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Economic and Institutional determinants of financial development for bank dominated and stock market-based economies in the SADC region

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2022

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Mogale, Etumeleng. (2022). Economic and Institutional determinants of financial development for bank dominated and stock market-based economies in the SADC region [Master's dissertation, University of the Witwatersrand, Johannesburg]. WireDSpace. https://hdl.handle.net/10539/38623

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Economic and Institutional determinants of financial development for bank dominated and stock market-based economies in the SADC region



A Research Report presented for the degree of Master of Economics Science at the School of Economics and Finance,

University of the Witwatersrand

BY

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Masters Research Report

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Abstract

The study examines the determinants of financial development from the bank-dominated economies (Angola, Lesotho and Madagascar) versus the bank and stock market-based economies'(Mauritius, Namibia and South Africa) point of view for the selected SADC countries. The study further examines which economies develop more over time between economies that are bank-dominated and those that have both the banking sector and the stock markets. Using a panel dataset that spans from 1996 to 2018 - which was sourced from the World Development Indicators (WDI) - the study utilized the Autoregressive Distributive lag (ARDL) techniques to separately model for the banking system and the stock market which allowed for the unpacking of any short-run and long-run contributors to the financial sector development and thus capture any possible links between the explanatory variables and the financial development proxies, domestic credit to the private sector and market capitalization. The study found that the banking sector development is influenced by GDP growth rate, foreign direct investment, governments debts, trade openness and the rule of law while the stock markets are largely driven by GDP growth rate, inflation, trade openness, rule of law and regulatory quality. Furthermore, the study found that the banking sector does benefit from the presence of stock markets and that over time economies with both financial sectors tend to develop more than bank-dominated economies and that they are less prone to external shocks. The contributions to the existing body of literature are by critically looking at the drivers or deterrents of financial development in the SADC region so that the appropriate policy prescriptions can be formulated and implemented with the broader view of closing the infrastructure gap that exists within the region. By separately modelling the two financial sectors the study was able to see indicators that are the driving force in each sector and which economies – bank-dominated vs stock market-based - tend to do well over time.

Keywords – Financial development, stock markets, bank system, financial markets, SADC, regress, trade openness, GDP growth

DECLARATION

I hereby declare that the thesis is based on my original work, except where otherwise indicated and acknowledged in the text, footnotes, tables, figures, and appendices. I also acknowledge that it has not been submitted previously or concurrently for any other degree at the University of the Witwatersrand or other institutions.

ACKNOWLEDGEMENTS

I would like to thank God, for the gift of life, the courage, strength, guidance, and patience to complete my studies. My profound appreciation and gratitude go to my supervisor Dr Nyasha Mahonye who supported and guided me in writing the thesis. His assistance and dedication made it possible for me to complete this research work. His contribution was truly remarkable.

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List of Acronyms

ARDL	Autoregressive Distributive lag
ASEAN	Association of Southeast Asian nations
CEMAC	Central African Economic and Monetary community
EAC	East African community
GDP	Gross Domestic Product
IMF	International Monetary Fund
IPS	Im, Peseran and Shin
MG	Mean Group
OLS	Ordinary Least Squares
PMG	Pooled Mean Group
PRS	Political Risk Services
PW	Pairwise
SAARC	South Asian Association for Regional Corporation
SADC	Southern African Development Community
URT	Unit Root Test
WAEMU	West African Economic and Monetary Union
WDI	World Development Indicators

1. Introduction

Financial development has become a fundamental prerequisite for any policy of financial liberalization and long-term economic development. History has shown that if financial liberalization occurs too quickly without any solid and consistent financial development to follow, it will result in stagnation, economic and financial recession, and a banking crisis (Khalfaoui, 2015). Financial development encompasses both the rehabilitation of the banking system and the restructuring of financial markets, to optimize choices and economic financing, as well as the optimal allocation of resources and risk diversification (Hamdi, 2015). The primary objective of the financial system is to facilitate the saving/ borrowing transactions (Al-Tarawneh, 2018) and the allocation of finances to productive sectors of the economy (Takyi and Obeng, 2013). As such, there has been a surge in empirical research which indicates that countries that have better developed financial systems tend to grow faster (Voghouei, 2011). The literature further suggests that long-run economic growth can be promoted by a well-functioning financial system (Beck et al, 2000; Ho, 2017). The study by (Rajan and Zingales, 1996) asserts that if the financial sector can lower external finance costs, firms that are short of funds, when given investment opportunities, should do better in economies with well-developed financial sectors. The study further found evidence that suggests that industries that are dependent on external financing grow relatively faster in countries that have better developed financial markets and institutions.

Thus, the positive effect that financial development has on economic growth has led researchers to study the determinants of financial development. Despite the growing surge of scholars researching and writing about the relationship between financial development and economic growth, and ultimately its growing importance, financial development in Africa has lagged. Particularly, in Africa, financial systems are overwhelmingly underdeveloped and thin and this level of underdevelopment can be attributed to informality, weak governance, political and economic instability (Beck and Honohan, 2007), lack of institutional quality (Singh et al, 2009) and sparse population density (Allen et al, 2013). It is also worth noting that in Africa financial sectors are, largely, historically bank dominated (Andrianaivo and Yartey, 2009; Senbet and Otchere, 2006). However, emerging theoretical literature is revealing the role that the stocks markets are playing in fostering economic growth (Ho,

2017), it is for this reason that we must look at the determinants of financial development from "bank dominated" economies versus "stock market economies" point of view.

Infrastructure development, under the right condition, can play a vital role in accelerating growth and equity and - through both channels - can help reduce poverty (Calderon, 2018). Hence, infrastructure development is still a critical component in the SADC region's wider socio-economic development strategy and there remains a need to improve the region's resource mobilization (Wentworth al el., 2018). This implies that there is an infrastructure gap that needs to be filled and thus financing is needed to plug this gap. Given the financial and infrastructure gap - both soft and hard infrastructure – (Dube, 2013), Africa needs financial development which will create well-functioning markets – for both banks dominated and stock market-based economies. This will help improve Africa's financial systems that are overwhelmingly underdeveloped (Beck and Honohan, 2007) and will also help those industries that are dependent on external financing.

While there is no doubt that there is a positive relationship between financial depth and economic growth, there is still uncertainty about the determinants of financial development, particularly for African countries in the Southern African Development Community (SADC) region. This is evident by the few studies that exist that look specifically at this region and the lack of data in countries such as Angola, Comoros and Eswatini. This is also fuelled by the attention that has been given to the relationship between financial development and economic growth while less attention has been given to the determinants of financial development. Although there are researchers who look at the determinants of financial development (Voghouei, 2011; Takyi and Obeng, 2013; Ibrahim and Sare, 2018), none of them has investigated such determinants for stock market based and bank dominated economies, specifically in the context of SADC. As such, this current study contributes to the existing literature by looking at the drivers of financial development in economies that are both bank-dominated and stock market-based[1] with the view of answering the following question:

[1] The study by Demirguc-Kunt and Levine (1999) defined a "bank-based" financial system whereby banks play a significant role in mobilizing savings, overseeing the investment decisions of corporate managers, allocating capital, and providing risk management vehicles. The "market-based" financial system is one in which the securities market share centre stage with banks in terms of transferring society's savings to firms, exerting corporate control, and easing risk management.

This study adopts the definition of the study conducted by Nyasha and Odhiambo (2017) whereby they defined a "bank-based" financial system as one whereby financial intermediary, such as banks and bank-like

What are the macroeconomic and institutional drivers of financial development for bank dominated[2] and stock market economies[3] based in the SADC region?

The study hypothesis is the following:

I. Macroeconomic factors and the institutional environment do influence the stock market and the banking sector development.

It is also of interest to investigate the drivers or deterrents of financial development in SADC such that appropriate policy prescription can be implemented to close the infrastructure gap by reducing the financial gap through upgrading financial development in the SADC region. Africa has an estimated 29 stock exchanges and 14 of them are located in the SADC region (60th Bi-Annual meeting of the SADC Stock exchanges). However, while countries which initially had similar income levels as Africa in other regions such as the Middle East and Asia have enjoyed improvements in their financial development the same cannot be said about Africa (Allen, Carletti, Cull, Qian and Senbet, 2010). When comparing different regions within Africa the study by (David, Mlachila and Moheeput, 2014) found that the SADC region has the highest level of financial development and the higher average levels of per capita income in Africa. This makes the SADC region an interesting case to explore and find out whether is Africa inherently slow to its counterparts or is it a case of inappropriate policies have been applied which has subsequently stalled financial development in Africa. Furthermore, in assessing the case of the SADC region can it then be used as a blueprint to assess other regions and then develop them as well.

As such, the study attempts to bridge this gap by providing light on what are the contributors to financial development in a region that has underdeveloped financial systems and whether are the determinants of financial development are the same for countries with both stock markets and banks and those with banking sector only?

The rest of the study is structured as follows: Section 2 provides a brief background on the role of financial development and trends in the SADC region. Section 3 covers the theoretical and conceptual frameworks. In Section 4 we derive and estimate the empirical model

institutions, play a leading role in driving an economy and a "market-based" financial system in which financial markets like the stock and bond market share centre stage with banks in driving the economy.

[2] Bank dominated Countries – Angola, Lesotho, and Madagascar

[3] Bank and stock market economies – Mauritius, Namibia, and South Africa

followed by interpretation and discussion of results. Section 5 provides an evaluation of the findings, conclusion, and recommendations.

