respectively on their corresponding variables for other SADC countries. The results show that an increase in liquid liabilities and broad money in South Africa results in growth of liquid liabilities and broad money of other SADC countries. South Africa's domestic and private credit variables are not statistically significant to explain their corresponding values in other SADC countries, although the signs of their coefficients are negative and positive, respectively.

Generally, the results indicate that an increase in financial development (money market) in South Africa supports development of financial sectors of other SADC countries. The results are consistent with the findings of Canales-Kriljenko, Gwenhamo and Thomas (2013), that substantial spill-over from South Africa into the other members of the SADC Customs Union reflects sizeable real and financial inter-linkages. Although the credit variables were statistically insignificant, interpretation of their effect based on the sign of the coefficients indicate mixed effects. Fundamentally, without spatial effects, the results suggest that from South Africa, money is stronger than credit in driving financial development in SADC.

The coefficients of lagged dependent variables across all the measures of financial development are all high and significant. The results indicate evidence of considerable persistence in the variables and a strong dependence on past period values. Trade openness is negatively related to financial development, a result that is contrary to expectation, presumably due to skewed trade balance in SADC that is in favour of South Africa. Financial openness is positive, supporting financial development in SADC. Economic growth, as measured by Growth in GDP per capita, is consistently positive, related to all the proxies for financial development, but is significant in credit, in line with findings of Allen and Ndikumana (1998). The results suggest that in SADC financial development, as measured by credit, is largely demand following, a result consistent with Aziakpono's study (2004). Real interest rate supports financial development in SADC and its effects are significant in domestic credit and liquid liabilities. Financial openness strongly supports broad money in SADC and has an insignificant effect across other variables.

7.4   Role of spatiality in financial development in SADC

Table 7.5 presents the results of GMM estimates of the impact of financial development in South Africa on other SADC countries when spatial variables that take into account effects of spatial externalities or distance from South Africa are included.

Table 7.5: GMM estimation: financial development in SA on SADC -with spatial effects

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Financial Development in SADC (-1)		0.9595 (0.0000)***	0.9950 (0.0000)***	1.0156 (0.0000)***	0.8644 (0.0000)***
GGDPPC		0.9910 (0.0114)**	0.2702 (0.0656)*	0.8415 (0.0002)***	0.0024 (0.4474)
Trade Openness		-0.0077 (0.6227)	-0.0143 (0.1373)	-0.0110 (0.2040)	0.0002 (0.2565)
Financial Openness		0.0204 (0.9715)	0.3537 (0.1837)	-0.4175 (0.2227)	0.0132 (0.0109)**
Real Interest Rates		0.1221 (0.0014)***	0.0086 (0.5343)	0.0152 (0.4379)	0.0002 (0.5602)
SP*Domestic Credit in SA(-1)		-0.0145 (0.3323)			
SP*Liquid Liability in SA(-1)			0.0576 (0.0597)*		
SP*Bank Credit to Private Sector in SA(-1)				-0.0184 (0.3484)	
SP*Broad Money in SA(-1)					0.0810 (0.0828)*
Diagnostics tests	*R-sqd*	*0.8656*	*0.9418*	*0.8373*	*0.8336*
	AdjR-sqd	*0.8637*	*0.9410*	*0.8351*	*0.8313*
	D-W stat	*2.0704*	*2.1993*	*1.9893*	*1.9718*
	J-stat	*0.8893*	*0.7306*	*0.9235*	*1.0887*
	Prob(J)	*0.3457*	*0.3927*	*0.3366*	*0.2968*

*SP-Spatial Effect, SA- South Africa; t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

7.4.1 Money Variables (Liquid Liabilities and Broad Money)

Using Liquid Liabilities and Broad Money as indicators of financial development, the coefficients of the spatial variables, at 0.0576 and 0.0810, respectively are positive and statistically significant at 10 per cent. The results suggest the presence of positive spatial externalities in the SADC countries in line with *a priori* expectations. The spatial variable $(1 - \rho_{SA})_i$ in the estimated model is the weight/degree of (financial) interconnectedness of country *i* with SA measured by the geographical distances. As such, based on the given results, it implies that the closer a country is to South Africa, the more its liquid liabilities and broad money are interconnected with and hence benefit from an increase in liquid liabilities and broad money in South Africa. Indirectly, the spatial variable has a complementary effect in the money market.

The results are consistent with Benos, Karagiannis and Karkalakos (2015) who found that proximity matters in capital markets in European regions and with Mobolaji (2008, 2010) for

Sub Saharan Africa countries. The results also support the theoretical argument of Baltagi *et al.* (2007) that the financial sector has a contagious effect beyond a country to other economies. Furthermore, the results are in support of an argument by the IMF (2012) that financial development in the advanced economy spills over to other countries through several channels, which includes trade, remittances and financial sector interconnections.

Possible explanations for this result is that liquid liabilities and broad money reflects monetary attributes; as such, there are more direct spill-over effects to countries that are closer to South Africa. There exists a high demand for South African money market instruments in neighbouring countries driven by financial flows, cross-border trading and remittances from South Africa. The use of South Africa's currency in four SADC countries, Lesotho, Namibia, Swaziland and Zimbabwe, coupled with the Monetary Area Agreement with Botswana could be influencing the results. Some of these countries have a common economic and monetary union that facilitates spatial externalities of monetary variables (Mobolaji 2010). In addition, a number of South Africa's financial institutions have more branches in the neighbouring than in further away countries. Such institutions have direct access to money in South Africa through their parent institutions in the form of offshore balances and banking services.

Furthermore, such institutions help in the circulation of the South African Rand not only in countries where it is regarded as legal tender, but also where there is significant cross-border trade with and remittances from South Africa. Mobolaji (2010) added that in many of these countries, there are no exchange or credit restrictions such that firms are free to borrow from South African banks. Given that these countries are closer to South Africa than other SADC countries, their monetary linkages with South Africa might be influencing the results. Overall, the outcome is, however, in support of the theory on spatial externalities in finance.

The lagged dependent variables remain high and statistically significant at one per cent level, indicating evidence of a strong dependence on previous period values. Financial openness is positive and significant in supporting financial development in SADC only in broad money, consistent with results of estimates without spatial effects. Trade openness is statistically insignificant although the dominant sign of the coefficients is negative, presumably due to a skewed trade balance of SADC in favour of South Africa. Economic growth relates positively to financial development and is significant in supporting liquid liabilities rather than credit variables. The GMM results show that in SADC the only real interest rates significantly support domestic credit.

7.4.2   Credit (Domestic and Private)

With Domestic Credit and Bank Credit to Private Sector in South Africa as measures of financial development, the spatial variables have statistically insignificant effects on corresponding credit in SADC. Since the variables are not statistically significant, analysis would only be limited to the sign of the coefficients. The sign of the coefficients of spatial variables imply that credit in South Africa has a negative spatial effect on credit in other SADC countries. The negative sign is consistent with Crocco, Santos and Amaral (2010) who found negative spatial association between the Brazilian municipalities' financial system and the findings of Mobolaji (2008, 2010) who found negative spatial effects of credit in Sub-Saharan Africa. Mobolaji (2008) pointed out that negative spatial externalities on credit in South Africa could be because of improved access to credit facilities by, and the cost of credit to investors is reduced through competition among banks.

There is, however, need for caution in the interpretation of the negative sign on credit variables. The negative sign indicates that more credit from South Africa goes to countries far away than to countries close by, and as such, is inversely related to a country's distance from South Africa. The negative sign could also reflect the crowding-out effects of credit from South Africa on credit in other SADC countries. In other words, an increase in credit in South Africa has the potential to replace credit of neighbouring countries driven by interlinkages and a high presence of South African firms and financial institutions in neighbouring countries. South Africa has a developed financial market that offers competitive credit when compared to its neighbours. Most neighbouring countries, with the exception of Namibia, Botswana and Zimbabwe, have relatively small and underdeveloped financial sectors that do not offer better terms for credit. Domestic markets, therefore, have high affinity for South African credit. South African credit has a strong substituting effect on credit in neighbouring SADC countries.

Furthermore, the negative sign could be indicating elements of natural behaviour of credit. Most South African companies and others operating in SADC countries are able to secure credit in South Africa to support operations in these countries. Credit normally flows to where there are high returns and favourable conditions in line with the theoretical argument by Levine (2005) that financial systems optimally allocate resources across space and time. The negative sign could indicate that private credit from South Africa flows to strong markets and economies in faraway countries such as Mauritius in the form of Foreign Direct Investment. For the period 2001 to 2010, Mauritius was the recipient with the highest flow of investments from South Africa, on average 44 per cent, followed by Tanzania at 12 per cent and Mozambique 7 per cent (Nkuna 2014). Further, in 2010, countries around South Africa received a low amount of

loans from South Africa as a proportion to their GDP, with Lesotho and Swaziland receiving below 1 per cent, Mozambique 1.6 per cent, and Zimbabwe 1.9 per cent, whilst Mauritius, a relatively far-off country, received 3.2 per cent (Basdevant *et al*. 2014 and Canales-Kriljenko *et al.* 2013).

This notwithstanding, since the coefficients are not significant, the negative sign alone would not suffice for the study to conclude on the relationship. This study therefore, performed dynamic panel estimates as a robustness check of the results.

The lagged dependent variable is high and significant, indicating evidence of a strong dependence on previous period values in concurrence with the findings of Chinn and Ito (2006) and Baltagi *et al.* (2007). Only growth in GDP per capita has a consistent positive relationship with all the proxies for financial development, whilst real interest supports financial development in the SADC countries under domestic credit. The other control variables are not sufficiently strong to affect the dependent variables.

This study used two different approaches to conduct robustness checks of the estimated GMM results. Firstly, the study performed dynamic panel estimates to compare results. Secondly, the study re-ran the GMM estimates, controlling for monetary union (Multilateral Monetary Agreement). This isolates the impact of South Africa's financial development on countries outside the monetary union from those in the Multilateral Monetary Agreement. The rationale is that countries in the Multilateral Monetary Agreement are very close and have enhanced linkage to South Africa under the monetary union that might increase spatial externalities. Below are the results for the dynamic fixed effects model.

7.5   Dynamic Fixed Effect results

Table 7.6 contains the Hausman test results. The results suggest the use of Fixed Effects estimation for all the measures of financial development. In line with the suggestions by the Hausman tests, the study only presents results of the Fixed Effects. The robustness check was done only for models with spatial variables.

Table 7.6: Hausman test - Financial development with spatial effect

Dependent Variable	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.	Decision
Domestic Credit	39.9020	6	0.0000	Fixed Effect
Liquid Liabilities	46.2803	6	0.0000	Fixed Effect
Bank Credit to Private Sector	57.1697	6	0.0000	Fixed Effect
Broad Money	71.8494	6	0.0000	Fixed Effect

Source: Author's own calculation

Table 7.7 presents the results of the Dynamic Fixed Effect estimates for the model with spatial effects. Dynamic fixed effects estimates produce results at variance with that of GMM on the impact of spatiality on credit.

Table 7.7: Dynamic Fixed Effect with spatial effects

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant		5.1004 (0.0999)***	11.274 (0.0000)	-1.1240 (0.5923)	0.0707 (0.03919)
Financial Development in SADC (-1)		0.7861 (0.0000)***	0.8472 (0.0000)***	0.7658 (0.0000)***	0.6294 (0.0000)***
GGDPPC		-0.2167 (0.0806)**	-0.1733 (0.0005)***	-0.1384 (0.0213)**	-0.0047 (0.0000)***
Trade Openness		-0.0290 (0.3072)	-0.0098 (0.3124)	-0.0005 (0.9656)	-0.0003 (0.1095)
Financial Openness		-0.0317 (0.1948)	0.0006 (0.9541)	0.0113 (0.3395)	-0.0001 (0.9462)
Real Interest Rates		0.7919 (0.2646)	0.5146 (0.0639)*	0.9587 (0.0083)***	0.0085 (0.1750)
SP*Domestic Credit in SA(-1)		0.0566 (0.0478)**			
SP*Liquid Liability in SA(-1)			-0.2005 (0.0166)**		
SP*Bank Credit to Private Sector in SA(-1)				0.1577 (0.0039)***	
SP*Broad Money in SA(-1)					0.2105 (0.0066)***
Diagnostic tests	*R-sqd*	*0.9006*	*0.9570*	*0.9095*	*0.8575*
	AdjR-sqd	*0.8956*	*0.9549*	*0.9050*	*0.8505*
	F-stat	*180.265*	*452.43*	*204.16*	*122.26*
	Prob(F)	*0.0000*	*0.0000*	*0.0000*	*0.0000*

*SA - South Africa; SP - Spatial Effect

Source: Author's own calculation

The spatial variables for domestic and bank private credit are now positive (0.0566 and 0.2105) and statistically significant at 5 per cent for domestic credit and 1 per cent for bank private credit. This indicates that with dynamic fixed effects, credit from South Africa is highly sensitive to proximity. Implicitly, the distance weighted interconnectedness of SADC countries with South Africa supports access to credit by countries that are closer to South Africa. The results show that more of South Africa's credit to SADC countries goes to neighbouring countries. It is critical to point out that the credit referred to, is not the entire credit from South Africa, but only the credit that goes to SADC countries. Given the dominance of South Africa in Africa in terms of financial development, more credit could be going outside SADC than to the SADC countries.

The results are possibly indicating combined effects of the amount of credit that countries around South Africa are receiving regardless of the size of the individual countries' financial sectors. Since countries around South Africa have relatively smaller financial sectors, aggregated effects of credit received from South Africa through branches of financial institutions, could be large enough for the overall credit from South Africa to respond to distance. Furthermore, South African private and public developmental institutions, such as the Development Bank of South Africa, access credit in the South African market and extend this to other countries through financing developmental projects. The AFRODAD (2014) indicated that the Development Bank of South Africa (DBSA) has been a major source of loans to Zambia, Tanzania, Namibia, Lesotho, Mozambique, Madagascar, the DRC and Malawi.

In addition, the results could also be indicating the relation of the amount of credit received by countries relative to the sizes of their financial sectors. Most SADC countries, with underdeveloped financial sectors, are closer to South Africa (Swaziland, Lesotho, Mozambique and Zambia). South African banks have a significant share of the assets in these countries; Swaziland 65 per cent (representing 29 per cent of GDP) and Lesotho 97 per cent (representing 47 per cent of GDP) and sizable presence in Botswana, Seychelles, Zambia and Zimbabwe (IMF 2014). As such, the credit they receive from South Africa could be significant, when compared to the size of financial sectors; hence the positive effects.

On money market variables, the spatial externalities variable has a positive significant effect that is positive under broad money, consistent with GMM estimates. The spatial variable, however, has a significant negative effect under liquid liabilities. It could be difficult to explain the new effect on liquid liabilities. It could be suggested that the spatial variable is selecting

the relative sizes of liquid liabilities across countries, reflecting the size of intermediation, which for neighbouring countries is low.

7.5.1   Openness Variables

Financial openness has a significantly positive support of broad money under GMM and insignificant support under dynamic fixed effects. Trade openness does not support spatially influenced financial development in the SADC countries. The study did not test for the Rajan-Zingales' hypothesis on simultaneous openness of both trade and financial sectors. However, findings on openness suggest that financial openness offers greater scope for advancing financial development through the money market than trade openness in the SADC region, contrary to the findings by Mobolaji (2010).

The SADC region was established mainly to promote trade among the countries and until 1994 to reduce their dependence on South Africa. As such, trade in SADC has been open and has not driven financial development given the unfavourable trade balances across countries. Most countries in SADC are net importers from South Africa, which creates skewed demand for financial services toward South Africa. On the other hand, opening of the capital account appears to support movement of monetary attributes across countries rather than other instruments of financial development such as credit. In SADC, financial openness is more beneficial to the redistribution of South Africa's broad money in neighbouring SADC countries than trade openness.

The study conducted further analyses on spatiality in financial development by controlling for the monetary union (Multilateral Monetary Agreement - MMA) in the SADC. The rationale is that countries in the MMA are very close to South Africa and it is anticipated that spatial externalities would be optimal. As such, geographical proximity of countries in the monetary union could be influencing the behaviour of spatial variables, hence the need to control them. The expectation is that if the monetary union effects were controlled, variables would give a robust indication of spatial effects beyond the influence of the monetary union. The analysis is also a robustness check for consistency of the GMM results after factoring out the current monetary agreement arrangement in the SADC.

7.6   Spatial effects and Multilateral Monetary Agreements (MMA)

Multilateral agreements delineate the movement of funds within the Multilateral Monetary Area, access to South African financial markets, foreign exchange transactions and compensation payments (Wang *et al.* 2007). Spatial effects are therefore expected to be enhanced by the multilateral agreements, hence the need to control these. Table 7.8 presents

the results of the GMM estimate of the model with spatial effects and multilateral monetary agreement effects.

Table 7.8: GMM estimation with spatial effects and Monetary Agreement variables

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Financial Development in SADC (-1)		0.9544 (0.0000)***	0.9906 (0.0000)	1.0155 (0.0000)***	0.8554 (0.0000)
GGDPPC		0.9716 (0.0132)**	0.2717 (0.0625)	0.8398 (0.0002)***	0.0025 (0.4004)
Trade Openness		-0.0044 (0.7929)	-0.0094 (0.3067)	-0.0110 (0.2197)	0.0002 (0.0825)
Financial Openness		0.0608 (0.9157)	0.3316 (02066)	-0.4172 (0.2256)	0.0129 (0.0111)
Real Interest Rates		0.1206 (0.0016)***	0.0090 (0.5103)	0.0152 (0.4386)	0.0001 (0.5440)
SP*Domestic Credit in SA(-1)		-0.0134 (0.3732)			
SP*Liquid Liability in SA(-1)			0.0496 (0.0841)*		
SP*Bank Credit to Private Sector in SA(-1)				-0.0185 (0.3526)	
SP*Broad Money in SA(-1)					0.0706 (0.1007)
RCMA* Domestic Credit in SA (-1)		-0.5144 (0.5330)			
RCMA* Liquid Liability in SA (-1)			-1.0988 (0.2001)		
RCMA *Bank Credit to Private Sector in SA(-1)				0.0567 (0.9540)	
RCMA *Broad Money in SA(-1)					-2.1024 (0.1135)
Diagnostic tests	R-sqd	0.8668	0.9426	0.8376	0.8520
	AdjR-sqd	0.8646	0.9417	0.8349	0.8325
	J-stat	0.6202	0.9334	1.1143	0.7265
	Prob(J)	0.4310	0.3340	0.2911	0.3940

<u>Source</u>: Author's own calculation   *SP-Spatial Effect, SA- South Africa

When the effects of the monetary union are controlled, the spatial externalities have a positive (significant) effect on liquid liabilities consistent with GMM estimations. The spatial variable for Broad Money retains a positive, although statistically insignificant effect, probably indicating that the monetary union has influence on the significance of the coefficient. The spatial variables for credit, although statistically insignificant, remain consistently negative. Other control variables remain with the same effect as under GMM estimation with spatial effects. Both financial and trade openness are now supporting Broad Money after eliminating the effects of the monetary union. This could be due to increased movement and usage of the Rand beyond the monetary union countries, driven by cross-border trade and remittances.

The results also show that South Africa's financial development, which is absorbed in other MMA countries, has no effect on financial development in SADC countries as all the coefficients are not significant. The results thus suggest an absence of second level spill-over effects from MMA countries into other SADC countries, and low levels of financial interconnectedness between other MMA countries and other SADC countries. Overall, the implication of the results are that financial arrangements (monetary agreements) in the SADC have some, although limited, influence on the spatial externalities of money and no influence on credit in the region. The monetary union is thus not strong enough to control spatial externalities of South Africa's financial development in the SADC.

7.7   Spatial effects of financial development in SADC

Spatial proximity theory asserts that externalities increase with proximity (Capello 2009) and in finance, countries closer to a relatively more developed country benefit more from spill-over effects than those further away. In SADC the spatial theory is consistently more applicable in money markets, than in credit markets. The money market in SADC, in particular broad money, has distinct spatial tendencies. On the credit market, although the positive spatial effects are evident, they are made inconsistent by elements of crowding-out, natural flow of credit towards optimal returns in stable markets and South Africa's global linkages. Furthermore, credit from South Africa has limited sensitivity to proximity in support of the theoretical position held by Levine (2005) that financial systems naturally influence the optimal allocation of resources across space and time.

Generally, South Africa's financial development is able to generate positive spatial externalities to neighbouring countries, a salient feature that a financially developed country should have (Mobolaji 2010). The indication is that South Africa's financial sector, particularly the money market, has a contagious effect in the SADC region; this concurs with the theoretical argument that financial sectors have a contagious effect beyond a country to other economies (Baltagi *et al.* 2007). The imperfect competition, high transaction costs, asymmetric information between investors and savers in other SADC countries are increasing the spatial effect of financial development around a relatively efficient South Africa. Such inefficiencies in the financial sector, pervasive risk and uncertainty justify spatial consideration in the financial markets (Klagge & Martin 2005). Proximity to South Africa brings spatial externalities that support growth in the financial development in SADC, mostly through the money market.

7.8   Chapter summary and conclusions

This chapter analysed the effects of spatiality on financial development in SADC countries using Generalised Methods of Moments and Dynamic Fixed Effects estimations. Results of the study suggest that there is a spatial effect on financial development in the region and the significant spatial externality among the countries is largely positive. Financial development in South Africa is responsive to spatiality although the responsiveness varies with the specific aspect of financial development. Results indicate that monetary measures (Liquid Liabilities and Broad Money) are highly sensitive to geography (proximity). The results also indicate that allowing for spatiality under GMM estimations, credit from South Africa seems not to respond to effects of spatiality. However, credit elicits positive spatial effects on credit in SADC when Dynamic Fixed Effects estimation is used. The results suggest the presence of spatial benefits for financial development in SADC and the benefits are highly visible in the money market. The spatial variable has a strong complementary effect in the money market and a relatively inconsistent complementary effect in the credit market.

Estimates that controlled the monetary union variable indicated that beyond the monetary area, South Africa's broad money continues to be affected by spatiality and credit is not responsive to spatial effects. Countries in the monetary union are too small to induce spatial effects on credit. The money market in South Africa is affected by spatial externalities even beyond the monetary area, indicative of 'centrifugal' effects of money and money markets in South Africa. Indirectly, it can be concluded that South Africa's monetary policy has a regional effect, even beyond the current monetary union. Findings on openness indicate that the current level of trade and financial openness is not sufficient to facilitate financial development in SADC beyond the money market. The findings, however, suggest that financial openness offers greater scope for advancing financial development through the money market than do trade openness in the SADC region.

The findings generally indicate that there is more scope and potential for SADC countries to utilise financial development in South Africa to enhance development of their financial sectors through the money and credit markets. Countries close to South Africa need to have in place mechanisms of linking their monetary sectors to that of South Africa in order to benefit from positive spill-overs. Countries also have to deal with any negative spatial externalities that might arise in South Africa's markets. In addition, SADC countries need to extensively develop their financial sectors in order to counter the elements of crowding-out of domestic credit by credit from South Africa. Inevitably, the heterogeneity among SADC countries and the varying

levels of financial development dictate that the region should promote financial integration in order to enhance development of underdeveloped financial systems through spatial spill-over gains.

The discussion in this chapter clearly shows that financial development in SADC is responsive to and affected by spatial externalities. Proximity has its own associated benefits and costs. However, proximity alone does not exhaust the benefits of spatial externalities in financial development, spill-overs are also important. If the impact of South Africa's financial development in SADC has a spatial dimension, what then are the spill-overs that come from South Africa into the region? Spill-overs could be direct or indirect, negative or positive. Building on the estimations of this chapter, the following chapter presents the results pertaining to spill-over effects of South Africa's financial development into the SADC region. Chapter Eight specifically presents results of impulse response analysis of spill-over effects on economic growth and financial development of other SADC countries.

CHAPTER EIGHT
SPILL-OVER EFFECTS OF FINANCIAL DEVELOPMENT IN SADC

8.1   Introduction

When markets are interlinked there is bound to be co-movement of these markets either positively or negatively. Markets are connected by trade, portfolio investment, remittances, labour movement, monetary policies and exchange rates. When economies are connected and more so if countries are of proximity to each other spill-overs are enhanced. Financial spillover effects encompass the direct impact of country-specific developments on financial markets elsewhere (IMF, 2016). The transmission mechanisms through which fundamentals in one financial market affect other markets are dependent on the inter-linkages of the markets. In the SADC region, South Africa has strong ties with other countries in the SADC region, which potentially facilitate financial spillovers. In Chapter Seven it was established that effects of South Africa's money and credit markets on other SADC economies respond positively to spatial proximity. Beyond proximity, the inter-connecting channels that create linkages between South Africa and other SADC countries are bound to create financial spill-overs in line with the theory on spill-overs.

