AN EXAMINATION OF THE ROLE OF STOCK MARKET DEVELOPMENT IN ECONOMIC GROWTH IN SADC: A PANEL VAR APPROACH

A MINI THESIS SUBMITTED IN PARTIAL FULFILMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE IN ECONOMICS

OF

THE UNIVERSITY OF NAMIBIA

BY

TAIMI AMUNKETE

200437755

APRIL 2023

SUPERVISOR: Prof. Emmanuel Ziramba (University of Namibia)

ABSTRACT

This thesis examines the impact of stock market development on economic growth in five SADC countries, namely Botswana, Malawi, Mauritius, Namibia, and South Africa for the period starting from 2004 to 2019. It tests for the existence of a long-run relationship as well the presence of a causal relationship between stock market development and economic growth. The study selects interactions of stock market development with the real economy using panel vector autoregression (VAR) based Granger causality tests as well as impulse response functions and forecast error variance decomposition to interpret the results. Using stock market capitalization, total value traded and stock market turnover as measures of stock market development, the study aims to determine whether these variables have an impact on GDP growth. The results suggest that there is no cointegration among the variables, suggestive of the fact that there exists no long run relationship. In terms of the short-run causal relationships, the Pairwise Granger Causality tests reveal that there is evidence of a short-term unidirectional causal relationship between stock market development and economic growth, running from stock market development to GDP growth. These results are consistent with the supply leading hypothesis, as was originally postulated by Schumpeter (1911). Also commonly referred to as the finance-led growth hypothesis or the finance-growth nexus, it assumes that causality flows from financial sector development to economic growth and not the other way round; and thus, stock market development is deemed the driver of economic growth. Given the importance of stock market development to economic growth, the study recommends prioritisation of stock market activities in the form on government policy interventions, diversification of stock market products and automation of trading system to ensure enhanced performance of stock markets, as a driver for increased economic growth.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACRONYMS

ASEA	African Stock Exchanges Association
BODIVA	Angola Debt and Securities Exchange
BSE	Botswana Stock Exchange
CoSSE	Committee of SADC Stock Exchanges
FDI	Foreign Direct Investment
FIP	Financial and Investment Protocol
GDP	Gross Domestic Product
IPO	Initial Public Offering
JSE	Johannesburg Stock Exchange
LDCs	Least Developed Countries
LUSE	Lusaka Stock Exchange
MENA	Middle East and North Africa
MLIQ	Stock Market Liquidity
MSM	Maseru Securities Market
NSX	Namibian Stock Exchange
PLSE	Port Louise Stock Exchange
SADC	Southern Africa Development Community
SSE	Seychelles Securities Exchange

SSX	Swaziland Stock Exchange
TNV	Turnover
Trop-X	Seychelles Stock Exchange
TVT	Total Value Trade
VAR	Vector Auto-Regression
VECM	Vector Error Correction Model
WFE	World Federation of Exchanges
DSE	Dar es Salaam Stock Exchange

ACKNOWLEDGEMENTS

I am grateful to my supervisor, Prof. Emmanuel Ziramba (PhD), for his assistance and valuable inputs during the research and the writing of this thesis. I am also immensely grateful for friends and family constantly encouraged to see this through.

DEDICATION

To my mom, Mee Anna “Ndunga ya M’kwahongo” Puye-Ipawa Namweya. And to my little loves, Etuna and Owetu.

DECLARATION

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

| --- | --- | --- |
| **Name of Student** | **Signature** | **Date** |

CHAPTER ONE

INTRODUCTION

1.1 Orientation of the Study

Over the years, the world has seen a rise in stock market activities, reinforcing the importance of the developed stock markets as part of countries' financial markets, which are viewed as important factors for driving economic growth. Stock market development entails strengthened and diversified stock market activities to meet the requirements of stock market participants effectively and efficiently. Economic growth on the other hand is known to be an important factor leading countries' drive for socio-economic development.

Stock markets provide capital for investment to companies listed on a stock exchange, allowing them to undertake greater investments than they would have been able to without listing. Additionally, they provide investment opportunities for both institutional and individual investors who provide their savings and in turn are repaid in the form of dividends. This entails greater availability of funds allowing for increased consumption, savings, and further investment. According to Levine and Zervos (1998), "countries with developed stock markets provide alternative sources of financing to companies, thereby making them less dependent on bank financing which in turn mitigate the risk of credit crunch. In this way, stock markets are able to positively influence economic growth by encouraging savings amongst individuals and providing avenues for firms financing". Investment is an important requirement for economic growth, and thus, it would appear, stock market development can be linked to driving the economic growth of a country.

The sixteen countries[1] of the Southern African Development Community (SADC) vary vastly in terms of stages of economic development, ranked between Least Developed Countries (LDCs) and Upper Middle-Income Countries. These differences extend to the countries' stock markets, with South Africa as the most advanced economy being home to the most developed stock market in Africa, and many of the other countries lagging far behind. In its efforts to eradicate poverty in the region, SADC (SADC, 2006) adopted the Finance and Investment Protocol (FIP) geared towards fostering financial and investment policies of member states with the aim of making them consistent with the objectives of the regional body. Financial markets are just one of the avenues used to improve countries' economic performance and address economic problems such as poverty and income inequality. The countries of SADC are heavily afflicted by economic problems, with Namibia and South Africa being 2 of the countries with the world's highest income inequality. Malawi on the other hand is one of the poorest countries in the region. Thus, looking at stock markets' ability to improve economic performance in SADC may provide an answer as to whether this avenue is worth prioritizing.

1.2 Statement of the Problem

All 16 countries of the SADC region are classified as developing countries. Under the World Bank's 2020 fiscal year country classification, these countries are classified under different developmental stages, ranging between low-income economies[2], lower middle income[3], upper middle income[4] and high income[5] economies. In most

[1] Angola, Botswana, Comoros, Congo (DR), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe
[2]With GNI per capita of USD1,036in 2015 or less – Congo (DR), Malawi, Madagascar, Mozambique, eSwatini, Tanzania, Zimbabwe
[3] GNI per capita between USD1,036 and USD4,045 – Angola, Comoros, Lesotho, Zambia
[4] With GNI per capita between USD4,046 and USD12,535 – Botswana, Namibia, South Africa
[5] With GNI per capita between above USD12,535 – Seychelles, Mauritius

developing countries' attempts to alleviate poverty and achieve economic development, economic growth is often used as an important indicator and measure of progress towards this goal. It refers to the change in national income over time, usually measured over one year.

Achieving greater levels of economic growth is viewed as an important objective for each of these countries. This is evident in individual countries' developmental objectives as well as regional development goals. Section 1 (a) of the SADC Treaty of 1992 highlights the organisation's objectives as the achievement of development and economic growth, alleviation of poverty, enhancement of standard and quality of life for poor people of southern Africa, and to provide support for the socially disadvantaged through regional integration. Over the years, SADC countries have achieved variable rates of economic growth through the various productive activities in the countries, of which stock markets form a part. It however remains ambiguous as to whether development in countries' stock markets is a contributing factor to countries' economic growth. As indicated by Levine and Zervos (1998), although some analysts view stock markets in developing countries as mere "casinos" that have limited positive impact on economic growth, there has been evidence that suggests that stock markets may give a big boost to economic development.

Although widely researched, there seems to be no clear consensus on the nature of the relationship between stock market development and economic growth. Several stances have been taken in literature on the subject with the common one being that there is a positive relationship between stock market development and economic growth. The supply leading hypothesis on stock market development and growth states that stock market development is required for economic growth to take place. This is the most

supported view in literature of stock market development and economic growth and is supported by authors such as Acaravzi, Ozturk and Acaravzi (2009).

The "debate" is, however, not only limited to the nature of the relationship, but also considers the developmental stage of the country in question. With exception of South Africa, most of the countries have severely underdeveloped stock markets offering no more than the plain vanilla of investment products. Market capitalisation, liquidity and other measures of stock market development are relatively low. A lack of clarity about the role of stock market development in their quest for higher rates of economic growth thus creates ambiguity in terms of policy planning and prioritisation of economic activities in countries' bid to achieve greater economic growth. Financial markets are just one of the avenues used to improve countries' economic performance and address economic problems such as poverty and income inequality. The countries of SADC are heavily afflicted by economic problems, with Namibia and South Africa being 2 of the countries with the world's highest income inequality. Malawi on the other hand is one of the poorest countries in the region. Thus, looking at stock markets' ability to improve economic performance in SADC may provide an answer as to whether this avenue is worth prioritizing.

1.3 Objectives of the Study

The objective of this study is to analyse the relationship between stock market development and economic growth in five SADC countries, namely Botswana, Malawi, Mauritius, Namibia, South Africa, for the period 2004 to 2019. The study has the following specific objectives:

- To examine if there exists a long-run relationship between stock market development and economic growth.
- To determine whether a causal relationship exists between the stock market development and economic growth, and if so, determine the direction of causality.

1.4 Research Hypotheses

The following sets of hypotheses are tested:

H^1_0: There is no long-run relationship between stock market development and economic growth in the selected countries

H^1_1: There is a long-run relationship between stock market development and economic growth

H^2_0: Stock market development does not Granger-cause economic growth in the selected countries

H^2_1: Stock market development Granger-causes economic growth in the selected countries

1.5 Justification of the Study

Investment in stock markets raises capital for use in productive activities. Investors also recoup dividends, which increases money supply towards other economic activities. In this sense, stock markets hold benefits for the economy in terms of both forward and backward linkages. On the other hand, stock markets are viewed to not be a great contributor to countries' economic performance. With such inconclusive views on the relationship between stock market development and growth however, it is

difficult to take a stance on its benefit to economies. In the presence of such ambiguities, it makes it difficult to make policy decisions in terms of prioritising it as a segment of the economy to enhance growth.

This study is therefore important in clearing up these ambiguities in order to assist both policy makers and the private sector to make decisions in terms of:

- Prioritising stock markets and their growth for their expected contribution to economic growth
- Undertaking regulatory reforms to ensure proper functioning of stock markets
- Reforming regulations to allow for a greater variety of products offered on stock markets, while at the same time ensuring that these products do not have unwanted economic consequences, and
- Advocating for stock markets as a preferred method of investment over other forms of investment

In terms of literature, the subject is widely researched across the world. And although there have been studies done for individual markets, there are very few focusing on the Southern Africa region as a whole examining stock markets as a contributor to economic growth. The study is therefore important in this respect. By combining the countries of Southern Africa, the study is a move towards examining the economies of the regional bloc. This is particularly important in light of economic integration where research has proven regional integration to be particularly important for developing countries.

1.6 Limitations of the Study

The study is purely quantitative in nature. It relies only on statistical data to draw conclusion on the relationship between stock market development and economic growth in the selected countries. It does not consider views of industry experts on the matter. For this reason, it misses out on the views and opinions of industry participants.

CHAPTER 2

OVERVIEW OF STOCK MARKETS

2.1 Introduction

Stock markets exist as a subset of the capital markets, which is a subset of the wider financial sectors of economies. This section describes the role of stock markets in an economy. It provides an overview of stock markets in the SADC region, discusses problems faced by stock markets in developing countries as well as some proposed solutions to promotion of stock market development.