2. The role of the financial sector in the economy

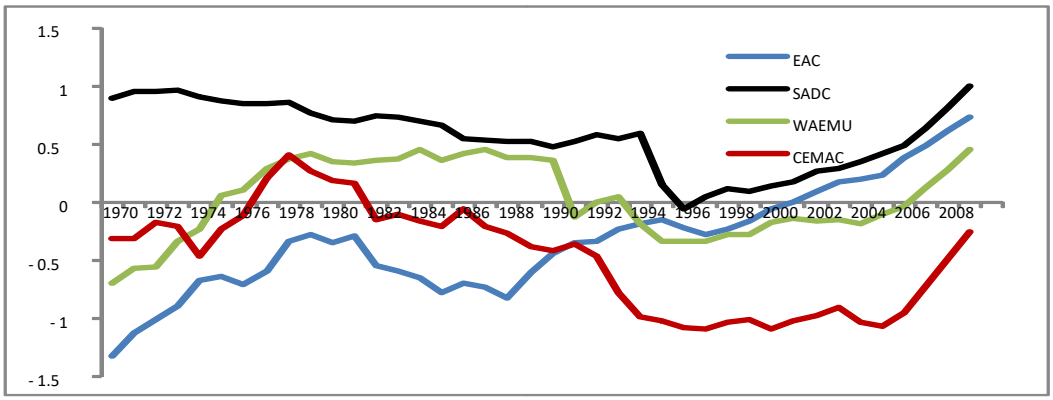
A developed financial system includes the banking sector, insurance companies, financial markets, market intermediaries, institutions, and regulatory bodies all working together to achieve long-term and balanced financial expansion and economic growth through efficient resource allocation among savers and investors (Anwar; Shahzadi; and Nasreen, 2017). It will perform these critical functions to enhance the efficiency of intermediation by reducing information, transaction, and monitoring costs (Levine, 2004). Conversely, inadequate financial structures and policies will be incapable of supporting and maintaining financial reforms that ought to take place which will subsequently lead to ill-functioning financial markets and intermediaries (Benyah, 2010).

A strong financial system also ensures high capital accumulation, trading, hedging, insurance services, diverse savings and portfolio options, all of which facilitate and promote the influx of foreign capital and, as a result, technological innovation (Raza; Shahzadi; and Akram, 2014). At the same time, the greater financial development leads to poverty reduction, reduced income inequality, savings mobilization, better access for the poor to finance, high investment return, encourage sound corporate governance and enhancement the economic growth as well as the welfare (Raza; Shahzadi; and Akram, 2014).

Different results were obtained in terms of the level of financial development and economic growth (Voghouei, Azali, and Jamali, 2011) despite the similarities in the financial policies adopted by the developing countries in the study. Although financial development was able to foster economic growth in some countries, unfortunately, it was unable to replicate the same success in other countries. This is especially true when looking at the African financial systems whereby Africa has lagged even when comparing it to other regions like Asia. Comparing the SADC region with other regions within Africa, the study by (David, Mlachila, and Moheeput, 2014) used credit to the private sector (as a share of GDP) to proxy financial development against the following indicators: liquid liabilities, credit to the private sector by deposit-taking banks, credit to the private sector by banks and other financial institutions, bank deposits, and financial system deposits – all as a share of GDP. The study found that the SADC region - which has higher average levels of per capita income than other regions -

has the highest levels of financial development in Africa. This was brought about by the rapid financial reforms that were introduced in the 1990s which resulted in the acceleration in financial development within the SADC region. Figure 1, extracted from the study, shows that the East African Community (EAC) region has made more consistent progress than other regions and, as a result, has caught up with the SADC region. Except for the SADC region, the West African Economic and Monetary Union (WAEMU) region had higher levels of financial development until the mid-1990s. The Central African Economic and Monetary Community (CEMAC) region has a similar growth path to that of WAEMU, but in absolute level terms, the region has the lowest financial development indicators. However, from this period until the mid-2000s these African trade blocks were plagued by stagnation.

Figure 1: Financial sector development Indices for selected African trade blocks



Source: David, Mlachila, and Moheeput, *(2014).*

2.1. A theoretical framework for the stock market and banking development

In this section, the study furnishes a theoretical framework of how the stock market and the banking sector developments are impacted by the macroeconomic factors, institutional environment, and trade openness. This will allow the study to highlight the important empirical implications and allow for the identification of the potentially relevant institutional, macroeconomic and trade openness measures to be used in the econometric analysis.

2.1.1. A theoretical framework for banking sector development

The study by (Mahonye, 2014) shows that African banks are less efficient than most banking industries of the world and this study is in line with that of (Andrianaivo and Yartey, 2010). The study also discovered that the level of efficiency varies little over the course of the

analysis. As a result, according to the study, financial intermediaries arose primarily as a result of informational and transaction cost issues. Many models have emphasized the importance of well-functioning financial intermediaries and markets in reducing information asymmetry and transaction costs, promoting resource allocation and faster long-run growth (Bencivenga and Smith, 1991; Bencivenga et al, 1995; King and Levine, 1993a). The study estimates the following model based on a review of theoretical and empirical literature:

$$Y_{i,t} = \beta_0 M_{i,t} + \beta_1 T_{i,t} + \beta_2 I_{i,t} + \varepsilon_{i,t} \quad \ldots\ldots\ldots\

across different countries. By using a sample of 49 countries, the study shows that countries with poor investor protections, which they measured by both the character of legal rules and the quality of enforcement, have smaller and narrow capital markets. This implies that in countries whose financial systems offer better protection and where firms can access such financing then the securities would have a higher valuation and the capital markets would be broader. In contrast, countries with poor investor protections have shares ownership which is concentrated.

The study by Beck et al (2003) went a step further and discovered that even the legal origins matter for financial development because of how legal traditions differ in their ability to adapt efficiently to evolving economic conditions. The study proxied legal institutions, which are not fundamentally related to the legal systems, by legal origins. The study highlights two interrelated channels through which the legal origin influences finance: Firstly, through the political channel which contends that legal traditions differ in terms of the priorities they attach to private property compared to the rights of the state and the protection of private contracting rights form the basis of financial development. Secondly, the adaptability channel which emphasizes that legal traditions differ in their ability to evolve with changing conditions and that the legal traditions adapt efficiently to minimize the gap between the contracting needs of the economy and the legal system's capabilities will foster financial development more efficiently than rigid systems.

Futhermore, Levine (1998) suggests that the legal origins influence economic growth through the shaping of national financial systems. This was done by tracing the effects of legal origins on financial development and long-run economic growth.

3. Related Literature

The law and the financial literature emphasize the important role that the institutional framework plays in financial development and output growth (La Porta et al, 1998). As such, understanding the macroeconomic determinants of financial institutional development has become paramount for policymakers to comprehend how macroeconomic policies can be used to foster the growth-promoting role of financial institutions (Aluko and Ibrahim, 2019). Thus, the synchronization of the financial sector with macroeconomic factors has resulted in the positive impact of financial institutions on economic growth (Mishra and Narayan, 2015). According to Levine (2005), financial institutions can promote economic growth through at

least five channels: (1) mobilizing and pooling savings; (2) facilitating the exchange of goods and services; (3) producing forecasts of information on potential investments and allocating capital; (4) monitoring investments and utilizing corporate governance mechanisms after allocating capital; and (5) facilitating risk trading diversification and management. As a result, more developed financial institutions are better able to perform these functions.

The Keynesians and structuralist theories of the 1950s and 1960s influenced developing countries' financial policies. These theories largely advocated for financial system repression. It is argued that by lowering interest rates and directing credit toward priority sectors, total investments and, as a result, the rate of growth would rise. Furthermore, the financial sector is regarded as the most viable source of revenue for the government, with revenue being collected from monetary growth through seigniorage on inflation taxes (Voghouei; Azali and Jamali, 2011). As such, many developing countries followed suit and placed ceilings on interest rates, high reserve requirements on commercial banks, and directed credit policies, which resulted in repressed financial sectors (Auerbach and Uddin Siddiki, 2004).

To unlock the developmental potential of finance, many African countries decided to liberalize their financial sectors between the late 1980s and early 1990s. There was also largely driven by a structural adjustment that was encouraged by the International Monetary Fund (IMF) and the World Bank (Otchere; Senbet; and Simbanegavi, 2017). Credit ceilings were removed, interest rates were liberalized, state-owned banks were restructured and privatized, and a variety of measures were implemented to promote the development of private banking systems and financial markets. In addition to these measures, bank supervisory and regulatory schemes were implemented (Cull; Senbet; and Sorge, 2005). These reforms were further exacerbated by the rapid improvements in global conditions and global technologies that connects Africa with the rest of the world. Thus, there are encouraging factors in play for the prospect of Africa to integrate into the global financial economy at large. With the growing integration of world capital markets, including those in emerging economies, barriers to international capital flows have been reduced. Together with rapid advancements in information technology that connect Africa to the rest of the world, this enables investors seeking to benefit from global diversification to have better access to African financial systems (Otchere; Senbet; and Simbanegavi, 2017).

Now more than ever it is paramount to explore and assess the factors that are essential and contribute significantly towards financial development. To this date, there is still insufficient

understanding about what brings about the emergence and development of financial markets (Mbulawa, 2015; Bui, 2019). Particularly, it remains unknown why in various countries that possess similar levels of economic growth yet experience different financial systems, what is behind the differences in the level of financial development in countries like the SADC region which have almost similar income levels and geographic conditions. The study then further examines whether does the institutional environment matter and what type of institutions are required to propel financial development further. It has become a norm that financial sector development is central to economic development (Levine, 1997) and that inclusive financial systems are crucial for inclusive development (Levine, 2004; Park and Mercado, 2015).