Spill-overs from South Africa's financial sector can directly or indirectly affect economic growth and financial development of other SADC countries. Direct financial spill-over effects occur when financial development in South Africa operates through primary transmission mechanisms to have a direct impact on growth or financial development in other SADC countries. Indirect spill-overs occur through secondary transmission mechanisms, wherein financial development in South Africa affects other variables, which in turn have secondary effects on other SADC countries. This current study evaluates the direct financial spill-over effects from South Africa on other SADC countries.

This chapter presents the results of an empirical test of financial spill-overs from South Africa to other SADC countries. The tests carried out point to the nature of spill-overs (that is whether they are positive or negative) and the magnitude of the spill-overs. The study tests spill-overs in two ways, firstly through dynamic panel regression models estimated by GMM in line with Basdevant *et al*. (2014), and secondly, it uses the Generalised Impulse Responses and Variance Decompositions analysis in line with studies by Canales-Kriljenko *et al.* (2013). The empirical evidence in this chapter provides new knowledge in understanding the dynamics of financial spill-overs in the SADC.

The following section presents *a priori* expectations, descriptive statistics, correlation and unit root tests of the variables, thereafter follows the results of estimates on spill-overs, starting with those for spill-overs on growth and then for spill-overs on financial development. In both cases, the results for GMM estimates are presented first, followed by impulse responses and then variance decompositions.

8.2   Growth variables description, *a priori* expectations and data diagnostics

Variables used for spill-overs vary depending on whether the analysis is for spill-overs on growth or on financial development. The variables used for testing financial spill-over effects on growth are presented in Table 8.1. In this chapter, the variables are for other SADC countries excluding South Africa and do not contain data for South Africa, unless indicated. However, for convenience, going forward in this chapter the term 'excluding South Africa' (xSA) will be dropped on all the variables.

Table 8.1: Variables description

Variable Category	Variable	Description	Definition
Dependent Variable	GGDPPC	Growth in Real Gross Domestic Product per capita (GDPPC)	Growth in real Gross Domestic Product per capita
Control Variables	GCF	Gross Capital Formation	Gross Capital Formation for other SADC countries excluding South Africa
	GEXP	Government Expenditure	Government Expenditure for other SADC countries excluding South Africa
	RINT	Real Interest Rate	Real interest rate for other SADC countries excluding South Africa
	TO	Trade Openness	(Exports+ Imports)/GDP for other SADC countries excluding South Africa
	POP	Population growth rate	Population growth rate for other SADC countries excluding South Africa.
South Africa Financial Development Variables	DCSA	Domestic Credit in South Africa	South Africa's Total credit by the financial sector to GDP
	LLSA	Liquid Liabilities in South Africa	South Africa's M3 to GDP
	BCPSA	Bank Credit to Private Sector in South Africa	South Africa's Total credit by banks to private sector to GDP
	M2SA	Broad Money in South Africa	South Africa's Broad Money to GDP

Source: Author's own calculation

Domestic Credit (DC), Liquid Liabilities (LL), Bank Credit to Private Sector (BCP) and Broad Money (M2) are used as proxies for financial development. *A priori* expectations are that

financial development in South Africa, across the above measures, has positive spill-over effects on economic growth and on financial development of other SADC countries. Below are the multi-collinearity and panel stationarity tests diagnostics of the data used in this chapter.

8.2.1 Multi-collinearity test results

In order to avoid estimates that have a large variance that gives inaccurate estimates, the variables were tested for multi-collinearity using a correlation matrix (see Table 8.2).

Table 8.2: Correlation matrix

	GGDPPC	GCF	GEXP	TO	RINT	POP	DCSA	LLSA	BCPSA	M2SA
GGDPPC	1.0000									
GCF	0.2654	1.0000								
GEXP	0.0521	0.4036	1.0000							
TO	0.1957	0.4329	0.5186	1.0000						
RINT	-0.2406	-0.2072	-0.3189	-0.1505	1.0000					
POP	-0.1302	-0.2453	-0.1773	-0.4072	-0.1926	1.0000				
DCSA	0.1385	0.0279	-0.0536	0.2080	0.1929	-0.2536	1.0000			
LLSA	-0.1556	0.0094	0.0464	-0.1553	-0.1403	0.1737	-0.7000	1.0000		
BCPSA	0.1388	0.0479	-0.0604	0.1889	0.1792	-0.2248	0.8865	-0.3805	1.0000	
M2SA	0.2062	0.0179	-0.0776	0.1737	0.1512	-0.1727	0.7690	-0.6277	0.7877	1.0000

Source: Author's own calculation

Table 8.2 indicates that there is high correlation among South Africa's financial development variables in particular between DCSA and BCPSA (88 per cent); BCPSA and M2SA (78 per cent), DCSA and M2SA (76 per cent) and BCPSA and M2SA (79 per cent) calculated according Cohen's guidelines (1988). As in the other chapters of this study, variables with high levels of correlation would not be included in the same model for any estimation.

8.2.2 Panel stationarity test

Table 8.3 shows the panel unit root test results for the new variable introduced for estimations in this chapter. All variables except for Bank Credit to Private Sector (for SA), Domestic Credit and Broad Money in South Africa, are stationary in levels under individual intercept. Bank Credit to Private Sector and Domestic Credit in South Africa are stationary in levels under individual intercept and trend. Broad Money is, however, stationary after first differencing.

Table 8.3: Panel unit root tests at level

Variable	Levin, Lin & Chu	Im, Persaran & Shin W-state	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
Growth in Real Gross Domestic Product per capita (GDPPC)	-5.8674 (0000)***	-6.2796 (0000)***	93.7712 (0000)***	183.695 (0000)***
Gross Capital Formation (GCF)	-3.7575 (0.0001)***	-3.9364 (0.0000)***	61.7678 (0.0002)***	62.3339 (0.0002)***
Government Expenditure (GEXP)	-4.1472 (0.0000)***	-4.4529 (0.0000)***	72.9357 (0.0001)***	65.5027 (0.0000)
Real Interest Rate (RINT)	-3.9916 (0.0000)***	-4.8805 (0.0000)***	79.6056 (0.0000)***	105.311 (0.0000)***
Trade Openness (TO)	-3.4445 (0.0003)***	-2.9879 (0.0014)***	53.3350 (0.0027)***	45.4330 (0.0199)**
Population growth rate (POP)	-0.8925 (0.1861)	-3.8955 (0.0000)***	85.9392 (0.0000)***	44.9409 (0.0224)*
Domestic Credit in South Africa	-4.2649 (0.0000)***	-2.7955 (0.0026)***	43.6206 (0.0303)**	43.7604 (0.0293)**
Liquid Liabilities in South Africa	-2.6368 (0.0042)***	-3.4727 (0.0003)***	51.476 (0.0044)***	24.7235 (0.6428)
Bank Credit to Private Sector in South Africa	1.7037 (0.9558)	-2.4873 (0.0064)***	40.5988 (0.0584)*	42.7177 (0.0371)**
Broad Money in South Africa	-0.8329 (0.2024)	1.4846 (0.9312)	10.7959 (0.9986)	5.507 (1.0000)
Broad Money in South Africa (-1)	-5.5740 (0.0000)	-5.6767 (0.0000)	80.2846 (0.0000)	124.265 (0.0000)

Source: Author's own calculation

8.3 Spill-over effects of Financial Development in SA on Growth of other SADC Countries

As outlined in the literature reviewed, spill-overs are important for growth, as they exist not only within but also across economies (Benos, Karagiannis & Karkalakos 2015). Cross-border market linkages increase the likelihood for shocks in a financially developed country to be transmitted internationally (Angkinand, Barth & Kim 2009). This section presents results of the spill-over effects of financial development in South Africa on economic growth of other SADC countries.

8.3.1 GMM estimation results - Impact of spill-overs

The dynamic panel GMM estimation results in Table 8.4 show the nature of spill-over effects as indicated by the sign and statistical significance of coefficients for proxies measuring financial development in South Africa.

Table 8.4: GMM estimates of financial spill-over effects on growth.

		Dependent Variable: GGDPPC			
Variable		Model 1	Model 2	Model 3	Model 4
GGDPPC (-1)		0.3251 (0.0000)***	0.3391 (0.0000)***	0.3266 (0.0000)***	0.3160 (0.0000)***
Domestic Credit in SA		0.0210 (0.0008)***	-	-	-
Liquid Liability in SA		-	0.0211 (0.5047)	-	-
Bank Credit to Private Sector in SA		-	-	0.0473 (0.0178)**	-
Broad Money in SA		-	-	-	0.0375 (0.0330)**
Trade Openness		0.0037 (0.6256)	0.0134 (0.0661)*	0.00616 (0.4304)	0.0073 (0.3418)
Gross Capital Formation		0.0243 (0.4430)	0.0455 (0.1981)	0.0235 (0.4771)	0.0373 (0.2429)
Government Expenditure		-0.0619 (0.0590)**	-0.0708 (0.0343)**	-0.0650 (0.0485)**	-0.0648 (0.0474)**
Population growth		-0.5362 (0.0226)**	-0.1758 (0.6045)	-0.5503 (0.0562)*	-0.4217 (0.1060)
Real Interest Rates		-0.0409 (0.0000)***	0.0295 (0.0013)***	0.0387 (0.0001)***	-0.0366 (0.0001))***
Diagnostic tests	*R-sqd*	*0.2495*	*0.2342*	*0.2425*	*0.2537*
	AdjR-sqd	*0.2374*	*0.2218*	*0.2302*	*0.2417*
	J-stat	*1.3156*	*10.6481*	*1.6798*	*0.0292*
	Prob(J)	*0.2514*	*0.0011*	*0.1949*	*0.8643*

*SA- South Africa; t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

Results in Table 8.4 indicate that financial development, particularly credit, in South Africa has a positive effect on economic growth of other SADC countries. Estimated coefficients for South Africa's Domestic Credit, Bank Credit to Private Sector and Broad Money, at 0.0210; 0.0473 and 0.0375 respectively, are positive and statistically significant at 1 per cent, 5 per cent and 5 per cent, respectively. The results imply that an increase in South Africa's financial sector (domestic credit, private credit or broad money) can potentially support economic growth in other SADC countries. This indicates a presence of positive spill-over effects from South Africa's financial sector to real sectors of other SADC countries. The result is in line with findings in Chapter Seven where for example credit from South Africa was found to have a crowding-out effect on domestic credit implying that it is highly demanded in other countries.

A possible explanation could be that high level of growth in other SADC countries could be supported by access to credit by firms from off-shore markets including South Africa. The

increase in foreign credit supports economic growth in recipient countries, especially in resource based industries. The local firms have a high preference for the highly competitive South African credit, to support their operations, ahead of domestic credit. Mobolaji (2010) stated that firms, attracted by lower cost of credit, better technology and service, and more competition, are free to borrow from South African banks; in the process crowding out domestic credit markets.

Furthermore, South Africa is the largest source of foreign direct investment, mostly for smaller countries in SADC, and a significant number of South African non-financial firms are present within the SADC. Rossow (2016) pointed out that the possible downgrade of South Africa's credit rating from Baa2 by Moody's in 2016 would have a bad impact on the region given that many of the borrowers in the region access funding in South Africa. It will become more expensive for borrowers to fund capital projects if South Africa's credit rating is downgraded.

The lagged per capita real GDP growth has a positive impact on subsequent values, indicating that levels from previous periods are important in explaining current growth. Trade openness positively supports economic growth in SADC implying that as the countries in SADC opens up their economies for trade, the rate of growth increase (Mbulawa 2015). Gross fixed capital formation has a positive effect on growth consistent with *a priori* expectations and findings of Shaheen, Awan, Waqas and Aslam (2013). Government expenditure was found to be adverse to growth as government spending, directed at non-productive expenditures, could have a negative effect on economic growth (Gorlach & Le Roux 2013). Population growth, in line with *a priori* expectations is inversely related to per capita real GDP growth. Real interest rates have a mixed effect on growth due to its varying impact on income distribution, costs, inflation and levels of demand in the economy across countries (Odhiambo 2011).

It is important to emphasise that the spill-over effects, though positive, are relatively low, as indicated by the small sizes of the coefficients. Although the result somehow confirms inter-linkages between South Africa's financial sector and economic activity in other SADC countries, the results suggest a presence of weak financial spill-over effects from South Africa on growth in the rest of SADC. The magnitude of the spill-over effects is, however, established by conducting impulse response (forecasting) and variance decomposition, under a VAR system. The following section performs robust checks of the obtained results by applying generalised impulse response functions and variance decompositions on a Bayesian VAR model.

8.3.2 Bayesian VAR estimates of impulse response and variance decomposition

Table 8.5 shows the results of the BVAR system with GGDPPC and the four measures of financial development for South Africa as endogenous variables. Ordinarily, a VAR system produces results of each endogenous variable being treated as a dependent variable. The results presented in Table 8.5, however, are only when economic growth (GGDPPC) is the dependent variable. VAR estimates for other endogenous variables in the model are not useful in explaining spill-over effects.

Table 8.5: Bayesian VAR estimates

Sample (adjusted): 1990-2014
Included observations: 350 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GGDPPC				
GGDPPC (1)	0.253934	BCPSA (1)	-0.013631	LLSA (1)	-0.088697
	[5.47338]***		[-0.17983]		[-0.68076]
GGDPPC (2)	0.078142	BCPSA (2)	-0.006473	LLSA (2)	-0.093668
	[2.13606]**		[-0.14493]		[-0.87178]
GGDPPC (3)	0.027884	BCPSA (3)	0.015288	LLSA (3)	-0.043851
	[0.99264]		[0.48580]		[-0.57043]
GGDPPC (4)	0.019647	BCPSA (4)	0.004212	LLSA (4)	0.000684
	[0.87544]		[0.17273]		[0.01106]
GGDPPC (5)	0.014091	BCPSA -5)	0.000423	LLSA (5)	-0.001997
	[0.75872]		[0.02126]		[-0.03826]
DCSA (1)	0.020504	M2SA (1)	-4.299716	C	12.39059
	[0.81378]		[-0.55708]		[1.45632]
DCSA (2)	-0.008840	M2SA (2)	-1.163130		
	[-0.48453]		[-0.17216]		
DCSA (3)	0.007700	M2SA (3)	-2.149038		
	[0.56318]		[-0.45352]		
DCSA (4)	0.005871	M2SA (4)	-0.545047		
	[0.54663]		[-0.14958]		
DCSA (5)	0.003749	M2SA (5)	-0.154613		
	[0.42508]		[-0.05245]		

R-squared   0.237276
Adj. R-squared   0.178424
F-statistic   4.031727

Note: ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

The Bayesian VAR estimates indicate that generally credit (both domestic and private credit) in South Africa has a positive spill-over effect on growth of other SADC countries with the positive effect being more pronounced in the long-run. The monetary variables or the money market in South Africa has a negative spill-over effect on growth of other countries. Compared to GMM estimates in Table 8.4, the Bayesian VAR estimates for credits are consistent with the GMM estimates but not so in the case of money market estimates. The effects are, however, consistently weak under both estimations and for all the financial development variables.

The BVAR system was tested for its stability and stationarity using Inverse Roots of AR Characteristic Polynomials (Figure 8.1). A stable VAR should have the inverse roots that are within 1 point (that is the dots must fall within the circle) for it to be regarded as stable.

Figure 8.1: Inverse roots of AR characteristic polynomial

Source: Author's own construct
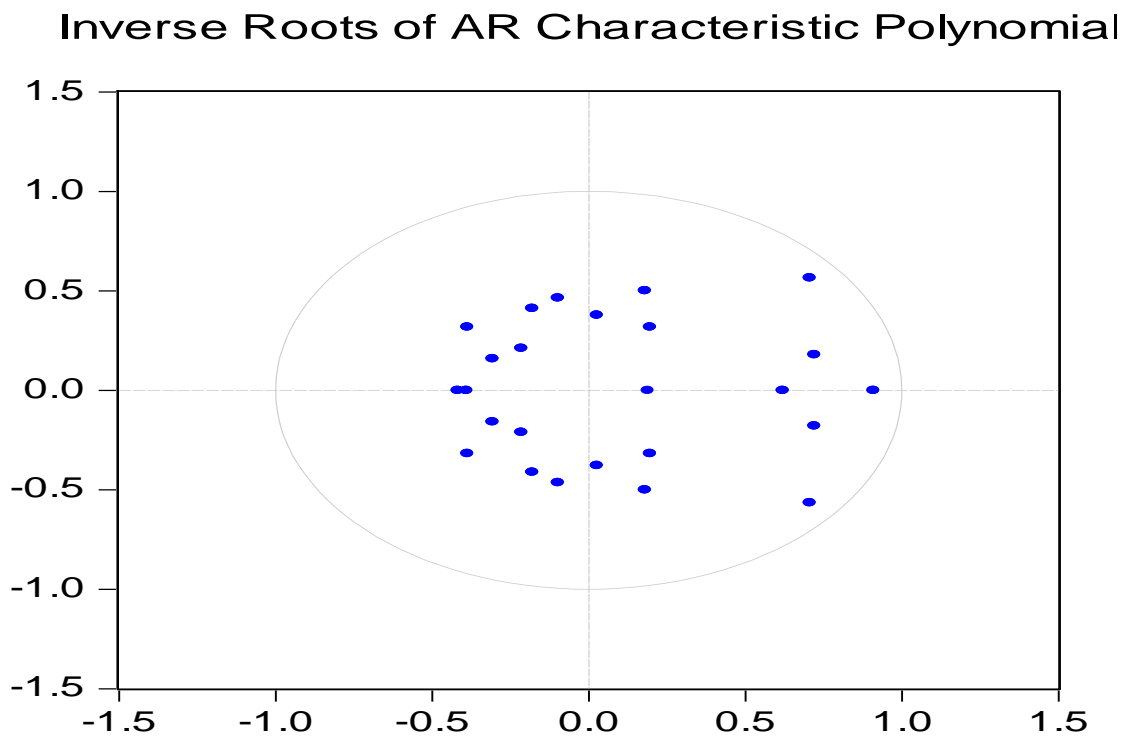
The inverse roots of AR characteristic polynomials established the stability of the VAR system as all the dots are in the circle. As such, the results are highly reliable as they were estimated by a stable VAR system.

8.3.3 Generalised impulse response functions

The impulse response analysis provides the outcome of the impact of a shock in South Africa's financial development on economic growth and financial development of other SADC countries. These effects are analyses below.

a. Effects of a shock in South African credit market

The results in Figure 8.2 depict the responses of the economic growth variable to shocks in credit variables in South Africa, in the BVAR model.

Figure 8.2: Response of GGDPPC to credit variables in SA

Response of GGDPPC to DCSA   Response of GGDPPC to BCPSA
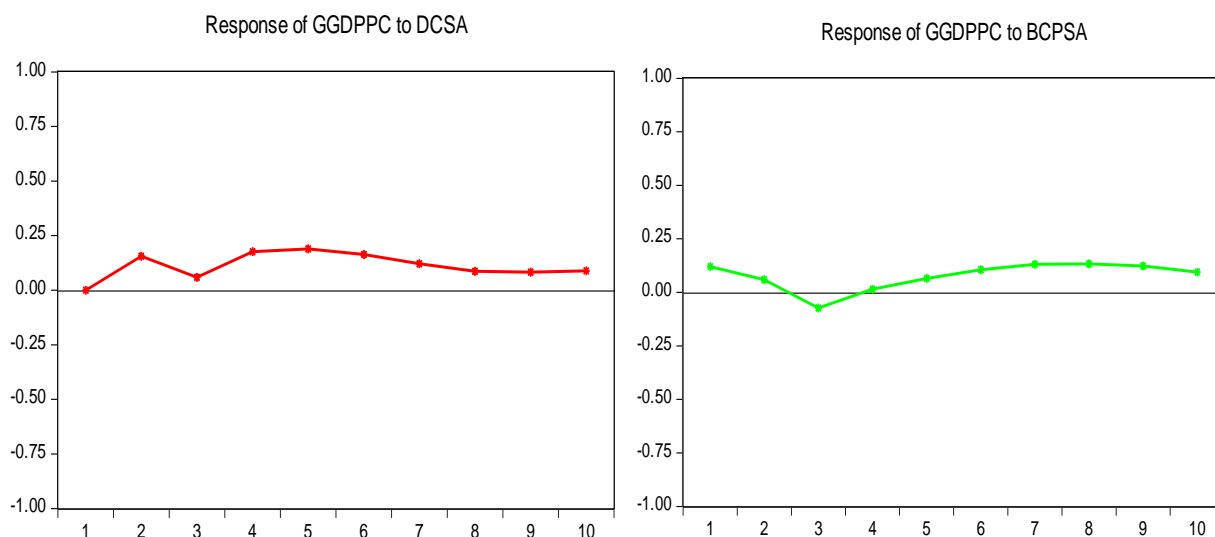
A one standard deviation shock in Domestic Credit in South Africa (DCSA) has a positive effect on growth of other SADC countries (GGDPPC). The positive effects remain sustainable in the first six periods before gradually easing out. This demonstrates the existence of positive spill-overs. A shock in Bank Credit to Private Sector in South Africa results in a positive effect on growth in the first period, which becomes negative at the end of the second period before turning into positive in the fourth period and beyond.

Access to credit from offshore markets in South Africa could be supporting high growth rates in SADC countries. Increase in credit in South Africa generally infiltrates other SADC countries either through branches and subsidiaries of financial institution or through corporates that have subsidiaries or representation in other SADC countries. Naturally, increase in credit drives economic activity and output, thereby supporting growth. In support of this argument, Mobolaji (2010) stated that credit in South Africa crowds-out domestic credit in other countries. Credit in other SADC countries is more costly than credit from South Africa, due to efficiencies in the South Africa market. As such, an increase in spill-overs of low-cost credit from South Africa could be driving growth in recipient countries as it substitutes a relatively expensive domestic credit.

a. Effects of a shock in South African money market

Figure 8.3 depicts the responses of the economic growth variable to shocks in money market variables in South Africa.

Figure 8.3: Response of GGDPPC to monetary variables in SA

Response of GGDPPC to LLSA   Response of GGDPPC to M2SA
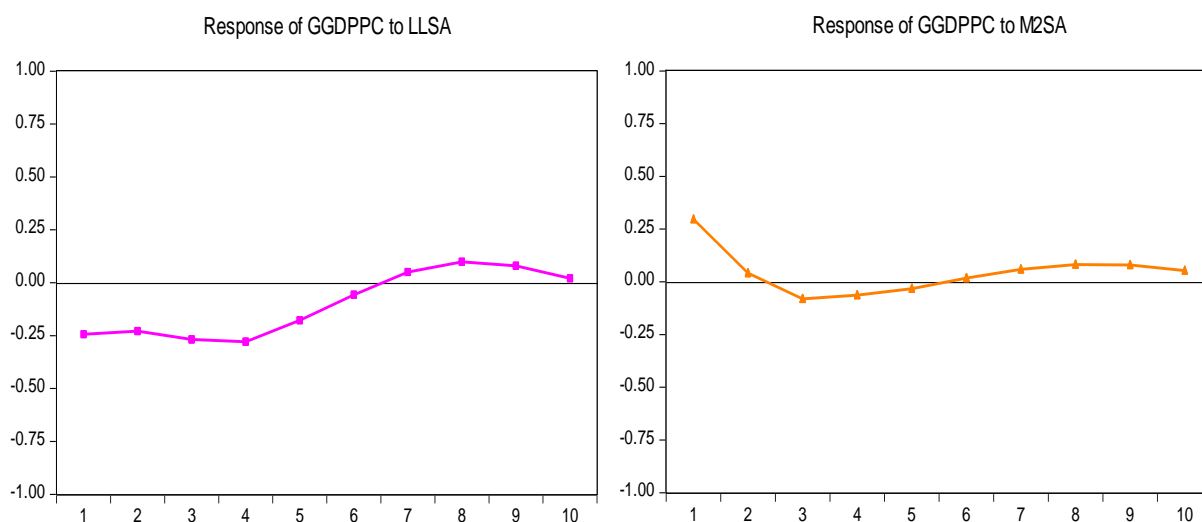
A shock in Liquid Liabilities in South Africa triggers a decline in growth of other SADC countries for six periods beyond which they become positive. A shock in South Africa's Broad Money generates the highest positive response in growth of other SADC countries in the first period when compared to other variables. The response turns to negative by the end of the second period until the fifth period beyond which it becomes positive. The graph showing response to self-shock by economic growth is in Figure A2 in Annexure 6.

In the short-term, a shock in the money market in South Africa sends negative spill-over effects whilst the credit market exerts positive spill-over effects to growth of other SADC countries. The rationale for the negative effect of the money market could be the fact that increases in liquidity and broad money weakens the South African currency. The weaker currency drives imports from South Africa that inhibits growth, especially given the trade imbalances of most SADC countries in favour South Africa.