2.2 The role of stock markets in an economy

The financial sector is split into three segments: the banking sector, capital markets and the non-banking financial sector. While the banking and the non-banking financial sectors are both generally well known, in most countries, capital markets only began to gain momentum over the last few decades. According to UNITAR/DFM (2005), referenced in Acquah-Sam and Salami (2014), capital markets began to take centre stage in the financial sector development of many developing or emerging economies due to the collapse of the Soviet Union and the positive effects of capital markets experienced by several developed countries such as the United States and the United Kingdom.

Capital markets are the portion of financial markets concerned with raising capital by dealing in stocks, bonds and other long-term investments. Capital markets channel savings from individual and institutional investors to users of capital, often businesses and governments. The stock market is a segment of capital markets where shares of companies are traded. Interested investors offer their savings to firms in exchange for dividend payments. Shares are traded in both the primary and the secondary market.

In the primary market, investors purchase shares directly from companies issued as Initial Public Offering (IPOs), whereas shares in the secondary market are traded between investors who wish to sell or buy previously issued shares. Firms use the funds raised on stock markets to expand existing business operations or invest in new business ventures with the expectation of increasing profits. Investor (shareholders) in return are paid dividends which equate to their share of the company's earned profits. For firms to participate on stock markets, companies are required to publicly list on a stock exchange. Most stock exchanges worldwide have in place requirements which companies are expected to meet to be able to list. These may vary between stock exchanges and countries. The more active a country's stock exchange, the more shares are traded. This implies that more firms have access to capital to invest in new business ventures or expand existing business operations, thus leading to increased economic activities in the country. In turn, this has potential for accelerating the country's economic growth.

Theoretical and empirical studies have backed the view that a country's stock market has greater potential to contribute to growth if the stock market is sufficiently large, active and liquid. The number of companies listed is a potential indicator of the size of a stock market. However, a better indicator may be market capitalisation, which factors in the number of shares outstanding and share price. In terms of liquidity, commonly used measures are the value of stocks traded per period as well as turnover.

2.3 Overview of Stock Markets in Africa

In comparison to developed countries, the majority of stock markets in Africa lag far behind. Over the past few decades however, stock market development experienced a

surge and stock exchanges saw growth. As according to Levine (1996), world stock markets have over the past few decades surged greatly and a large portion of this growth is attributed to emerging markets. Stock market activities Sub-Saharan Africa gained momentum over recent years with South Africa being home to the largest and oldest stock exchange in Sub-Saharan Africa. The latest stock exchanges to have been established in Africa are in Ghana, Malawi, Swaziland, Uganda, and Zambia.

2.3.1 Stock Markets of SADC

As per the Association of Stock Exchanges in Africa (ASEA), there are currently 29 stock exchanges in Africa, representing 38 nations' capital markets. Of the 16 countries in SADC, only two, namely Democratic Republic of Congo and Madagascar do not have stock exchanges. South Africa and Zambia are the only two countries in the region to have established more than one stock exchange. The stock exchanges in the region are listed in table 1 below.

Table 1: List of SADC stock exchanges

Country	Name of Stock Exchange	Year	Listings
Angola	Angola Debt and Securities Exchange (BODIVA)	2016	23
Botswana	Botswana Stock Exchange (BSE)	1989	44
Comoros	n/a		
Lesotho	Maseru Securities Market (MSM)	2016	-
Malawi	Malawi Stock Exchange (MSE)	1995	15
Mauritius	Stock Exchange of Mauritius (PLSE)	1988	88
Mozambique	Bolsa de Valores de Mozambique (BVM)	1999	-
Namibia	Namibia Stock Exchange (NSX)	1992	44
South Africa	Johannesburg Stock Exchange (JSE)	1887	402

	ZAR X	2016	3
Seychelles	Seychelles Securities Exchange (SSE)	2013	9
Swaziland	Swaziland Stock Exchange (SSX)	1990	11
Tanzania	Dar es Salaam Stock Exchange (DSE)	1998	17
Zambia	Lusaka Stock Exchange (LUSE)	1994	16
	Zambia Agricultural Commodities Exchange (ZAMACE)	2007	-
Zimbabwe	Zimbabwe Stock Exchange (ZSE)	1948	64

Source: Author's compilation

As seen in the table, South Africa has the oldest (and the newest) stock exchange in the region followed by Zimbabwe. Seychelles, Angola and Lesotho have the newest stock exchanges in the region having been established in 2013 for Seychelles and 2016 for Angola and Lesotho. Below is short discussion on each of the countries' stock markets covered in this research.

i. The Botswana Stock Market

The Botswana Stock Exchange (BSE) was initially launched in 1989 as the Botswana Share Market and was renamed the BSE in 1994 when it was re-established under the Botswana Stock Exchange Act, Act No. 11 of 1994. The exchange experienced some growth over the years, going from a listing of five companies in December 1989 and growing to over 30 listings. Market capitalisation at the end of 2019 stood at USD 3.6 billion.

ii. The Malawi Stock Market

Although officially inaugurated in March 1995, the Malawian Stock Exchange (MSE) began trading in November 1996, after the listing of Malawi's largest insurance firm, NICO Holdings Limited, under the regulatory supervision of the Reserve Bank of Malawi. The stock exchange has 15 listings and a market capitalisation of USD 1.9 billion in 2019.

iii. The Mauritius Stock Market

The stock exchange in Mauritius, the Port Louise Stock Exchange (PLSE) was established 1989 and officially began trading in July of the same year. The exchange grew over the years, going from a listing of six companies in December 1989 and growing to 88 listings as per 2015 data. In terms of market capitalisation during the same range of years, the market capitalisation grew to USD 8.6 billion in 2019.

iv. The Namibian Stock Market

The Namibian Stock Exchange (NSX) is Namibia’s only stock exchange. Historically, the Lüderitz Stock Exchange was established in the 1900s, named after the town of Lüderitz in which it was established. It came about as a result of the diamond rush which brought prospectors to the desert, who then built towns. After the diamond rush ended, the Lüderitz Stock Exchange closed as there was no longer business to conduct. Stock market activities were then re-opened in 1990. The majority of listed companies are dual listed on the South African stock exchange. In total, the exchange has a listing of over 40 companies, of which 9 are local, as per 2019 data. Market capitalisation for the same year was at USD 2.5 billion in 2019.

v. The South African Stock Market

South Africa is one of the few countries only two countries in the SADC region to have more than one stock exchange, namely the Johannesburg Stock Exchange and ZAR-X.

(a) The Johannesburg Stock Exchange (JSE)

Established in 1887, the Johannesburg Stock Exchange (JSE) is also the oldest stock exchange in Africa, after the Egyptian stock exchange established in 1883. It was founded in Johannesburg in 1887, during the Witwatersrand gold rush. It was established with the aim to enable new mines in South Africa and their financiers to raise capital to aid the development of the mining industry. Market capitalisation stood at USD 1 trillion as per 2019 data. The JSE is by far the biggest stock exchange in Africa measured by market capitalisation. In 2004, it was recorded the 17th largest stock exchange in the world by the same measure.

(b) ZAR X

In addition to the JSE, South Africa has a second and lesser-known stock exchange called ZAR X. The exchange started trading in 2016 and currently has a listing of 3 companies mainly in agri-business. Unlike the JSE, ZAR X has lower listing requirements and thus allows for companies with a lesser market capitalisation to gain access to capital. In terms of regulation, ZAR X falls under the ambit of the Financial Services Board of South Africa.

2.4 Problems facing SADC Stock Markets

A host of theoretical and empirical literature has supported the notion that a direct and indirect correlation exists between the level of development of a nation's capital market and its overall social and economic development. Despite these perceived benefits however, in the majority of African countries, of which SADC forms a part, contradictory evidence has been shown. Stock markets in some countries have been seen to be mere casinos which have failed to bring about the expected benefits. As according to Piesse and Hearn (2008), failure of stock markets in developing countries to bring about benefits can be attributed several factors. Firstly, many markets are small and suffer from large scale inefficiencies. In comparison to larger markets which are cost efficient as intermediaries, have high liquidity and have sufficient breadth and depth to ensure price efficiency, African stock markets experience challenges of increasing liquidity, expand access and thus reduce the cost of capital. These markets additionally suffer from a lack of domestic investors to undertake the investments necessary. Additionally, it is worth noting that the African region has a relatively economically disadvantaged population. For this reason, financial intermediary functions which includes banking and other financial services are severely restricted (Piesse & Hearn, 2008). As a result of these factors, stock markets in developing Africa may fail to bring about the expected benefits.

As discussed in the preceding section, stock markets in the region and in Africa in general are small with few listed companies and low market capitalization. Egypt, Nigeria, South Africa and Zimbabwe are the exceptions with listed companies of 792, 207, 403 and 79 respectively. The average number of listed companies on sub-Saharan African markets excluding South Africa is 39 compared with 113, with the inclusion

of Egypt and South Africa. Market capitalization as a percentage of GDP is as low as 1.4 in Uganda. The Johannesburg Securities Exchange has about 90 percent of the combined market capitalization of the entire continent. Excluding South Africa and Zimbabwe the average market capitalization is about 27 percent of GDP. This is in contrast with other emerging markets like Malaysia with a capitalization ratio of about 161 percent.

2.5 Proposed solutions to promotion of stock market development

As indicated by Benimadhu (2003) African stock exchange suffer from specific issues of low levels of liquidity, few listed companies and the small size of the exchange as well as efficiency. Several propositions have been made in a bit to solve problems of African stock markets. These include those set out in Yartey & Adjasi (2007) namely; increase automation, demutualization of exchanges, regional integration, promotion of institutional investors, regulatory and supervisory improvements, involvement of foreigner investors, and educational programs. These are discussed in the section below.

(a) Automation

Automation is widely discussed as one of the policies on how to promote the development of stock markets in Africa. It is expected to reduce the costs and inefficiencies associated with manual systems and increase trading activity, improving market transparency and liquidity in the stock markets by speeding up operations (Capital Markets Authority, 2010). As according to Omuchesi, Bosire and Muiru (2014) recent studies on African stock markets have attributed the low turnover partially to the use of manual trading systems.

According to the Stock Exchange of Mauritius (SEM) (2004), advantages from automation and the application of the automated trading system (ATS) on the exchange's operation include electronic matching of orders, internet trading facilities, enhancing internationalization of the stock market' multiple prices for an order, quick order execution prices and volume levels available in real time. Furthermore, automation has entailed the improvements in market data online report of prices, higher volume of trade and index, online corporate reporting, transparency of dealings and fairness in establishing order priority. Conceptually, an automated stock market will ensure automatic monitoring and a user-friendly stock market. All these operational advantages of automation translate into improved market efficiency.

Empirical studies on the subject have however not yielded consisted results as seen in Omuchesi et al (2014) who studied the effect of automation on stock market efficiency for the Nairobi Securities Exchange which introduced automation in 2006. The study found that the introduction of the ATS did not have a statistically significant effect on market efficiency of the exchange. Automation was found to not have yielded any of the anticipated benefits in improving the exchange's efficiency. On the other hand, Dubey, Chauhan and Syamala (2017) concluded that for the case of India, in the first five years of the automated trading system implementation in 2009, the volume of trading in financial markets increased by 60% as a result of high speed of transfer.