Though the SADC region has seen some considerable performances both in terms of financial sector reforms and economic growth, however, the fact remains that its financial markets are considerably underdeveloped in comparison to those in the other regions (Antonio, Montfort, and Ashwin, 2014). Particularly, financial sectors of most African countries (including those in the SADC region) remain less well-developed even by the standard of their peer low-income countries which implies that the African financial development gap is huge and so is the financial inclusion gap (Allen et al, 2016). Thus, this leaves one to wonder whether Africa's level of financial development is generally slow to that of its counterparts or is it a case whereby inappropriate policies were applied in Africa in efforts to enhance its financial development?

In general, developing countries lack financial intermediation, as evidenced by the mismatch between institutional savings and investment. The need for investment is undeniable, and it can be addressed through structural adjustment programs such as the establishment of development financial institutions and other vehicles that provide credit at market rates for the acquisition of capital (Kelly and Mavrotas, 2003). Therefore, when designing these financial sector reforms, policies ought to be guided by a functional perspective of financial systems and not just by savings and capital mobilization.

As such, it is widely believed that countries with better financial systems can weather global storms with their economies more efficiently (Anwar, Shahzadi and Nasreen, 2017). More so, there is compiling evidence that higher financial sector development dampens economic volatility (Ibrahim and Alagidede, 2017). Hence, countries with better developed financial institutions tend to have better-developed economies.

Using a panel data set of 42 emerging markets from 1990 to 2004, Yartey (2010) investigates the institutional and macroeconomic determinants of stock market development. The author discovered three key findings. First, the author discovered that income level, domestic investment, banking sector development, private capital flows, and stock market liquidity are important determinants of stock market development in emerging markets. Second, the relationship between the development of the banking sector and the development of the stock market in emerging markets is either positive or negative. Third, institutional factors such as political risk, law and order, democratic accountability, and bureaucratic quality are important determinants of emerging market stock market development. It is for this reason that we must look at the determinants of financial development from "bank dominated" economies versus "stock market economies" points of view within the SADC region. In doing so, the study attempts to bridge a gap by providing light on what are the contributors to financial development in a region that has underdeveloped financial systems and whether are the determinants of financial development the same for countries with both stock markets and banks and those with banking sector only?

4. Econometric methodology and data

Over the years different determinants of financial development have been explored which have ranged from legal systems and institutions (Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998) to financial and trade openness (Chinn and Ito, 2006). However, despite the number of variables that have been explored to determine financial development, there remains no set variable(s) that could be attributed as the primary determinant of financial development (Benyah, 2010). Due to differences in the underlying theoretical foundation, the study will model the banking system and the stock market separately, allowing for the identification of both market-specific and general economic and institutional factors that can explain financial market development. In this way, the study will be able to test the importance of competing theories in explaining financial market development.

4.1. Estimation procedure

The study investigates the factors explaining the financial development process by setting up a model, such as Equations 1 and 2, where the region’s level of financial development depends on macroeconomic factors and the institutional environment. To do so, the study uses domestic credit to the private sector – as a percentage of GDP - to proxy the banking

sector. Furthermore, the study will then use market capitalization to proxy the stock market. The study will model the banking sector and the stock market separately due to the differences in the underlying theoretical foundation. To do so the study will create a dummy variable of which 1 will represent those countries that have both the banking sector and the stock market while 0 will represent those countries with the banking sector only. This will allow for the identification of both market-specific factors and general economic and institutional factors that can explain financial market development.

Specifically, the study will regress the indicator of the banking sector development, namely the domestic credit to the private sector, as a percentage of GDP, on measures such as GDP growth rate, inflation, Interest rate spreads, FDI, trade openness, rule of law and regularity quality. To model the stock market the study shall regress market capitalization, as a percentage of GDP, on GDP growth rate, inflation, foreign direct investment, inflation, interest rate spread, government debt, trade openness, rule of law and regularity quality.

The study does recognize the issue of unobserved country-specific effects which if ignored may produce inconsistent estimates given that they are likely to be correlated with the explanatory variables. As such, methods like the Ordinary Least Squares (OLS) will be inconsistent because of the violation of the assumption of strict exogeneity. Thus, it is for this reason that the study utilized the ARDL approach which will exploit the linear moment restrictions that are applied by the panel model.

Due to the lack of a general consensus in the set of macroeconomic and institutional variables and proxy variables to proxy the banking sector and stock market development (David, Mlachila, and Moheeput, 2014) choosing the right measures of financial development was daunting task for the study. However, the study opted to use the variables, see section 4.2 and 4.3 below, which have been widely used in past literature studies that have been instrumental in this research filed. Such studies include (Andrianaivo and Yartey, 2010; Takyi, and Obeng, 2013; Cherif, and Dreger, 2016 and Aluko and Ibrahim, 2020).

4.2. Dependent variables

4.2.1. The stock-market

The study uses the stock market capitalization (as a percentage of GDP) to proxy the stock market development. The assumption behind the use of this variable as an indicator of stock

market development is that the size of the stock market is positively correlated with the ability to mobilize capital and diversify risk (Levine and Zervos, 1996).

4.2.2. The banking system

The domestic credit to the private sector is used as a proxy for the banking sector development index in the study. Domestic credit to the private sector refers to financial resources provided to the private sector, such as loans, purchases of non-equity securities, trade credits, and other accounts payable that establish a claim for repayment. Credit to public enterprises is one of the claims made by some countries.

4.3. Macroeconomic indicators

The macroeconomic variables that are adopted by this current study include GDP per capita, GDP growth rate, foreign direct investment, inflation, and the interest rate spreads (Andrianaivo and Yartey, 2009; Mahonye, 2014). The study does acknowledge the possibility of reverse causality between some of these variables and financial sector development. While some variables may drive this development, this development might in turn contribute to the growth of these variables.

4.3.1. GDP per capita and GDP growth rate

They are often used as a measure of economic development. GDP per capita measures the standard of living while the GDP growth rate measures the overall rate of growth of the economy. There is a possibility of reverse causality with these two variables. While these two are projected to have a positive impact on the measures of the stock market and banking sector development, financial sector development can also help drive their growth.

4.3.2. Foreign direct investment (FDI)

This index is used to represent external funds in the development of the financial sector. The study anticipates a positive relationship between FDI and the development of the SADC stock market and banking sector.

4.3.3. Inflation and interest rate-spread

Inflation and interest rate spreads are used as indicators of macroeconomic stability in financial sector development. Inflation and high-interest rate spreads will reduce investment by raising the cost of doing business. As a result, the study anticipates a negative relationship

between these variables and both measures of banking sector development and stock market development.

4.4. Trade openness and government debt

Trade openness is measured by the sum of imports and exports relative to GDP while government debt represents the money (or credit) that is owned by the central government to domestic and as well as international creditors. These show the degree to which a country is open to international trade and can be linked to financial development because openness may influence the demand for external finance through specialization and sectoral structure or technology transfer and innovation and can therefore require more use of external finance. However, the more open the economy is the more exposed they are to external shocks. As such, the relationship between trade openness and financial development is ambiguous while a positive relationship between government debt and financial development is envisaged.

4.5. Institutional factors

The study incorporates the rule of law and regulatory quality as proxies for institutional quality measures. Improved rule of law enforcement, higher-quality government business, and low perception of corruption all contribute to economic development by encouraging investment. As a result, the study anticipates a positive relationship between institutional quality and financial development.

4.6. The data

The study uses a panel dataset that was sourced from the World Development Indicators (WDI) of the World Bank. This data spans from 1996 to 2018 and it is for the 6 African member states that make up the selected countries to mirror the SADC region. The decision to not use all the 16 member states of the SADC region was largely motivated by the unavailability of data in the majority of these member countries. The rule of law and regularity quality are the institutional quality indexes used in this study. These variables provide various measures of political (in) stability as well as other institutional quality indicators such as the level of corruption. These indices are derived from the Political Risk Services International Country Risk Guide (PRS).

The World Bank and Global Development Finance websites provide stock market development variables such as stock market capitalization, the value of stock traded, turnover

ratio, and several domestic listed companies, as well as other control variables such as GDP per capita, foreign direct investment, GDP growth rate, trade openness, government debt, interest rate spread, and inflation rate. The World Bank and Global Development Finance websites also provide banking sectors development proxies such as domestic credit to the private sector and domestic credit provided by the banking sector.

5. Diagnostics tests

The study is interested in examining the relationship between the variables by using a panel data set. The main advantage of using panel data is that one can increase the number of degrees of freedom and power of the test by using more information of the behaviour on many units simultaneously. Additional advantages of panel data are that problems of multicollinearity can be mitigated that may arise if time-series is modelled individually and there is a presence of heteroskedasticity in cross-sectional data. These problems are addressed efficiently by a panel data set. As such, the study employed panel data techniques to estimate the regression models due to the nature of the dataset at hand. Specifically, the study utilized the Autoregressive Distributive Lag (ARDL) techniques which allowed this study to unpack any short- and long-term contributors to financial sector development and capture any possible links between the explanatory variables and the financial development proxies, domestic credit to the private sector and market capitalization. Furthermore, the study employed the ARDL approach to producing consistent and efficient estimators of the parameters in the presence of country heterogeneity which is in contrast with prior studies that are based on variables integrated with the same order.