Impulse response functions usually show graphs with confidence intervals. Bayesian VAR models, however, do not show these intervals. To compensate for this, the study performed an impulse response function test on an unrestricted VAR model and produced the confidence intervals shown in Figure A2 in Annexure 6. Confidence intervals for the impulse response function are commonly based on Lutkepohl's (1990) asymptotic normal approximation or bootstrap approximations to that distribution (Runkle 1987, Kilian 1998a, 1999). In the graphs, the solid lines represent the impulse response function whilst the two broken lines show the +/- 2 standard error or 95% confidence interval.

Generally, the mixed responses of growth makes it difficult to determine the overall effects of shocks in South Africa's financial development on growth in the SADC countries as the effects are cancelling out. There are, however, three observations that can be made out of the results. Firstly, credit in South Africa generally has a positive spill-over effect on growth in other SADC countries, both in the short and long-run whist the money market has negative spill-over effects. Secondly, in the long run, South Africa's financial development across all the measures has positive spill-over effects on growth in the SADC.

Thirdly, the impulse response functions graphs are very close to the axis indicating that the 'vibrations' after the shocks are not vigorous. The results specifically indicate that the spill-overs from South Africa are not strong, possibly indicative of country specific common components outweighing regional common components (Kabundi & Loots 2007). The third observation of weak spill-overs can be checked by assessing the decomposition of variances of these impulse responses. The following section present discussion on variance decomposition.

8.3.4 Variance decomposition

Table 8.6 shows the decomposition of the variances in economic growth to a shock in financial development in South Africa. Ordinarily, variance decomposition would be for all the variables with each variable being regarded as the endogenous variable. As such, variance decomposition of financial development variables is shown in Table A2, Annexure 7.

Table 8.6: Variance decomposition of GGDPPC

Period	S.E.	GGDPPC	DCSA	BCPSA	M2SA	LLSA
**Variance Decomposition of GGDPPC**						
1	4.416595	100.0000	0.000000	0.000000	0.000000	0.000000
2	4.562748	99.76858	0.116096	0.063333	0.019817	0.032172
3	4.609805	99.43684	0.130345	0.223277	0.064263	0.145272
4	4.631747	98.98513	0.274330	0.351301	0.122809	0.266426
5	4.642453	98.70036	0.438752	0.399774	0.165649	0.295463
6	4.647588	98.56389	0.561981	0.400675	0.178591	0.294865
7	4.650632	98.45897	0.628927	0.418090	0.179183	0.314830
8	4.653814	98.34205	0.662823	0.463009	0.179934	0.352180
9	4.656405	98.24961	0.693881	0.499193	0.181264	0.376050
10	4.657832	98.20147	0.729687	0.507703	0.181202	0.379939

Source: Author's own calculation

Table 8.6 indicates that a shock, impulse or innovation to growth in real GDP per capita accounts for more than 98 per cent of fluctuations in itself over the 10 periods; this is indicative of significant self-propelling effects. The results also show that all the financial development variables in South Africa account for a small or insignificant percentage fluctuation in growth of other SADC countries. In other words, fluctuations in real GDP per capita growth variable

180

cannot significantly be explained by other variables in the VAR model. The results imply that, taking the variances to represent spill-overs, the spill-over effects of financial development, though present, are not strong enough (implicitly they are weak) to explain growth of other SADC countries.

There are no known previous studies that attempted to establish financial spill-overs in SADC and comparison would therefore be based on studies of real sector spill-overs. The obtained results seem to support the findings of Basdevant *et al*. (2014) of no evidence of real growth spill-overs from South Africa to the rest of the continent over the period 1960 to 2009. The implication of the results seems to be in line with Canales-Kriljenko *et al.* (2013) that shocks to real GDP growth in South Africa, do not systematically affect growth developments in SACU countries as a group.

The positive financial spill-overs in the long-run across all financial development measures however, concur with the findings of Basdevant *et al.* (2014) who found that a one percentage point increase in South Africa's long-term growth rate is associated with a ½ to ¾ per cent increase in long-term growth rates in the rest of Sub-Saharan Africa. The positive spill-overs could also be in line with Kabundi and Loots (2007) who found evidence of co-movement of the South African business cycle with nine SADC countries.

8.4   Spill-overs of financial development in SA to financial development in SADC

Financial spill-overs from South Africa could also be directly affecting financial development of other SADC countries. In that regard, the study evaluated the presence of finance to finance spill-over effects in the SADC. The results in Table 8.7 show the relationship between financial development in South Africa and that of other SADC countries, an outcome which can be used to depict the nature of spill-over effects.

The results indicate that South Africa's money market (liquid liabilities and broad money) exerts positive spill-over effects to other SADC countries' money markets. For credit variables, the effects are statistically insignificant, although the signs of the coefficients are positive for both bank credit to private sector and domestic credit. The positive spill-over effects in the money market support the theoretical argument that cross-border market linkages increase the likelihood for shocks in an economically and financially developed country to be transmitted internationally (Angkinand, Barth & Kim 2009).

Lagged dependent variables are significant, indicating evidence of a strong dependence on previous period values. Growth in GDP per capita has a consistent positive relationship with all the proxies for financial development. Trade openness is negatively related to financial development, except under Broad Money. Financial openness positively supports financial development in SADC (except under Bank Credit) in line with the findings of Chinn and Ito (2006) and Baltagi *et al.* (2007) that emphasized the role of openness in financial development. Real interest has a positive effect on financial development in SADC.

Table 8.7: GMM estimation: Impact of direct financial development spill-overs

		Dependent Variables			
		Domestic Credit (xSA)	Liquid Liability (xSA)	Bank Credit to Private Sector (xSA)	Broad Money
Independent Variables	Financial Development in SADC (-1) (xSA)	0.9532 (0.0000)***	0.9871 (0.0159)**	0.9600 (0.0000)***	0.8428 (0.0000)***
	GGDPPC (xSA)	0.8366 (0.0265)**	0.2429 (0.1300)	0.7897 (0.0002)***	0.0031 (0.2857)
	Trade Openness (xSA)	-0.0084 (0.6186)	-0.0107 (0.0075)***	-0.0118 (0.2499)	0.0003 (0.0911)*
	Financial Openness (xSA)	0.2364 (0.6601)	0.2486 (0.2290)	-0.0900 (0.7697)	0.0115 (0.0133)**
	Real Interest Rates (xSA)	0.1127 (0.0027)***	0.0077 (0.0122)**	0.0152 (0.4266)	0.0002 (0.3799)
	Domestic Credit in SA(-1)	0.0035 (0.7859)			
	Liquid Liability in SA(-1)		0.0313 (0.0148)**		
	Bank Credit to Private Sector in SA(-1)			0.0122 (0.4734)	
	Broad Money in SA(-1)				0.0439 (0.0732)*
Diagnostics tests	R-sqd	0.8712	0.9450	0.8447	0.8397
	AdjR-sqd	0.8695	0.9442	0.8427	0.8375
	J-stat	1.7841	2.9277	0.0145	1.0446
	Prob(J)	0.1817	0.0871	0.9041	0.3068

* t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

Consistent with the results for finance-growth spill-overs, however, the spill-overs are low and weak as indicated by small values of coefficients of the variables of interest. For example, a one unit change in liquid liabilities and broad money in South Africa, results in 0.03 and 0.07 units change in the other SADC liquid liabilities and broad money, respectively.

The low or weak spill-overs in the financial sector could probably be a result of financial 'spill-backs' from other SADC countries into South Africa, which cancels out South African financial spill-overs into SADC. Institutions and companies that receive credit from South Africa make repayments back to South Africa and coupled by financial leakages and outflows prompted by trade deficits with South Africa, there is bound to be financial spill-backs. Mafusire and Leigh (2014) noted that financial institutions in Swaziland channel their locally mobilised resources to the South African market for investment purposes. As such, if such flows are aggregated across countries, the net effect of financial spill-overs from South Africa to other SADC countries is diluted.

8.4.1   Generalised impulse response functions

The study runs a Bayesian VAR estimated for the finance-to-finance model (See Table A3 in Annexure 8). Only liquid liabilities and bank credit to private sector in South Africa have positive and significant effects on credit in SADC in the long run. In other words credit in SADC countries responds positively to shocks in liquid liabilities and bank credit to private sector in South Africa. The other VAR estimates are statistically insignificant showing somehow inconsequential effects of these South African financial sector variables on variables for other SADC countries.

The impulse response functions were determined from this VAR system. Figure 8.4 shows graphs for impulse response of financial development in other SADC countries to one standard deviation shock in corresponding financial development measure in South Africa.

Figure 8.4: Domestic credit and private impulse responses
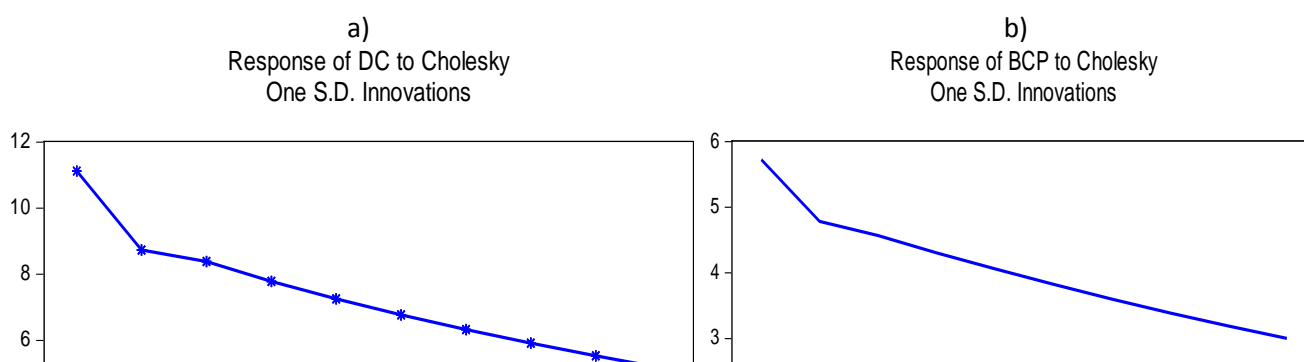
a)
Response of DC to Cholesky
One S.D. Innovations

b)
Response of BCP to Cholesky
One S.D. Innovations

Figure 8.4 reveals that a shock to the financial sector in South Africa has a positive impact to both domestic credit and private credit in SADC, which gets stronger in the long run. In other words, SADC countries credit responds positively to one standard deviation positive shocks in South Africa's financial sector. SADC domestic credit is more responsive to shocks in South Africa's liquid liabilities than it is to shock in credit variables. Bank private credit in SADC countries is more receptive to innovations (one standard deviation shock) in South Africa's domestic credit than other measures of the country's financial variables. The response in credit is relatively more significant than responses of other financial development variables, especially in the long run.

The results are in line with GMM results in that in the short run (in the first period) the response is insignificant under GMM. GMM estimates are static and measure the short run effects, which were found be statistically insignificant and this is confirmed by the lines for credit variables that are closer to the axis in the first two periods.

Figure 8.5 shows response of money market variables in SADC countries to changes in South African financial sector variables.

Figure 8.5: Liquid liabilities and broad money impulse responses
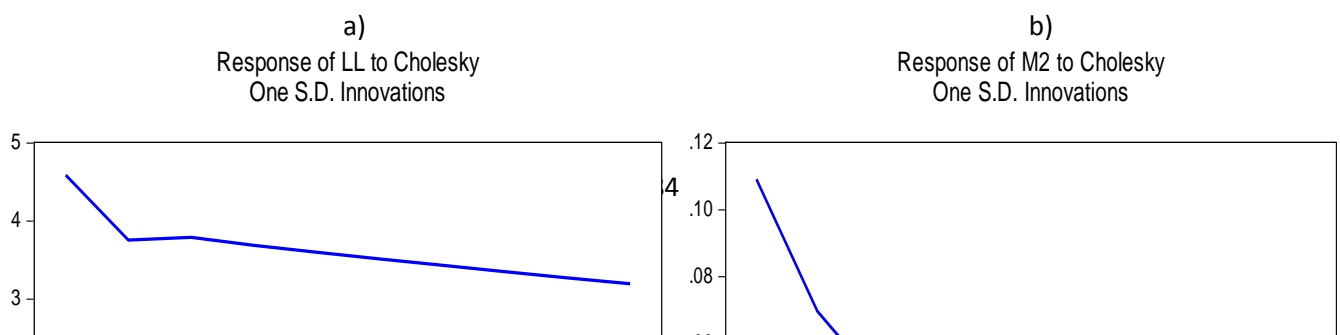
a)
Response of LL to Cholesky
One S.D. Innovations

b)
Response of M2 to Cholesky
One S.D. Innovations

<u>Source</u>: Author's own construct

Liquid Liabilities of SADC countries are more responsive to shocks in South Africa's liquid liabilities with response to shocks in domestic credit in South Africa also being relatively significant in the long-run; that is after 7 periods. In the short-run, however, a shock in South Africa's financial sector reduces liquid liabilities in SADC countries. Broad money in SADC is more receptive to changes in domestic credit in South Africa. As the case with credit, the response remains relatively weak compared to responses in credit as the graphs are also close to zero over the entire 10 periods.

The study also evaluated the distribution of variances of the impulse responses and the results are presented in Table A4, Annexure 9. Decomposition of the variances of the given impulse responses in Figures 8.3 and 8.4 indicate constrained financial spill-over effects. Only domestic credit in South Africa accounts for the highest proportion at 1.5 per cent relative to other SADC countries' private credit. Overall, the results indicate weak finance to finance spill-overs in SADC. The weak finance to finance spill-overs are in contrast to theory which states that spill-overs increase between countries are strongest within sectors (IMF 2016).

It can be noted that generally shocks in South Africa's financial system disperse positive effects into the SADC region, in the short and long-run, indicating the presence of positive financial spill-overs. Notable spill-overs are, however, realised in the credit markets of SADC countries and these are generated from liquid liabilities and domestic credit of South Africa. Credit from

South Africa exerts positive spill-over effects given that companies in SADC countries have direct access to credit from South Africa's financial sector. Furthermore, South African financial institutions have branches in most SADC countries and increase in liquid liabilities in South Africa enhances their access to credit from their head offices in South Africa. This explains the relatively more significant response of credit in SADC countries to financial development shocks in South Africa.

Comparatively, finance-to-finance spill-over effects are relatively significant relative to finance-to-growth spill-over effects and highly so in the credit market than the money market. The inter-linkages between South Africa and other countries, particularly neighbouring countries, through monetary agreement, use of the South Africa Rand, monetary and fiscal linkages, exchange rate policy linkages and cooperation in monetary issues combine to support positive spill-overs in financial development. South Africa's presence in the region is spread across the entire financial sector including banking, insurance, investment management, the stock market and non-financial sectors (Canales-Kriljenko, Gwenhamo & Thomas 2013). Ntswane (2014) finds that that South Africa's Fitch, Moody's and S&P issued ratings have a positive relationship with both portfolio bond and commercial bank and other private institutions net flow rates in other countries.

8.5   The Weak South Africa's financial spill-over effects on SADC countries

The results indicate that generally, financial spill-over effects on both growth and financial development of other SADC countries are largely low and constrained. There are some possible explanations to this outcome. The spill-over effects are possibly weighed down by underdeveloped financial systems of some SADC countries, which limit their absorption capacity and reduce their receptiveness to any spill-overs from South Africa. The weak financial spill-overs, on the back of varying levels of financial development across SADC countries, lends support to the theoretical argument by the IMF that spill-overs increase between countries with similar macro-financial fundamentals (IMF 2016).

The low spill-overs in the financial sector could possibility be a result of financial 'spillbacks' from other SADC counties into South Africa that cancels out South Africa financial spill-overs into SADC. Institutions and companies that receive credit from South Africa make repayments back to South Africa and coupled by financial leakages and outflows prompted by trade deficits with South Africa, there bound to be financial spillbacks. Furthermore, any increase in domestic demand in these countries, result in increase in imports, mostly from South Africa

due to domestic production constraints. Theory holds that financial markets in the other country could be adversely affected by reduced demand for exports (Shinagawa 2014). An increase in imports from the financially developed country also slows down or re-exports financial spill-overs.

If such flows are aggregated across countries, the net effect of financial spill-overs from South Africa to other SADC countries is diluted. In other words, although this is not empirically tested, the result are suggesting that any financial flows from South Africa into SADC countries are retracing back to South Africa before they have a significant impact on the recipient country's financial sector or economic growth.

The financial inter-linkages in SADC, especially with South Africa through trade and portfolio investments, seemingly promote more real sector spill-overs than financial spill-overs. Financial spill-overs are seemingly transmitted through the real sector, rather than the financial sector in line with theory that channels that create macro-economic linkages can enhance spill-overs across economies (Ciccarelli, Ortega & Valderrama 2012). Literature confirms the existence of real sector co-movements between South Africa and some SADC and SSA countries (Kabundi & Loots 2007, Basdevant *et al.* 2014 and Canales-Kriljenko *et al.* 2013). As such, it can be argued that financial development in South Africa has indirect spill-over effects on other SADC countries and the transmission mechanism works through the real sector. Basdevant *et al.* (2014), however, suggested the possibility of multiple spill-over channels that pull in opposite directions.

Related to that, South Africa's economic and financial sectors are connected to the global economy and markets with evidence of co-movements (Ruch 2013, Kabundi 2009, Botha 2010 and Boshoff 2010). SADC countries have relatively small financial sectors that cannot compete with global markets in attracting spill-overs from South Africa's financial sector, which apparently has a global effect. In addition, theory suggests that larger spill-overs are expected between countries with larger bilateral portfolio exposures (Shinagawa 2014). Given the limited exposure in bilateral investments between South Africa and SADC relative to the size of the South African market, spill-overs in the financial sector are bound to be minimal.

The results could also mean that South Africa does not send out significant spill-overs to SADC members despite the inter-linkage. It could also imply that inter-connectedness in financial

systems in SADC works toward consolidating financial development in South Africa with minimal benefits to other countries.

8.6   Chapter summary and conclusion

This study assesses the effects and magnitude of financial spill-overs from South Africa on growth and financial sectors of other SADC countries. The results indicate the presence of positive spill-overs from South Africa's financial sector to economic growth of other SADC countries. In the short-term, a shock in the money market in South Africa sends negative spill-overs whilst the credit market exerts positive spill-overs to growth of other SADC countries. Spill-overs from all the financial markets tend to be positive in the long-term. The study, however, established that spill-overs are relatively low.

The study also established that the South African financial system exerts positive spill-over effects on financial sectors of other SADC countries. The inter-linkage between South Africa and other countries, through monetary agreements, use of the South African Rand, stock market and exchange rate policies, combine to transmit positive spill-overs in financial development. Impulse responses and variance decompositions, however, confirm relatively stronger spill-over effects on credit markets and a slightly lesser effect on the money market of other SADC countries. The results provide evidence that the financial sector, with additional support, could be propped up to be an effective transmission mechanism for financial spill-overs, especially credit, from South Africa.

The relatively constrained financial spill-over effects outcome, however, brought evidence that inter linkages in the financial sector within SADC presumably support real spill-overs than financial spill-overs. Evidently, literature confirms existence of real sector co-movements between South Africa and some SADC countries (Kabundi & Loots 2007), some SSA countries (Basdevant et al 2014) and SACU countries (Canales-Kriljenko, Gwenhamo & Thomas 2013). The results could also mean that South Africa does not send out significant spill-overs to SADC members despite the inter-linkage. It could also imply that interconnectedness in financial systems in SADC works toward consolidating financial development in South Africa with minimal benefits to other countries. In other words, the linkages such as trade, remittances and labour, which ordinarily should be driving spill-overs and spatial externalities, are more beneficial to South Africa than the other SADC countries. Thus, in SADC the macro-economic linkages are seemingly not supporting financial spill-overs.

The relatively weak spill-over effects give credence to the imbalances in financial development in SADC, as weak financial spill-overs imply that South Africa's financial development is not optimally spread across other countries. The results also provide evidence that the financial sector, in its currently state, is not an effective transmission mechanism through which spill-overs from South Africa can be channelled. It also revealed that inter-linkages in the financial sector within SADC presumably support real spill-overs rather than financial spill-overs.

The presence of spill-overs implies that any negative shocks in South Africa's financial sector have an impact on SADC countries, although the impact would be very minimal. On the contrary, weak spill-overs imply that other SADC countries would not be able to realise any gains from growth and booms in global financial markets that directly affect South Africa. The low financial spill-over effects on growth and financial development, however, could imply that other SADC countries are insulated from any direct adverse effects of financial shocks and crises that affect South Africa. However, the evidence of centrifugal effects in the South African money market that was found in Chapter Seven could counter this conclusion especially when the shocks are negative, given that spill-over effects are more pronounced during crises than in normal periods (IMF 2013).

Although the results indicate presence of positive financial spill-over effects on both growth and financial development of other SADC countries, it is important that SADC countries continue to strengthen their financial linkages with South Africa in order to enhance their growth and financial sector development. One approach that could be promoting growth and financial development is financial integration in the region. Financial integration sets a platform for direct support of financial development in other countries by South Africa. Theory has it that financial market integration strengthens the role of financial factors in transmitting financial spill-overs relative to trade linkages (IMF 2016).

Having established that financial development in SADC is affected by spatiality and that it has limited spill-overs, the next stage is to evaluate its distribution. When countries have different levels of financial development, it implies financial development is not fairly distributed and there could be elements of financial concentration. Concentration in financial development, especially in the banking sector in SADC, is evident within and across countries. It is therefore, necessary to establish whether concentration is affecting levels of financial development in SADC. Furthermore, if spatiality is a factor, it is necessary to establish how changes in South Africa's financial sector affect financial concentration in other SADC countries. The following

chapter presents the results of empirical tests to determine the impact of concentration on financial development in SADC.

<div align="center">

CHAPTER NINE

FINANCIAL CONCENTRATION AND FINANCIAL DEVELOPMENT IN THE SADC COUNTRIES

</div>

9.1   Introduction

The imbalance in terms of the varying levels of financial development across countries within a region reflects elements of concentration of financial development. The extent to which a financial sector is controlled by a few bigger institutions in the market as defined by market shares reflects financial concentration (IMF and World Bank 2005). In the financial sector, concentration can be institutional concentration, where a few institutions account for a high proportion of the resources of any given financial sector, or asset concentration (D'Arista

2009). Concentration has implications on financial sector efficiency, bank stability, competitiveness, policies, regulations and levels of financial development. In addition, institutional concentration affects the central bank's effectiveness in stabilising the financial systems as the market power of individual institutions and the interdependence of institutions and markets increases.

In SADC, the varying levels of financial advancement, with South Africa at the upper end, some countries the middle and majority at the lower end - clearly reflect elements of concentration of financial sector development in the region. Concentration of financial development in a few countries indicates inequality that is potentially holding back financial development in Africa (Gwama 2014). However, in Chapters Seven and Eight it was established that financial development in SADC is not immune to spatial effects and there are positive financial spill-overs from South Africa. Additionally, it was noted in Chapter Two that South African financial institutions have significant presence within the region. *A priori* expectations, therefore, are that as institutions from South Africa expand into the region, on the back of spatial spill-overs, financial concentration in recipient countries is affected.

This chapter presents results of a number of empirical estimations carries out around the issue of financial concentration in the SADC region. Section 9.2 presents the results of the Herfindahl-Hirschman Index (HHI) for financial concentration in SADC and for other SADC countries excluding South Africa. Section 9.3 has the descriptive statistics and panel roots results for the variables used in empirical estimations. Section 9.4 presents the estimation results of the effects of financial concentration on financial development in the SADC countries and how the effect varies with the level of income of a country. Section 9.6 conducts a robustness check of the results. Section 9.7 presents the result of the effects of South Africa's financial development on financial concentration in other SADC countries.

9.2   The Herfindahl-Hirschman Index (HHI) for SADC

The Herfindahl-Hirschman Index (HHI), which is the sum of squares of the market shares of all firms in a sector, is a sophisticated measure of concentration (IMF 2013). As applied in the current study, the HH Index becomes the sum of the squared sizes of all the banking sector assets in the region, where each country's banking assets total is expressed as a proportion of total banking assets in the SADC region. This approach of measuring financial concentration has elements of spatial distribution in it as bank assets for individual countries

are used. As such, the concentration obtained by the method is not about the assets of the top three banks in SADC, but spread of top banking assets across countries in SADC.

The study uses three-bank concentration to measure concentration in the financial sectors of SADC countries. Three-bank concentration is defined as the assets of three largest commercial banks as a share of total commercial bank assets in the country (World Bank 2015). The rationale is that in most SADC countries, the financial systems are dominated by banks, with minimal development of non-bank financial institutions. Within the banked based financial systems, the sector is again dominated by a few banks, mostly foreign banks. It can then be argued that using bank concentration could better reflect the level of financial market concentration in these countries. Furthermore, the diversity in financial development across the African continent is exemplified by a high concentration of the largest banks in just a few countries (Ndikumana 2001). As such, in the SADC context, and for purposes of this study, financial market concentration could be viewed as analogous to bank concentration.