Within the SADC region, the Stock Exchange of Mauritius, Namibia Stock Exchange (NSX), Johannesburg Securities Exchange (JSE) and the Lusaka Stock Exchange (LuSE) are the only ones to have automated and Central Depository Systems. On the

continent, they are joined by the Algiers Stock Exchange, Bourse Régionale des Valeurs Mobilières (BRVM), the Cairo and Alexandria Stock Exchange (CASE), the Nigeria Stock Exchange and the Tunis Stock Exchange.

(b) Demutualisation

Mehra (2010) defines demutualisation as the process by which a customer-owned mutual organization (mutual) or cooperative changes legal structure to form a joint stock company. Yartey & Adjasi (2007) define demutualisation as a change in the legal status, structure and governance of an exchange from a non-profit, protected interest one to a profit oriented one. The process of demutualization involves a change in ownership structure and a change in legal and organization form.

Stock exchanges historically started off as mutually governed, self-regulated structures where profit was not a very strong motive. However, demutualization started gaining popularity in the 1990s. This has been due a number of factors such as competition among exchanges, need for increased capital, need for good corporate governance and the urge to open up ownership of exchanges to public investors (Pirrong, 2000). As according to Hughes & Zargar (2006) some of the benefits owing to demutualisation are that it;

- results in more flexible governance structure fostering decisive action in response to changes in the business environment,
- leads to greater investor participation in the governance of the exchange,
- yields an improved platform in response to potential competitors in the form of alternative trading systems,
- allows greater flexibility and access to global markets,

- facilitates faster and more complete consolidation of stock exchanges to enhance available synergies, and
- ensures increased access to resources for capital investment raised by way of equity offerings or private investment (Hughes & Zargar, 2006).

In the SADC region, the JSE is the only demutualised stock exchange, whereas on the African continent, the Nairobi Stock Exchange joined the JSE in demutualisation in 2004. Yartey & Adjasi (2007) notes that demutualisation should rather be a medium to long term objective for African stock exchanges and the majority are all quite young and still grappling with issues such as a lack of liquidity and poor infrastructure.

(c) Regional Integration

Regional integration has been proposed as another solution to problems of African stock exchanges. Integration at its most extreme form entails combining a group of stock exchanges into one entity. This holds several benefits such as gaining from the experience of the most established exchange in the group, cutting overhead costs and other synergies. According to Yartey and Adjasi (2007), proponents of the idea of regional integration argue that a well-integrated stock market would be a powerful source and driver of capital flows. If well structured, such and exchange has the ability to solve the current problems of illiquidity, small size, and fragmentation (Yartey & Adjasi, 2007). Integration therefore promotes cost efficiency and improves liquidity and price discovery.

The SADC region in particular has undertaken several initiatives to integrate its stock exchanges. CoSSE set up a strategy aimed at developing an integrated real-time network of securities markets within the region. As according to Irving (2005), the

strategy required that each national exchange automated its trading of instruments through a single and accessible regional system. It also encouraged the harmonization of listing rules across the region. As at 2000, all SADC exchanges had harmonized listing requirements in accordance with the JSE system. The JSE and the NSX have also advanced further in harmonizing systems where the NSX uses the trading and settlement systems of the JSE. The two exchanges are also linked on the regulatory side in that the NSX rules and requirements are based on that of the JSE (Irving, 2005).

Other regional cooperation efforts include the Common Market for Eastern and Southern Africa (COMESA)[6] and the East African Community (EAC)[7]. As per Irving (2005), dual listing within the region is also viewed as a form of regional integration. The majority of shares listed on the NSX for example also have primary listings on the JSE. Liberalization of exchange controls in SADC in the 1990s promulgated dual listings of companies.

Box 1: Regional Membership

ASEA is an association of securities exchanges in Africa which aims to develop member exchanges and provide a platform for networking. The association was established in 1993, and works closely with member exchanges to enhance African capital markets and the African economies by:

[6] Members with established national exchanges are Egypt, Kenya, Malawi, Mauritius, Swaziland, Uganda, Zambia, and Zimbabwe.

[7] The capital market regulatory authorities of Kenya, Tanzania, and Uganda entered into a Memorandum of Understanding (MoU) in 1997. This MoU sets out cooperation goals for the three countries' securities markets and set up the East African Member States Securities Regulatory Authorities (EASRA) as the coordinating regulatory body for capital market integration and cooperation.

1. enhancing the visibility of ASEA members at the international level with a view to attract capital inflows to African capital markets,
2. providing an authoritative information portal on African public markets and provide aggregated statistics and information on African exchanges,
3. being a powerful lobbying and advocacy voice for member exchanges,
4. promoting market development among member exchanges,
5. promoting capacity building and training for member exchanges, and
6. initiating strategic alliances on behalf of member exchanges.

Its membership is composed of stock exchanges within the African continent, but also includes entities that are affiliated or have an interest in African capital markets. Members of the association are able to interact among themselves in a bid to exchange information and share experiences and best practices.

The membership of the association is open to any securities exchange or nascent stock exchange located in the African region. There are three categories of members. Full membership is open to a recognized, regulated and supervised securities exchange, derivative and commodities exchange operating in Africa whereas associate membership is open to entities operating in the capital markets industry in Africa or elsewhere. Observer membership is open to a national or international organization that has an interest in or is concerned with securities exchange, derivative and commodities exchange and that wishes to participate or assist in any constructive way in furthering the objectives of the association.

ASEA has a total of 32 members of which 27 are full members, 2 are observer members and 3 associate members. All existing SADC stock exchanges are members of ASEA, with the exception of Angola and Lesotho. Benefits of ASEA membership include:

- knowledge transfer and information sharing amongst members of the association
- visibility at an international level through strategic memberships and partnerships
- participation in policy making on the African capital market
- interaction with key decision makers on the continent

ASEA's vision is to enable African securities exchanges to become key significant drivers of the economic and societal transformation in Africa. The association's long-term mission is to provide a forum for mutual communication, exchange of information, cooperation and technical assistance among its members, as well as to facilitate the process of financial integration within the region for the effective mobilization of capital to accelerate economic development in Africa.

Source: ASEA, 2022

(d) Promote Institutional Investors

Institutional investors are financial institutions that accept funds from third parties for investment in their own name but on such parties' behalf. They include pension funds, mutual funds and insurance companies. According to Yartey and Adjasi (2007), institutional investors typically favour greater transparency and market integrity in

both primary and secondary markets, seek lower transaction costs, and encourage efficient trading and settlement facilities. They can therefore act as a countervailing force to commercial and investment banks as well as other market intermediaries, forcing them to be more competitive and efficient. For this reason, institutional investors can have positive gains for African stock markets.

(e) Strengthen Regulation and Supervision

The rules created in the regulation of financial markets are made typically with the goal to protect investors from the potentially opportunistic behaviour of insiders. Given that investors are important to the success of stock markets, it is imperative for developing countries to ensure investor protection in order to solve agency problems and information asymmetry arising from inside information (Yartey & Adjasi, 2007). La Porta, Lopez de-Silanes and Shleifer (2003) indicate that this helps in making optimal decisions, increasing access to external finance and resulting in productive investment and eventually higher firm growth:

> *"There is the need for a well-structured and clear rule of law, within an efficient judicial system, which allows for contract repudiation and expropriation risk in this regard. Strict ethical and conduct of business rules could be developed for members of African stock exchanges. Rules must follow international best practices but at the same time reflect local structures and needs."* Yartey & Adjasi (2007, p.25)

(f) Attract Capital Flows and Encourage Foreign Participation

As is inherent to developing economies, domestic residents have a limited means to undertake the kinds of investments required to grow an economy or develop the country's stock market. For this reason, attracting foreign capital flows and encouraging foreign participation is particularly important for developing countries. Asiedu (2006) notes that sustained economic growth, quality public institutions and infrastructure, trade liberalization, and efficient capital markets are important for attracting capital flows. In order to achieve this, countries need to create an "enabling business climate with low costs of doing business, property rights, effective regulations and legal institutions, and some capital account liberalization are important" (Yartey & Adjasi, 2007, p.26)

(g) Strengthen Education

Given that stock market activities are sufficiently new in Africa, there is very little knowledge about it, and more so for individual investors. People in developing countries in particular have limited understanding of stock markets and their investment benefits and therefore choose to stay away. As according to Yartey and Adjasi (2007), raising public awareness and knowledge of stock markets have the potential to foster stock market development in Africa. Education is important not only to individual investors but also to institutional investors who require education of issues such as how stock markets work, the benefits of listing, how to meet listing requirements and meet other regulatory requirements.

2.6 Conclusion

As is evident, stock markets in SADC, and other countries in Africa (with the exception of South Africa) lag far behind those in the developed world. Ambiguity in the role of stock market in boosting economic growth has been a factor and questions to the benefits of stock markets in SADC have remained to be answered. Although there have been proposed solutions to achieving efficiency in developing country stock markets, these solutions may present their own challenges and therefore, it is important that each proposed solution is viewed within the context of each individual country and its needs. The next chapter reviews literature on the link between stock market development and economic growth and addresses some of these ambiguities for countries where similar studies have been conducted.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

The subject of stock market development and its relation to economic growth has been widely researched theoretically and empirically. However, despite a large body of literature on the relationship between the two, conclusions are far from definitive. Several theories have been explored on how stock market development affects growth. In addition to theory, there is a plethora of empirical literature which explore the link between stock market development and economic grow using measures of stock market development. Additionally, since stock markets form part of the wider capital and financial markets, theoretical and empirical analysis on the effects of capital or financial markets can thus be generalised to stock markets. This chapter reviews first theoretical literature and then empirical literature on the subject.

3.2 Theoretical Literature

In principle, stock markets are said to be important in the process of promoting growth in that they channel savings to productive use, thereby fostering efficient allocation of resources to investments capable of expanding growth. One of the most common ways in which the relationship between economic growth and stock market development has been discussed in literature is in terms of the supply-leading and demand-pushing hypothesis (see Avaravci, 2011). These are two contrasting views on the relationship between the two variables. Additional to these two is the hypothesis of bi-directional

causality, one of no causal relationship as well as the stage of development hypothesis are also discussed.

Although the supply-leading hypothesis (and its contrast) is focused on financial sector development as a whole, stock markets form part of the wider financial sector and thus its development forms part of the wider financial sector development. Thus, when analysed separately, both the supply–leading and the demand-following hypothesis can be said to apply to the relationship between stock market development and economic growth. This view is supported by Ali, Zubairu and Abdullahi (2015) who note that, although most earlier studies on the growth-finance nexus, have focused more on bank based financial indicators[8], the increase in the volume of share trade globally has prompted researchers to consider stock market indicators in determining financial sector development on other macroeconomic variables. This can be seen in the large body of literature focused on the role of stock market development in promoting economic growth. Several authors have discussed these five hypotheses (see Ali et al, 2015; Schumpeter, 1911; Adeyeye, Fapetu, Aluko & Mirgoro, 2015; Ali et al, 2015; Levine & Beck, 2004; Levine & Zervos, 1996 Robinson, 1952; Lucas, 1988; Patrick, 1966; Stern, 1989). The section below reviews literature in support of each of the five hypotheses in greater detail.