The starting point is the descriptive statistics which shows and explain the characteristics of each variable in the model and shows how they relate to each group to engage in a comparative analysis. To demonstrate whether the regressors have or do not have an exact linear relationship amongst each other the study made use of the correlation analysis, specifically the Spearman correlation analysis. The study then performed the 1st and or the 2nd generation Unit Root Tests (URT) to ascertain whether no variable is integrated of order two. To test for any long-run relationship between the variables the study made use of Kao and Pedroni cointegration techniques. This also represents the joint significance of the level's equation. Furthermore, with the absence of multicollinearity, the study used the Granger Causality test to check whether the explanatory variables are useful in the forecasting of the

dependent variables and to also find any patterns of correlation within our data set. Lastly, because there is cointegration in our model for economies with both financial sectors the study employed the Mean Group (MG) and Pooled Mean Group (PMG) estimates to further explore both the long-run and short-run effects of the explanatory variables on the financial sector development of economies with both sectors and estimate the speed of convergence toward the steady-state of the financial sector development for these economies.

This dynamic panel heterogeneity analysis technique was introduced by Pesaran et al (1999). This method deals with the stationarity series problem of different orders to monitor any possible convergence in the long run horizon (Bardi, Ayouni and Hamdaoui, 2019). Furthermore, this approach is suited in studying hypothesis that includes finding the determinants of financial development. Thus, the panel data techniques employed will be used to determine to verify the determinants hypothesis in our sample. Hence, this method is deployed by this current study, and it is the preferred approach.

i. Summary statistics

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
domcredit	138	64.609	39.802	1	133
marketcap	138	18.5	22.545	1	70
intsprd	138	13.369	15.288	.525	70.75
GDPg	138	3.908	3.417	-12.674	15.029
infl	138	61.022	39.169	1	129
fdi	138	3.559	5.174	-6.057	40.167
lner	138	3.803	2.454	1.458	12.518
govdebt	138	65.261	34.924	1	123
trop	138	76.721	31.242	25.311	152.627
rq	138	61.862	32.907	1	121
rl	138	60.877	32.827	1	121
finstatus	138	.5	.502	0	1

Source: World Bank Development Indicators (WDI).
Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth and Lner – log of exchange rate.

Table 1 represents the study's summary statistics. There are two dependent variables of which one is a proxy for the banking sector development, namely domcredit, and the other one is a proxy for the stock market development, namely marketcap. The rest of the other variables represent the explanatory variables excluding the finstatus variable – it is a dummy variable where 0 is for those countries with the banking sector only and 1 is for those countries with both the banking sector and the stock market. For each variable, there are 138

observations. Trop (which is trade openness) has the highest mean while fdi (which is the foreign direct investment) has the lowest mean. The standard deviation – which tells us how spread the data is from the mean – tells us that both the domcredit and the inflation are the most spread variables in our data set while finstatus (financial status) is the least spread.

Besides the intsprd (interest rate spread), GDPg (GDP growth), inflation, fdi, and trop our variables have a minimum value of 1.

ii. Correlation tests

The nature of the data employed in the study is on an interval scale and continues. Therefore the study shall make use of the Pearson cointegration test for the correlation test. Furthermore, the Spearman test will only be used for comparison purposes and will be reserved for the annexure.

Table 2: Pearson correlation test for banking-based economies only

	domcredit	intsprd	GDPg	infl	fdi	govdebt	trop	rq	rl
domcredit	1.00								
intsprd	-0.19	1.00							
GDPg	0.22	0.20	1.00						
infl	-0.17	0.28*	-0.14	1.00					
fdi	-0.05	0.45*	-0.06	0.08	1.00				
govdebt	0.47*	-0.22	0.29*	-0.31*	-0.06	1.00			
trop	-0.13	-0.28*	0.12	-0.11	0.12	0.34*	1.00		
rq	0.06	0.30*	0.28*	-0.12	0.14	0.37*	-0.04	1.00	
rl	-0.05	0.24*	0.19	-0.09	0.193	0.04	0.00	0.53*	1.00

Source: Own calculations based on data from the WDI Note: *denotes significance at 5% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

The Pearson correlation measures the degree of association between two variables. Table 2 contains only those countries with banking-based economies only. Looking at table 2, we can infer that infl (inflation) has a weak, negative, and insignificant association with the domestic credit (domcredit), that is, there is a 17 percent change in the association between infl and the domcredit. Interest rate spread (intsprd) has a weak and negative correlation with domcredit. This implies the amount of domestic credit issued in these countries from the banking sector does not depend on the level of interest rates then. Government debt has a strong positive association with domestic credit while economies with both sectors have a positive but weak association with government debt (as shown in table 3). This implies that the banking sector

in economies with the banking sector only hold more government bonds than economies with both sectors as these economies tend to have a mixture of government bonds and shares/bonds from the stock markets. This implies that the banking sector does hold government bonds. Regulatory quality (rq) and the rule of law (rl) have a very strong and positive association with one another. That is, there is a strong association between the two variables which implies that there is a positive web of association between the institutional variables. Inflation has a weak and negative correlation with GDP growth (GDPg). Though there is a form correlation in that an increase in GDP growth is associated with a decrease in inflation due to the rise in the level of activities.

Table 3: Pearson correlation test for stock market and bank-based economies

	domcredit	intsprd	GDPg	infl	fdi	govdebt	trop	rq	rl
domcredit	1.00								
intsprd	0.27*	1.00							
GDPg	0.32*	0.18	1.00						
infl	-0.05	0.09	-0.11	1.00					
fdi	0.30*	-0.17	0.14	-0.05	1.00				
govdebt	0.02	-0.17	-0.03	0.15	0.11	1.00			
trop	0.60*	0.38*	0.19	0.07	0.39*	0.11	1.00		
rq	-0.04	-0.10	0.10	-0.20	-0.21	-0.33*	-0.51*	1.00	
rl	0.40*	0.19	0.06	0.06	0.008	-0.16	0.28*	0.23	1.00

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – government debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

Table 3 looks at those countries with both the banking sector and the stock market. Inflation still has a weak and negative relationship with domestic credit. There is only a 5 percentage association between the two. Interest rates spread also has a weak positive relation with domestic credit and a weak and negative association with market capitalization. This is also true when we use the Spearman correlation test as evident in tables A.2, A.3 and A.4 in the Annexure. This result alludes that both the level of domestic credit issued and the market capitalization are not influenced by the interest rates. This is not in line with prior theory as interest rates are often used to manage the financial sector development – especially the banking sector – either to accelerate or decelerate the process depending on the state of the economy at that time. The inflation rate result is in line with prior theory in that high inflation leads to an increase in interest rates thus causing a decrease in the level of credit issued out/ demanded. Government debt, however, has a weak positive relationship with domestic credit.

This implies that the banking sector in these countries does not hold too many government bonds and thus are shared between the stock market and the banking sector. However, Foreign Direct Investment (FDI) has a strong and significant positive association with domestic credit. Thus, the more capital is channelled into these economies the issuance of credit there is to the private sector. GDP growth has a relatively strong positive relationship with domestic credit. This implies that the more economic activities there is an economy the more savings there will be and thus these incremental savings or deposits will be used by banks to extend credit to the private sector. Trade openness has a strong positive association with domestic credit which means the economy can attract more foreign direct investment which can then be able to be accessed by private firms. The rule of law highlights the fact that with strong and functional institutions it becomes viable to obtain private credit and it is safe to do so. Thus, this means that countries with economic prosperity, openness to trade and quality of institutions are associated with a developed banking sector, which can be attributed to the ability to attract foreign direct investment and the ability to retain local investment too.

Table 4: Pearson's correlation statistics for bank dominated and stock market based economies

	markcap	intsprd	GDPg	infl	fdi	govdebt	trop	rq	rl
markcap	1.00								
intsprd	-0.004	1.00							
GDPg	0.19	0.18	1.00						
infl	-0.07	0.09	-0.11	1.00					
fdi	0.16	-0.17	0.14	-0.05	1.00				
govdebt	-0.04	-0.17	-0.03	0.15	0.11	1.00			
trop	0.07	0.38*	0.19	0.07	0.39*	0.11	1.00		
rq	0.30*	-0.10	0.10	-0.20	-0.21	-0.33*	-0.51*	1.00	
rl	0.20	0.19	0.06	0.06	0.008	-0.16	0.28*	0.23	1.00

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – government debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

Table 4 shows the correlation between the macroeconomic and institutional variables and the stock market. The rule of law and the regulatory quality have a positive correlation with market capitalization (marketcap). This implies that there is a strong association between the stock market development and institutions. As such, the stock market development thrives when there are strong institutions. Government debt (govdebt) has a negative correlation with market capitalization. This means that in the stock market they are holding more foreign bonds than local bonds. Inflation has a weak negative relationship with market capitalization

and thus it has a less chance of increasing when there is a boom in the stock market while the GDP growth rate has a positive correlation with the market capitalization. Though FDI is insignificant, however, does have a weak positive association with the stock market development. Thus, economic prosperity plays a very important role in the development of the financial sector. However, it must be emphasized that other than institutions, other covariates have an insignificant association with the stock market development.

iii. Panel unit root tests

Table 5: Unit root test for bank-based economies only

Variable	**Im, Peseran and Shin**		**ADF-Fisher (ADF)**	
	level	1st difference	Level	1st difference
Dependent variable				
domcredit	-2.00	-4.78	-2.35	-8.32
Explanatory variables				
intsprd	-1.49	-4.27	-1.91	-6.86
GDPg	-3.26	-5.25	-4.63	-10.63
fdi	-1.55	-5.28	-1.81	-10.26
lner	-1.64	-4.03	-1.79	-6.12
infl	-3.60	-5.22	-5.31	-10.29
govdebt	-2.86	-5.86	-3.93	-13.38
trop	-0.85	-4.43	-0.83	-7.23
rl	-2.16	-5.63	-2.75	-11.80
rq	-3.05	-5.99	-4.85	-12.29

Source: Own calculations based on data from the WDI Note: used 10% level of significance Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

Table 5 show the IPS and the Fisher type unit root tests for those countries with the banking sector only. The dependent variable, domestic credit, is stationary for both tests at levels and the first difference. Both the interest rate spread and the foreign direct investment are non-stationary at the IPS level but are stationary at the first difference. They are both stationary when using the fisher type test both at a level and at the first difference. Trade openness is non-stationary at levels for both tests however it is stationary for both at the first difference. The rest of the variables are stationary for both tests at levels and the first difference. The statistical properties of these stationary variables do not vary with time and hence they follow a normal distribution. Since no variable is integrated into order two, The ARDL technique can be applied.