It is important to note that when SADC is regarded as one market, the value of bank assets vary across countries and this reflects the market share that each country has in SADC. The distribution of these assets across countries in the SADC region could be regarded in this study, as a crude indication of how financial sector (banking) is spread around SADC countries.

Two indices were constructed, one for all SADC countries and the other for other SADC countries excluding South Africa. The rationale was to investigate how banking assets are spread in the SADC with and without South Africa. Figure 9.1 shows the HHI in the banking sector of SADC as a region for each year from 1985 to 2014. The figure shows that financial concentration in SADC as a region is generally high although the level of concentration has been on a gradual decline over the years since the 1990s. The gradual decline is partly as a result of an increase in bank and non-bank financial institutions in SADC countries other than South Africa. The decline could also remotely be attributed to the effects of the global financial crisis of 2007 that affected South Africa, though growth in assets of some banks, such as Capitec Bank, are to the contrary of the argument. The global economic crisis triggered an economic recession in South Africa, in 2009, which affected consumer affordability, spending patterns, uptake and servicing of debt (Banking Association South Africa 2010). The economic recession resulted in the increase in non-performing loans which had a huge impact on the banks' loan books and total assets and liabilities declined (Maredza and Ikhide 2013).

Indicatively, growth in total bank assets in South Africa slowed down to below three per cent since 2012 (Banking Association South Africa 2014).

Figure 9.1: HHI for SADC
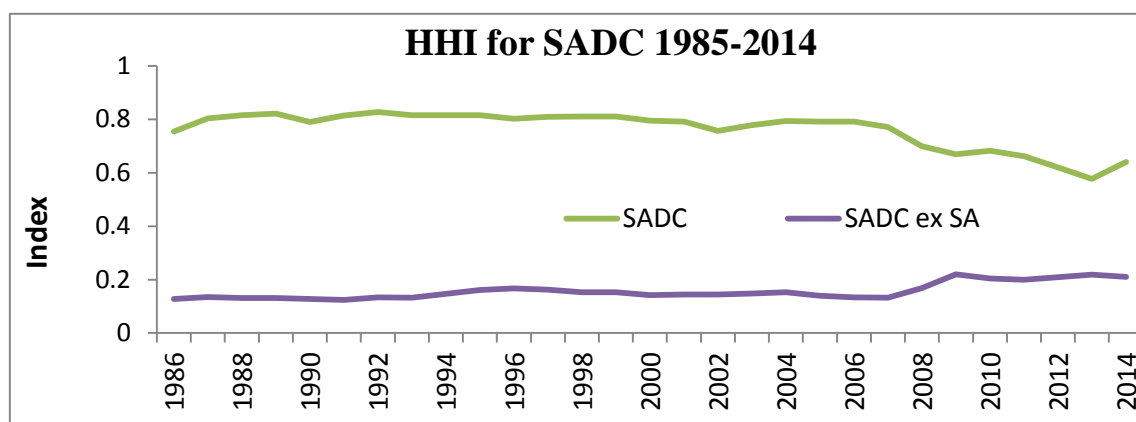
Source: Global Financial Development Database (2015)

When South Africa is excluded the level of concentration in the region declines significantly, indicating a fair distribution of banking assets across countries. The low concentration, however, does not mean financial concentration (bank concentration) within individual countries is low. The gap between the indices could be taken to indicate South Africa's contribution or dominance in the financial sector in the region. The results confirm theoretical underpinnings that a specific industry is considered "concentrated" if a great part of service is carried out in a reduced number of countries within the same region (Ceapraz 2008). The level of concentration is, however, slowly increasing as shown by a marginal increase in the index especially after 2006, indicative of countries with financial sectors that are improving significantly.

Having established the level of financial concentration in the SADC, the study then investigates how financial concentration in each country affects financial development. The assumption is that a high level of financial concentration within a country limits financial development as it is known that financially developed economies have low levels of concentration. Below is an analysis of the variables to be used for the estimations.

9.3   Description of variables and *a priori* expectations

The variables used in testing the relationship between financial market concentration and financial development are presented in Table 9.1. In this chapter, the variables contain data for all SADC countries including South Africa. Most of the variables have been discussed in

previous chapters and the only new variables are those that capture concentration and the dummy variables for countries' income levels.

Table 9.1: Variables description

Category	Variable	Description	Definition
Dependent Variables	DC	Domestic Credit	Total credit by the financial sector in SADC countries
	LL	Liquid Liabilities	M3/GDP in SADC countries
	BCP	Bank Credit to Private Sector	Total credit by banks to private sector in SADC countries
	M2	Broad Money	Broad Money to GDP in other SADC countries
Control Variables	GGDPPC	Growth in Real GDP per capita	Growth in real Gross Domestic Product per capita
	TO	Trade Openness	(Exports+ Imports)/GDP for other SADC countries
	FO	Financial Openness	Chin Index of Financial Openness for SADC countries
	RINT	Real Interest Rate	Real interest rate for SADC countries
Financial Market Concentration	FC	Financial Concentration	Proportion of total assets of the top three banks in a country to total banking assets in that country
Income Variables	MIC	Middle Income Countries	Dummy for SADC countries classified by the World Bank as middle income in 2015.
	LIC	Low Income Countries	Dummy for SADC countries classified by the World Bank as low income in 2015.

Source: Author's own construct

A priori expectations are that financial concentration has a negative effect on financial development given that most countries with underdeveloped financial sectors have high levels of concentration in their financial sectors.

The study also investigates how the effects of financial concentration on financial development vary with income levels. As such, the study introduces a dummy variable to capture the level of development or income level of countries as classified by the World Bank. In 2015 the World Bank classified Angola, Botswana, Namibia, Mauritius and South Africa as middle income, with the rest of the countries being classified as low income countries. Below are the multi-collinearity and panel stationarity diagnostic tests of the data used in this chapter.

9.3.1 Multi-collinearity test results

The correlation matrix for testing multi collinearity among the variables is shown in Table 9.2. The table also indicates high correlation between financial concentration in Middle Income

Countries and financial concentration in Low Income Countries of about 95 per cent.

Table 9.2: Correlation matrix

	DC	LL	BCP	M2	GGDPPC	TO	FO	RINT	FC	BCMIC	BCLIC
DC	1.0000										
LL	0.6045	1.0000									
BCP	0.7292	0.7134	1.0000								
M2	0.5032	0.6695	0.5768	1.0000							
GGDPPC	-0.0948	0.0948	0.0062	0.0403	1.0000						
TO	-0.0979	0.3497	0.1055	0.1812	0.2073	1.0000					
FO	0.0838	0.3724	0.1644	0.2329	0.2121	0.1872	1.0000				
RINT	0.0327	0.0726	0.0705	-0.0403	-0.2334	-0.1325	-0.0507	1.0000			
FC	-0.0634	-0.0545	-0.1420	0.0480	-0.0189	0.1716	-0.2173	-0.2174	1.0000		
BCMIC	0.3096	0.4254	0.6497	0.3407	0.0954	0.0342	0.1187	-0.1027	0.0894	1.0000	
BCLIC	-0.3227	-0.4330	-0.6799	-0.3177	-0.0992	0.0208	-0.1848	0.0315	0.2290	-0.9490	1.0000

Source: Author's own calculation

To address the challenge of multicollinearity of the variables, those with high levels of correlation would not be included in the same model for any estimation in this chapter. Below is the stationarity test of the variables to be used in this chapter.

9.3.2 Panel stationarity test

Table 9.3 shows the panel unit root test results of the newly introduced variables to be used in this chapter.

Table 9.3: Panel unit root tests at level

Variable	Levin, Lin and Chu	Im, Persaran and Shin W-state	ADF-Fisher Chi-Square	PP-Fisher Chi-Square
Broad Money	-10.346 (0.0000)***	-7.0084 (0.0000)***	52.2656 (0.0071)***	78.7379 (0.0000)***
Financial Openness	-2.3966 (0.0083)***	-1.6631 (0.0481)**	39.6451 (0.1119)	48.1997 (0.0189)**
Financial Concentration	-3.3915 (0.0003)***	-3.1961 (0.0007)***	52.1281 (0.0008)**	53.4556 (0.0293)**

$I(0)^{\dagger}$ means the variable is level stationary under individual intercept and trend.
Source: Author's own calculation

All three variables in Table 9.3 are stationary in levels with financial concentration being stationary in levels under individual intercept and trend. Stationarity of the other variables to be used in this chapter is as discussed in previous chapters.

9.4   Financial market concentration and financial development

Table 9.4 presents the results of the effects of concentration on financial development in the SADC countries.

Table 9.4: Dynamic Fixed Effects

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant		19.693 (0.0007)***	14.237 (0.0000)***	13.689 (0.0000)***	0.2019 (0.0001)***
Financial Development (-1)		0.8059 (0.0000)***	0.8241 (0.0000)***	0.7464 (0.0000)***	0.6358 (0.0000)***
GGDPPC		-0.2028 (0.1014)	-0.1734 (0.0002)***	-0.1471 (0.0131)**	-0.0043 (0.0001)***
Trade Openness		-0.0224 (0.3568)	0.0017 (0.8601)	0.0138 (0.2337)	0.0005 (0.7806)
Financial Openness		1.1121 (0.1229)	0.2795 (0.3087)	0.9377 (0.0081)***	0.0095 (0.7806)
Real Interest Rates		-0.0483 (0.0519)*	-0.0130 (0.1672)	-0.0022 (0.8510)	-0.0003 (0.1322)
Financial Concentration		-0.1018 (0.0642)*	-0.0843 (0.0002)***	-0.0914 (0.0010)***	-0.0006 (0.1531)
Diagnostics tests	*R-sqd*	*0.9584*	*0.9570*	*0.9345*	*0.8639*
	Adj R-sqd	*0.9564*	*0.9549*	*0.9314*	*0.8573*
	F-stat	*477.876*	*452.43*	*295.6302*	*131.435*
	Prob. (F)	*0.0000*	*0.0000*	*0.0000*	*0.0000*

*t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

<u>Source</u>: Author's own calculation

Concentration has a negative effect on financial development across all measures of financial development. The coefficients for financial concentration are negative for domestic credit (-0.1018), liquid liabilities (-0.0843) and bank private credit (-0.0914), and statistically significant at 10 per cent, 1 per cent and 1 per cent respectively. The estimated models are robust given the high levels of R-squared and the F-statistic. It is only under broad money where the coefficient is not statistically significant, although it remains negative.

The results are in support of the theoretical argument that concentration reduces financial sector growth and also in line with findings of Levine (2000) and Demirgüç-Kunt and Levine (2000). The results are also in line with implications of the findings by Căpraru and Andrieş (2015) that increased concentration has a negative impact on financial stability in 27 European Union

member countries. Financial stability is a necessary condition for financial development. Results are contrary to those of Ratti, Lee and Seol (2008), who found that in a highly concentrated banking sector firms are less financially constrained. Financial constraints limit the development of financial sectors.

The effects of the control variables on financial development are as explained in previous chapters. The observable trend between bank concentration and financial development (Figure 9.2) shows an inverse relationship between financial development and bank concentration. The graphs show the average and median level of financial concentration and measures of financial development over the period 1985 to 2014. Average bank concentration in SADC was high in the 1980s and started to fall in the 1990s when most countries liberalised their financial sectors. Correspondingly, average levels of financial development started to improve during the same period, as the sectors expanded and restrictions were removed with financial liberalisation.

Figure 9.2: Mean and median of bank (financial) concentration and financial development
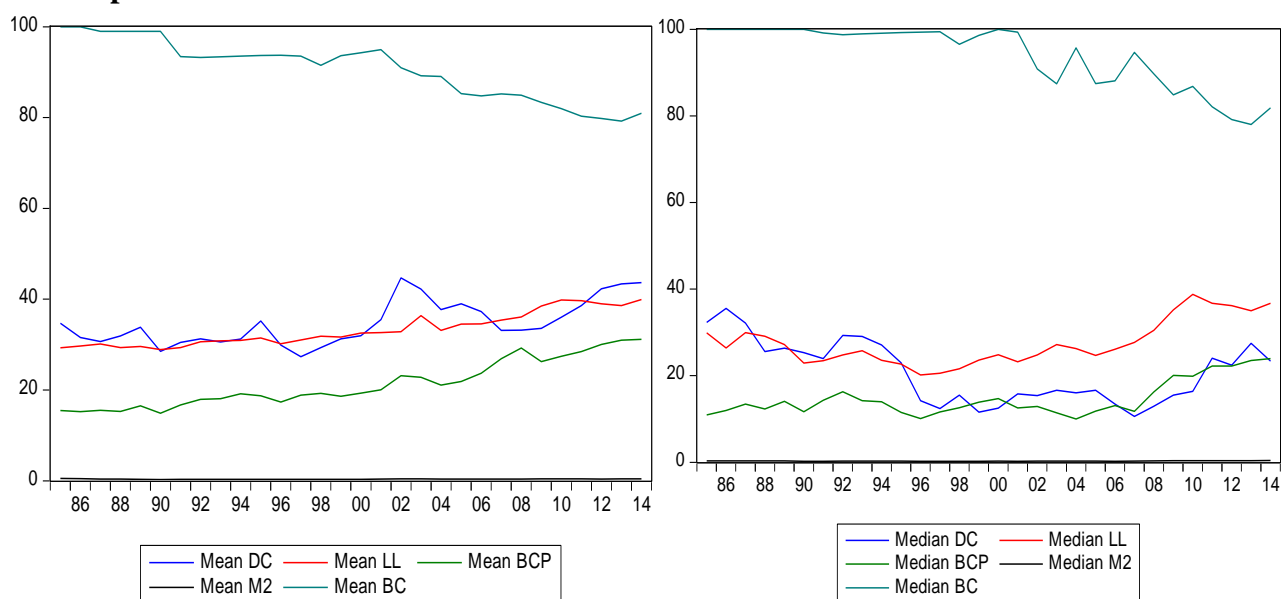
*BC is bank concentration, which measures financial concentration
Source: GFDD (2015)

The correlation coefficients between financial concentration and the three statistically significant financial development measures (domestic credit, liquid liability and private credit), calculated using the same GFDD (2015) data, are negative at -0.06; -0.05 and -0.14 respectively, indicating an inverse relationship.

The results indicate that in the SADC region, having a concentrated financial sector constrains development of the sector. By implication, the results suggest that diversification and

competition in the banking sector enhance the development of the financial sectors in SADC. Theory holds that competition in the financial sector matters for the efficiency of the production of financial services, the quality of financial products and the degree of innovation in the sector (Claessens 2009). The results are supported by the fact that despite the presence and high concentration of regional and international banks that are well capitalised, the financial sectors in most SADC countries lack depth and efficiency and have high levels of financial exclusion. Some SADC countries have highly concentrated but relatively under-developed financial structures, dominated by strong foreign banks and with minimal diversification.

Given the varying income levels of countries in the SADC, it is necessary to ascertain whether the negative relationship between concentration and financial development is influenced by a country's income. Below is the analysis of how country income levels affect financial development and the relationship between concentration and financial development.

9.5   Income, concentration and financial development

To test the effect of income levels on financial concentration- financial development relationship, this chapter performed two analyses. Firstly, it introduces a dummy for the income level and interacts that with financial development measures in the estimation models. Secondly, as a robustness check, the chapter groups the countries according to their levels of income, as classified by the World Bank, and applies separate models for each group.

Table 9.5 shows the results of how income levels of a country affects financial development in SADC. In the table, country income effects on financial development are captured by dummy variables that are split between middle income and low income countries.

Table 9.5: Country income level and financial development

Variable	Domestic Credit	Liquid Liability	Private Credit	Broad Money
Financial Development (-1)	0.9709 (0.0000) ***	0.9690 (0.0000)***	0.9471 (0.0000)***	0.7554 (0.0000)***
GGDPPC	-0.0582 (0.6331)	-0.1139 (0.0152)**	-0.0470 (0.4204)	-0.0035 (0.0014)***
Trade Openness	-0.0212 (0.1197)	0.0012 (0.8204)	0.0043 (0.5043)	0.0003 (0.0061)***
Financial Openness	0.6346 (0.1519)	0.4664 (0.0099)***	0.3350 (0.1176)	0.0192 (0.0000)***
Real Interest Rates	-0.0066 (0.7558)	0.0018 (0.8246)	0.0100 (0.3378)	-0.00008 (0.6679)
Dummy Middle Income Countries	5.2913 (0.0047)***	2.3993 (0.0017)***	2.8359 (0.0051)***	0.1096 (0.0000)***

		Dummy Low Income Countries			

		2.9927 (0.0560)*	1.3773 (0.0250)**	0.7166 (0.3289)	0.0539 (0.0002)***
Diagnostic tests	*R-sqd*	*0.9526*	*0.9526*	*0.9255*	*0.8337*
	Adj. R-sqd	*0.9519*	*0.9519*	*0.9245*	*0.8314*

* t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

<u>Source</u>: Author's own calculation

The level of income has a positive effect on financial development and the result is consistent across all measures of financial development. Middle income countries have a more significant effect on financial development in SADC than low income countries. For example, under Domestic Credit, the coefficient for middle income countries is 5.29 and for low income countries 2.99. This result specifically indicates that middle income countries have a net additional contribution of 2.3 to financial development in SADC. Overall, income levels matter for financial development in SADC, such that the higher the income level the more the country contributes to financial development.

In order to test how effects of financial concentration vary with income levels, the dummy for income level is interacted with the financial concentration variable. When the dummy variables for country income levels are interacted with financial concentration, the results show a persistent negative effect of financial concentration on financial development and the effect is higher in middle income countries than in low income countries (Table 9.6).

Table 9.6: Concentration, income level and financial development

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Financial Development (-1)		0.7922 (0.0000)***	0.8182 (0.0000)***	0.7113 (0.0000)***	0.6330 (0.0000)***
GGDPPC		-0.1822 (0.1409)	-0.1707 (0.0003)***	-0.1361 (0.0205)**	-0.0042 (0.0001)***
Trade Openness		-0.0175 (0.4704)	0.0027 (0.7794)	0.0181 (0.1174)	0.00007 (0.7326)
Financial Openness		0.6618 (0.3799)	0.2220 (0.4436)	0.6817 (0.0580)*	0.0079 (0.2307)
Real Interest Rates		-0.0466 (0.0597)	-0.0127 (0.1760)	0.0002 (0.9806)	-0.0003 (0.1462)
Financial Concentration in Middle Income Countries		-0.2833 (0.0087)***	-0.1089 (0.0164)**	-0.2379 (0.0000)***	-0.0013 (0.1469)
Financial Concentration in Low Income Countries		-0.0468 (0.4456)	-0.0788 (0.0010)***	-0.0578 (0.0500)*	-0.0004 (0.3741)
Diagnostic tests	*R-sqd*	*0.9422*	*0.9585*	*0.9360*	*0.8641*
	AdjR-sqd	*0.9392*	*0.9564*	*0.9327*	*0.8572*
	F-stat	*320.636*	*454.469*	*287.670*	*125.117*

	Prob(F)	0.0000	0.0000	0.0000	0.0000

* t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

<u>Source</u>: Author's own calculation

The results shown in Table 9.6 suggest that concentration inhibits development of the financial sectors in all SADC countries regardless of income level. The effect of financial concentration is, however, more pronounced in middle income countries than in low income countries given the size of the negative coefficients and the high number of statistically significant coefficients for middle income countries. The results are in contrast to the findings of Law & Abdulla (2006) who found a positive association between concentration and financial development in the lower middle-income and low-income countries.

9.6   Robustness tests of the results

The results in Table 9.6 were tested for robustness by running separate estimations for middle income countries and for low income countries (Tables 9.7 and 9.8). The separation of the countries is meant to address possible pulling effects caused by the inclusion of countries with different income levels in one model.

The results in Table 9.7 show that financial concentration has no effect on financial development in middle income countries, as the coefficients are not statistically significant. Concentration, however, has a negative sign for Domestic Credit, Liquid Liabilities and Private Credit. The results are in contrast with those obtained when all countries were included in the model.

Table 9.7: Concentration and financial development in Middle Income Countries

Variable	Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant	18.722 (0.1220)	10.646 (0.0783)*	11.717 (0.0133)**	0.0319 (0.5763)
Financial Development (-1)	0.7965 (0.0000)***	0.8483 (0.0000)***	0.8875 (0.0000)***	0.8657 (0.0000)***
GGDPPC	0.0627 (0.7609)	-0.0176 (0.7961)	0.0088 (0.8913)	0.0005 (0.5461)
Trade Openness	-0.0103 (0.8489)	-0.0038 (0.8314)	-0.0090 (0.5972)	0.00004 (0.8397)
Financial Openness	3.7399 (0.0074)***	0.8837 (0.0426)**	1.0781 (0.0146)**	0.0124 (0.0331)**
Real Interest Rates	0.0985 (0.1081)	0.0444 (0.0281)**	0.0303 (0.1141)	0.0004 (0.0718)*
Financial Concentration in Middle Income Countries	-0.0570 (0.6386)	-0.0307 (0.5230)	-0.0585 (0.1640)	0.0004 (0.3927)

Diagnostics tests	R-sqd	0.9732	0.9755	0.9828	0.9647
	Adj. R-sqd	0.9712	0.9737	0.9815	0.9621
	F-stat	487.03	534.56	766.55	366.75
	Prob (F)	0.0000	0.0000	0.0000	0.0000
	Observations	150	150	150	150

* t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

The no effect result shown in Table 9.7, however, is closer to findings by Beck *et al.* (2003a) and Demirgüç-Kunt and Levine (2000) of a weak effect of bank concentration on financial development. The rationale could be that for high income countries, concentration does not matter much as the few banks dominating the market and the developed non-bank financial sectors are able to support financial development.

The results for Low Income Countries (Table 9.8) show that financial concentration also has a negative effect on all measures of financial development and the coefficients for Liquid Liabilities and Private Credit are statistically significant at 1 per cent. This implies that in low income countries, the level of concentration is a major determinant factor for financial development. The results are also consistent with dynamic panel estimations that used dummy and interactive dummy variables (Tables 9.4 and 9.5) in terms of the negative effect, although the magnitude is now marginally higher.

Table 9.8: Concentration and financial development in Low Income Countries

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant		17.364 (0.0080)***	14.548 (0.0000)***	13.883 (0.0001)***	0.1899 (0.0048)***
Financial Development (-1)		0.7156 (0.0000)***	0.7981 (0.0000)***	0.4668 (0.0000)***	0.6087 (0.0000)***
GGDPPC		-0.3266 (0.0358)**	-0.2401 (0.0001)***	-0.2463 (0.0020)***	-0.0061 (0.0001)***
Trade Openness		-0.0159 (0.5513)	0.0066 (0.5774)	0.0378 (0.0068)***	0.00004 (0.8830)
Financial Openness		-1.3681 (0.1733)	-0.0711 (0.8594)	-0.1436 (0.7633)	-0.0007 (0.9392)
Real Interest Rates		-0.0766 (0.0044)***	-0.0249 (0.0230)**	0.0022 (0.8714)	-0.0004 (0.1103)
Financial Concentration in Low Income Countries		-0.0865 (0.1580)	-0.0947 (0.0003)***	-0.1075 (0.0010)***	-0.0007 (0.2247)
Diagnostic tests	R-sqd	0.8540	0.9369	0.6690	0.7996
	AdjR-sqd	0.8461	0.9334	0.6509	0.7886
	F-stat	106.92	271.356	36.927	72.885

	Prob(F)	0.0000	0.0000	0.0000	0.0000

Source: Author's own calculation

The results in Tables 9.4 and 9.6 are seemingly affected by the pulling effect of a country's level of income. When the countries were modelled together, the negative effect on financial development contributed by middle income countries was higher than the contribution of low income countries. However, when the countries were separated (Tables 9.7 and 9.8), concentration in low income countries had a stronger negative effect on financial development compared to middle income countries. The overall result, therefore, supports deductions by Law and Abdullah (2006) that the effect of bank concentration on financial development is subject to the level of economic development.

9.7   Financial development in South Africa and financial concentration in the SADC

This section presents results of the effect of financial development in South Africa on financial concentration in the SADC region. The expectation is that financial development variables for South Africa are negatively related to concentration in SADC, driven by institutions' expansion into the region. Two new variables, ratio of Foreign Banks to Total Banks and Banks Return on Assets, were introduced as control variables. The expectation was that more foreign banks, particularly fully fledged, imply a higher number of banks in that country and this dilute the country's concentration in the financial sector. With return on assets, high returns attract other players into the industry, thereby diluting the concentration. Real GDP per capita growth represents average income per person, reflecting potential demand for banking services and is expected to have a negative effect on concentration. Financial openness, the more open an economy is to finance the more competition it generates in the market, investment and assets flow to the banking sector and the more institutions are established. Table 9.9 shows the results of the estimations.