3.2.1 The Supply leading Hypothesis

Schumpeter (1911) is commonly cited as the proponent of the hypothesis that financial development is positively related to economic growth, which came to be known as the supply-leading hypothesis. Also commonly referred to as the finance-led growth hypothesis or the growth-finance nexus, it assumes that causality flows from financial

[8] such as private sector credit as a ratio of GDP, bank deposit ratio to nominal GDP, ratio of liquid liability to GDP

sector development to economic growth and not the other way round; and thus stock market development is the driver of economic growth. Adeyeye et al (2015) summarise Schumpeter's 1911 postulation, indicating that a well-functioning financial sector is required to facilitate growth in the real sector and as a result, brings about economic growth. This means that *"economic growth is reliant on how well the financial sector is deepened or developed. As the financial sector deepens, there is an increase in the supply of financial services"*. Adeyeye et al (2015, p.2)

In support of this hypothesis, Ali et al (2015) note that successful stock markets can have a positive impact on the financial sector, which in turn will have a positive influence on the overall economy. According to the authors, stock markets help firms to raise external finances used to expand operations, and this helps particularly blue-chip firms. Other theoretical studies which support this hypothesis include Levine and Beck (2004) who take the view that financial markets in general – of which stock markets form a part – are important in channelling investment capital, providing liquidity and pooling risks. Levine and Zervos (1996) note that financial markets reduce "socially unnecessary liquidity", attracting savings into productive investments and allowing for diversification in liquidity and investment risks. This suggests capital formation is used to grow the economy.

> "*The existence of well-developed financial sector enhances the creation of financial services as well as accessibility to them in anticipation to their demand by participants in the real sector of the economy. The supply-leading hypothesis presumes that the economy responds to growth in the real sector facilitated by financial development."* Adeyeye et al (2015, p.2)

3.2.2 The Demand Following Hypothesis

Converse to the supply leading hypothesis is the demand-following hypothesis, also referred to as the growth-led finance hypothesis or the growth-finance nexus. This thesis was pioneered by Robinson (1952) who takes the view that the deepening of the financial sector is dependent on the growth of an economy. Contrary to the supply-leading hypothesis, the demand-following hypothesis suggests the direction of causality to run from economic growth to financial development. Lucas (1988) takes the view that, as the economy grows, so do economic agent's needs for financial services. Thus, financial intermediaries expand their operations in order to meet the needs of economic agents, thus deepening the financial sector. This view is in support of the demand-following hypothesis in that, in order for the financial sector to grow, there has to be a need for greater financial service provision brought about by an increase in economic growth. Economic growth is thus a pre-requisite for financial sector development.

3.2.3 Bi-directional causality

This hypothesis postulates that financial sector development (and in turn stock market development) and economic growth have a bi-directional causal relationship. Growth in the financial sector expands economic growth. An expansion in economic growth in turn leads to greater development of the financial sector through feedbacks. Authors who support this view include Greenwood and Jovanovic (1990), Saint-Paul (1992), Berthelemy and Varoudakis (1996); Demetriades and Hussein (1996); Greenwood and Smith (1997); Blackburn and Hung (1998); and Harrison, Sussman and Zeira (1999).

3.2.4 No causal dependence

The fourth hypothesis is one that postulates that financial deepening and economic growth are causally independent. This suggests that there is no relationship between the variables and thus a change in one does not affect the other. This hypothesis is seemingly not very popular, with limited support for it in existing literature. One supporter of this is Lucas (1988) who argues that financial deepening, at best, plays a very minor role in economic growth.

3.2.5 Stage of Development Hypothesis

A final view on the effect of financial development and economic growth is that termed the stage of development hypothesis. It was proposed by Patrick (1966) who indicated that the direction of causality between stock market (financial) development and economic growth depends on a country's level of development. It is essentially a combination of both the supply-leading and demand-leading hypothesis. Whether the supply-leading hypothesis holds or the demand-following hypothesis is largely dependent on the developmental stage a country. As according to Patrick (1966), the supply leading hypothesis will hold in an economy which is in its early stages of development. As the economy grows however, the supply-leading hypothesis fades and the demand-following hypothesis starts to hold.

It may thus be said that, for countries in their early stages of development, the supply-leading hypothesis holds in that capital formation in the financial sector (stock market) allows for investment in productive activities thus leading to growth in the economy. However, as an economy grows and approaches the developed economy stage, the growth in such an economy allows for excess savings which is then used to invest in

the financial sector (capital markets), leading to financial sector experiencing a growth led expansion.

3.2.6 Conclusion

As according to Adeyeye et al (2015) the existence of the supply leading hypothesis is more desired in comparison to the demand following hypothesis. This is for reasons that in developing countries – of which all SADC countries are – "financial intermediaries are required to always act as catalysts for economic growth" (Adeyeye et al, 2015, p.2). Thus, given Patrick's (1966) postulation, it can be expected that the supply leading hypothesis would hold for all SADC economies as they are all in their initial stages of development.

In addition to the theoretical assertions, empirical studies have been undertaken to determine the direction of causality between stock market (financial) development in many countries across the globe. These are in addition to the theoretical views discussed above. The section below analyses such empirical studies.

3.3 Empirical Literature

A plethora of studies have been conducted at both country level (see Badr, 2015; Acquah-Sam, 2014; Adeyeye et al, 2015; Bahabwa, 2015; Bayar, 2014; Olweny and Kimani, 2011; Ishioro, 2013; Kadenge & Tafirei, 2014, Matadeen & Seetanah, 2015, Nazir et al, 2010), and by country groupings using panel data methods (see Acaravci et al, 2009; Ali & Aamir, 2014; Azam et al, 2016; Beck & Levine, 2002; Beck & Levine, 2002; Boubakari & Jin, 2010; Bundoo, 2017; Caporale et al, 2004; Caporale & Spagnolo, 2011; Carp, 2012; Cavenaile, Gengenbach & Palm, 2014; Chang, 2001;

Dumitrescu & Hurlin, 2012; Enisan & Olufisayo, 2009; Hailemariam & Guotai, 2014; Haque & Hossain, 2011; Levine & Zervos, 1996; Liu and Sinclair, 2008; Mohtadi & Agarwal 2001, Naik & Padhi, 2015, Odhiambo (2007) and Pan & Mishra, 2018).

In the same fashion as the theoretical literature, empirical studies seem to be in support of the five hypotheses discussed. This section analyses empirical literature on the relationship between financial (stock) market development and economic growth. Building onto the review of theoretical literature, the section groups the reviewed studies in terms of hypotheses they support. Furthermore, given that the stage of development hypothesis accounts for a country's level of development, the paper further analyses literature grouped for different stages of development (developed and developing economies) in order to see whether this hypothesis is indeed supported by empirical literature.

3.3.1 The supply-leading hypothesis

A number of studies have supported the supply leading hypothesis. These are both country specific and panel studies. The section below looks these studies further.

3.3.1.1 Panel studies in support of the supply-leading hypothesis

Using a system of GMM for dynamic panels to investigate the impact of stock markets and banks on economic growth for 40 countries from 1976 to 1998, Beck and Levine (2004) found that stock market development positively influence economic growth, supporting the supply-leading hypothesis. Naik and Padhi (2015) in studying the relationship between economic growth and stock market development also conclude that stock market development significantly contributes to economic growth. Using dynamic panel 'system GMM' estimators and panel non-causality test of Dumitrescu

and Hurlin (2012) which is designed for heterogeneous panel- used to test for direction of causality, the authors report a unidirectional causation running from stock market development to economic growth. The unidirectional nature of the relationship can be said to be purely in support Schumpeter's 1911 supply-leading hypothesis which suggests that causality flows from finance to economic growth with no feedback response from economic growth. Additionally, Naik and Padhi (2015) concluded that macroeconomic variables, such as investment ratio, trade openness and exchange rate strongly influence economic growth.

Using Granger causality test, Boubakari and Jin (2010) investigated the link between stock market development and economic growth for some Euronext countries[9] for the period 1995 - 2008. The study found evidence of positive links between the stock market development and economic growth, for Netherlands, France and the United Kingdom. Where causality was present, the authors found that the causality ran from stock market proxies to economic growth showing a significant relation between market capitalization, total trade value and turnover ratio on the GDP and FDI, implying unidirectional causality, and thus also in support of this hypothesis.

Using a panel of 70 countries, Chang (2001) concludes that development of stock markets has significant positive effects on both the long-run growth rate and short-run level of real GDP per capita. Similarly, Hailemariam and Guotai (2014) conclude that stock market development is an important wheel for economic growth. In doing this, the authors used dynamic panel GMM on the data for 17 emerging market and 10 developed market economies during the 12 years' period from 2000 – 2011. With their results, the authors concluded that stock market development is an important driver of

[9] Pre-Brexit, Euronext countries constituted of, Belgium, France, Portugal, Netherlands and United Kingdom

economic growth and take the view that stock market development affects economic growth both directly and indirectly by boosting investment behaviour.

A study that makes the same conclusion is that by Mohtadi and Agarwal (2001), which examines the relationship between stock market development and economic growth for 21 emerging markets over 21 years, using a dynamic panel method. The authors' results too suggest that a positive relationship exists between several indicators of the stock market performance and economic growth both directly.

Cavenaile et al (2014) investigate the long run relationship between the development of banks and stock markets and economic growth and causality direction in five countries through the period 1977 to 2007 by using Unit Root Test, Cointegration Test and Causality Test. The authors found single cointegrating vector between financial development and growth, and also found that there was causality going from financial development to economic growth. Another piece of panel-based literature that supports the supply-leading hypothesis is that by Caporale and Spagnolo (2011). In this paper, the authors examine the linkages between stock markets and economic growth in the Czech Republic, Hungary and Poland. The findings by these authors suggest a unidirectional causality running from stock markets to growth. This was seen to particularly become stronger with the accession of the European Union, presumed to be a catalyst for institution building and development. Similarly, Caporale et al (2004) also examined the relationship between stock market development and economic growth for the countries of Chile, Korea, Malaysia and Philippines employing the panel VAR techniques. The study similarly concluded that stock market development enhances the rate of economic growth through the investment productivity channel.

3.3.1.2 Country specific studies in support of the supply-leading hypothesis

Applying the Johansen co-integration analysis, unit root, Toda & Yamamoto Granger causality tests, Bahabwa (2015) tests the relationship between stock market development and economic growth in Namibia. The results of this study are also purely in support of the supply leading hypothesis, finding a unidirectional relationship that runs from stock market development to economic growth.

Kadenge and Tafirei (2014) examine the short and long run impact of bank and stock market developments on growth in Zimbabwe with annual data from 1988-2012 using a financially augmented production growth function and ARDL approach, as well as the error correction mechanism. The authors found that a steady long run relationship exists between growth, bank and stock market developments, although this relationship was found to be stronger for banks than it was for stock markets. Nonetheless, the result of the study clearly gives support for the supply-leading hypothesis in the case of Zimbabwe for the period under the study.