Table 6: Unit root test for the stock market and bank-based economies

Variable	Im, Peseran and Shin		ADF-Fisher (ADF)	
	level	1st difference	Level	1st difference
Dependent variables				
domcredit	-5.03	-6.33	-8.83	-14.07
marketcap	-2.22	-4.95	-2.69	-8.91
Explanatory variables				
intsprd	0.26	-3.26	0.53	-4.45
GDPg	-3.40	-5.42	-4.66	-10.85
fdi	-3.74	-5.53	-5.38	-11.43
lner	0.85	-3.35	1.12	-4.61
infl	-2.20	-5.24	-2.65	-10.18
govdebt	-3.69	-5.19	-5.36	-10.18
trop	0.29	-3.88	0.48	-5.94
rl	-1.22	-4.68	-1.31	-8.20
rq	-2.68	-5.31	-3.57	-10.33

Source: Own calculations based on data from the WDI Note: Used 10% level of significance Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – government debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

Table 6 represents the countries with both the banking sector and the stock market. The two dependent variables, domestic credit, and market capitalization are both stationary at levels and the first difference for both tests. Therefore, the statistical properties of these variables do not vary with time and hence they follow a normal distribution. Interest rate spreads, exchange rate and the rule of law are non-stationary at levels but stationary at the first difference for both tests. Trade openness is non-stationary at levels for the fisher type test but is stationary at the first difference for the same test. The rest of the independent variables are stationary at levels and the first difference for both tests. Hence, no variable is integrated of order two in the model. Thus, since the dependent variables are both stationary at levels, all the non-stationary explanatory variables at levels stationary at the first difference and no variable are integrated of order two then the ARDL method can be applied.

iv. Cointegration tests

Pedroni cointegration test:

Ho: No cointegration

Ha: All panels are cointegrated

Table 7: Bank-based economies only

Test Stats.	Panel	Group
v	-0.97	.
rho	0.96	1.62
t	-1.68	-2.17
ADF	-0.74	2.00

Source: Own calculations based on data from the WDI.

Kao cointegration test:
Table 8: Bank-based economies only

Dependent variable: domcredit	Lags	statistics	P-value
Modified Dickey-Fuller	1	-0.81	0.21
Dickey-Fuller	1	-1.63	0.05
Augmented Dickey-Fuller	1	-0.33	0.37
Unadjusted Modified Dickey-Fuller	1	-5.54	0.00
Unadjusted Dickey-Fuller	1	-3.70	0.00

Source: Own calculations based on data from the WDI.

Apart from the t-statistic the null hypothesis of no cointegration is accepted at the 1% level for both the panel and group statistics in table 7. Table 7 statistical figures in absolute terms are less than 2 and thus, for countries with the banking sector only, the panels in the data are not cointegrated. Hence, we can conclude that for countries that are bank dominated within the SADC, the integration of macroeconomic environment and institutional factors with financial development is non-existence. Table 8 also echoes the same sentiments in that, except for the Unadjusted Modified Dickey-Fuller and the Unadjusted Dickey-fuller, the null hypothesis of no cointegration cannot be rejected. Thus, the panel is not cointegrated.

Pedroni cointegration test:

Table 9, excluding the v-statistic, means the null hypothesis of no cointegration is rejected. That is, the results indicate a cointegration relationship between the explanatory variables and the domestic credit (domcredit). Table 10 also confirms these findings, indicating that for economies with both a stock market and a banking sector, the null hypothesis of no co-integration is rejected.

Table 9: Stock market and bank-based economies

Test Stats.	Panel	Group
v	-0.95	.
rho	-1.91	-1.43
t	-7.93	-9.49
ADF	-2.5	0.39

Source: Own calculations based on data from the WDI.

Kao cointegration test:
Table 10: Stock market and bank-based economies

Dependent variable: domcredit	Lags	statistics	P-values
Modified Dickey-Fuller	1	-0.48	0.32
Dickey-Fuller	1	-4.26	0.00
Augmented Dickey-Fuller	1	1.86	0.03
Unadjusted Modified Dickey-Fuller	1	-14.98	0.00
Unadjusted Dickey-Fuller	1	-11.96	0.00

Source: Own calculations based on data from the WDI.

Pedroni cointegration test:

Table 11: Cointegration for bank based and stock markets economies

Test Stats.	Panel	Group
v	-1.05	.
rho	0.75	1.49
t	-2.15	-1.93
ADF	0.04	2.56

Source: Own calculations based on data from the WDI.

Kao cointegration test:
Table 12: Cointegration for bank based and stock markets economies

Dependent variable: marketcap	Lags	Statistics	P-value
Modified Dickey-Fuller	1	1.12	0.13
Dickey-Fuller	1	0.71	0.24
Augmented Dickey-Fuller	1	0.98	0.16
Unadjusted Modified Dickey-Fuller	1	-6.29	0.00
Unadjusted Dickey-Fuller	1	-4.22	0.00

Source: Own calculations based on data from the WDI.

Looking at table 11 the results show that, apart from the t-statistic, for the stock market only the null hypothesis of no cointegration cannot be rejected. All the statistics are close to or less than 1. Table 12 reaches the same conclusion in that, except for the Unadjusted Modified Dickey-Fuller and the Unadjusted Dickey-Fuller, there is no cointegration relationship between the explanatory variables and market capitalization (marketcap). Thus, the panels in the data are not cointegrated.

v. Panel Granger Causality test

Table 13: Causality test for bank-based economies only

Null Hypothesis	Lags	Z-bar-statistics	P-value	Decision
intsprd does not Granger cause domcredit	1	4.11	0.00	Reject
GDPg does not Granger cause domcredit	1	1.71	0.09	Reject
infl does not Granger cause domcredit	1	0.76	0.45	Accept
fdi does not Granger cause domcredit	1	0.60	0.55	Accept
govdebt does not Granger cause domcredit	1	0.06	0.95	Accept
trop does not Granger cause domcredit	1	-0.31	0.76	Accept
rq does not Granger cause domcredit	1	0.57	0.57	Accept
rl does not Granger cause domcredit	1	-0.22	0.83	Accept

Source: Own calculations based on data from the WDI. Note: using 10% level of significance

Table 13 above looks at the relationship between the macroeconomic environment, and the institutions in bank-based economies. Using the 10% level of significance, it is only the interest rate spread (intsprd) and GDP growth (GDPg) that does granger cause the banking sector's development. Thus, these variables are significant in the forecasting of the banking sector's development. This implies that economic prosperity drives banking sector development and the more the economy prospers the more the banking sector tends to develop. Interest rates spread is a component of the banking sector development and the more positive interest rate spreads are for the bank system the more profitable the banking system becomes and the more developed it gets. The rest of the variables do not granger cause the banking sector development. As such, the lagged values of these variables are not useful in forecasting the banking sector development.

Table 14: Causality test for the stock market and bank-based economies

Null Hypothesis	Lags	Z-bar-statistics	P-value	Decision
intsprd does not Granger cause domcredit	1	-0.41	0.68	Accept
GDPg does not Granger cause domcredit	1	1.48	0.14	Accept
infl does not Granger cause domcredit	1	2.13	0.03	Reject
fdi does not Granger cause domcredit	1	-0.16	0.87	Accept
govdebt does not Granger cause domcredit	1	-0.29	0.77	Accept
trop does not Granger cause domcredit	1	-0.77	0.44	Accept
rq does not Granger cause domcredit	1	0.25	0.81	Accept
rl does not Granger cause domcredit	1	-0.62	0.54	Accept

Source: Own calculations based on data from the WDI. Note: using 10% level of significance

Table 14 looks at the relationship between the macroeconomic environment, and institutions in countries that have both the banking sector development and the stock development. Using

the 10% level of significance, it is only the inflation that does granger cause the banking sector development whereas the other variables do not. Even in countries with both the banking sector development and the stock market development, the lagged values of these variables are not useful in the forecasting the banking sector development.