Table 9.9: Financial development in SA and financial concentration in SADC

Dependent Variable: Financial Concentration				
Variable	**Domestic Credit**	**Liquid Liability**	**Private Credit**	**Broad Money**
Constant	22.225 (0.0006)***	2.6382 (0.6135)	10.965 (0.1011)	24.340 (0.0001)***
Financial Concentration (-1)	0.8343 (0.0000)***	0.8169 (0.0000)***	0.8742 (0.0000)***	0.8110 (0.0000)***
GGDPPC	0.0381 (0.6779)	0.0692 (0.4450)	0.0236 (0.7981)	0.0456 (0.6167)
Financial Openness	-0.2141 (0.7275)	-0.2720 (0.6488)	-0.4167 (0.4987)	-0.1431 (0.8146)

Foreign Banks Proportion	-0.0245 (0.5500)	-0.0249 (0.5322)	-0.0402 (0.3273)	-0.0218 (0.5907)
Return on Assets	-0.0710 (0.5983)	-0.0533 (0.6854)	-0.1195 (0.3773)	-0.0577 (0.6662)
Domestic Credit in SA	-0.0422 (0.0441)**			
Liquid Liability in SA		0.3103 (0.0002)***		
Private Credit in SA			0.0265 (0.6620)	
Broad Money in SA				-11.185 (0.0057)***
Diagnostic tests	*R-sqd*	*0.8614*	*0.8668*	*0.8592*	*0.8634*
	AdjR-sqd	*0.8506*	*0.8565*	*0.8483*	*0.8528*
	F-stat	*80.468*	*84.269*	*79.011*	*81.847*
	Prob(F)	*0.0000*	*0.0000*	*0.0000*	*0.0000*

Source: Author's own calculation

Domestic Credit and Broad Money in South Africa have a negative effect on financial concentration in SADC and their coefficients are statistically significant. The implication is that a development of domestic credit and broad money in South Africa reduces financial concentration in other SADC countries. Contrary to *a priori* expectations, the results, however, show that Liquid Liabilities and Private Credit have positive effects on financial concentration in other SADC countries. It is difficult to obtain an ultimate position on the overall effect of South Africa's financial development on financial market concentration in SADC as the measures of financial development have opposing effects. The negating effects are likely to reduce the significance of financial development on financial concentration. Given limited weak spill-over effects in the region, obtained in previous chapters, the effect of South Africa's financial sector on concentration in the financial sector of other SADC countries is expected to be equally weak.

9.8   Chapter summary and conclusions

This chapter reported on varying results obtained for a number of empirical tests conducted in respect of the issue of financial market concentration within the region. The results show that the level of concentration in SADC's financial sector, as measured by the Herfindahl-Hirschman Index (HHI), is generally high. When South Africa is excluded, the level of concentration in the region reduces significantly indicating a fair distribution of banking assets across countries. Financial concentration has a negative effect across all measures of financial development. The study also established that the level of income has a positive effect on financial development. The results also show that financial market concentration limits development of the financial sector in all SADC countries regardless of income level, with the

effect being more pronounced in low income countries. The results further reveal mixed and opposing effects of South Africa's financial development on financial concentration of other SADC countries, with the negating effects likely to produce weak net effects on concentration.

The findings on financial concentration in SADC suggest that the financial sectors, though small, are in support of diversification of the financial industry across all countries. Theory holds that financial concentration brings economies of scale that promote financial growth. However, in SADC countries, the few strong big institutions create banking sectors that have high market power. Banking sectors with high market power have inefficiencies including high cost of financial service, high interest rates and poor reach and access (Beck, Demirgüç-Kunt and Levine 2004). In most SADC countries, financial sectors remain relatively underdeveloped with high levels of financial exclusion despite presence and dominance of a few large banks that are supposed to generate economies of scale to support financial development. The findings thus confirm the theoretical argument by Gwama (2014) that concentration of financial development brings inequality, which retards financial development.

Diversification of financial sectors in SADC is apparent. Microfinance institutions, wholesale funds to SMEs, mobile banking and mobile money, partially, are a form of financial diversification that brought new players and institutions in the financial systems of most SADC countries. These have helped in increasing access and depth of financial sectors for majority of SADC countries, a development that the dominant large banking institutions were failing to carry out effectively.

The study findings that South Africa financial development is not effective in reducing financial concentration in other SADC countries suggests that South Africa financial institutions that are expanding to the region either are part of the large and dominant few or are too small to effectively influence financial concentration.

Further, although not empirical tested in this study, the findings could imply that financial development in other SADC countries could be enhanced through promoting expansion of non-bank financial institutions to enhance diversity of financial institutional in these countries. In other words, in SADC diversification of the financial system is not only about increasing the number of highly capitalised banking institutions in order to reduce the concentration ratio, but also to develop non-bank financial institutions.

Given that most SADC countries operate a bank based financial system, diversification across sectors may be dragging. As such, SADC countries need to look beyond domestic financial markets and engage international and global markets in order to enhance diversification and reduce concentration.

The advantage for SADC in that regard is that four countries South Africa, Mauritius, Seychelles and Botswana have international financial centres. This makes SADC the region with the highest density of international financial centres in Africa. In addition, South Africa is connected with global financial markets and its financial sector is directly affected by global financial developments. The following chapter reviews the impact of international financial centres and international finance on financial development in SADC as well as the option of connecting SADC to the global financial markets.

CHAPTER TEN
GLOBAL FINANCE AND FINANCIAL DEVELOPEMNT IN THE SADC

10.1 Introduction

Discussion on financial development would not be complete without referring to international finance. Financial sectors of countries are directly and indirectly affected by global financial developments. For SADC countries, the issue of international finance is inevitable given that the region has the highest concentration of international financial centres compared to other regions in Africa. The region has four countries, Botswana, Mauritius, South Africa and Seychelles that have international financial centres. Among these centres, South Africa and Mauritius are rated among the world's global financial centres and are among the only three rated in Africa (Global Financial Centres Index 2015).

In addition, South Africa is a member of the BRICS (Brazil, Russia, India, China and South Africa) countries, which is a global economic zone of emerging economies that have global influence. This bloc has already made strides in financial development by establishing a

development bank, the New Development Bank. As such, the effect of international financial centres and subsequently global finance should be present in SADC.

SADC countries, just like other developing countries, have access to global finance through multilateral institutions such as the World Bank, International Monetary Fund (IMF) and the African Development Bank (AfDB) as developmental assistance. Countries also access global finance through humanitarian and donor assistance for health, poverty reduction and education. This finance, particularly developmental assistance, created a problem of debt and arrears, which most developing countries are grappling with. Limited inflows of private capital and Foreign Direct Investments have been realised.

Most SADC countries are disconnected from global markets, due to their size and underdevelopment relative to global markets. It can be argued that the lack of development in financial sectors of these countries is partly a result of the lack of access to global financial markets. SADC markets lack competition and efficiency as they are not exposed to international finance that has globally set benchmarks. Limited access to international finance also constrains SADC countries' economic development given that the countries do not have alternative ways to finance exploitation of their resources. This comes on the back of indications that foreign direct investment is diversifying away from natural resources (Adam, Jones & Woods 2015). The linkage of other SADC countries with global financial markets has to be created through other established financial sectors such as South Africa that have strong connections to these markets.

This chapter presents discussions around global finance, international financial centres and financial development in the SADC. The following section presents the results of an empirical estimation on the contribution of countries with international financial centres to financial development in the SADC. The chapter also intends to test the impact of international finance on financial development in the SADC countries using Foreign Direct Investment and Official Development Assistance as measures of international finance. The subsequent section presents a critical analysis of the possible options and strategies through which South Africa could link SADC countries to global financial markets. The options and strategies are identified in line with theory on establishment, distribution, size and roles of global financial centres as well as empirical evidence on the impact of global finance in the region.

10.2 SADC international financial centres and financial development

Global non-bank financial markets and institutions can drive competitiveness of the banking sectors in developing countries (Obstfeld 2007). Investment structures and financial intermediation available in international financial centres help domestic and foreign investors in developing countries to access efficient institutions, which are often unavailable locally (Sharman 2009). Financial globalisation can lead to significant benefits in the long run, particularly the development of financial systems (Obstfeld 2007).

Table 10.1 presents results of the effects of financial centres on financial development in SADC. The results show that the coefficients for dummy variables for financial centres are all positive and significant, indicative of a positive effect of international financial centres on financial development. The results imply that countries with international financial centres contribute more to financial development in SADC than countries without international financial centres. The contribution by countries with international financial centres is highest in domestic credit and lowest in broad money. The results therefore, suggest that international financial centres enhance the availability of credit in SADC countries more than they enhance growth in money supply.

Table 10.1: Financial centres and financial development in SADC

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant		2.9454 (0.0611)*	1.9791 (0.0069)***	0.6959 (0.3759)	0.0785 (0.0001)***
Financial Development (-1)		0.9631 (0.0000)***	0.9386 (0.0000)***	0.9541 (0.0000)***	0.6639 (0.0000)***
GGDPPC		-0.0600 (0.6231)	-0.1235 (0.0089)***	-0.0430 (0.4642)	-0.0039 (0.0003)***
Trade Openness		-0.0215 (0.1153)	0.0033 (0.6101)	0.0049 (0.4702)	0.0003 (0.1135)
Financial Openness		0.1436 (0.7798)	0.3470 (0.1109)	0.0951 (0.7093)	0.0092 (0.0877)*
Real Interest Rates		-0.0113 (0.5877)	-0.0001 (0.9828)	0.0037 (0.7216)	-0.0002 (0.2470)
Dummy International Financial Centre		3.2944 (0.0517)*	1.9652 (0.0210)**	1.6732 (0.0602)*	0.1154 (0.0000)***
Diagnostic tests	R-sqd	0.9344	0.9294	0.9156	0.7442
	AdjR-sqd	0.9335	0.9284	0.9144	0.7406
	F-stat	1016.93	939.33	774.01	207.58
	Prob(F)	0.0000	0.0000	0.0000	0.0000

*t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

These results are in line with the findings of Jankee (2014) that financial centres support financial development and are suggesting that global finance could contribute to development of financial sectors in SADC. Literature states that investment structures and financial intermediation available in international financial centres assist domestic and foreign investors in developing countries to access efficient institutions, which are often unavailable locally (Sharman 2009). SADC countries need efficient financial intermediation in their financial sectors in order to enhance financial development. Since credit is the measure of financial development found to be highly affected by financial centres, the study reviews its trend in countries that have international financial centres.

Figure 10.1 shows the trend of domestic credit and bank credit to private sector for Botswana, Mauritius, Seychelles and South Africa.

Figure 10.1: Trend in credit for countries with international financial centres
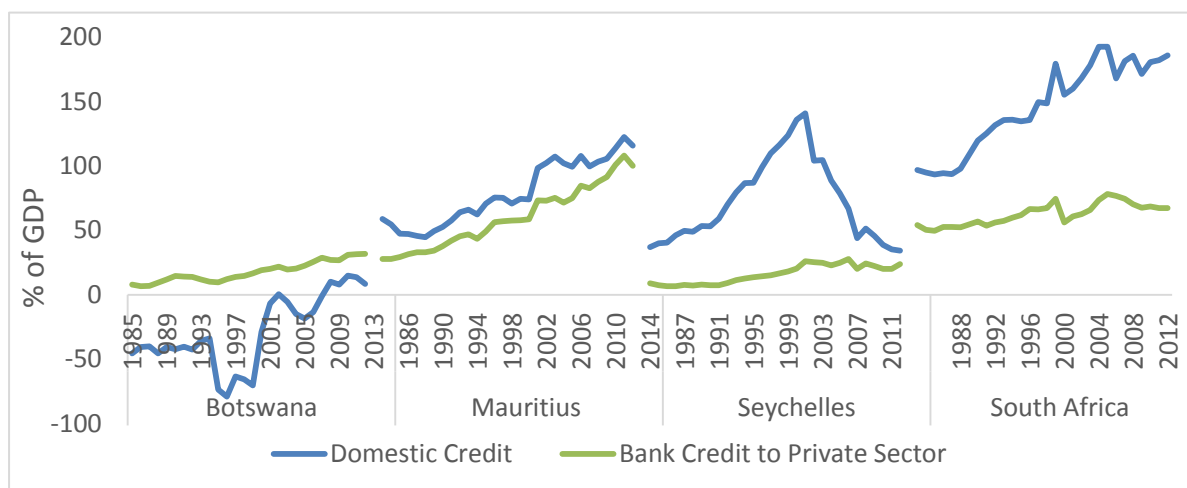
The observable trend is that credit generally grew in these countries over the period under study, and the growth could partly be attributed to the development of financial centres in these countries. The World Bank (2010) indicated that the financial boom in high income countries from 2000 to 2007, together with financial innovation, generated a reduction in the price of risk, expansion in domestic credit and a rise in foreign flows in developing countries. Section

208

10.3 presents results of the evaluation of the impact of international finance on financial development in SADC.

10.3 International finance and financial development in SADC

The study estimated the effects of international finance on financial development in SADC. The variables used to measure international finance are Foreign Direct Investment (FDI) and Official Development Assistance (ODA). Foreign Direct Investment refers to investments involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise residing in an economy other than that of the foreign direct investor (UNCTAD 2007). Official Development Assistance (ODA) is defined as government aid designed to promote the economic development and welfare of developing countries (OECD 2016). The rationale for using these variables as measures of international finance is that most SADC countries have received this kind of finance more than other forms of international finance.

The other control variables used in the estimation are GGDPPC, Trade and Financial Openness and Real Interest Rates. GGDPPC retains the same effect on financial development as explained in Chapters 5, 6, and 7. Trade and Financial Openness are expected to aid increased flows of investment and international finance into a country. Real interest rates are also an important determinant in deciding placement of investment portfolios even across countries.

Estimations were made using Dynamic Panel Models that considered fixed and random effects. The results in Table 10.2 show the Dynamic Fixed Effect estimations.

Table 10.2: Fixed Effects-International finance and financial development in the SADC

Variable	Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant	9.5965 (0.0002)***	4.9649 (0.0000)***	4.1533 (0.0013)***	0.1383 (0.0000)***
Financial Development (-1)	0.8126 (0.0000)***	0.8577 (0.0000)***	0.7785 (0.0000)***	0.6394 (0.0000)***
GGDPPC	-0.1849 (0.1356)	-0.1585 (0.0009)***	-0.1247 (0.0365)**	-0.0042 (0.0001)***
Trade Openness	-0.0220 (0.3888)	0.0029 (0.7686)	0.0163 (0.1848)	0.00001 (0.09476)
Financial Openness	1.4288 (0.0418)**	0.5458 (0.0448)**	1.1603 (0.0011)***	0.0113 (0.0627)*
Real Interest Rates	-0.0370 (0.1267)	-0.0046 (0.6141)	0.0060 (0.6037)	-0.0002 (0.2335)

	Foreign Direct Investment	0.0589 (0.5798)	-0.0086 (0.8321)	0.0066 (0.8963)	0.0010 (0.2398)
	Official Development Assistance (ODA)	0.0065 (0.5839)	0.0075 (0.1021)	0.0053 (0.3582)	0.000003 (0.9714)
Diagnostic tests	R-Sqd	*0.9412*	*0.9573*	*0.9329*	*0.8637*
	AdjR-sqd	*0.9384*	*0.9551*	*0.9295*	*0.8567*
	F-stat	*315.201*	*441.065*	*273.688*	*124.645*
	Prob(F)	*0.0000*	*0.0000*	*0.0000*	*0.0000*

*t-statistic (probability); ***. **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

The results in Table 10.2 show that both foreign direct investment and official development assistance have statistically insignificant coefficients implying that international finance has no effect on financial development in SADC. The results are suggesting that in SADC international finance in the form of foreign direct investment and official development assistance has no support to domestic financial sectors. Interpreting the results based on the sign, FDI has a positive sign on Domestic Credit, Private Capital and Broad Money, and a negative sign on Liquid Liabilities. ODA has a positive sign on all measures of financial development in SADC. Effectively, the results suggest that international finance, although currently insignificant, has the potential to support financial development in SADC.

The Fixed Effect results were tested for robustness by running Random Effects estimations on the same model. The results of the random effects are presented in Table 10.3.

Table 10.3: Random Effects-International finance and financial development in SADC

Variable		Domestic Credit	Liquid Liability	Private Credit	Broad Money
Constant		3.3256 (0.0318)**	1.2558 (0.0384)**	0.9791 (0.1916)	0.0596 (0.0000)***
Financial Development (-1)		0.9775 (0.0000)***	0.9742 (0.0000)***	0.9743 (0.0000)***	0.7812 (0.0000)***
GGDPPC		-0.0444 (0.7063)	-0.1101 (0.0153)**	-0.0330 (0.5583)	-0.0034 (0.0011)
Trade Openness		-0.0210 (0.1299)	0.0010 (0.08584)*	0.0070 (0.2917)	0.0004 (0.0046)***
Financial Openness		0.6086 (0.1972)	0.3163 (0.0919)*	0.3715 (0.1073)	0.0174 (0.0000)***
Real Interest Rates		-0.0139 (0.4899)	-0.0021 (0.7831)	0.0010 (0.9135)	-0.0002 (0.1239)
Foreign Direct Investment		0.0445 (0.6463)	-0.0384 (0.3047)	-0.0361 (0.4388)	-0.0002 (0.8061)
Official Development Assistance		0.0007 (0.9291)	0.0062 (0.0484)**	-0.0020 (0.6071)	0.00006 (0.3337)
	R-Sqd	*0.9344*	*0.9526*	*0.9242*	*0.8251*

Diagnostic	Adj. R-sqd	0.9333	0.9518	0.9230	0.8222
tests	F-stat	869.156	1226.268	744.549	287.901
	Prob (F)	0.0000	0.0000	0.0000	0.0000

*t-statistic (probability); ***, **, * significant at 1%, 5% and 10% levels respectively

Source: Author's own calculation

Dynamic Random Effects estimation results show that only ODA has positive significant effects on liquid liability. All other coefficients are not significant. The study, however, conducted a Hausman test in order to identify the model that should be adopted and the result showed that Fixed Effects prevailed over Random Effects.

The results in general showed that international finance has no effect on financial development in SADC. Despite there being no previous studies to compare with, the results are not surprising. The nature of FDI that comes into SADC countries is mainly directed toward extractive industries (Mahembe 2014). Extractive industries are capital intensive and most of this capital is in the form of equipment and machinery. As such, the FDI flows into the country come in the form of plant, equipment and machinery, which apparently would not have a direct effect on domestic financial markets. In addition, corporates that bring in such Foreign Direct Investment are able to source finance from global off-shore markets and would rely minimally on domestic markets. As such, the effect on Foreign Direct Investment of local financial systems remains minimal.

In respect of Official Development Assistance, the results are explained by the fact that development assistance in SADC is mainly intended for poverty reduction and humanitarian aid. A significant portion of this assistance comes in the form of goods and services targeted at the beneficiaries, with little financial flows. For example, with food aid, donors and aid agencies normally bring in the food rations to the vulnerable and affected, with minimal assistance coming in the form of finance. Such kind of assistance does not support neither the domestic financial sector nor local production in the recipient countries, which otherwise would have supported the domestic financial sectors.

The weak effect of the Official Development Assistance and Foreign Direct Investment in enhancing financial development in SADC necessitates consideration and expansion of other forms of international finance. Private portfolios, international bonds and other global financial market instruments need to be intensively expanded. This justifies the need to connect SADC countries with global financial markets. Literature indicates that financial globalisation could

lead to the development of financial systems in the long-run (Obstfeld 2007). Notwithstanding the problems of volatility and others associated with global financial markets, SADC largely needs to be connected to global markets in order to enhance development of its economies and financial systems. Below is an analysis of the strategies of linking SADC countries with global financial markets.

10.4   Linking SADC to global financial markets

The arguments in support of having global financial markets linked to and supporting financial development in SADC countries are contentious. Nonetheless, it remains important for SADC to connect to global financial markets in order to enhance financial and economic growth. Literature reviewed indicates that global finance has a positive effect on economic growth (City of London 2011) and that financial centres support financial development (Jankee 2014 and World Bank 2010).

It is, however, important to point out from the onset that applicability and feasibility of the strategies and options suggested below is conditional on addressing some of the SADC countries' perennial challenges. The majority of SADC countries are riddled with the usual problems associated with low income countries, including poverty, underdeveloped financial systems, lack of adequate infrastructure and high levels of financial exclusion. These problems combine with internal conflicts, instabilities and lack of political will in some countries, to draw back coordination of any developmental activities in the region. This notwithstanding, the strategies remain optimal in guiding SADC to access global finance that can enhance financial development in the region.

The discussions presented below could be regarded as recommendations for global finance and financial development in SADC. Their inclusion, at this stage, is meant to enhance discussion on the empirical results and is part of a qualitative analysis of how international and global finance could support financial sector development in SADC.

10.4.1 Creating information and economic hinterlands for the SADC

As outlined in theory, the geography of finance deals with the location of transactions (information centres/hinterland) instead of economic production (economic hinterland) (Zhao 2010 citing Gordon 2002). The information hinterland provides the best access point for the profitable exploitation of valuable information flows (Zhao, Zhang & Wang 2004). Information hinterland is a centre of information and investment whilst economic hinterlands dominate and

lead production activities (Zhao 2010). The SADC case can be structured such that South Africa would establish itself as the information centre with other SADC countries being the economic hinterland where production activities take place. South Africa becomes the centre for global markets engagement by SADC countries and would be coordinating financial information from global financial markets. On the other hand, SADC countries become economic hinterlands with well-coordinated and structured production that provides activity for and feed information to the financial centre for relaying to the global financial markets.

Initial arrangements could be structured around companies and corporates currently listed on the Johannesburg Stock Exchange or those that JSE's Africa Board is targeting. SADC has a potential to attract global financial markets by setting production activities that create value through value adding of its existing range of tradable commodities that are being exported in raw form. Xinhua-Dow Jones (2014) pointed out that distribution of international financial centres is closely related to the world's economy and trade pattern. As such, SADC's link to global markets becomes a function of its production and trading. Related to this, given that the SADC and Africa domestic markets are small to sustain and guarantee demand for its commodities, linkages with established and big markets remain critical. As such, part of the connections that South Africa could be facilitating is access to global economic markets to enhance demand for the value added products.

10.4.2 Restructuring and shifting economic activity

The lack of development of financial sectors in some SADC countries has been attributed to low economic activity in these countries. Although Thomas, Panesar and Makris (2013) indicated that the size of a county's financial sector is largely unrelated to the size of a country's population and GDP, a strong economy is required for effective financial sector development. The rise of the Chinese economy in the world economy in the post financial crisis potentially drove growth, roles and positions of Chinese financial centres in the global financial centres network (Zhao 2010).

City of London (2013) added that financial service businesses are affected by a country's growth, economic policy, tax rates, and the ease, speed and cost of implementing business decisions. Existing growth in South Africa propelled the country to its current rating in the global financial markets. Going forward, South Africa needs the SADC region in order to boost its economic base and improve its positioning in global financial ratings. Regional integration creates a big economic hinterland for South Africa that can be used to enhance its linkage, and

therefore, rating in global financial markets. Fundamentally, development of economic hinterlands in SADC pulls with it financial development.

As has been extensively debated in literature, the major challenge to economic development in SADC and other developing countries is the lack of investment capital to finance that development. Most FDI that comes into SADC is resource seeking, as 63 per cent of the US$290 Billion in FDI received by SADC during the period 2003 to April 2013, was invested in the extractive sectors (Mahembe 2014). This investment is made by multinational companies that seek not only to enhance production, but also to increase return on their investment. The multinationals are, however, headquartered in developed economies or other emerging regions and actively participate in financial centres or markets in these regions. The multinationals gain access to global finance in their parent regions, whilst production activities are happening elsewhere, including in SADC countries. Technically, SADC countries are economic hinterlands for some global financial centres in other regions.

A dynamic change in this structure could redirect global finance into SADC as Zhao (2010) indicated that changes in global information hinterlands cause financial centres to evolve. Advances in technology, the free movement of capital, and the need to service an increasingly global clientele are creating opportunities for the establishment of new world class financial centres (Securities Industrial Association 2007). South Africa is linked to SADC as well as other Africa countries, which are grossly underserved; countries that can sustain high growth rates; and countries that are endowed with untapped potential and South Africa can leverage on these to redirect the flow of global markets to the SADC.