Bayar et al (2014) study the role of stock market development in economic growth for the country of Turkey during the period 1999-2013 by using Johansen-Juselius cointegration test and the Granger causality test. The authors also found evidence in support of the supply leading hypothesis, with the results indicating that there exists a long run relationship between economic growth and stock market capitalization, total value of stocks traded, turnover ratio of stocks traded. The authors found that there is there is unidirectional causality from stock market capitalization, total value of stocks traded, and turnover ratio of stocks traded to economic growth.

For the case of Kenya, Olweny and Kimani (2011) investigate the causal relationship between stock market performance and economic growth for the period 2001 – 2010,

using VAR based Granger causality tests. The study reached the conclusion that the causality between economic growth and stock market runs in one direction from the country's NSE 20-share index to the GDP, also supporting the supply leading hypothesis.

Another study in support of the supply leading hypothesis is that by Nazir et al (2010) for the case of Pakistan. The study investigated the relationship between stock market development and economic growth using size and liquidity of the stock market as measures of stock market development. The authors conclude that a country can improve economic growth by increasing the size of the stock market. Azam et al's 2016 study similarly carries out time series cross country analysis on data for the countries Bangladesh, India, China and Singapore. The authors used ARDL bound testing approaches and found there to exist a there is long-term cointegration among economic growth, foreign direct investment (FDI), stock market development and inflation, in support of the supply leading hypothesis.

3.3.2 The demand-following hypothesis

In comparison to the supply leading hypothesis above, there seems to be fewer studies in support of the demand-following hypothesis. These are both country specific and panel studies. The section below looks at these studies further.

3.3.2.1 Panel level studies in support of the demand-following hypothesis

Odhiambo (2007) undertook to study the direction of causality between financial development – of which stock markets form part –, and economic growth for the countries of Kenya, South Africa and Tanzania. The study found that the demand

following hypothesis holds for Kenya and South Africa. Given that the authors used several proxies for financial development, the authors also found that the results were sensitive to the choice of proxy used for financial development.

3.3.2.2 Country level studies in support of the demand-following hypothesis

Liu and Sinclair (2008) investigate the relationship between stock market performance and economic growth in Greater China over the period 1973 to 2003 through use of causality tests within the VECM framework. The study found evidence of unidirectional causality running from economic growth to stock prices in the long run, which is in support of the demand following hypothesis. Pan and Mishra (2018) investigate the interplay between stock market and real economy to figure out the various channels through which financial markets drive economic growth using an ARDL model and the Toda Yamamoto causality test. The study did not find any evidence of a relationship between stock market and real economy in the short run. In the long-run however, the study found evidence in support of the demand-following hypothesis which postulates that economic growth spurs development of stock markets for China's B share market.

3.3.3 Bidirectional causality

A number of studies have supported the hypothesis of bi-directional causality. These are both country specific and panel studies. The section below looks at these studies further.

3.3.3.1 Panel level studies in support of the hypothesis of bidirectional causality

Enisan and Olufisayo (2009) studied the relationship between stock market development and economic growth in seven African countries found support for the hypothesis of bi-directional causality in the case of Ivory Coast, Kenya, Morocco and

Zimbabwe, using the VAR technique. The authors found evidence of bi-directional causality between two indicators of stock market development and economic growth. Kagochi, Nasser and Kebede (2013) investigate the relationship between financial development and economic growth in seven Sub-Saharan countries using panel Granger causality tests. The study found that there is two way causality between stock market development and economic growth, also in support of the hypothesis of bidirectional causality.

3.3.3.2 Country level studies in support of the hypothesis of bidirectional causality

Marques et al (2013) test the relationship between stock market development and economic growth in Portugal for the period 1993 – 2011. Using VAR modelling, Granger causality, variance decomposition and impulse response function, the authors found evidence of Granger bidirectional causality between the stock market and economic growth meaning that stock market development and economic growth cause each other. Zivengwa, Mashika and Makova (2015) used advanced econometric techniques of Unit Root Tests, Vector Autoregressive (VAR) and Granger Causality Tests to explore the causal link between stock market development and economic growth in Zimbabwe using annual time series data for the period 1980 to 2008. The authors used market size (measured by stock market capitalization as a ratio of GDP) and stock market turnover (measured by the value of stocks traded as a ratio of stock market capitalisation) as measures of stock market development. Zivengwa et al (2015) found evidence of a unidirectional causal link that runs from stock market turnover to economic growth, but no causal relationship between stock market size and economic growth. The authors further found that stock market has an indirect

impact on economic growth through is significant influence on investment, implying that the supply leading hypothesis holds through the investment channel. Furthermore, all the stock market development measures were also found to have a positive influence on investment as the main determinant of economic growth, implying the demand-following hypothesis holds (Zivengwa et al, 2015). Ultimately, this implies that bi-directionally causality exists as both the supply-leading and demand following hypothesis was said to hold.

The findings of Zivengwa et al (2015) support those of an earlier study carried out on the same country by Ishioro (2013). Using the ADF unit root tests and the long-run Grangernon-causality estimation technique, the author tested the nature and direction of the causality between economic growth proxy by the real GDP growth rate and stock market development proxy by real market capitalization, value traded ratio and stock market volatility. The study similarly found that a bi-directional causality exists between economic growth and stock market development.

Acquah-Sam (2014) studied the impact of stock market development as part of the wider capital markets, on economic growth in Ghana, for the period 1991 to 2011, employing Structural Equation Modelling (SEM) through Path Analysis. The author fount there to be a bi-directional relationship between economic growth and capital markets, of which stock markets is a component. This link was found to be strong enough for the author to advocate for financial sector development as catalyst for economic growth.

Adeyeye et al (2015) also studied the link between financial sector development, of which stock markets form part, and economic growth for the country of Nigeria. Using data between 1981 and 2013, the authors used Granger Pairwise to explore the nature

of the relationship. The study concluded that for the case of Nigeria, there exists a bi-directional causality exists financial development variables and indices of economic growth. Finally, another study which supports the hypothesis of bi-directional causality is that by Metadeen and Seetanah (2015). For the case of Mauritius, the authors analyse the relationship between stock market development, banking development and economic growth in a unified framework using data for the period 1988-2011, through a dynamic Vector Error Correction Model (VECM). The study concludes that stock market development has a positive impact on economic growth in the long run and Granger-causality results indicate the presence of a bi-directional causality between the two variables

3.3.4 No causal relationship

A number of studies have supported the hypothesis that there is no causal relationship between stock market development and economic growth. These are both panel level and country specific studies. These are discussed further below.

3.3.4.1 Panel level studies in support of the postulation of no causal relationship

Using Granger causality test, Boubakari and Jin (2010) investigated the link between stock market development and economic growth for some Euronext countries[10] for the period 1995 - 2008. The authors concluded that there existed positive links between the stock market development and economic growth, but only for those countries which had highly active and liquid stock markets. The findings reject the existence of a causal relationship for countries where stock markets are small and not very liquid. The study however did not find a significant causal effect of stock market development

[10] Pre-Brexit, Euronext countries constituted Belgium, France, Portugal, Netherlands and United Kingdom

of economic growth for the countries Belgium and Portugal. Based on these results, it can be concluded that the hypothesis of no causal relationship holds for Belgium and Portugal. It is worth noting however that, for Portugal, these results are in direct contrast to that of Marques et al (2015) who found a positive relationship using data for the years 1993 to 2011 and using VAR model, Granger causality test and impulse response function. Another study which supports the hypothesis of no causal relationship is that by Naceur and Ghazouani (2007). Using GMM to test for the relationship between banks, stock markets and economic growth for 11 Middle Eastern and North African countries from 1979 to 2003, the authors find no evidence of a significant relationship between stock market development and economic growth.

Using Granger causality test, Carps' 2012 analysis of stock market impact on volatility of the foreign capital inflows which is used as proxy for economic growth in Central and Eastern Europe through the period 2000 to 2007 found that stock market capitalization and stock value traded do not have any impact on the rates of economic growth in the long run. Enisan and Olufisayo's 2009 study which covers 7 African countries found that for Nigeria, there was no evidence of causal relationship between stock market development and economic growth. Haque and Hossain (2011) study the benefits of stock market development on economic growth in the South Asian Association for Regional Cooperation between 1980 and 2008. Similarly, the authors failed to find a direct link between stock market development and economic growth. One of the reasons attributed to this is that stock market funds are too small relative to the economy, to have an impact on growth of the economy.

3.3.4.2 Country level studies in support of the postulation of no causal relationship

In evaluating the relationship between stock market development and economic growth in India from 1998 to 2001, Azarmi, Lazar and Jeyapaul (2005) found that there was no relationship between the variables for the pre-liberalisation period[11]. Based on this, the authors concluded that for the period before liberalisation, the Indian stock market merely served as a casino that did not contribute to the economic growth of the country. For the post-liberalisation period on the other hand, the authors found a negative relationship. In testing the relationship between growth and stock market for Egypt, Badr (2015) found that there is no causal relationship between the real GDP growth and market capitalisation when tested alone, although, market capitalisation when tested jointly with FDI, a causal relationship was found to exist.

3.3.5 The stage of development hypothesis

The stage of development hypothesis takes the view that the supply leading hypothesis holds when a country is in its initial stages of development (developing) and the demand push hypothesis holds when a country is developed. Thus, for a study to fully support this hypothesis, it would need to have tested the relationship during a country's predevelopment stage, and again afterwards, possibly omitting the years of transition for clearer results. This test may thus only be possible for countries which became developed and provided that data is available from such country's pre and post development stage. However, one may still contrast the developmental stage of a country against its results to conclude that this country's results (although partially/inconclusively) are in support of this hypothesis. Thus, in a panel data study which comprises a mixed of developed and developing countries analysed separately,

[11] Talk about Indian liberalisation

one should expect that the supply leading hypothesis holds for all developing countries and the demand following hypotheses for all developed countries.

Rioja and Valev (2011) studied the effects of stock markets and banks on the sources of economic growth, productivity and capital accumulation, using a large cross-country panel that includes high- and low-income countries. The authors found that stock markets have not contributed to capital accumulation or productivity growth in low-income countries. For high income countries however, the authors found that stock markets have a significantly large positive effect on productivity growth. Conversely, in high-income countries, stock markets are found to have sizable positive effects on productivity growth, while banks only affect capital accumulation. The results of this study are entirely contrary to expectation in view of the stage of development hypothesis.

Also, in the case of country level cross-sectional studies (or panel data studies of countries at the same stage of development), in order to check for the stage of development hypothesis, one should expect that the supply leading hypothesis holds always for developing countries and the demand following hypothesis always for developed countries. The section below thus looks at studies at different levels of development to see whether this is the case.

3.3.5.1 Evidence from developed economies

Arestis and Demetriades (1997) used time series analysis and Johansen co-integration analysis for the USA and Germany. For Germany, the authors found that there was an effect growth resulting from banking development. In the USA, there authors found that there was insufficient evidence to claim a growth effect of financial development,

and that the data pointed towards the indication that real GDP contributes to both the banking system and stock market development.