Table 15: Causality test for Bank based and stock market economies

Null Hypothesis	Lags	Z-bar-statistics	P-value	Decision
intsprd does not Granger cause marketcap	1	1.52	0.13	Accept
GDPg does not Granger cause marketcap	1	1.35	0.18	Accept
infl does not Granger cause marketcap	1	1.79	0.07	Rejected
fdi does not Granger cause marketcap	1	-0.36	0.72	Accept
govdebt does not Granger cause marketcap	1	-0.15	0.88	Accept
trop does not Granger cause marketcap	1	4.13	0.00	Reject
rq does not Granger cause marketcap	1	-0.46	0.65	Accept
rl does not Granger cause marketcap	1	0.50	0.62	Accept

Source: Own calculations based on data from the WDI. Note: using 10% level of significance Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

Table 15 looks at the macroeconomic environment, quality of institutions and the stock market development. This is for countries with both the banking sector development and the stock market. Using the 10% level of significance, only trade openness does granger cause the stock market development while the other macroeconomic factors and institutions do not. This implies that foreign participation at stock exchanges is helping in deriving the development of these equity markets. Thus, in these economies, the macroeconomic environment and institutions do not influence stock market development.

Since the study has found that there is no cointegration between the explanatory variables and the dependent variable, as shown by tables 7 and 8 above, the study cannot further proceed to perform the PMG vs PG analysis for the bank-based economies. This is also true for the explanatory variables and market capitalization when we look at the stock market only - A shown in tables 11 and 12. However, because there is cointegration for economies with both sectors and thus the study proceeded to do the short-run and long-run effects analysis only for these economies as shown in table 16.

iv. Mean Group and Pooled Mean Group Estimates

Table 16: MG and PMG test for stock and bank-based economies

variables	Mean Group Estimates				Pooled Mean Group Estimates			
	coef.	Std.err	Z	P-value	coef.	Std.err	Z	P-value
Dependent: domcredit								
Long-run coefficients								
intsprd	5.30	4.86	1.09	0.28	0.43	0.72	0.59	0.55
GDPg	-1.74	2.84	-0.61	0.54	3.15	0.68	4.61	0.00
infl	-0.04	0.19	-0.22	0.82	-0.04	0.04	-1.08	0.28
fdi	5.09	1.95	2.61	0.01	1.94	0.58	3.37	0.001
govdebt	0.22	0.08	2.67	0.01	0.08	0.07	1.09	0.28
trop	0.82	0.71	1.15	0.25	0.87	0.15	5.66	0.00
rq	-1.05	0.90	-1.16	0.25	0.06	0.05	1.14	0.26
rl	0.42	0.59	0.72	0.47	-0.27	0.09	-3.17	0.00
Hausman test	0.00							
Err. Corr. Coef.	-1.74	0.37	-4.67	0.00	-1.38	0.52	-2.63	0.01
Short-run coefficients								
Δintsprd	-3.26	1.89	-1.73	0.08	-0.83	3.78	-0.22	0.83
ΔGDPg	3.89	3.11	1.25	0.21	-1.75	1.82	-0.96	0.34
Δinfl	0.09	0.14	0.6	0.55	0.01	0.15	0.05	0.96
Δfdi	-1.82	0.21	-8.49	0.00	1.36	2.36	0.58	0.56
Δgovdebt	-0.22	0.12	-1.79	0.07	-0.16	0.16	-1.04	0.30
Δtrop	-0.84	1.18	-0.71	0.48	-0.19	1.10	-0.17	0.86
Δrq	-0.25	0.22	-1.15	0.25	-0.43	0.30	-1.44	0.15
Δrl	0.18	0.21	0.86	0.39	0.32	0.05	6.03	0.00
Constant	107.41	208.00	0.52	0.61	15.83	19.72	0.8	0.42

Source: Own calculations based on data from the WDI.
Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

In table 16, the Hausman test does specify that the PMG is the correct model. Looking at the PMG of table 16, we can infer that the long-run coefficient of GDP growth rate, foreign direct investment, trade openness and the rule of law exhibit cointegration with the banking sector development. This is shown by the statistical significance of these variables. These variables also have a positive impact on the banking sector development at the one percent level. The rest of the other variables do not exhibit cointegration as they are statistically insignificant. Due to the error correction coefficient, any deviation from the economy is corrected at 138 percent adjustment speed and the panel does exhibit cointegration since the

value is statistically significant. This is for countries with both the banking sector and the stock market development.

vii. T-tests

Table 17: t-test using domcredit

Group (domcredit)	Obs	Mean	Std err	t stat	P-value
Banking sector only	69	60.10	4.95		
Both sectors	69	69.12	4.60		
Combined	138	64.61	3.39	-1.33	0.18
Diff		-9.01	6.76		

Source: Own calculations based on data from the WDI.

In table 17, the banking sector represents countries with the banking sector only while both sectors represent countries with both the banking sector and the stock market. The absolute value of the t-score is 1.33 and the P-value is 0.18. Though the t-score does show that there is no difference in the means between the two groups, this result is statistically insignificant. However, on average countries with both the stock market and the banking sector tends to provide more domestic credit to the economy.

Table 18: t-test using bnkcredit

Group (bnkcredit)	Obs	Mean	Std err	t stat	P-value
Banking sector only	69	51.23	5.24		
Both sectors	69	77.99	3.67		
Combined	138	64.61	3.39	-4.18	0.00
Diff		-26.75	6.40		

Source: Own calculations based on data from the WDI.

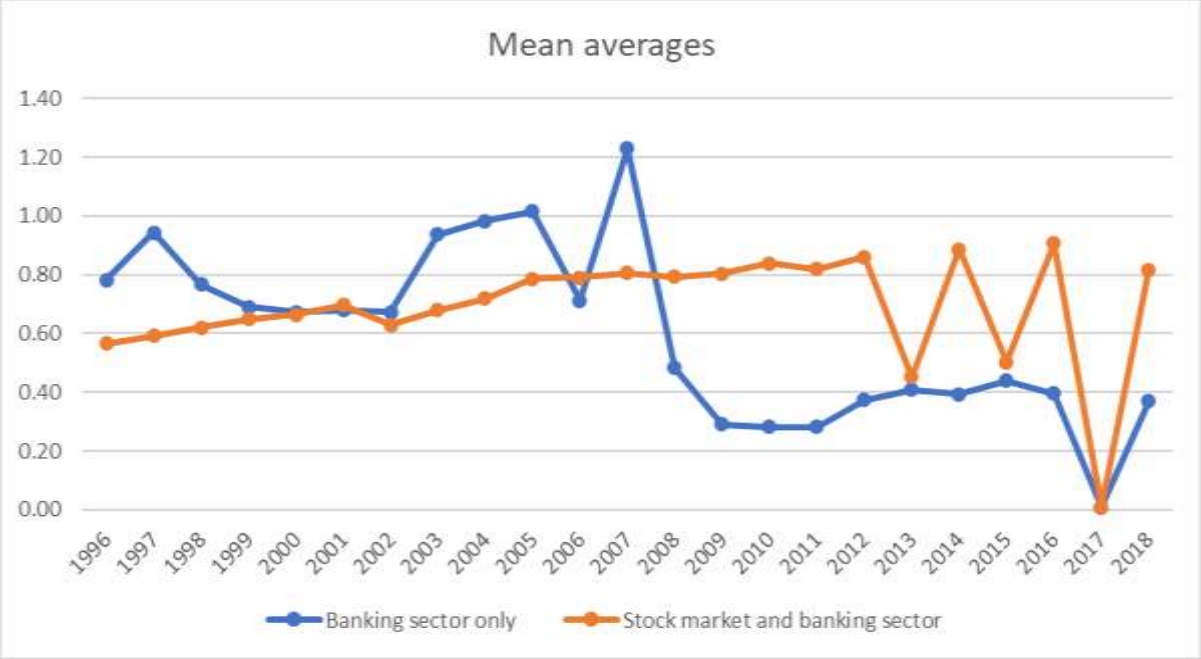
Table 18 examines bank credit to the private sector (bnkcredit) and finds that the t-score absolute value is 4.18 and the p-value is 0.00. This indicates that there are large differences in the means of the two groups and this result is statistically significant. This implies that the banking sector does benefit from the presence of the stock market. This is highlighted by the fact that some of the banks (sometimes all) are listed on the local stock exchange, and they often can raise more funds through these equity markets that can be utilized to provide more liquidity to the economy.

Credit to the private sector plays a pivotal role in the development of financial markets and economies that allocate credit to the private sector tend to grow faster than the ones that allocate more to the public sector. The paper by King and Levine (1993) asserts financial systems that prioritize credit to private firms over the government tend to provide more

services. The paper found that the percentage of credit allocated to private firms and the ratio of credit issued to a private firm to GDP are robustly correlated with growth, the rate of physical capital accumulation, and improvements in the efficiency of capital allocation. Furthermore, the lagged values of these financial development indicator variables are used to forecast the subsequent values of the growth indicators. Thus, this leads to the conclusion that Countries that allocate credit to the private sector tend to grow faster than the ones that allocate more to the public sector and the economy will prosper in countries that offer more credit to the private sector, which is the case in countries with both bank-based and market-based financing in our model.

viii. Mean averages

Figure 2: Mean averages of domestic credit (domcredit).



Source: Own calculations based on data from the WDI

Figure 2 shows the mean averages (domestic credit) for countries with the banking sector only, highlighted by the blue line, and those with both the banking sector and the stock market, and highlighted by the brown line. From 1996 until mid-2007 the countries with the banking sector only were on average greater than those with both banking sector and the stock market. Thereafter, countries with both become greater than those with the banking sector only. This figure also highlights the fact that countries with the banking sector only tend to be hit hard by external shocks. Looking at 1998, during the Asian crises, the averages of these countries took a dip while the brown line continued with its upward trajectory.