Furthermore, a drive towards pan African companies and institutions becomes critical for SADC. The financial sector has already made progress in this regard through establishing pan African banks and financial institutions, such as Standard Bank, Ecobank, MBCA, BancABC and ABSA that are replacing pre-dominantly European based banks.

In addition, SADC requires inclusive growth supported by private investment through driving employment creation, economic diversification and environmental sustainability and infrastructure development. Private investment in SADC should also promote broad-based entrepreneurship, including Micro, Small and Medium Enterprises (MSMEs), and women entrepreneurs and firms in rural areas (OCED-SADC Policy Brief 2015).

10.4.3 Wholesale provision of global finance into the region

The financial sectors of most SADC countries are too small and underdeveloped to establish direct linkages with global markets. Global financial markets may perceive SADC financial markets as risky and underdeveloped to warrant their attention. However, integration of a number of these small markets creates one significant market. Global markets could provide wholesale finance to South Africa for onward lending to SADC countries. South Africa could attract this wholesale finance by floating bonds or other market instruments to raise funds for regional projects. The primary target could be infrastructure projects that the SADC region needs, whose requirements are estimated at US$500 billion (OCED-SADC Policy Brief 2015). The OCED-SADC Policy Brief (2015) pointed out that poor infrastructure is preventing the region from reaching their full growth potential in sectors such as tourism, agriculture, mining or commerce. South Africa could utilise its strong financial sector to raise these funds in global financial markets.

South Africa would then provide development finance to the SADC, on commercial terms, through its development institutions such as the Industrial Development Cooperation and the Development Bank of South Africa. As South Africa provides development finance in SADC countries, it works with local financial sectors thereby enhancing development of domestic financial markets. Pan African banks in South Africa could also be another avenue for raising global finance and channel it into the SADC financial sectors.

10.4.4 Commercialisation of solutions to SADC's financial and other challenges

SADC countries face a number of challenges including poverty, hunger, infrastructure deficit and social inequality. In the financial sector, the countries have significant levels of financial exclusion when compared to other regions outside Africa. SADC countries have for decades been receiving global finance in the form of development assistance, donor funds, grants and aid towards addressing these challenges. Unfortunately most of these challenges persist, despite the huge support in developmental assistance and humanitarian aid. In addition, some of the financial support extended to SADC countries for development has created a problem of debt and arrears overhang, which is now worsening these countries' challenges.

A commercial approach to solving these problems could provide a sustainable solution and this has been evident in the financial sector. Evidence supports the hypothesis that developed financial institutions and financial markets drive economic development, alleviate poverty and improve standards of living (Thomas, Panesar & Makris 2013). Mobile money and financial innovation has helped to reduce financial exclusion, with micro finance and wholesale funding

to SMEs also enhancing increased access to credit by the marginalised. Mobile money and microfinance were pioneered as donor funded projects in Kenya, Bangladesh and other places. The successful commercialisation of the initiatives has assisted in enhancing financial inclusion in most countries, including SADC countries. These have grown to be embraced in the formal financial system by established banking institutions.

SADC countries could address their problems of financial sector underdevelopment by commercialising financial inclusion initiatives, increase competition and bring in more capital, especially from global markets.

10.4.5 Support deepening of financial systems in SADC countries

The lack of financial infrastructure remains the primary hindrance to financial development in SADC. Countries do not have the capacity to roll out adequate financial infrastructure that could drive financial inclusion. As such, countries need to cooperate in infrastructure development and take advantage of technology and financial innovation to reach out to the financially excluded and the underserved. South Africa could provide financial structures for the development of such infrastructure, on commercial and sustainable arrangements, which guarantees viability to the provider and affordability to the users.

In addition, there are countries that may need to develop off-shore or international financial centres. South Africa, together with other countries that have such centres, could provide the knowledge, expertise, technical assistance in terms of setting up regulations, policies and structures for such centres. Theory indicates that global non-bank financial markets and institutions can drive competitiveness of banking sectors in developing countries (Obstfeld 2007). Furthermore, international financial centres can ease the path of entry by investors into developing countries and provide support for economic growth among developing countries (Sharman 2009). Further to that, SADC could build a network of financial centres, starting with the existing ones, and use these to attract global finance into the SADC region.

10.4.6 Financial integration

The SADC financial sectors are in their current state fragmented, lack cohesion or uniformity in terms of regulations, and are too small to draw significant investment on their own (OCED-SADC Policy Brief 2015). Regional integration and cooperation creates a more attractive environment for foreign investment, builds regional infrastructure and goods markets, and capitalise on economies of scale across sectors (OCED-SADC Policy Brief 2015). Financial

integration not only harmonises these markets in terms of policy and regulation but also creates one big market for the region that can attract global finance and improve internal access, depth and efficiency of financial sectors. Financial integration creates well-coordinated and unified financial markets that result in reducing barriers to transaction facilitation, information symmetries and knowledge economies (Jarvis 2009). The significant progress in the SADC towards financial integration is encouraging, including the establishment of the SADC Finance and Investment Protocol and cooperation in monetary policy, exchange rates and stock market management. The experiences of financial and economic integration in other regions, such as the European Union, should guide the integration path of the SADC.

10.5   Chapter summary and conclusions

This chapter reviewed the role of global finance and international financial centres on financial development in SADC. Estimations established that countries with international financial centres contribute nearly double to financial development in SADC when compared to countries without. Global finance currently received by SADC countries has no effect on financial development in the SADC. A number of SADC countries do not have direct access to global financial markets to help in driving the development of financial systems in their countries. Given their underdeveloped finance sectors, access would only be through South Africa, a globally connected country.

This chapter analysed the possible options and strategies through which South Africa could facilitate the flow of global finance into SADC countries. Suggested options include, creating information and economic hinterlands for SADC; wholesale provision of global finance into the region; commercialisation of solutions to the challenges of SADC countries; providing support for deepening the financial systems in SADC countries; and financial integration.

It can be concluded that the global finance that has been flowing to SADC in the form of grants, aid and donor funds is not sustainable to eliminate challenges that the SADC countries face. It is necessary for these countries to attract commercial global finance from open financial markets. For commercial global finance flows to increase in SADC, the countries need to cooperate and harmonise their regulation, policies and structuring of financial markets. SADC needs to forge ahead with increasing economic cooperation as well as enhancing financial integration.

CHAPTER ELEVEN
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

11.1 Introduction

This study attempted, through a combination of geographical, financial and economic fundamentals, to conduct a complex analysis of cross-country spatial dynamics of financial development in a regional setting. In broad terms, the study analysed economic effects and behaviour of finance when they are affected by space, across countries. The study was prompted by the prevailing financial development imbalances across SADC countries that are not consistent with the linkages and interconnectedness of financial systems of these economies. South Africa is the most financially developed country in the region, yet it is surrounded by economies with relatively small and underdeveloped financial systems compared to its size and level of development. This financial structure setup in SADC is not consistent with spatial proximity theory, which holds that countries closer to a financially developed country benefits from spatial externalities and spill-overs. The study conducted a number of empirical estimations around financial development and the spatiality of financial development in SADC in order to evaluate their existence and nature of relationships in the SADC.

This chapter presents a summary of the entire study, highlighting financial sectors in SADC countries and their interconnectedness, the literature on the main issues under study, the research methodology and the outcomes of the empirical estimations. The chapter also presents

the conclusions of the study, policy recommendations, limitations of the study and suggested areas for further research.

11.2   Summary of the study

This summary is presented in three sections: The first section presents a brief summary of an financial development in SADC. The second section contains a summary of the literature reviewed in the current study, whilst the last section summarises the findings of the study.

11.2.1 Financial development in the SADC

The study firstly performed an in-depth analysis of the financial sectors and financial development of the SADC countries. South Africa's financial sector is the most developed compared to the rest of the SADC with strong money and capital markets, insurance and mutual funds. South Africa is a leading source of foreign direct investment (FDI) in the region. In the SADC region, Botswana, Mauritius, Namibia and South Africa are the most banked countries in terms of usage and access to banking services. The non-bank financial sector in other countries remains relatively small and under-developed in some cases.

The interconnectedness of financial systems between South Africa and other SADC countries is evident judging by the presence of South Africa's financial and non-financial institutions in other SADC countries. The existing monetary union of some countries in Southern Africa facilitates inter-connectedness of financial systems of the member countries. Interconnectedness of financial systems in SADC has also been enhanced by financial integration initiatives in the SADC region. The Southern Africa region has been registering significant growth rates in the past decade, generating annual real GDP growth rates that average approximately 4.3 per cent from 2001 to 2012. Growth has over the years increasingly become more widespread across countries, including the non-resource-rich countries.

11.2.2 Literature review

The literature reviewed showed that financial development is measured by size, depth, access, efficiency and stability of a financial system (World Economic Forum 2012). Determinants of financial development, which could be the main source of the differences in performance across countries include, institutions, openness policy, geography and technology, among other (Voghouei, Azali & Jamali 2011).

Debate on the relationship between finance and economic growth dates back to the early twentieth century and can be traced back to Schumpeter (1911), but remains inconclusive.

Three relationships were noted, namely finance-lead growth or supply-leading (Levine 1997, King & Levine 1993a, Rajan & Zingales 1998); demand following finance or growth-driven finance (Robinson 1952, Kuznets 1955 & Stem 1989), and the two-way causal relationship. The impact of financial development on economic growth is captured through the role of capital and investment in growth models. Lucas (1988), McKinnon (1973) and Shaw (1973) however, criticised the role of financial intermediaries and financial markets in the development process, although the 2008 financial crisis demonstrated the impact of finance on economies. Empirical literature reviewed on the relationship between finance and economic growth in SADC pointed to mixed causal relationships. Financial reforms enhance growth by promoting financial innovation and efficiency and competition in the banking industry (Moyo *et al.* 2014). On the contrary, financial reforms may worsen asymmetric information in the financial sector and create competition that increases financial fragility of financial intermediaries (Moyo *et al.* 2014).

The literature also revealed that the right kind of financial innovation drives banks to invest in new technologies that promote growth, but too much innovation can have serious consequences for the overall economy (Stiglitz 2010, Beck *et al.* 2012). Financial innovation however, is associated with higher growth volatility. Allen (2011) and Llewellyn (2009) argued that the Global Financial Crisis of 2007 was caused by financial innovation. There is empirical evidence on the relationship between financial innovation and economic growth but the evidence is limited in respect of SADC countries.

The reviewed literature also indicates that geography matters in financial development. The spatiality theory states that countries benefit through their proximity to a financially developed country (Capello 2011). Financial geography emphasises that location remains important in the conduct of financial transactions and markets. Proximity to a more financially developed country generates spatial externalities to the neighbours in the form of technology transfer, reduction of transaction costs, risk sharing, and enhanced liquidity (Mobolaji 2010). Empirical evidence suggests that the financial systems in Sub-Saharan Africa are geographically sensitive and not immune to spatial externalities.

Literature also points out that proximity enhances spill-overs in financial development (Shinagawa 2014). Spill-overs in the financial market are transmitted through trade, geographical preference of portfolio investment, currency, stock market prices, bond and debt financing, syndicated loans, private debt and equity capital flows and remittances (Nissanke

2009). Cross-border market linkages increase the likelihood for spill-over effects from a financially developed country to be transmitted internationally (Angkinand, Barth & Kim 2009). Studies show evidence of real sector spill-overs in SADC, emanating from South Africa. Literature also confirms economic and financial inter-linkages between South Africa and the rest of SADC, which support the transmission of spill-overs.

Theory reviewed indicates that concentration in the financial sector can be measured by the k-bank concentration ratio and the Herfindahl-Hirschman Index (HHI), among others. Concentration in the financial industry affects the financial sector's efficiency, bank stability, industrial competitiveness, thus hindering financial development. Empirical evidence indicates the existence of high bank concentration in most SADC countries.

Literature also points out that global financial markets and institutions can drive competitiveness of banking sectors in developing countries, and support development of the financial system. The major downside of global finance to developing countries is that it exposes countries to financial crises, volatilities and contagion of global financial markets (Schmukler 2004). SADC countries have accessed global finance through multi-lateral lending institutions in the form of humanitarian and development finance. Development finance created a problem of debt, which has a negative impact on economic and financial development. In SADC there are international financial centres in South Africa, Mauritius, Seychelles, and Botswana (Waris 2014). Despite this, other SADC countries remain disconnected to global financial markets.

11.2.3 Summary of the main research findings

In this study, the dynamic panel models estimated by GMM found that financial development does not support or is adverse to economic growth in the SADC. Financial reforms were found to be insufficient to drive growth. A bi-directional causality between financial development and economic growth was established with causality being strong when flowing from economic growth to financial development. The results are consistent with findings by Phakedi (2014), Allen and Ndikumana (1998) and Le Roux and Moyo (2015), but not consistent with *a priori* expectations. Under-developed financial systems, inefficiencies in the financial intermediation, and strong country heterogeneity effect are some of the factors identified to be affecting the finance-growth relationship in the SADC. In addition, the weak effects of financial reforms result from inadequate reforms that also lacked support of well-functioning institutions, regulations and monitoring mechanism, which caused them to be ineffective.

In respect of financial innovation, the study applied the extended AHM Model (developed by Laeven, Levine & Michalopoulos 2012) and was estimated by an Autoregressive Distributive Lag (ARDL) approach. The study established that financial innovation generally has a positive effect on economic growth in the long-run, although the effects vary with the variable used to measure financial innovation. Introducing mobile banking, a specific measure of financial innovation, buttresses the role of financial innovation in growth. The results obtained are consistent with theory, *a priori* expectations and recent developments in the SADC. The results counter models and theory of economic growth, which generally ignore the role of financial innovation (Michalopoulos *et al.* 2009). The panel Granger causality test results suggest that there is no causality, in either direction, between financial innovation and economic growth in both the short and long-run.

Using a Spatial Durbin Model, the study reveals the presence of spatial effects on financial development in the region that are largely positive, although the responsiveness varies with the specific aspects of financial development. Monetary measures are more sensitive to geography (proximity) than credit measures. Proximity to South Africa brings spatial benefits for financial development in SADC and the benefits are consistent in the money market and inconsistent in the credit market. The results are in line with findings of Mobolaji (2008, 2010) (for monetary variables only), Benos *et al.* (2015), and Crocco *et al.* (2010). The results concur with the spatial proximity theory, which asserts that externalities increase with proximity (Capello 2009).

Estimates that controlled for monetary union indicated that the money market in South Africa is affected by spatial externalities even beyond the monetary area, indicative of the 'centrifugal' effect of money and money markets in South Africa. Findings on openness indicate that the current level of trade and financial openness in SADC is not sufficient to facilitate financial development outside the money market.

The study found positive financial spill-over effects on both economic growth and financial development of other SADC countries, after running Impulse Response Functions on a Bayesian VAR model. In the short-term, a shock in the money market in South Africa sends out negative spill-overs whilst the credit market exerts positive spill-overs to growth of other SADC countries. In the long-run spill-overs are positive in support of findings by Canales-

Kriljenko *et al* (2013), Basdevant *et al.* (2014) and Kabundi and Loots (2007) who established positive real sector spill-overs from South Africa into regional countries.

Finance to finance spill-over effects are relatively stronger compared to finance to growth spill-over effects and these are relatively higher in the credit market than the money market. The inter-linkage between South Africa and other countries through the monetary agreement, use of the South Africa Rand, stock market and exchange rate policies combine to transmit positive direct spill-over effects into the financial sectors.

Generalised impulse responses and variance decompositions indicate that the spill-overs are, however, constrained. This could possibly be due to underdeveloped financial systems of some SADC countries, which limit their receptiveness to financial spill-overs from South Africa. It could also be a result of financial 'spillbacks' emanating from repayment of credit back to South Africa, financial leakages and financial outflows prompted by trade deficits with South Africa.

The Herfindahl–Hirschman Index established a high level of financial concentration in SADC countries around South Africa and a fair distribution of banking assets across other countries when South Africa is excluded. High financial concentrations within countries constrain financial development and the evidence applies across all countries regardless of income level. This outcome is in line with the findings of Beck *et al.* (2003a) and Demirgüç-Kunt and Levine (2000), but disagrees with that of Law and Abdulla (2006). The study also established mixed and opposing effects of South Africa's financial development on financial concentration in SADC, with the negating effects producing weak net effects on concentration.

Dynamic Random and Fixed Effects models also established that countries with international financial centres contribute more to financial development in SADC than countries without. International finance has a positive but insignificant effect on financial development in SADC. The majority of SADC countries do not have direct access to global financial markets and there are options through which South Africa could link SADC countries to global financial markets.

11.3   Conclusions

A number of conclusions can be drawn from the study findings. These can be split into generalised conclusions, in line with the broader issues under study, and specific conclusions in line with the study objectives.

11.3.1 General conclusions

The broad and generalised conclusions that can be drawn from the study findings are explained below.

Proximity to South Africa creates huge potential for increasing financial development in SADC, particularly through the money market. The proximity theory is consistently more applicable in money markets than in credit markets. South Africa provides financial spill-overs to other SADC countries and the benefits of spatial proximity are realised more in the long-run than in the short-run. Implicitly, South Africa's monetary policy has a regional effect, mainly through the currency, given the demonstrated 'centrifugal' effect of monetary variables beyond the monetary union. Credit from South Africa is potentially a source of financial development in neighbouring countries, given the relatively significant spill-over effects, provided the inefficiencies in the financial intermediation systems of these countries are addressed.

Financial systems of some SADC countries in their present state are highly fragmented, underdeveloped and too small to effectively utilise their proximity to South Africa to attract credit and to absorb financial spill-overs from South Africa and international markets. The under-developed financial systems are characterised by high financial intermediation inefficiencies and high financial exclusion. The overall figure of financial exclusion remains unacceptably high (Nene 2015). Resultantly the sectors suffer financial leakages, are not receptive to financial spill-overs from South Africa and often generate financial spillbacks to South Africa.

The linkages in financial systems, financial flows, trade, remittances and labour, which ordinarily should be driving financial spill-overs and spatial externalities, are not distributing financial development in SADC effectively. Once the current constraining fundamentals are addressed, there is potential for increased financial development in SADC, particularly in the medium to long-term. There are opportunities to develop and expand financial systems in these countries through financial inclusion. The relatively small financial systems in Africa's low income countries, in relation to the size of their economies allows more space for policy-makers and regulators to shape their financial systems in order to effectively serve the needs of development (Griffith-Jones, Karwowski & Dafe 2014).

Results of empirical estimations suggest that financial development in SADC countries could be enhanced by promoting economic growth (due to demand- following causality), promoting

financial innovation, diversification of financial sectors and linkages with global financial markets.

The impact that financial innovation has had on financial inclusion, cross-border flows of funds, remittances and trade in SADC, is indicative that it could be one of the solutions to financial sector under-development in the region.

In SADC, the financial sectors have limited capacities to drive growth, and growth is currently being driven by factors other than finance. Given a strong demand following causality, strengthening economic growth could be a more feasible approach to increasing financial development in SADC.

Diversification in the financial sector remains critical in developing and deepening financial systems in SADC. International financial markets regard countries other than South Africa as too small and under-developed to attract global finance. SADC countries need to integrate and create one big market for purposes of attracting international financial markets. Related to that, in SADC, countries need each other, albeit for different reasons. South Africa, a financially developed country, needs neighbouring countries to enhance the strength of its money market, especially the currency. Other countries need South Africa to access credit, to have more institutions to diversify their financial sectors, for financial innovation and for development of their financial sectors.

11.3.2 Specific conclusions

This section comprises specific conclusions in line with the study objectives as outlined below:

The study confirms that finance has a negative influence on growth in the finance -growth relationship, and the region has a demand following finance. It can be concluded that under-development of financial sectors in SADC countries impedes financial development and limits the impact of finance on growth. Under-developed financial systems also cause weak absorption of spill-overs and limits availability of international finance in the region, hence a negative relationship with growth. As such, the study rejects the null hypothesis of finance leading or driving growth in SADC. The stronger demand following causality suggests that increasing economic growth is the most feasible option for sustainable financial development in SADC. Financial reforms, through liberalisation, though they managed to remove restrictions, had a minimal effect on financial development. It suggests that financial liberalisation alone is not sufficient to guarantee financial development that drives growth.

The positive relationship between financial innovation and economic growth leads to the conclusion that financial innovation matters for growth in SADC. In the SADC, the introduction of mobile banking increased depth and access of financial intermediation. This generated increased economic activity as the previously marginalised people were given access to credit or saving products on their mobile platforms. The current low levels of financial innovation in SADC, however, are hindering its effectiveness to stimulate economic growth. Absence of causality between financial innovation and growth suggest that there is potential to increase financial innovation in SADC without being constrained by the country's level of economic growth.

Findings on proximity lead to the conclusion that proximity to South Africa brings spatial externalities that support growth in the financial development in SADC, mostly thorough the money market. In SADC the spatial theory is seemingly stronger in the money market than in the credit market. The result leads to the acceptance of the null hypothesis that spatial proximity to South Africa promotes financial development in SADC. It can also be concluded that spatial proximity supports South Africa's money market even beyond the monetary area. The result could suggest that the Rand is a regional currency, as concluded by the Xinhua-Dow Jones (2014) International Financial Centres Development Index where the South African currency was rated the least in terms of being international among the currencies of BRICS countries.

Consequently, South Africa needs its neighbouring countries to support the inter-nationalisation of its currency and other money market activities. In the credit market, though the positive spatial effects are evident, they are made inconsistent by elements of crowding-out, natural flow of credit towards optimal returns in stable markets and South Africa's global linkages. Overall, the findings show that there is more scope and potential for SADC countries to utilise financial development in South Africa to enhance development of their financial sectors through the money and credit markets.

The relatively stronger finance to finance spill-over effects from South Africa to SADC countries, than the finance to growth spill-over effects, suggest that the financial sector can be propped up to be effective transmission mechanisms of financial spill-overs from South Africa. Since the spill-overs remain largely constrained, it can be concluded that inter-connectedness of financial systems needs to be further enhanced in order to facilitate financial absorption capacity of other SADC countries. Given evidence of real spill-overs confirmed in literature,

it can, however, be concluded that financial spill-overs are working through the real sector, particularly through trade, in line with findings of Shinagawa (2014) who suggested that financial spill-overs are also transmitted through trade. Notwithstanding the relatively weak spill-over effects in growth, the null hypothesis of positive spill-over effects on both growth and financial development cannot be rejected.

Furthermore, it can also be concluded that interconnectedness of financial systems in SADC seemingly supports financial development in South Africa and has minimal benefits to other countries. The under-developed financial systems of some SADC countries have strong financial leakages, combined by investment outflows to stable markets in South Africa and outflows prompted by trade deficits with South Africa generate strong financial 'spillbacks' that counter positive financial spill-over effects from South Africa. Constrained financial spill-over effects, however, could also imply that other SADC countries are insulated from direct adverse effects of global financial shocks and crises that affect South Africa. In addition, any negative shocks in South Africa's financial sector potentially have an impact on SADC countries through spill-overs. On the contrary, other SADC countries miss out on benefits from global financial booms and economic growth that affect South Africa.

The findings on financial concentration in SADC lead to the conclusion that expansion and diversification of the financial sector in all SADC countries is essential for financial development, regardless of the size of the financial sector. Implicitly, the result supports the null hypothesis that financial concentration is negative to financial development. Diversification is important for financial development in SADC in order to increase competition in the banking sector, to reduce cost of credit across institutions and to develop the non-banking sector. Financial inclusion has been improved mainly as a result of non-bank institutions such as microfinance, mobile banking and access to credit by SMEs. It can therefore, be concluded that opening up to entry of foreign institutions into the domestic market enhances financial development of other SADC countries by increasing competition, access to credit and innovation.

In addition, the study findings that South Africa financial development is not effective in reducing financial concentration in other SADC countries suggests that South Africa financial institutions that are expanding to the region either are part of the large and dominant few or are too small to effectively influence financial concentration.

Findings in international finance suggest that international finance from global financial markets is needed in SADC to support development of financial infrastructure, increase availability of low cost credit, and for the development of the non-banking sector. Creating linkages with international financial markets could support financial development in SADC countries. Although the result shows that international finance has an insignificant coefficient, the positive sign of the coefficients leads to conclusion that the hypothesis that global finance has a positive effect on financial development in SADC cannot be rejected.

11.4   Policy recommendations

The study established that there are four broad avenues that can be used to enhance financial development in SADC countries; these include promoting economic growth (due to demand-following causality), promoting financial innovation, diversification of financial sectors and linkages with global financial markets. A number of studies on financial development in SADC countries also recommended that countries need to develop their financial system without necessarily giving details. The current study provides specific recommendations for each of the broad issues that were under study, as outlined below.

a)   *Financial development and Economic growth*

Results show that finance does not support growth in SADC and finance is demand- following. It is recommended that SADC countries enhance inclusive sustainable economic growth in order to facilitate financial development given the stronger demand-following causality. In SADC countries, there are significant productive activities in SMEs, rural and small holder agriculture, and informal enterprises and these sectors have a potential of enhancing economic growth of SADC countries.