Boubakari and Jin (2010) investigated the link between stock market development and economic growth for some Euronext countries[12] for the period 1995 - 2008. The authors concluded that there existed positive links between the stock market development and economic growth, for Netherlands, France and the United Kingdom. The study rejected the existence of a causal relationship for Belgium and Portugal. Based on these results, it can be concluded that the hypothesis of no causal relationship holds for Belgium and Portugal whereas the supply leading hypothesis holds for the other three countries. This is also contrary to the "stage of development" hypothesis, taking into account these countries' stages of development.

3.3.5.2 Evidence from developing and emerging economies

Enisan and Olufisayo (2009) studied the relationship between stock market development and economic growth in seven African countries, namely Egypt, Ivory Coast, Kenya, Morocco, Nigeria, South Africa and Zimbabwe. Using Granger causality test based on a VECM, the study found that there was a unidirectional long-run relationship between the variables for Egypt and South Africa, supporting the supply-leading hypothesis. In the case of Ivory Coast, Kenya, Morocco and Zimbabwe, using VAR based Granger Causality test, the authors found evidence of bi-directional causality between two indicators of stock market development and economic growth, supporting the hypothesis of bi-directional causality. For Nigeria of

[12] Pre-Brexit, Euronext countries constituted; Belgium, France, Portugal, Netherlands and United Kingdom

the other hand, the study found that there was no causal relationship between the variables.

Using a dynamic panel data model with GMM estimators for a panel of 10 LDCs for the period 1995 – 2009, Seetanah et al (2012) find an insignificant relationship between stock market development and economic growth. Their results however found banking development and education within their model to be the main factors contributing towards the growth of these countries. The authors further explain that these results may be due to the fact the economies in this study are mostly banking oriented and have relatively young stock markets.

Ali & Aamir (2014) used GLS regression on panel regression test on five emerging economies, namely India, Pakistan, China, Malaysia and Singapore from 1991-2011. The study concluded that there is a positive link between economic growth and stock market development. Within the SADC region, Zivengwa et al (2015) found evidence of a unidirectional causal link that runs from stock market turnover to economic growth for Zimbabwe, but no causal relationship between stock market size and economic growth. The authors further found that stock market has an indirect impact on economic growth through is significant influence on investment, implying that the supply leading hypothesis holds through the investment channel. All the stock market development measures were also found to have a positive influence on investment as the main determinant of economic growth, thus implying the demand-following hypothesis holds (Zivengwa et al, 2015). Ultimately, the study thus concludes that a bi-directionally causality exists as both the supply-leading and demand following hypothesis was said to hold. Although the supply-leading hypothesis holding is in support of the "stage of development" hypothesis, the fact the demand-following hypothesis also holds is in fact contrary to the "stage of development" hypothesis for

Zimbabwe as a developing country. Suring the sane year, Bahabwa (2015) found evidence of a unidirectional relationship that runs from stock market development to economic growth for Namibia, supporting the view that the supply leading hypothesis holds for these developing countries.

From the studies reviewed under the supply leading hypothesis for both developed and developing countries, it is evident that there is no consensus at all in support of the stage of development hypothesis. Developing country results have shown different outcomes besides what would be expected – the supply leading hypothesis. The section below looks at other factors besides the 4 hypothesis which may explain the various outcomes, as per the literature.

3.3.6 Other findings

As is evident in the literature discussed above, a number of authors have found straight forward results in clear support of one of the hypotheses discussed above. With many other studies however, results have been more complex results and take into account several other factors such as the size of the stock market, the variables used, and the econometric techniques employed. Other results have taken into account the economic regime of the country at the time the study was carried out, for example the period pre- and post-liberalisation. These are discussed in the section below.

3.3.6.1 Size and liquidity of the Stock Market

The view that the link between stock market development and growth can differ between countries is not only limited to a country's stage of development. Other

factors responsible for such difference as explained by several authors (see Nazir et al, 2010; Boubakari & Jin, 2010) can be the size and liquidity of a country's stock market. Boubakari and Jin (2010) for example justify their findings based on the size and activity of the stock markets. According to the authors, there are positive links between the stock market development and economic growth, but only for countries with highly active and liquid stock markets. Their findings rejected the existence of a causal relationship for countries where stock markets are small and not very liquid. Both Boubakari and Jin (2010) and Nazir et al (2010) thus conclude that economic growth can be attained by increasing the size of the stock markets of a country as well as the market capitalization in a country's stock market.

3.3.6.2 Variables used

One of the main factors determining the outcomes of the relationship in question is the variables used as well as the proxies for those variables. Thus, a common question in the literature on the subject is how to measure stock market development across countries or within a country. According to Acaravci (2009), empirical results are very much country-specific and dependent on the proxies chosen for financial development or economic growth. Different measures have been used with the most prevalent one in the majority of literature being market capitalisation, turnover as well as stock market liquidity. Market capitalisation is calculated as the number of outstanding shares multiplied by the share price. According to Nazir, Nawaz and Gilani (2010), liquidity can be defined as the ability of the stock market to absorb fairly large volumes of stock trades without drastically affecting the price. It is calculated as the value of traded shares as a proportion of gross domestic product. These measures are often used

together, where liquidity is used to complement market capitalisation. This is for reason that, as according to Nazir, Nawaz and Gilani (2010), a market that is large in size may not necessarily mean it is advanced, as it may not have sufficient levels of trading.

3.4 Conclusion

The issue of the causal relationship as well as the direction of causality between growth and financial sector development is an issue widely discussed in literature on different countries. In terms of empirical research, although many of the results widely agreed, there are also contradictory results for both developed and developing economies over the years. The supply leading hypothesis that stock market development is required for economic growth to take place has come up as the most commonly supported hypothesis. It is thus claimed to be the most dominant force behind the relationship between finance and the sources of growth, in particular, financial depth contributes more to the causal relationship in developing countries (Avaravci, 2009). Even in this case however, it is not a blanket application to all countries as results can vary depending on the developmental stage of the country, the country's economic regime as well as the size and liquidity of the country's stock market. The differences in terms of results are even more pronounced in panel data studies particularly those which cover countries with the same economic characteristics. In terms of methodology, many of them have adopted a unified econometric technique, however, techniques used vary from GMM, VAR, ARDL and OLS techniques. The most commonly used variables to measure stock market development have been market capitalisation, turnover and value traded.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. Introduction

This section deals with the empirical framework used to examine the impact of stock market development on economic growth. It discusses the methodological approach used to determine the nature of the relationship between stock market development and economic growth. Section 4.2 discusses sample selection and data processing, whereas 4.3 specifies the model used to test the hypothesis and describes the variables used. Section 4.4 describes the sources of data used in the study. Section 4.5 provides a discussion on the econometric analysis used to determine the relationship between stock market development and economic growth in the selected countries and 4.6 the ethical considerations.

4.2. Selection of Countries under the study and Data Processing

This section describes how the countries were selected for as part of the study, as well as the statistical tools used to test the model as set out in the subsequent sections below.

4.2.1 Selection of Countries under the study

Although SADC consists of sixteen countries, only five countries were selected for the study. The data set consists of a panel of observations for Botswana, Mauritius, Namibia, South Africa and Malawi for the period 2004 – 2019. This is done solely based on the availability of data for the period under consideration. Out of the sixteen countries in SADC, the six countries of Angola, Comoros, DRC, Lesotho, Madagascar and Seychelles currently either do not have stock markets or have newly established stock markets and could not be included in the study due to insufficient data.

Swaziland, Tanzania, Zambia and Zimbabwe were also not included in the study as data for these countries was not accessible. Thus, out of a total of ten countries with stock exchanges that have been operating for a sufficiently long amount of time, five countries were included in the study, which represents fifty percent of the countries.

4.2.2 Data Processing

Data was obtained from the World Bank's World Development Index and individual country stock exchanges (see appendix A). The Statistical Software Package E-views is used to test the data and the tests conducted are described below. In many situations, log transformations are done in order to make data smaller scale to reduce non-linearity. This makes the data more linear, making estimators BLUE (Best Linear Unbiased Estimators). However, since the data for all the variables in this study are expressed as percentages, it is already sufficiently small and thus log transformations were not deemed necessary.

4.3 Measurement Variables

The dependant variable in this analysis is economic growth, which is proxied by GDP growth (GDP). In analysing how stock market development affects the dependent variable, two main measures of stock market development are used. These are market capitalisation ratio (MCAP), which is the value of all listed shares on a country's stock exchange divided by GDP, and stock market liquidity. Stock market liquidity is further split into two indicators which are used as its proxies, namely total value traded (TVT) and stock market turnover (TNV). TVT is the value of shares traded on a country's stock exchange expressed as a percentage of GDP whereas TNV is the value of total shares traded expressed as a percentage of total market capitalisation. Given that this is a growth equation, Gross Fixed Capital Formation (GFCF) is used as a proxy for

capital as done by Tang (2006), Naceur and Ghazouani (2007) and Metadeen and Seetanah (2019). Finally, growth rate of the employment to population ratio (EPOP) is used to proxy labour. The variables are described further below.

Growth in gross domestic product (GDPG) - Percentage change in gross domestic product is used as a measure of economic growth. It measures the change in economic activity from one period to another and in the case of this study, from one year to the other as annual observations are used.

Market capitalization ratio (MCAP) - Market capitalisation is the value of all outstanding shares in the market. It is calculated as the total number of shares outstanding multiplied by the stock price. Domestic market capitalisation as a percentage of individual countries' gross domestic product is used as a proxy for stock market size. It is calculated as the total number of domestic shares outstanding multiplied by the stock price, and subsequently calculated as a ratio of total gross domestic product. Based on existing literature, market capitalization is a common indicator for the size of the market. This is seen in the works of Pagano (1993), Demirguc-Kunt and Levine (1996), Levine and Zervos (1998), Rousseau and Wachtel (2000), Mazur and Alexander (2001), Beck and Levine (2003), Mohtadi and Agarwal (2001) and Metadeen and Seetanah (2019). A large market capitalisation as a percentage of GDP may be indicative of a well-developed stock market whereas a smaller market capitalisation may indicate the opposite. A high market capitalisation provides greater risk diversification on the stock market. It also entails greater capital allocation for investment in individual firms.

Total value of stocks traded (TVT) – This is the total value of stocks traded as a percentage of GDP. Total value traded (TVT) is the value of stocks traded (ST) in a

year multiplied by the share price (SP) during that year, subsequently calculated as a ratio of gross domestic product (Y). According to Levine and Zevros (2008), even though it is not the ideal way of measuring liquidity of markets, the total value of stocks traded as percentage of GDP is used as a proxy for liquidity, since the value of stocks traded can be considered as a relatively good indicator of liquidity. This variable measures the volume of stock trading relative to the size of the economy.

Turnover ratio (TNV) – This is the stock market turnover value calculated as a percentage of GDP. Turnover ratio is measured as the total value of stocks traded (TVT) divided by the value of stocks listed on the domestic stock exchange (MCAP). According to Hailemariam and Guotai (2014), this is a more objective indicator of stock market liquidity in that it measures the volume of stock trading relative to the size of the stock market. According to Levine and Zervos (1996), a small but liquid stock market can still have a high value of turnover. In the same vein, a large but inactive stock market can have a low value of turnover.