Though both countries took a dip during the dot-com bubble in 2001, the brown line dipped more than the blue line. However, the 2007/8 financial crisis took a huge shock on countries with the banking sector only. There is a massive deep in the blue line while there is a slight, but insignificant, dip in the brown line. Thus, countries with the banking sector only do not whether financial crises are well and are thus more prone to external shocks emanating from the banking sector.

6. Empirical results

The study makes use of the panel data to circumvent the possible issues of multicollinearity that may arise if the time series is modelled individually and when there is a presence of heteroscedasticity in the cross-sectional data. In doing so, the study modelled the banking sector and the stock market separately due to the differences in the underlying theoretical foundation. As such, the use of the ARDL technique allows for the study of any short-and-long-term contributors to financial development and capture any possible links between the explanatory variables and the financial sector development proxies.

Looking at our cointegration tests, for economies with the banking sector only both the Pedroni and the Kao tests do not reject the null hypothesis of no cointegration. Thus, the panel of these economies are not cointegrated. This result is also true for the explanatory variables and market capitalization when we look at the stock market only. However, for economies with both sectors, the panel is found to be co-integrated. The Pedroni and Kao tests both reject the null hypothesis of no co-integration between the explanatory variables and domestic credit in economies with both a banking sector and a stock market. In general, there is no cointegration in our sample and it results from economies with banks only. Hence, we can infer from these results that in the long run our variables are not correlated and as such, there is no long-run equilibrium relationship among them. It is, therefore, for these reasons that the study did not subject the determinants of the stock market development to the long-run and short-run effects (PMG vs MG). That is, Kao and Pedroni attest that there is no long-run relationship in this model. Therefore, the study could not proceed to unpack these effects.

Interest rates spread and the GDP growth does granger cause domestic credit for economies with the banking sector only. Hence, they are significant in the forecasting of the banking sector development. Since economic growth does also granger cause domestic credit, it signals the importance of economic prosperity on the banking sector development. The more

an economy prospers the more this sector develops. However, looking at table A.5 (in appendix section) domestic credit only granger causes the interest rates spread. For economies with both sectors, it is only inflation that does granger cause domestic credit but from table A.6 (in appendix section) domestic credit only granger cause trade openness. Therefore, inflation is a significant variable in forecasting domestic credit for these economies and hence inflation targeting plays a significant role for these economies. This is because inflation hinders the financial development process since high inflation reduces the buying power of households and reduces the saving capacity which in turn reduces the number of bank deposits and hence increases banks' default ratios. The study further found that only trade openness granger cause market capitalization while market capitalization granger causes both the interest rates spread and trade openness as evident from table A.7 (in appendix section). This implies that foreign participation at the stock exchanges does play a significant part in fostering the development of these equity markets, increases the demand for external finance and that it is a pre-condition for financial development in these selected SADC countries.

In general, the study found that there is no cointegration in this panel data sample and it results from economies with the banking sector only. Lastly, the study does show that in these economies the lagged values of the macroeconomic and institutional variables employed by the study do not influence the forecasting of the stock market and the banking sector development.

7. Discussion of results

From our empirical results, we can infer that a high GDP growth rate plays a significant role in the development of the financial sector development in selected SADC economies. Hence, the more an economy prospers, i.e., the higher the growth rate, the more savings and deposits and the higher issuance of credit to the private sector by banks. This result is not in line with what was expected, particularly for African countries. The paper by Allen et al, (2016) found economic growth to not be a significant factor in fostering financial sector development. This result was further confirmed by Bui, (2019) when the results of his paper found financial development to be negatively affected by economic growth amongst ASEAN countries. The current study also found that Trade Openness (TOP) and the quality of institutions are among the drivers of the banking sector development while stock market development is largely influenced by strong institutions and economic prosperity. These results are in line with the

expectations from past literature. The study by Anwar, Shahzadi and Nasreen, (2017) also found TOP and the quality of institutions to have a positive effect on the financial development of selected Southern Association for Regional Corporation (SAARC) countries.

Inflation and interest rates spread have a significant impact on economies with the banking sectors only. These variables can be used in forecasting the banking sector's development. However, they do differ in signs in that inflation has a negative relationship while interest rates spread has a positive relationship with the two sectors. This result is in line with what Bui, (2019) found in that inflation hurts financial development. Furthermore, economies with both financial sectors tend to hold more foreign bonds as opposed to the banking sector which holds more government bonds. Though both economies do have a positive relationship with institutions, it is economies with both financial sectors that relish, and thus thrive the most with the presence of these institutions. This is evident by their stronger relationship with the institutional variables. These results echo the same sentiments as the study by Mbulawa, (2015) whereby institutional quality needs to be enhanced and thus complement the levels of financial development which in turn boosts economic growth.

The current study further found that on average economies with both the stock market and the banking sector tends to provide more domestic credit than economies with the banking sector only and this can be attributed to the ability to attract foreign direct investment and the ability to retain local investment. This was expected since the study of Yartey (2010) found that the attractiveness of equity investment is affected by the development of good quality institutions and hence led to the development of the stock markets. Furthermore, the study does provide evidence that the banking sector does benefit from the presence of the stock market because some banks are listed on the local stock exchange, therefore, they can raise more funds through the equity which they can then utilize to provide more liquidity to their economies. This result is in line with the findings of the study conducted by Mahonye, (2014) whereby he found the relationship between the stock market and the banking sector development to be positive and that these two tend to operate as complements rather than substitutes for a sample of African countries.

Overtime economies with both sectors develop more than economies with the banking sectors only. Also, economies with the banking sector only are vulnerable to external shocks and are hit the hardest by financial crises than economies with both. Figure 2 does highlight that during the Asian crises and the 2008/9 financial crises the banking sector only economies

dipped significantly while economies with both dipped moderately. However, they both dipped moderately during the dot-com bubble crisis. This supports the findings of the studies by (Anwar, Shahzadi and Nasreen, 2017) and (Ibrahim and Alagidede, 2017) that found countries with developed financial systems do well in times of crisis and they tend to have better and developed economies.

8. Contributions

Much emphasis has been placed on the relationship between financial development and economic growth, but little emphasis has been placed on the determinants of financial sector development, particularly in the SADC region. It is for this reason that this study decided to look at the determinants of financial development from the "bank dominated" economies versus "stock market and bank dominated" economies point of view.

As such, the study contributes to the body of existing literature by asking the question: what are the macroeconomic and institutional drivers of financial development for bank dominated economies and stock market-based economies within the selected SADC region countries? In doing so, the study investigated the drivers or deterrents of financial development in SADC so that the appropriate policy prescriptions can be formulated and implemented with the view of closing the infrastructure gap that exists within the SADC region. To bridge this gap the study provided light on what contributes to financial development in a region that is plagued by underdeveloped financial systems. Furthermore, the paper investigated whether the determinants of financial development are the same for countries with both a stock market and a banking sector, as opposed to those with only a banking sector, and which set of economies tends to develop more over time, bank-dominated economies or economies with both financial sectors.

Conclusively, the study looked at the bilateral relationship between variables (granger-causality test), stationarity, cointegration, speed of adjustment and T-tests.

9. Conclusion and evaluation

This study aimed to explore the determinants of the financial sector development; that is, what are the macroeconomic and institutional drivers for financial development for bank dominated and stock market economies based in the selected SADC countries? The study found that the banking sector development is influenced by: GDP growth rate, foreign direct investment (FDI), government debts, trade openness and the rule of law are significant

contributors while the stock market is largely driven by GDP growth, inflation rate, trade openness, interest rates spread and strong institutions. These results are significant at the 10% level. Thus, we can infer that the GDP growth rate, trade openness, FDI and strong institutions play a vital role in the development of the overall financial development within the SADC region with trade openness and FDI specifically taking centre stage. The study further concludes that the banking sector does benefit from the presence of the stock market and that over time economies with both financial sectors tend to develop more and are less prone to external shocks. The study by De Haas and Van Lelyveld (2010) asserts that foreign ownership of banks tends to have a counter-cyclical effect because the associates of foreign banks do not have to reduce credit supply during a financial crisis that is specific to the domestic economy. Goldberg et al. (2002) concluded that foreign ownership of Argentine and Mexican banks contributed significantly to the financial system's stability during a crisis that afflicted emerging markets. According to Fiala and Havranek (2017), the risk of contagion among local banks is far greater than the risk of contagion between local banks and their foreign owners (assuming institutional ownership). Furthermore, their results discovered a weaker co-movement of extreme losses in stock prices between a local bank and its foreign owners than between local banks.

To foster financial sector development, authorities need to ensure that there is economic growth happening and hence economic prosperity. They need to manage inflation and keep it within an acceptable bound, i.e., inflation targeting, the level of interest rates should be kept at a level that fosters and does not hinders investment and invest in institutions that ensure that the rule of law is upheld given that it is the only significant institutional variable. For a large investment to take place economies must open and allow the influx of foreign direct investment to take place.

The benefits of having both sectors are that these economies can weather through financial crises significantly less bad off than economies that are banking sector dominated and they are also at liberty to issue more liquidity to the economies. As a result, a policy implication of this study is that authorities should view the banking sector and the stock market as complements rather than substitutes, and thus invest in the development of both sectors rather than just one. Furthermore, they should have policies aimed at opening the economy to global markets, which has the potential to increase the amount of credit issued and allow firms to raise capital from a variety of source.