Most of the credit that the formal financial system provides does not support development of these sectors, yet the sectors support economic growth in a number of countries. Countries need to structure their financial sector in such a way that it will enable them to obtain structured finance, targeted at supporting these sectors. In line with this recommendation, Griffith-Jones and Gottschalk(2016) found that African regulators and policy makers have space to adjust their small financial systems to help support inclusive and sustainable growth by, for example, supporting lending to SMEs. Pro-growth policies should be intensified so that growth subsequently, pulls with it financial development (Odhiambo 2010). SADC countries need to address challenges that pull back economic development.

Related to the recommendation above, SADC countries need to promote access to credit by the private sector in order to enable investments that expand productive capacity for future production and growth. Countries should enhance the process of credit allocation through tight regulation of credit, and promote competition in the banking sector. Allowing for availability of foreign credit in the domestic economy, though it crowds-out domestic credit in the short-run, it promotes competition among banks, attracts customers, and leads to efficient credit allocation for productive investment, all of which can enhance economic growth (Mobolaji 2010).

With regards to financial reforms, the minimal effects of financial reforms on economic growth, established by the study, point to the recommendation that SADC countries need to regularly and constantly reform their financial sectors. Financial reforms should be across all areas beyond regulation, to cover institutional reforms, financial sector structural reforms and infrastructure reforms.

b) *Financial innovation and economic growth*

Given that financial innovation was found to support growth, SADC should promote financial innovation in order to enhance development of their financial sectors. Financial innovation is an optimal option that has multiple effects, such as addressing financial exclusion, enabling integration with developed markets and facilitating economic activity within and across SADC countries. Evidently financial innovation through mobile banking and microfinance has increased access to financial services, promoted remittances, attracted cross-border investment flows and enhanced trading in SADC countries.

In formulating policies, SADC governments have to balance the distinctive priorities of promoting financial sector development, financial innovation and financial inclusion, while at the same time limiting risks to financial sector stability (Mlachila *et al.* 2013). Where SADC countries receive assistance for promoting access to financial services, the target should be towards enhancing innovation-based platforms.

SADC countries should promote alternative delivery channels when providing financial services, such as mobile and agency banking (supermarkets, post-offices and petrol/gas stations) in line with the findings of Phakedi (2014) who recommended promotion of non-conventional ways of providing financial services. Alternative operating models are less costly

and efficient to serve the large 'unbanked' populations that are widely dispersed over large areas (Lamikanra 2015).

c) *Spatial Spill-overs and Financial development in SADC*

The results of this study indicate positive but low financial spill-over effects on both growth and financial development of other SADC countries. It is recommended that SADC countries continue to strengthen their financial linkages with South Africa in order to enhance capacity to absorb financial spill-overs. SADC countries need to devise ways of attracting financial development from South Africa. Countries close to South Africa need to have in place mechanisms of linking their monetary and credit sectors with that of South Africa to benefit from positive spill-overs, given the sensitivity to proximity. In the same vein, neighbouring countries also need to have in place mechanism to deal with vulnerabilities that could emanate from South Africa's monetary sector since they are equally exposed to any negative spatial externalities that might arise.

Given that the money market in South Africa responds to spatial effects, it is advisable for countries closer to South Africa to structure financial instruments (including credit) around and/or tied to the South Africa Rand so as to benefit from proximity and spill-overs. Furthermore, the high financial spill-over effects from South Africa found in the credit market calls for countries around South Africa to enhance mechanisms of capturing this credit. Also countries need to appreciate the direct competition that credit from South Africa pauses to their domestic credit. As such, there is need for countries to benchmark their domestic credit to that of South Africa in order to reduce competition and the pressure of crowding out.

d) *Financial Concentration and financial development*

The findings on financial concentration in SADC suggest the need for expansion and diversification of the financial sector in all SADC countries, regardless of the size of the financial sector. In order to enhance diversification of financial systems in the SADC, it is recommended that countries open up to foreign institutions including those from South Africa in order to increase competition and efficiency. Diversification of financial sectors in SADC should not only be about increasing the number of highly capitalised banking institutions in order to reduce the concentration ratio, but also to develop non-banking financial institutions. In line with this recommendation, Phakedi (2014) also recommended that smaller countries in SADC need to resolve the institutional and structural problems in their economies, and make use of cross-border financial institutions where appropriate. Further, SADC countries need to

embrace and develop more regional Pan-African banks in line with observations by (Lamikanra 2015) that the rapid rise of Pan-African banks has supported growth of banking sectors of a number of sub-Saharan African (SSA) countries.

e) *International finance and financial development in SADC*

South Africa has a bigger role to play in terms of connecting SADC countries and global financial markets. Other countries such as Mauritius, Botswana and Seychelles are also pivotal in assisting with increasing the flow of global finance in the region. In order to enhance access to international finance, the study suggests the creation of information centres in South Africa with SADC countries as economic hinterlands, commercialisation of solutions to SADC countries financial challenges, financial integration and support for deepening of financial systems in SADC countries. Further to that, SADC could build a network of financial centres, starting with the existing ones, and use these to attract global finance into the SADC region and for development of financial centres in other countries.

11.4.1 Other recommendations

i. *Interconnectedness of financial systems and financial development in SADC*

Financial systems in most SADC countries are weighed down by high levels of financial exclusion. If only 30 per cent of the SADC population is banked, 18 per cent is accessing non-bank formal financial services, 12 per cent accessing informal services and 34 per cent are excluded; the indication is that financial exclusion is the greatest challenge in the region (Finmark 2015). Even in countries with fairly developed financial sectors, services are often mostly directed at established businesses and higher income households (KPMG 2015).

This study recommends that SADC countries first address the issue of financial exclusion. Whereas in developed regions financial development is mainly about sophistication, convenience and integration of markets, for SADC the primary focus should be on reducing financial exclusion. In financially less developed countries challenges are still numerous, including challenging legal environments, limited information, poor infrastructure, and uneven regulatory functions (KPMG 2015). Most countries in SADC need to put in place measures to reorganise their financial sectors and enhance their access, depth and efficiency whilst addressing challenges of inadequate financial infrastructure and regulation. SADC countries should put mechanism in place to address barriers to financial inclusion such as limited capacity; lack of incentives; inappropriate delivery channels; administrative, systemic and

attitudinal challenges; and currently inhibiting policy and regulatory environments (Finmark 2015).

Financial inclusion has multiple effects on SADC countries; it increases financial access, expands the size of domestic financial markets, create demand for financial institutions, and it supports economic activity. In order to enhance financial inclusion, SADC countries need to attract investment in financial sectors, commercialise financial inclusion initiatives, attract international finance, strengthen their financial regulation and cooperate to enhance development of financial infrastructures. Improvement in financial systems should also be achieved through the strengthening of weak financial systems and institutions; resolve the institutional and structural problems; and make use of cross-border financial institutions to enhance diversification.

In line with the recommendation, the SADC countries, in acknowledgement of the role of financial inclusion in improving livelihoods, driving industrialisation and economic growth, are in the process of drafting a Financial Inclusion Strategy for the region (Finmark 2015). The strategy is meant to overcome the barriers to access, delivery of financial services and products that are available, accessible and affordable to all segments of the population (Finmark 2015).

ii. *Financial Integration*

Although the study did not carry out estimations that relate to integration of financial sectors, there is a strong conviction that financial integration remains critical in enhancing financial development in SADC. SADC countries currently are not realising optimal financial externalities and spill-overs despite their proximity to South Africa. As such, transformation of the financial sectors is needed. Individually, countries face huge challenges that stall financial development, and proximity to South Africa alone does not guarantee development of financial sectors. Cooperation among SADC countries remains critical for financial development. The heterogeneity among SADC countries and the varying levels of financial development dictate that the region should promote financial integration in order to enhance development of underdeveloped financial systems through spatial spill-over gains.

Financial integration will assist SADC countries to attract global financial flows. Regional financial integration could potentially address several of the issues associated with the small, fragmented financial markets in Africa (Wakeman-Linn & Waugh 2008). SADC countries need to cooperate and harmonise their regulation, policies and structuring of financial markets. Cooperation in production and trade as well as infrastructure development remains important

for creating a solid significant market in the SADC. Consolidated financial markets can bring together financial infrastructure; boost the numbers and types of financial institutions and instruments; increase competition and innovation; and harmonise regional laws and institutions, among others (Wakeman-Linn & Waugh 2008). As such, SADC countries should promote co-operation in the development of infrastructure, regulation, technology and innovations under the regional financial integration framework.

Countries need to view the potential benefits of regional financial integration from their levels of financial development. Benefits of financial integration would never be similar or shared equally across countries. To South Africa, financial integration enhances strength of its money market, given its response to proximity, strengthens its currency and is needed for expanding an economic hinterland for development of its globally linked financial markets. To other countries, financial integration supports deepening of their financial sector, efficiency in intermediation, development of financial infrastructure, access to financial innovations and access to regional and global financial markets. It is recommended that countries need to take note of the long-term benefits rather than be concerned about short-term discomforts of financial integration.

11.5   Limitations of the study

This current study only analysed spatial effects and financial spill-overs from South Africa and did not consider spatial effects and financial spill-overs between other countries other than South Africa. However, the underdeveloped and small size of financial sectors of other countries in SADC, naturally limits, if any, the financial spill-overs from these countries to other SADC countries. This might mean that the assumption that the current study made remains valid as long as other countries have small and underdeveloped financial systems.

The study did not further extend analyses on the effects of financial innovation on spatial effects. Financial innovation, globalisation and integration of markets are seemingly diluting the influence of geography, space or proximity in finance. A lack of data on financial innovation and agreed measures of financial innovation prevent such an analysis. The only certainty is that growth in financial innovation in most SADC countries, although on the increase, remains highly constrained and its impact on spatial effects would in the short-term remain insignificant.

In estimating spill-overs, the study used a Bayesian VAR model in a panel data framework, which does not allow for interdependence and cross sectional heterogeneity of units (countries). As such, the study may have lost country variations in reaction to spill-overs. However, this did not affect the study as interdependencies across countries other than with South Africa were not considered. Also, feedback shocks to South Africa, although acknowledged, were not part of the model or analysis and are largely weak.

11.6   Areas for further research

In any study there is always room to relook at the same issues under investigation from a different perspective or using different methodologies. The increase in financial innovation in SADC could be driving financial development to resist the spatial proximity forces. Further studies could look at the impact of financial innovation on spatiality of financial development. Further research could also focus on the impact of financial innovation in enhancing spill-overs, both in the real sector and financial sector. Studies in future could also analyse the impact of financial innovation in reducing financial exclusion in SADC.

Further studies could also evaluate financial spatial spill-over effects across all countries in the SADC without limiting the source of spill-overs to South Africa. There could be potential financial spill-overs from other SADC countries. Also further studies could also interrogate the main transmission mechanisms and conditions required for spatial spillovers in SADC. Related to the point above further studies, with sufficient data, could also consider the use of panel VAR models in estimating spill-overs as these allow for interdependence and cross sectional heterogeneity of all the countries.

Further studies could also look into the financial competitiveness in SADC and establish the idea level of competitiveness that could enhance financial development. With micro data on individual banks, future studies could apply models such the Panzar Rose Model to estimate financial competitiveness and then relate that to financial development in SADC.

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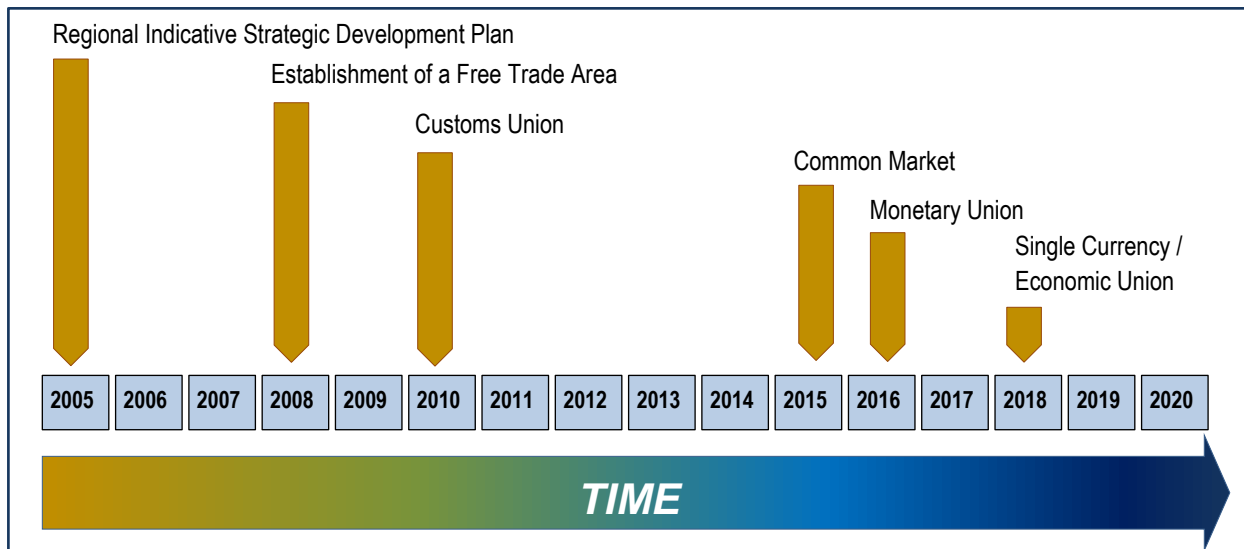
ANNEXURES

Annexure 1: History of SADC

The Southern African Development Co-ordination Conference (SADCC) was established in 1980 in Lusaka, Zambia and later (1992) became the Southern African Development Community (SADC). The SADCC founding member states comprised all majority ruled states of Southern Africa at the time: Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe. The SADCC was formed to advance the cause of national political liberation in Southern Africa and to reduce dependence, particularly on the then apartheid South Africa (SADC 2015). Reduction in dependence was to be achieved through effective coordination and utilisation of the specific characteristics and strengths of each country and its resources (SADC 2015). The objectives of the SADCC went beyond just dependence reduction to embrace basic development and regional integration (SADC 2015).

The transformation of the organisation from a Coordinating Conference (SADCC) into a Development Community (SADC) took place on August 17, 1992 in Windhoek, Namibia (African Union 2015). The SADC was established under Article 2 of the SADC Treaty to promote economic integration of Southern African states. SADC members are Angola, Botswana, DR Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe (SADC 2015). The SADC Treaty was amended in an Agreement that established a 15-year Regional Indicative Strategic Development Plan (RISDP). The RISDP highlights specific priorities for the region and emphasises the need to deepen monetary cooperation (SADC 2015). To enable integration in the financial sector, the SADC implemented plans to increase economic and financial liberalisation. Liberalisation of the financial sector involves removing restrictions and regulatory controls over financial institutions, thereby allowing key instruments, such as interest rates and credit distribution, to be determined by the market (SADC 2015).

In 2006, the SADC established a Protocol on Finance and Investment, which requested member states to cooperate on aspects of financial systems as the region works toward a market-driven, integrated regional economy (SADC 2015). This protocol expected members to cooperate in banking supervision, payment systems, exchange control policies and stock exchanges. In addition, the protocol is also applied to accelerate growth, investment and employment in the region. This would be achieved through increased cooperation, coordination and management of macroeconomic, monetary and fiscal policies (SADC 2015). The alliance aims at establishing and sustaining macroeconomic stability as a precondition to sustainable economic growth and for the creation of a monetary union. Ultimately, SADC envisages establishing itself into an economic union with a single currency as set out in the timeframes in Figure A.1.

Figure A.1: SADC targets and timeframe towards an economic union

Regional Indicative Strategic Development Plan
Establishment of a Free Trade Area
Customs Union
Common Market
Monetary Union
Single Currency / Economic Union

2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

TIME

Source: Adapted from www.sadc.int

2(a): Growth spill-over Index

Capello (2009) calculated growth spill-overs for European countries as:

$$SP_{r,t} = \sum_{j=1}^{n} w_i \frac{\Delta Y_{jt}}{d_{rj}} \qquad\qquad j = 1, \dots, n; j \neq r \qquad\qquad (1)$$

where: ΔY_{jt} = income growth; j = all neighbouring regions of region r; d_{rj} = physical distance between region r and j; n = number of neighbouring regions; and w_i = proportion of the economy of region j on the economy of Europe. The magnitude of spatial spill-overs is dependent on geographical distance (a spatial dimension), growth rates of neighbouring regions (a dynamic dimension) and on size of the neighbouring regions (an absolute dimension) (Capello 2009).

2(b) The Diebold and Yilmaz Volatility Spill-over index

Diebold and Yilmaz (2010) developed a variety of volatility spill-over indices. The spill-over indices are normalisations of forecast-error variance decompositions from a General VAR model of volatility proxies, which exploit the generalised VAR framework of Koop, Pesaran and Potter (1996) and Pesaran and Shin (KIPSS) (1998). Using the volatility contributions from the KPPS variance decomposition, Diebold and Yilmaz (2010) constructed a total volatility spill-over index as:

$$S^g(H) = \frac{\sum_{\substack{i,j=1 \\ i \neq j}}^{N} \tilde{\theta}_{ij}^g(H)}{\sum_{i,j=1}^{N} \tilde{\theta}_{ij}^g(H)} \times 1 \qquad = \qquad \frac{\sum_{\substack{i,j=1 \\ i \neq j}}^{N} \tilde{\theta}_{ij}^g(H)}{N} \times 100 \qquad (2)$$

The total spill-over index measures the contribution of spill-overs of volatility shocks across the measured variables to the total forecast error variance (Diebold & Yilmaz 2010). As the generalised impulse responses and variance decompositions are not affected by the ordering of variables, directional spill-overs are calculated using the normalised elements of the generalised variance decomposition matrix (Diebold & Yilmaz 2010). Directional volatility spill-overs received by market i from all other markets j are measured as:

$$S_{ij}^g(H) = \frac{\sum\limits_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ij}^g(H)}{\sum\limits_{j=1}^{N} \tilde{\theta}_{ij}^g(H)} \times 100 \qquad (3)$$

In similar fashion, directional volatility spill-overs transmitted by market i to all other markets j is measured as:

$$S_{ji}^g(H) = \frac{\sum\limits_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\theta}_{ji}^g(H)}{\sum\limits_{j=1}^{N} \tilde{\theta}_{ji}^g(H)} \times 100 \qquad (4)$$

Net spill-overs from market i to all other markets j as:

$$S_i^g(H) = S_{ji}^g(H) - S_{ij}^g(H)$$

The net volatility spill-over is simply the difference between gross volatility shocks transmitted to, and gross volatility shocks received from all other markets (Diebold & Yilmaz 2010).

Annexure 3: VAR Models - Spill-overs, impulse response and variance decomposition

3(a)   Derivation of the Global VAR model

The derivation of the Global VAR model is a two-step procedure. In the first step, small-scale country-specific models are estimated conditional on the rest of the world. These models are represented as augmented VAR models, denoted as VARX* and feature domestic variables and weighted cross-section averages of foreign variables (Chudik & Pesaran 2014). In the second step, individual country VARX models are stacked and solved simultaneously as one large global VAR model. The solution can be used for shock scenario analysis and forecasting as is usually done with standard low-dimensional VAR models (Chudik & Pesaran 2014). To model a Global VAR model, as outlined by Galesi & Sgherri (2009), consider N countries, indexed by $i=1,...N$. Each country i is modelled as a *VARX*(1.1):*

$$\boldsymbol{x}_{it} = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1}\boldsymbol{\Phi}_i\boldsymbol{x}_{i,t-1} + \boldsymbol{\Lambda}_{i0}\boldsymbol{x}_{it}^* + \boldsymbol{\Lambda}_{i1}\boldsymbol{x}_{i,t-1}^* + \boldsymbol{\mu}_{i,t} \tag{5}$$

for $t = 1,2...,T$ and $i = 1,2...,N$. $\boldsymbol{x}_{it}$ is a $k_i \times 1$ vector of country specific (domestic) variables and $\boldsymbol{x}_{it}^*$ is a $k_i^* \times 1$ vector of foreign variables specific to country i. $\boldsymbol{\Phi}_i$ is a $k_i \times k_i$ matrix of coefficients associated with aged domestic variables while $\boldsymbol{\Lambda}_{i0}$ and $\boldsymbol{\Lambda}_{i1}$ are $k_i \times k_i^*$ matrices of coefficients related to, respectively, contemporaneous and aged foreign variables. $\boldsymbol{a}_{i0}$ is a $k_i \times 1$ vector of fixed intercepts, $\boldsymbol{a}_{i1}$ is a $k_i \times 1$ vector of coefficients of the deterministic time trend, and $\boldsymbol{\mu}_{i,t}$ is a $k_i \times 1$ vector of country-specific shocks assumed to be serially uncorrelated with a zero mean and a non-singular covariance matrix (Galesi & Sgherri 2009).

Therefore, by construction, the Global VAR model allows for interactions among the different economies through two channels: (i) the contemporaneous interrelation of domestic variables x_{it} with foreign specific variables x_{it}^* and with their lagged values and; (ii) the contemporaneous dependence of shocks in country i on the shocks in country j, as described by the cross-country co-variances. Each country-VARX* model is estimated individually, treating x_{it}^* as weakly exogenous I (1), in order to ensure consistency of parameter estimates (Galesi & Sgherri 2009). After having estimated each country's VARX* model, the construction of the Global VAR model involves two stages. First, both the domestic and foreign variables grouped as $z_{it} = (x_{it}^{*'}, x_{it}^{*'})'$ in order to write each country model as:

$$\boldsymbol{A}_i\boldsymbol{z}_{it} = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1}t + \mathbf{B}_i\boldsymbol{z}_{i,t-1} + \boldsymbol{\mu}_{i,t} \tag{6}$$

Where $\boldsymbol{A}_i = (\boldsymbol{I}_{ki}, -\boldsymbol{\Lambda}_{i0})$, $\boldsymbol{B}_i = (\boldsymbol{\Phi}_{i,}\boldsymbol{\Lambda}_{i1})$.

Second, by collecting all the domestic variables of all the countries, to create the *global* vector,

$$\boldsymbol{x}_i = \ \boldsymbol{x}_{1t}; \boldsymbol{x}_{2t}; ..; \boldsymbol{x}_{3t}$$

which is a $k \times 1$ vector containing all endogenous variables. Following the two steps, the identity $\boldsymbol{z}_{it} = w_i x_t$ is obtained, where w_i is a country-specific link matrix of dimensions constructed on the basis of financial weights (Galesi & Sgherri 2009). This identity allows writing each country model in terms of the global vector x_i by substituting $z_{it} = w_i x_t$ in 7, to obtain:

$$\boldsymbol{A}_i \boldsymbol{W}_i x_{it} = \boldsymbol{a}_{i0} + \boldsymbol{a}_{i1} t + \boldsymbol{B}_i \boldsymbol{W}_i \boldsymbol{z}_{i,t-1} + \boldsymbol{\mu}_{i,t} \tag{7}$$

Where $\boldsymbol{A}_i \boldsymbol{W}_i$ is a matrix of dimensions $k_i \times k$. The Global VAR model thus built by stacking up each country model so that:

$$\boldsymbol{G} x_t = \boldsymbol{a}_0 + \boldsymbol{a}_{i1} t + \boldsymbol{H} x_{t-1} + \boldsymbol{\mu}_t \tag{8}$$

where $\boldsymbol{G} = \boldsymbol{A}_1 \boldsymbol{W}_1; \boldsymbol{A}_2 \boldsymbol{W}_2; \dots; \boldsymbol{A}_3 \boldsymbol{W}_3 \qquad \boldsymbol{H} = \ \boldsymbol{B}_1 \boldsymbol{W}_1; \boldsymbol{B}_2 \boldsymbol{W}_2; \dots; \boldsymbol{B}_3 \boldsymbol{W}_3$

3(b): Derivation of the Generalised VAR model

The Generalised VAR (p) model, as outlined by Duncan & Kabundi (2011) deriving from Pesaran & Shin (1998) is given by:

$$\boldsymbol{x}_t = \sum_{k=1}^{p} \boldsymbol{\Phi}_k \boldsymbol{x}_{t-1} + \epsilon_t \tag{9}$$

where $\boldsymbol{x}_t = (\boldsymbol{x}_{1t}, \boldsymbol{x}_{2t}, \dots, \boldsymbol{x}_{mt})$ denote a vector of endogenous proxies for period t volatility in m distinct financial markets. $\boldsymbol{\Phi}_k$ are coefficient matrices and $\epsilon_t = (\varepsilon_{1t}, \varepsilon_{2t}, \dots, \varepsilon_{mt})$ is a vector of mean-zero error terms. We assume ϵ_t has a multivariate normal distribution, with ε_t independent for ϵ_s for $s \neq t$ and with nonsingular covariance matrix $\boldsymbol{E}_{t-1}(\epsilon_t \epsilon_t') = \sum_t = (\sigma_{ij})$ for $i, j = 1,2 \dots, m$. Furthermore, suppose that (7) is a covariance stationary process, this implies the following infinite moving average representation for the system:

$$\boldsymbol{x}_t = \sum_{k=0}^{\infty} \mathbf{A}_k \epsilon_{t-k}$$

By setting $\boldsymbol{A}_k = 0$ for $\boldsymbol{k} < 0$ and $\boldsymbol{A}_0 = I_m$, the coefficient matrix is established as

$\boldsymbol{A}_k = \boldsymbol{\Phi}_{1,} \mathbf{A}_{k-1} + \boldsymbol{\Phi}_{2,} \mathbf{A}_{k-2} + \cdots + \boldsymbol{\Phi}_{p,} \mathbf{A}_{k-p}$ recursively for $k = 1,2 \dots, m$. Within this framework, an impulse response function isolates the impact of a particular realisation of the error vector at time t (denoted $\epsilon_t = \delta$) on the period $t + n$ expected outcome of the system.