Gross fixed capital formation (GFCF) – This is gross fixed capital formation as a percentage of GDP. Gross fixed capital formation is the net increase in physical assets (investment minus disposals) within the measurement period. Drawing from the works of Tang (2006), Naceur and Ghazouani (2007), and Metadeen and Seetanah (2019), this variable is included as a proxy for capital.

Growth in employment to population ratio (EPOP) - A country's employment to population ratio is a measure of the civilian labour force currently employed in a country against the total working age population of that country. It is calculated by dividing the number of people employed by the total number of people of working age.

The growth rate of this is subsequently computed to serve a proxy for labour in this analysis.

4.4 Model Specification

The basic specification of the model is based on the principles of growth models developed by studies such as those by King and Levine (1993), Levine and Zervos (1998), Levine, Loayaza and Beck (2000), Bekaert, Harvey and Lundblad (2001), Watchel (2001), Tang (2006), Seetanah (2008) and Matadeen and Seetanah (2019). Since this is a panel VAR, all variables are determined endogenously and hence the functional form of all the equations are as follows:

GDP = f (MCAP, TVT, TNV, GFCF, EPOP, γ, ε)

MCAP = f (GDP, TVT, TNV, GFCF, EPOP, γ, ε)

TVT = f (GDP, MCAP, TNV, GFCF, EPOP, γ, ε)

TNV = f (GDP, MCAP, TVT, GFCF, EPOP, γ, ε)

GFCF = f (GDP, MCAP, TVT, TNV, EPOP, γ, ε)

EPOP = f (GDP, MCAP, TVT, TNV, GFCF, γ, ε)

Where:

GDP – Growth in gross domestic product

MCAP – Market capitalisation as a percentage of GDP

TVT – total value of stocks traded as a percentage of GDP

TNV – stock market turnover

GFCF – Change in gross fixed capital formation at a percentage of GDP

EPOP – growth in labour force participation

γ – variable specific effects,

ε – idiosyncratic errors (independent disturbance)

The VAR specification of the model is as follows:

$$Y_{it} = \alpha_0 + \alpha_1 Y_{it-1} + \alpha_2 Y_{it-2} + \ldots + \alpha_{k-1} Y_{it-k+1} + \alpha_k Y_{it-k} + \gamma_i + \varepsilon_{it}$$

or in standard matrix form:

$$Y_{it} = \alpha_0 + \sum_{k=1}^{n} A_k Y_{it-k} + \gamma_i + \varepsilon_{it}$$

Where: $\boldsymbol{Y_{it}}$ is a (*1*×*k*) vector of endogenous variables (GDP, MCAP, TVT, TNV, GFCF, EPOP), $\boldsymbol{\alpha_0}$ is a *(1*×*k)* vector of constants and $\boldsymbol{\alpha_k}$ is a (*k*×*k*) matrix of parameters to be estimated, $\boldsymbol{\gamma_{it}}$ is a (1xk) vector of variable specific effects, $\boldsymbol{\varepsilon_{it}}$ is a (*1*×*k*) vector of idiosyncratic errors (independent disturbance). *k* denotes the number of variables and *n* is the optimal lag order set to render the error terms serially uncorrelated. The subscripts *i* and *t* indicate country and time respectively.

4.5. Estimation Procedure

To address the objectives of the study, several steps are followed in order to ensure that the analysis yields robust results. The Statistical Software Package E-views is used to test the data and the tests conducted are described below. These include the pre-estimation tests, diagnostic tests and the VAR procedure.

4.5.1. Time Series properties of the data

The time series properties of the data are observed in order to determine the qualities of the data and to check for its conformity to economic theory and intuition. Summary statistics and correlation matrix is derived in order to observe the basic properties of the data.

4.5.2. Pre-estimation test

Pre-estimation tests are undertaken to ensure that the data will yield the most robust results and also to test for some basic relationships of the data. This will be done in the form of unit root tests and cointegration tests.

4.5.2.1 Panel Unit Root Tests

Panel data consists of a series of cross-sectional units observed over time. Therefore, it has both a time dimension and cross-sectional dimension, making it essentially a mixture of time series and cross-sectional data. Time series data in many instances is prone to having a unit root. For this reason, a unit root test is done to determine the time series properties of the variables in the equation. If found to be non-stationary the data is differenced to ensure that it no longer exhibits a unit root. This is because, in the presence of a unit root, spurious regression results are obtained, leading to incorrect conclusions. Moreover, panel unit root testing is done as a precondition for running panel cointegration.

To run panel cointegration, variables need to be non-stationary in levels, but must become stationary when converted to first differences. A joint stationarity test is performed on the data testing the joint null hypothesis that every time series in the panel is non-stationary. For this, a summary test of the Levin, Lin and Chu (2002), Im, Pesaran and Shin (IPS) (1995), Augmented Dickey Fuller (ADF) (1979) Fisher Chi-square test and the Phillips-Peron (1988) Fisher Chi-Square panel unit root tests are used. The Levin, Lin and Chu unit root test will be used as the benchmark as it is deemed the most appropriate for panel data. The result is based on the majority of the tests with the benchmark being in agreement. Where the test results are split, or the benchmark is not in agreement, the series are considered non-stationary.

The VAR technique requires that all series be integrated of the same order. If all series are found non-stationary, the data is subsequently differenced until found stationary. If the data has been found stationary in levels (integrated of order zero), it can be concluded that there exists no long-run association between the variables. The variables are thus said to be not cointegrated. On the other hand, if the data is found to be non-stationary in levels and subsequently differenced once to become stationary (integrated of order 1), a test for cointegration is undertaken to determine whether there is a long-run relationship between the variables.

4.5.2.2 Panel Cointegration Analysis

Conducting of the cointegration test depend exclusively upon the order of integration and thus on the results of the unit root tests. As indicated above, if the data has been found stationary in levels (integrated of order zero), it can be concluded that there exists no long-run relationship between the variables. The variables are thus said to not be cointegrated and thus there would be no need to test for cointegration. If all series are integrated of order 1 however; the question that follows is whether there is a long run relationship between the variables, i.e. whether the variables are cointegrated. It thus follows that there is a need to conduct a cointegration test in order to determine this.

Series that are cointegrated move together in the long run at the same rate, meaning that they "obey" an equilibrium relationship in the long run. This is tested through cointegration tests. There are 3 tests for panel cointegration, namely, the Pedroni (1995), Kao (1999) and Johansen (1991) test of cointegration. The Pedroni test of cointegration is said to be a more comprehensive test for panel data than its counterparts. For this reason, if required, the Pedroni residual test of cointegration is used to determine whether there is cointegration between the variables.

Furthermore, the inclusion of an error correction term in the model depends on the nature of cointegration results. These dictate whether to use panel-VAR or VECM to estimate the model. If there is cointegration amongst the variables, panel VECM – which includes an error correction term – is used to estimate the model, whereas if no cointegration is found, panel VAR is used.

4.5.2 Lag Selection

In economics, the impact of one variable on another is rarely instantaneous and very often happens with a lapse of time, usually referred to as a lag. The selection of an appropriate lag is essential for the estimation of a panel VAR, as it entails deciding on the number of lags of the dependent and independent variables to include in the model. For all endogenous variables, the same number of lags are usually used in all equations. There exists a trade-off between the number of lags and the degrees of freedom, in that, too large a lag could cause a loss in the degrees of freedom, increase in the mean square forecast of the model and a reduction of the estimation precision of the impulse responses. It can also lead to multicollinearity, serial corelation in the error term and misspecification errors. On the other hand, too small a lag may fail to capture the system's dynamics and often generates auto-correlated errors.

Lag length selection depends typically on the empirical issues pertaining to the model. Annual data typically has a lag of 1 to 2 periods, where quarterly data may have up to 8 period lags and monthly data can have up to 12 or more lags. Selection of the lag length is usually done using a statistical criterion. The most commonly used information criterion is the Akaike Information Criterion (AIC), Schwartz-Bayesian Information Criterion (SBIC) and the Hannan-Quinn Criterion (HQ). These are defined as follows:

$$AIC = \log\det(\sum) + \frac{2k'}{T}$$

$$SBIC = \log\det(\sum) + \frac{k'}{T}\log(T)$$

$$y_{i,t} = \log\det(\sum) + \frac{2k'}{T}\log(\log(T))$$

where $\sum$ is the variance-covariance matrix of residuals, T is the number of observations and k' is the total number of regressors in all equations. The rule of thumb in picking the best information criterion based on which to choose an optimal lag is to choose the information criterion which gives the lowest value.

4.5.5 Diagnostic Tests

To ensure robust result, a VAR needs to meet some conditions. These includes the condition that the VAR needs to be stable as well as to exhibit no autocorrelation. These tests are thus conducted and are described below.

4.5.5.1 VAR Stability Condition

If a VAR is not stable, the impulse response function standard errors are unreliable. Thus, the results of the VAR estimation cannot be relied upon. The test for stability is thus conducted to test whether the VAR is stable by looking at the inverse roots of AR characteristics polynomial.

4.5.5.2 Autocorrelation

Autocorrelation refers to the degree of association between the values of the same variables across different observations in the data. A serially correlated VAR yields spurious results which are not reliable. For this reason, the autocorrelation correlation LM test as well as the Durban Watson statistic are conducted to detect autocorrelation

or rule out the possibility of the VAR exhibiting autocorrelation. Where autocorrelation is found to exist, steps are taken to eliminate it to ensure robust results.

4.5.6 Estimation of VAR process

The nature of cointegration determines whether the VAR to be estimated include an error correction term or not. The VAR model is thus estimated taking this into account as well as the selected optimal lag. In order to interpret the results of the VAR model, three interdependent approaches are used. These are Granger Causality, impulse response functions and variance decompositions.