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Annexure

Table A.1. Variable definition and descriptions

Notation	Variables	Data Source	Unit of measurement	Expected signs
Domcredit	Domestic credit to the private sector by banks	International Monetary Fund, International Financial Statistics and data files, and World Bank and OECD GDP estimates 2020	Percentage of GDP in US dollars	Proxy for the banking sector
Marketcap	Market capitalization	World Federation of Exchanges database 2020	Percentage of GDP in US dollars	Proxy for the stock market
Intsprd	Interest spread	International Monetary Fund, International Financial Statistics, and data files 2020	US Dollars	Negatively correlated with both the marketcap and domcredit
GDPg	GDP growth	International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International debt Statistics, and World Bank and OECD GDP 2020	Percentage of GDP in US Dollars	Positively correlated with both the marketcap and domcredit
Infl	Inflation	International Monetary Fund, International Financial Statistics, and data files 2020	Annual perecentage in US dollars	Negatively correlated with both the marketcap and domcredit
Fdi	Foreign direct investment	International Monetary Fund, International Financial Statistics and Balance of Payments databases, World Bank, International debt Statistics, and World Bank and OECD GDP 2020	Percentage of GDP in US dollars	Positively correlated with both the marketcap and domcredit
Lner	Exchange rate	World Bank staff calculations based on Datastream and IMF International Finance statistics data 2020	Local currents units relative to the US dollar	Positively correlated with domcredit and negatively correlated with marketcap
Govdebt	Government	International monetary fund,	Percentage of GDP	Negatively correlated with

	debt (Net lend/ Net borrowing)	Government Finance Statistic Yearbook, and data files. 2020	in US dollars	both the marketcap and domcredit
Trop	Trade openness (Merchandise trade)	World Trade Organisation, and World Bank GDP estimates 2020	Percentage of GDP in US dollars	Positively correlated with marketcap and negatively correlated with domcredit
Rq	Regulatory quality	www.govindicators.org 2020	Annual percentage in US dollars	Positively correlated with both the marketcap and domcredit
Rl	Rule of law	www.govindicators.org 2020	Annual percentage in US dollars	Positively correlated with both the marketcap and domcredit

Source: Author's compilation.

A.2. Corelation test for bank-based economies only

Spearman	domcredit	intsprd	GDPg	infl	fdi	govdebt	trop	rl	rq
domcredit	1.00								
intsprd	0.01	1.00							
GDPg	0.36*	0.01	1.00						
infl	-0.17	0.22	-0.14	1.00					
fdi	-0.18	0.28*	-0.12	0.23	1.00				
govdebt	0.44*	-0.24*	0.34*	-0.26*	-0.26*	1.00			
trop	-0.10	-0.55*	0.10	-0.11	0.12	0.39*	1.00		
rq	0.14	0.27*	0.15	-0.13	-0.03	0.36*	-0.03	1.00	
rl	0.03	0.28*	0.11	-0.09	0.13	0.10	0.002	0.58*	1.00

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

A.3. Correlation test for bank-based and the stock market

Spearman	domcredit	intsprd	GDPg	infl	fdi	govdebt	trop	rl	rq
domcredit	1.00								
intsprd	0.14	1.00							
GDPg	0.34*	0.24*	1.00						
infl	-0.02	0.07	-0.08	1.00					
fdi	0.31*	-0.17	0.19	-0.10	1.00				
govdebt	0.02	-0.18	-0.002	0.14	0.06	1.00			
trop	0.56*	0.36*	0.24*	0.07	0.38*	0.09	1.00		
rq	0.07	-0.26*	0.13	-0.21	-0.14	-0.32*	-0.44*	1.00	
rl	0.49*	0.07	0.23	0.03	0.06	- 0.16	0.31*	0.53*	1.00

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

A.4. Correlation test for stock market development only

Spearman	markcap	intsprd	GDPg	infl	fdi	govdebt	trop	rl	rq
markcap	1.0								
intsprd	-0.07	1.0							
GDPg	0.20	0.24*	1.0						
infl	-0.08	0.07	-0.08	1.0					
fdi	0.23	-0.17	0.19	-0.10	1.0				
govdebt	-0.07	-0.18	-0.002	0.14	0.06	1.0			
trop	0.06	0.36*	0.24*	0.07	0.38*	0.09	1.0		
rl	0.38*	-0.26*	0.13	-0.21	-0.14	-0.32*	-0.44*	1.0	
rq	0.33*	0.07	0.23	0.03	0.06	-0.16	0.31*	0.53*	1.0

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

A.5. Causality test for bank-based economies only

Null Hypothesis	**Lags**	**Z-bar-statistics**	**P-value**	**Decision**
domcredit does not Granger cause intsprd	1	2.94	0.00	Reject
domcredit does not Granger cause lngdp	1	1.31	0.19	Accept
domcredit does not Granger cause infl	1	-0.88	0.38	Accept
domcredi does not Granger cause fdi	1	-0.42	0.67	Accept
domcredit does not Granger cause lner	1	-1.17	0.24	Accept
domcredit does not Granger cause govdebt	1	0.68	0.50	Accept
domcredit does not Granger cause trop	1	-1.00	0.32	Accept
domcredit does not Granger cause rq	1	-0.35	0.73	Accept
domcredit does not Granger cause rl	1	1.42	0.16	Accept

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

A.6. Causality test for bank-based and the stock market

Null Hypothesis	Lags	Z-bar-statistics	P-value	Decision
domcredit does not Granger cause intsprd	1	-0.11	0.91	Accept
domcredit does not Granger cause lngdp	1	-0.85	0.39	Accept
domcredit does not Granger cause infl	1	-0.24	0.81	Accept
domcredi does not Granger cause fdi	1	-0.54	0.59	Accept
domcredit does not Granger cause lner	1	0.14	0.89	Accept
domcredit does not Granger cause govdebt	1	0.32	0.75	Accept
domcredit does not Granger cause trop	1	2.04	0.04	Reject
domcredit does not Granger cause rq	1	-1.02	0.31	Accept
domcredit does not Granger cause rl	1	-1.03	0.30	Accept

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.

A.7. Causality test for stock market only

Null Hypothesis	Lags	Z-bar-statistics	P-value	Decision
marketcap does not Granger cause intsprd	1	5.46	0.00	Reject
marketcap does not Granger cause lngdp	1	-1.14	0.25	Accept
marketcap does not Granger cause infl	1	0.73	0.47	Accept
marketcap does not Granger cause fdi	1	7.76	0.00	Reject
marketcap does not Granger cause lner	1	-0.96	0.34	Accept
marketcap does not Granger cause govdebt	1	1.09	0.28	Accept
marketcap does not Granger cause trop	1	3.61	0.00	Reject
marketcap does not Granger cause rq	1	0.58	0.57	Accept
marketcap does not Granger cause rl	1	0.42	0.67	Accept

Source: Own calculations based on data from the WDI Note: *denotes significance at 10% Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law

A.8 Mean Group and Dynamic Fixed effects for banking sector and stock market economies

variables	Mean Group Estimates				Dynamic Fixed Effects			
	coef.	Std.err	Z	P-value	coef.	Std.err	Z	P-value
Dependent: domcredit								
Long-run coefficients								
intsprd	5.30	4.86	1.09	0.28	0.01	0.92	0.01	0.9
GDPg	-1.74	2.84	-0.61	0.54	2.53	1.42	1.78	0.0
infl	-0.04	0.19	-0.22	0.82	0.03	0.09	0.3	0.7
fdi	5.09	1.95	2.61	0.01	0.45	1.63	0.28	0.78
govdebt	0.22	0.08	2.67	0.01	0.14	0.10	1.36	0.1
trop	0.82	0.71	1.15	0.25	0.63	0.30	2.12	0.0
rq	-1.05	0.90	-1.16	0.25	0.16	0.14	1.12	0.2
rl	0.42	0.59	0.72	0.47	0.09	0.13	0.65	0.5
Hausman test	0.00							
Err. Corr. Coef.	-1.74	0.37	-4.67	0.00	-1.50	0.13	-11.57	0.0
Short-run coefficients								
Δintsprd	-3.26	1.89	-1.73	0.08	-2.93	2.75	-1.07	0.2
ΔGDPg	3.89	3.11	1.25	0.21	-2.13	1.75	-1.22	0.2
Δinfl	0.09	0.14	0.6	0.55	-0.02	0.11	-0.23	0.8
Δfdi	-1.82	0.21	-8.49	0.00	0.83	1.89	0.44	0.6
Δgovdebt	-0.22	0.12	-1.79	0.07	-0.10	0.13	-0.76	0.4
Δtrop	-0.84	1.18	-0.71	0.48	-0.04	0.65	-0.06	0.9
Δrq	-0.25	0.22	-1.15	0.25	-0.26	0.19	-1.36	0.1
Δrl	0.18	0.21	0.86	0.39	0.06	0.17	0.33	0.7
Constant	107.41	208.00	0.52	0.61	-22.57	43.55	-0.52	0.6

Source: Own calculations based on data from the WDI

Domcredit – domestic credit to the private sector, Marketcap – Market capitalization, Finstatus – Financial status (dummy variable), Fdi – Foreign direct investment, Intsprd – interest rates spread, GDPg – gross domestic product growth, infl – Inflation, gov – governemnet debt, trop – Trade openness, rq – regularity quality and rl – rule of law.