Specifically, the estimate is on the difference between, the n-period ahead, expectation of x_t conditional on δ, and the corresponding expectation of x_t in the absence of any shocks (Duncan & Kabundi 2011).

3(c): Generalised Impulse Response function (GIRF)

Following Morris and Shin (1998), the generalised impulse response function is defined by:

$$\psi_n = \mathrm{E}_t(\mathrm{x}_{t+n}|\epsilon_t = \delta, \ \Omega_{t-1}) - E_t(x_{t+n}|\ \Omega_{t-1}) \tag{10}$$
$$= A_n\delta$$

where (10) is a function of the forecast period $n = 0.1\ldots$ and the period- t shock δ, but its value is invariant to past observations Ω_{t-1}. Consider the system-wide impact of a stock to the jth element of ϵ_t (i.e. we set $\epsilon_t = \delta$ and $\epsilon_t = 0$ for all $i \neq j$) (Duncan & Kabundi 2011). Given the assumed distributional properties of ϵ_t, we have the following conditional expectations.

$$E_{t-1}\left(\epsilon_t|\varepsilon_{jt} = \delta_j\right) = (\sigma_{1j}, \sigma_{2j}, \ldots, \sigma_{jj}, \ldots, \sigma_{mj})'\sigma_{jj}^{-1}\delta_j \tag{11}$$
$$= \frac{\Sigma_t e_j\, \delta_j}{\sigma_{jj}}$$

where ϵ_j denotes the jth column of I_m. Consequently the $n - period$ ahead GI of x_t conditional δ_j is given by:

$$\psi_{j,n} = \mathrm{E}_t\left(\mathrm{x}_{t+n}|\varepsilon_{jt} = \delta_j, \Omega_{t-1}\right) - E_t(x_{t+n}|\ \Omega_{t-1})$$
$$= \frac{A_n\Sigma_t e_j\, \delta_j}{\sigma_{jj}}$$

Letting δ_j equal $\sqrt{\sigma_{jj}}$ we obtain

$$\psi_{j,n} = \frac{A_n\Sigma_t e_j\, \delta_j}{\sqrt{\sigma_{jj}}} \qquad \text{for any } j = 1,2\ldots, m. \tag{12}$$

Equation 12 measures the expected impact on x_{t+n} of 1 standard error shock to variable j. Predicting the $i - th$ element to x_t with a forecast horizon of n, the expected cumulative impact on $x_{i,t+n}$ a period t shock δ_j equal $\sqrt{\sigma_{jj}}$ is

$$\psi_{ji,n} = \sum_{t=0}^{n} e_i'\psi_{j,l} \tag{13}$$

3(d): Generalised Forecast Variance Decompositions (GFVD)

In comparison, the total n-step ahead forecast-error and forecast covariance for i is given as

$$\xi_{i,n} = \sum_{t=0}^{n} e_i' A_l \epsilon_{t+n-l}$$

$$cov\ (\xi_{i,n}) = \sum_{t=0}^{n} e_i' A_l \sum_l A_l' e_i \tag{14}$$

Using equations 12, 13 and 15 the *n*-step ahead generalised forecast-error variance decompositions (GF) for variable i can be defined. Specifically, the contribution of innovations in variable j to the total forecast-error variance i is given by:

$$\theta_{ij,n}) = \frac{\sigma_{ii}^{-1} \sum_{t=0}^{n}(e_i' A_l \sum_l e_j)^2}{\sum_{t=0}^{n} e_i' A_l \sum_l A_l' e_j}$$

$$= \frac{\sigma_{jj}}{\sigma_{ii}} \left[\frac{cov(\varphi_{ji,t})}{cov(\xi_{i,n})} \right] \tag{15}$$

Note that the values of 4.43 and 4.46 are uniquely determined, and thus, invariant to the ordering of variables in the VAR. This is a special property of impulse response and forecasting analysis. Pesaran and Shin (1998) showed that generalised impulse responses coincide with orthogonalised impulse responses obtained through Cholesky factorisation only if j is the first variable included in the VAR (Duncan & Kabundi 2011).

Fundamentally, variations in methodological approaches start from the type of data used in the analysis. Research by King and Levine (1993a, 1993b) and Levine and Zervos (1998) was based on cross-sectional data using standard OLS estimation methods. These confirmed the positive correlation between financial development and economic growth (Samargandi, Fidrmuc & Ghosh 2013).

Criticising this approach, Chuah and Thai (2004) argued that conclusions based on cross-sectional analysis are unreliable as they are sensitive to the sample of countries chosen and cross-sectional studies do not take advantage of time-series variation in the data. It is inappropriate to draw policy implications from findings obtained from cross-country studies that treat different economies as homogeneous entities (Samargandi *et al.* 2013). In addition, the issue of causal relationship cannot be handled formally in cross-sectional studies (Khan & Senhadji 2003). Using time-series data does not resolve these problems either as high frequency data is required to gain econometric power from the time series approach (Beck 2008). With time series data, although the variables could be I (1) (organised around unit root and co-integration) small samples may significantly distort the power of standard tests and lead to misguided conclusions (Christopoulos & Tsionas 2003).

Researchers, including Calderon and Liu (2003) and Dawson (2010), turned to panel data that enable combining time-series and cross-sectional features and offer a variety of estimation approaches. Panel co-integration techniques exploit both the cross-sectional and time-series dimensions of the data, thereby addressing the simultaneity issues of the regressors. The panel co-integration framework used was able to provide long-run estimates, short-run adjustments, and addressed the endogeneity issues by formally treating all variables as part of a vector auto-regression (Christopoulos & Tsionas 2003).

4(a)   Panel data and panel estimations

The empirical models in the study are estimated using a panel data framework. Panel data and panel estimation have been widely used in research, with many advantages. Davidson and MacKinnon (1999) defined panel data as data sets measured across time and cross-section dimensions. Gujarati (2004) pointed out several advantages to using panel data. First, panel data increase the sample size considerably. Second, by studying repeated cross-section observations, panel data are better suited to study the dynamics of change. Third, panel data enable studying more complicated behavioural models. Panel data methods are preferred due

to their increased precision of regression estimates, the ability to control for individual fixed effects and the ability to model temporal effects without aggregation bias (Martinez-Zarzoso 2008). Panel data improves the efficiency of Granger causality tests by increasing the degrees of freedom and reducing the collinearity among explanatory variables (Greene 2008; Baltagi 2005 cited by Töngür 2013). Panel data allows for more flexibility in the modelling of the behaviour of cross-sectional units than conventional time series analysis (Greene 2008).

Despite their substantial advantages, however, panel data pose several estimation and inference problems. Since such data involve both cross-section and time dimensions, problems that plague cross-sectional data (e.g. heteroscedasticity) and time series data (e.g. auto-correlation) need to be addressed. There are some additional problems, such as cross-correlation in individual units at the same point in time (Gujarati 2004). It is likely that the error terms for a model using panel data display certain types of dependence, which should be taken into account when estimating such a model.
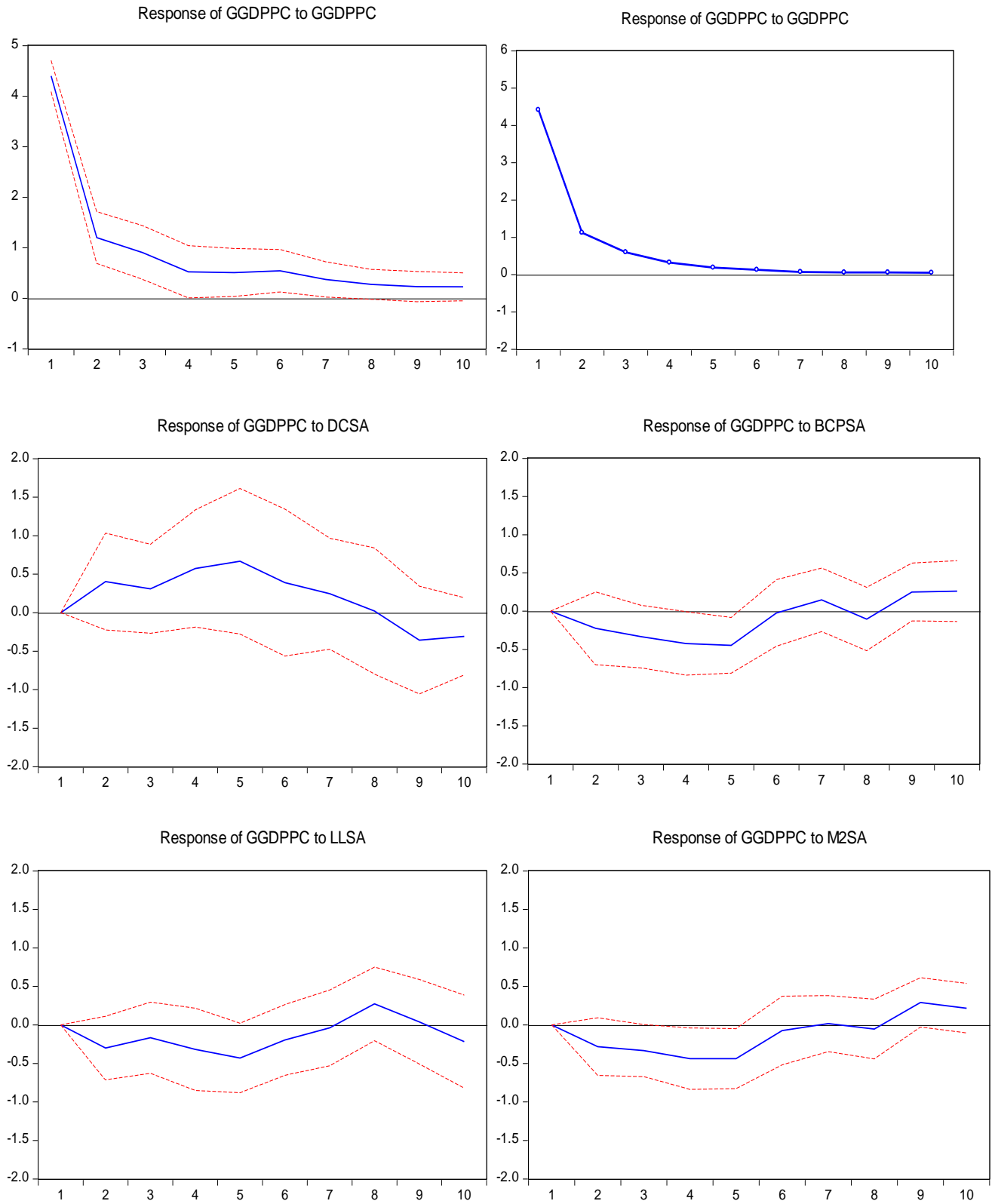
Table A1: Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
BC	90.6596	100.0000	100.0000	42.6333	13.2084	450
BCP	21.3252	14.2335	108.0562	0.1542	20.1023	450
BCPSA	62.379	61.850	78.294	49.667	8.2626	412
CPI	123.5316	9.9587	23773.13	-9.6161	1170.376	450
DC	34.6577	20.2925	192.6602	-79.0924	44.6533	450
DCP	26.0657	15.1865	160.1249	0.1982	30.8331	450
DCSA	145.23	148.56	192.66	93.499	33.650	412
FDI	3.9201	2.2348	43.3288	-6.8976	5.9336	450
FO	-0.5923	-1.1876	2.3896	-1.8888	1.3015	450
GBCP	0.0768	0.0350	7.8800	-0.88	0.4759	450
GCF	21.6596	20.2054	74.8220	1.5251	10.3354	450
GEXP	19.5373	18.5017	47.1915	2.0471	8.7282	450
GGDP	1.6188	1.8754	18.4876	-27.1459	4.8768	450
GGDPPC	1.6584	1.8681	18.5067	-27.146	4.8456	450
LL	33.2761	27.7789	108.5462	3.2869	20.2163	450
LLSA	46.602	46.957	54.427	39.993	4.4027	412
M2	0.3665	0.2930	3.0924	0.0002	0.2858	450
M2M1	2.3617	1.9403	7.2897	1.0420	1.1864	450
M2SA	0.6023	0.5539	0.8079	0.4550	0.1044	412
MM	31.5290	13.1076	167.2976	0.0013	39.9257	304
ODA	65.7465	46.8116	688.7694	-11.6452	76.8406	450
POP	2.2049	2.5050	6.0988	-2.6286	1.0792	450
RINT	10.4498	8.3844	252.1153	-94.2199	27.5197	450
RMMA	0.0022	0.0000	0.0586	0.0000	0.0070	412
SP	0.5653	0.6168	0.9323	0.0000	0.2942	412
TO	89.7477	76.0416	217.3047	14.32573	42.7097	450

BC	Bank (financial) Concentration	GCF	Gross Capital Formation
BCP	Bank Credit to Private Sector	GBCP	Growth in Bank Credit to Private Sector
BCPSA	Bank Credit to Private Sector in South Africa	GGDPPC	Growth in Real GDP per capita
M2	Broad Money	LL	Liquid Liabilities
M2SA	Broad Money in South Africa	LLSA	Liquid Liabilities in South Africa
M2M1	Broad to narrow Money	MM	Mobile Banking/Money
CPI	Consumer Price Index (Inflation)	ODA	Official Development Assistance
DC	Domestic Credit	POP	Population growth rate
DCSA	Domestic Credit in South Africa	RINT	Real Interest Rate
DCP	Domestic credit to private sector	RMMA	Revenue proportion from the MMA
FO	Financial Openness	TO	Trade Openness
FDI	Foreign Direct Investment		
GEXP	Government Expenditure		

Figure A2: Impulse Response Functions with Confidence Intervals

Response of GGDPPC to GGDPPC

Response of GGDPPC to GGDPPC

Response of GGDPPC to DCSA

Response of GGDPPC to BCPSA

Response of GGDPPC to LLSA

Response of GGDPPC to M2SA

Annexure 7: Finance to growth model- variance decomposition tables

Table A2: Variance decomposition of financial development variables and GGDPPC

Variance Decomposition of DCSA:

Period	S.E.	GGDPPC	DCSA	BCPSA	M2SA	LLSA
1	9.132192	0.038061	99.96194	0.000000	0.000000	0.000000
2	10.16228	0.375150	98.92719	0.001119	0.688868	0.007675
3	10.70887	0.446278	98.65047	0.091293	0.802616	0.009341
4	11.18216	0.447200	98.59420	0.097992	0.829141	0.031466
5	11.57663	0.447484	98.57725	0.101021	0.830387	0.043862
6	11.99366	0.432500	98.55862	0.094725	0.868413	0.045739
7	12.29212	0.432660	98.53712	0.092135	0.894251	0.043835
8	12.52274	0.429014	98.53080	0.092172	0.904058	0.043955
9	12.71203	0.422720	98.52702	0.092615	0.914083	0.043561
10	12.86845	0.416990	98.52142	0.091047	0.927977	0.042564

Variance Decomposition of BCPSA:

Period	S.E.	GGDPPC	DCSA	BCPSA	M2SA	LLSA
1	3.067407	0.073623	49.85507	50.07131	0.000000	0.000000
2	3.230346	0.113707	49.93910	47.77876	0.038274	2.130157
3	3.383382	0.235574	53.56678	43.92691	0.109386	2.161342
4	3.486005	0.242588	55.85568	41.46907	0.196697	2.235970
5	3.620411	0.229662	55.94115	40.01457	0.600154	3.214465
6	3.797288	0.299224	55.69104	38.36192	1.300700	4.347118
7	3.906671	0.549511	56.02533	37.11486	1.712025	4.598282
8	3.958500	0.757250	56.73274	36.20781	1.815787	4.486416
9	3.993444	0.820043	57.04478	35.75223	1.787653	4.595296
10	4.031913	0.805764	56.75144	35.68806	1.778613	4.976119

Variance Decomposition of M2SA:

Period	S.E.	GGDPPC	DCSA	BCPSA	M2SA	LLSA
1	0.018993	0.450455	14.23515	10.23815	75.07625	0.000000
2	0.025589	1.635801	27.03770	7.615404	62.14565	1.565442
3	0.031305	1.790660	40.79401	5.237121	49.19909	2.979116
4	0.035885	1.562753	49.40532	4.134795	40.39076	4.506373
5	0.039987	1.281627	55.44177	4.001071	33.42947	5.846054
6	0.043473	1.098085	60.12499	4.032483	28.40774	6.336696
7	0.046053	1.030206	63.65438	3.849530	25.32505	6.140833
8	0.047911	1.000970	66.29951	3.568758	23.39950	5.731261
9	0.049296	0.966067	68.08056	3.422608	22.10425	5.426520
10	0.050382	0.926638	69.20463	3.431556	21.16173	5.275449

Variance Decomposition of LLSA:

Period	S.E.	GGDPPC	DCSA	BCPSA	M2SA	LLSA
1	1.187028	0.303050	7.372280	31.51894	0.384393	60.42134
2	1.621255	0.392718	22.50377	28.55387	0.208780	48.34086
3	1.779651	1.407818	27.57763	26.90708	0.255909	43.85156
4	1.851945	1.856016	31.56627	24.84933	1.090506	40.63787
5	1.933850	1.758966	33.09888	24.65160	2.629368	37.86119
6	2.029263	1.684104	32.72211	25.73607	3.990286	35.86743
7	2.100169	1.878043	33.05727	26.15942	4.625904	34.27936
8	2.137956	2.096337	34.53550	25.58990	4.659105	33.11915
9	2.174745	2.120018	36.27159	24.84888	4.511169	32.24834
10	2.228424	2.019166	37.43078	24.54618	4.517434	31.48644

Annexure 8: Bayesian VAR estimates: finance-finance model

Table A3: Bayesian VAR Estimates finance-finance

Bayesian VAR Estimates
Sample (adjusted): 1987 2014
Included observations: 392 after adjustments
t-statistics in [ ]

	DC	BCP	LL	M2
DC(-1)	0.800975	0.853461	0.820872	0.717494
	[22.8458]***	[24.5412]***	[24.1034]***	[19.0158]***
DC(-2)	0.135141	0.100134	0.159708	0.026491
	[3.98905]***	[2.90827]***	[4.73327]***	[0.83498]
DCSA(-1)	-0.024355	0.046466	-0.002286	8.71E-05
	[-0.37153]	[1.39134]	[-0.08458]	[0.12939]
DCSA(-2)	-0.047117	-0.039818	0.005226	-7.16E-05
	[-0.96385]	[-1.59256]	[0.25866]	[-0.14225]
BCPSA(-1)	0.374859	0.068938	-0.055830	0.003413
	[1.67144]*	[0.60074]	[-0.60102]	[1.47432]
BCPSA(-2)	0.053547	-0.049149	0.104248	-0.000283
	[0.37378]	[-0.66889]	[1.75415]	[-0.19062]
LLSA(-1)	-0.576961	-0.235352	0.023305	-0.002057
	[-1.70793]*	[-1.36104]	[0.16638]	[-0.58924]
LLSA(-2)	0.632270	0.266814	0.080309	0.002147
	[2.38722]**	[1.97354]**	[0.73323]	[0.78724]
M2SA(-1)	5.885421	2.704577	4.052803	-0.024409
	[0.30099]	[0.26961]	[0.49979]	[-0.12070]
M2SA(-2)	-8.186631	1.262885	-2.224186	-0.069547
	[-0.52850]	[0.15912]	[-0.34709]	[-0.43550]
C	-16.09453	-4.837172	-8.266018	-0.063106
	[-1.08050]	[-0.63490]	[-1.33812]	[-0.41001]
R-squared	0.893749	0.896529	0.952363	0.753287
Adj. R-squared	0.890900	0.893813	0.951113	0.746811
F-statistic	313.7548	330.1187	761.7028	116.3303

Annexure 9: Finance-Finance Model -Variance decomposition

Table A4: Variance decomposition of financial development variables

a) Variance decomposition of DC

Period	S.E.	DC	DCSA	LLSA	BCPSA	M2SA
1	11.1212	100.0000	0.00000	0.00000	0.00000	0.00000
2	14.1636	99.6919	0.18339	0.00066	0.12108	0.00292
3	16.4888	99.4162	0.24974	0.15108	0.18060	0.00234
4	18.2805	98.9997	0.29823	0.44873	0.24618	0.00709
5	19.7208	98.6031	0.32974	0.74778	0.30745	0.01191
6	20.8972	98.3117	0.35797	0.96653	0.35022	0.01351
7	21.8713	98.1195	0.38650	1.10744	0.37372	0.01282
8	22.6869	97.9901	0.41494	1.19882	0.38413	0.01194
9	23.3761	97.8951	0.44150	1.26400	0.38756	0.01178
10	23.9619	97.8191	0.46476	1.31588	0.38785	0.01230

b) Variance decomposition of LL

Period	S.E.	LL	DCSA	LLSA	BCPSA	M2SA
1	4.58808	100.0000	0.00000	0.00000	0.00000	0.00000
2	5.93135	99.9508	0.02764	0.00151	0.00984	0.01016
3	7.04278	99.8756	0.02939	0.05180	0.02304	0.02007
4	7.95657	99.7250	0.03021	0.17105	0.03890	0.03482
5	8.74315	99.5530	0.04309	0.29215	0.05980	0.05190
6	9.43266	99.4162	0.06539	0.37916	0.07652	0.06268
7	10.0462	99.3135	0.09959	0.43232	0.08696	0.06758
8	10.5985	99.2297	0.14490	0.46425	0.09252	0.06860
9	11.1004	99.1520	0.19960	0.48533	0.09528	0.06773
10	11.5595	99.0743	0.26159	0.50130	0.09664	0.06610

c) Variance decomposition of BCP

Period	S.E.	BCP	DCSA	LLSA	BCPSA	M2SA
1	5.72512	100.0000	0.00000	0.00000	0.00000	0.00000
2	7.48013	99.5082	0.41948	0.01127	0.04306	0.01789
3	8.77549	99.4207	0.51123	0.00860	0.04137	0.01800
4	9.78796	99.2762	0.64211	0.00815	0.04721	0.02622
5	10.6101	99.1367	0.76300	0.01027	0.05562	0.03433
6	11.2929	98.9904	0.89235	0.01194	0.06365	0.04156
7	11.8680	98.8396	1.03124	0.01242	0.06993	0.04672
8	12.3578	98.6832	1.18002	0.01220	0.07445	0.05011
9	12.7785	98.5211	1.33717	0.01176	0.07768	0.05223
10	13.1426	98.3542	1.50082	0.01130	0.08006	0.05354

d) Variance decomposition of M2

Period	S.E.	M2	DCSA	LLSA	BCPSA	M2SA
1	0.10918	100.0000	0.00000	0.00000	0.00000	0.00000
2	0.12976	99.6555	0.23138	0.01632	0.09591	0.00083
3	0.13859	99.5024	0.32727	0.05907	0.10070	0.01047
4	0.14266	99.3382	0.43793	0.10418	0.10073	0.01888
5	0.14457	99.2033	0.53110	0.13566	0.09934	0.03053
6	0.14549	99.0940	0.61191	0.15190	0.09809	0.04401
7	0.14594	99.0056	0.67910	0.15913	0.09795	0.05815
8	0.14617	98.9346	0.73295	0.16236	0.09887	0.07115
9	0.14629	98.8792	0.77455	0.16402	0.10028	0.08185
10	0.14636	98.8374	0.80581	0.16501	0.10170	0.08999

*Note: a) DC-Domestic Credit in SADC excluding SA
          b) LL- Liquid Liabilities in SADC excluding SA
          c) BCP- Bank Credit to Private Sector in SADC excluding SA
          d) Broad Money in SADC excluding SA.

Source: Author's own calculation