4.5.6.1 Panel Granger Causality Test

The objective of the Granger causality test is to show whether the change in one variable has impact on the changes in other variables and their past values. The panel Granger causality test is used to establish whether there is a long-run causal relationship between the variables, and, where causality exists, to determine the direction of causality. The functional expression of the model,

GDP = f(MCAP, TVT, TNV, GFCF, EPOP)

the Granger causality equations expressed in a vector autoregressive (VAR) framework are as follows:

$$GDP_{it} = \alpha_{1j} + \Sigma_{k=1}^{n}\beta_k MCAP_{it-k} + \Sigma_{k=1}^{n}\beta_{1ik} GDP_{it-k} + \gamma_i + \varepsilon_{it} \quad (1)$$

$$MCAP_{it} = \alpha_{2j} + \Sigma_{k=1}^{n}\beta_k MCAP_{it-k} + \Sigma_{i=1}^{n}\beta_{it} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (2)$$

$$GDP_{it} = \alpha_{1j} + \Sigma_{k=1}^{n}\beta_k TVT_{it-k} + \Sigma_{k=1}^{n}\beta_{1ik} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (3)$$

$$TVT_{it} = \alpha_{2j} + \Sigma_{k=1}^{n}\beta_k TVT_{it-k} + \Sigma_{i=1}^{n}\beta_{it} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (4)$$

$$GDP_{it} = \alpha_{1j} + \Sigma_{k=1}^{n}\beta_k TNV_{it-k} + \Sigma_{k=1}^{n}\beta_{1ik} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (5)$$

$$TNV_{it} = \alpha_{2j} + \Sigma_{k=1}^{n}\beta_k TNV_{it-k} + \Sigma_{i=1}^{n}\beta_{it} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (6)$$

$$GDP_{it} = \alpha_{1j} + \Sigma_{k=1}^{n}\beta_k GFCF_{it-k} + \Sigma_{k=1}^{n}\beta_{1ik} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (7)$$

$$GFCF_{it} = \alpha_{2j} + \Sigma_{k=1}^{n}\beta_k GFCF_{it-k} + \Sigma_{i=1}^{n}\beta_{it} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (8)$$

$$GDP_{it} = \alpha_{1j} + \Sigma_{k=1}^{n}\beta_k EPOP_{it-k} + \Sigma_{k=1}^{n}\beta_{1ik} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (9)$$

$$EPOP_{it} = \alpha_{2j} + \Sigma_{k=1}^{n}\beta_k LFP_{it-k} + \Sigma_{i=1}^{n}\beta_{it} GDP_{it-i} + \gamma_i + \varepsilon_{it} \quad (10)$$

Granger causality tests are performed to test whether the coefficients of the lag lengths of the independent variables are collectively equal to zero. For example, in equation 1 above, if the coefficient of MCAP is found to be significantly different from zero at a particular level of significance, then MCAP can be said to cause GDP. Similarly, if the coefficients of GDP in equation 2 above also differs significantly from zero, then GDP is also said to cause MCAP. Thus, where both the coefficients of MCAP and GDP in equation 1 and 2 are found to cause be significantly different from zero, then a mutually causal relationship is said to exist between the variables, which is also known as bidirectional causality. On the other hand, if only the coefficient of MCAP differ significantly from zero and not the alternate, then a unidirectional causal relationship from MCAP to GDP exists. The alternate holds true. If on the other hand, neither of the coefficients in equation 1 and 2 differ significantly from zero, then there is said to be no causal relationship between the variables.

4.5.6.2 Impulse Response Function

As a result of the interaction between variable in a dynamic VAR system, a shock to one of the variables may be transmitted to all the endogenous variables. Granger causality tests may not be sufficient to give an indication of the interaction between the variables in the system. For this reason, impulse response functions (IRF) are used. Impulse response functions refer to any feedback of any dynamic system in response

to an external change or shock over time. It identifies the responsiveness of the dependant variable in a VAR system when a shock is put to the error term. Estimating VAR allows for the "deriving" of an impulse response function.

Impulse response functions trace out the response of the dependent variables in a system, to one-unit increase or one standard deviation increase in the current value of the one of the VAR errors, assuming the error becomes (again) zero in the next period and that all other errors in the system are equal to zero. In calculating the impulse response function, the ordering of variables is important. For this purpose, different methods have been developed for ordering variables. Cholesky ordering of variables for impulse response analysis are used for this study because the errors should be uncorrelated across equations when changing one error, holding other errors fixed.

4.5.6.3 Forecast Error Variance Decomposition

Another method of interpreting VAR system results is the variance decomposition. The variance decomposition allows for the examination of the relative importance of the variable of interest for the other variables included in the model. It allows for the examination of the proportion of the movement in the dependent variables that are caused by their own shocks and proportion of the movements that are caused by shocks to other variables. Shocks to one dependent variable will affect this variable and will also be transmitted to all other variables in the VAR system. This study is interested in the variance shares of stock market development shock because they can be interpreted as measures of the quantitative effect of stock market development of economic growth.

4.6. Ethics

This research seeks to ensure quality of work and to uphold professional integrity. The data used in this study was not distorted, fabricated nor falsified in any manner. All sources used in this study have been properly acknowledged.

4.7 Conclusion

This chapter details the set of objectives of the study, the data and its sources, countries in the studies, the tests to be conducted as well as the ethical considerations. These are deemed sufficient to achieve the objectives of the study. The execution of the test procedures is thus detailed in the subsequent chapter.

CHAPTER 5

PRESENTATION AND INTERPRETATION OF RESULTS

5.1 Introduction

Following the methodology set out in chapter 4, the study proceeds to conduct econometric tests to test the hypothesis of the study. This chapter deals with the presentation and interpretation of the results. It begins by conducting pre-estimation tests, followed by lag length selection, VAR diagnostic tests as well as the estimation of the model using VAR based Granger causality test, impulse response functions and well as forecast error variance decomposition to interpret the results. Finally, it concludes of the process of testing and interpretation of the results.

5.2 Time series properties of the data

Table 2 below sets out the summary statistics of the data displaying the mean, median, maximum, minimum, standard deviation and Kurtosis.

Table 2: Summary Statistics

Descriptive Statistics	GDP	MCAP	TVT	TNV	GFCF	EPOP
Mean	3.96	75.74	17.42	25.24	22.00	0.54
Median	4.11	31.94	3.30	5.42	20.93	0.16
Maximum	12.27	352.16	135.80	227.84	36.23	6.95
Minimum	-7.65	4.84	0.16	0.90	6.55	-6.50
Std. Dev.	2.94	92.73	30.52	42.44	6.45	2.11
Skewness	-0.40	1.53	1.99	2.86	0.28	0.09
Kurtosis	5.70	3.92	6.10	11.35	2.69	5.31

Source: Author's compilation

The data depicts various degrees of skewness. Deviation around the mean differs significantly between the variable. The data seems to depict some outliers are deviation around the mean is quite wide for MCAP, TVT and TNV.

The results of the correlation test for the group of variables are as depicted in Table 3 below. As can be expected based on theory, there exists unitary correlation between a variable and itself, whereas there are varying degrees of correlation (positive and negative) between the rest of the variables.

Table 3: Correlation Matrix

Variable	GDP	MCAP	TVT	TNV	GFCF	EPOP
GDP	1					
MCAP	-0.28	1				
TVT	-0.30	0.94	1			
TNV	0.03	-0.05	0.15	1		
GFCF	0.06	-0.17	-0.17	0.02	1	
EPOP	0.16	-0.08	-0.08	-0.03	0.20	1

Source: Author's compilations

As further expected, the relationship between MCAP and TNV as well as TVT and TNV is logical given the derivation of TNV. The table shows that there is positive correlation between GDP growth and gross fixed capital formation and employment to population ration, which is consistent with theory. Interestingly however, the table shows a negative correlation between market capitalisation and GDP growth as well as between GDP growth and TVT. This seems somewhat contradictory to theory although may have a plausible explanation. Furthermore, it also shows negative correlation between market capitalisation and the growth in employment to population ratio. Additionally, the table shows that there exists negative correlation between the growth rate in gross fixed capital formation and growth in employment to population

ratio, which might seem contradictory to theory particularly for developing countries. This is because one might expect that an increase in gross fixed capital formation would have a positive impact in the employment to population ratio, particularly in developing countries where fixed investments would be mainly in the form of labour-intensive projects, leading to an increased demand for labour.

5.3 Pre-estimation tests

The results of the Unit root tests and the cointegration tests are discussed below.

5.3.1 Panel Unit Root Testing

As summary of panel unit root tests was conducted to test whether the data was stationary. The test considers 5% as the appropriate level of significance and considers the fours tests; Levin Lin and Chu, Im, Pesaran and Shin, Augmented Dickey Fuller and Phillips Perron test. The results are presented in table 4 below.

Table 4: Panel unit root test results in levels

Series	**Levin Lin Chu**		**Im Pesaran Shin**	
	t-stat	**p-value**	**t-stat**	**p-value**
GDP	-3.5015	0.0002*	-1.88594	0.0297**
MCAP	-2.8047	0.0025*	-3.70903	0.0001*
TVT	-3.1343	0.0009*	-2.59214	0.0048*
TNV	-2.2968	0.0108**	-2.70084	0.0035*
GFCF	-2.4540	0.0071*	-2.11849	0.0171**
EPOP	-2.0077	0.0223**	-2.07284	0.0191**

Series	ADF - Fisher Chi^2		PP – Fisher Chi^2	
	t-stat	p-value	t-stat	p-value
GDP	19.7269	0.0319**	32.501	0.0003*
MCAP	36.1244	0.0001*	29.0737	0.0012*
TVT	23.4581	0.0092*	37.4185	0.0000*
TNV	26.5983	0.0030*	36.504	0.0001*
GFCF	20.6739	0.0235*	10.6921	0.3820***
EPOP	20.1586	0.0278**	30.6846	0.0007*

Source: Author's compilation

*Notes: (a) *, ** and *** represent significance at 1%, 5% and above 5% (which is deemed not stationary) respectively*

(b) H_0: the time series has a unit root is tested

The study considers the Levin, Lin and Chu unit root test as the benchmark as it is deemed the most appropriate for panel data. As shown in table 4 above, the results of all the other unit root tests for the majority of the variables are consistent with Levin, Lin and Chu, with the exception of GFCF which is not deemed stationary by the PP-ADF test. The results are concluded based on the majority of test and the benchmark being in agreement. Thus, for all the variables GDP, MCAP, TVT, TNV, GFCF and EPOP, the test rejects the null hypothesis that the series are non-stationary in levels. It is thus concluded that all the series are found to be stationary in levels.

5.3.2 Panel Cointegration

The results of the unit root tests led to the conclusion that all six variables are integrated of order zero and therefore do not require differencing. As a result, it can be concluded since the variables are integrated of order zero, there would exist no cointegration

relationship between the variables. No cointegration means there is no long run relationship between the variables. Furthermore, it follows that is no need to include an error correction term and therefore, the unrestricted VAR model can be run. This result essentially answers the first hypothesis of this thesis which seeks to investigate whether there is long run relationship between the growth and stock market development in the countries under the study. This is in direct contrast to Enisan and Olusifayo (2009) who found there to be a cointegration relationship for the case of Egypt and South Africa and thus concluded the presence of a long-run relationship.

5.4 Lag Length Selection

The results of the lag length selection are as presented in table 5 below.

Table 5: Lag Length Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1570.06	NA	1.45E+12	45.03041	45.22314	45.10696
1	-1324.27	442.4243	3.63E+09	39.03637	40.38547*	39.57225*
2	-1286.93	60.81076*	3.57e+09*	38.99809*	41.50355	39.99329

Source: Author's computation

As set out in the methodology, the rule of thumb in selecting the information criterion based on which an optimal lag is chosen is selecting the information criterion which yields the lowest value. As seen in table 5, the AIC yields the lowest value of 38.99 in comparison to the rest. Based on the AIC, the optimal lag for the model is two, and therefore, for all endogenous variables in the system, the number of lags to include in the model is two. This implies that any change in the system is felt with a time lag of two years. This is consistent with theory in that, with annual observation, a time lag of between one and two years is considered normal, and any higher a lag can only be expected for quarterly or monthly data.

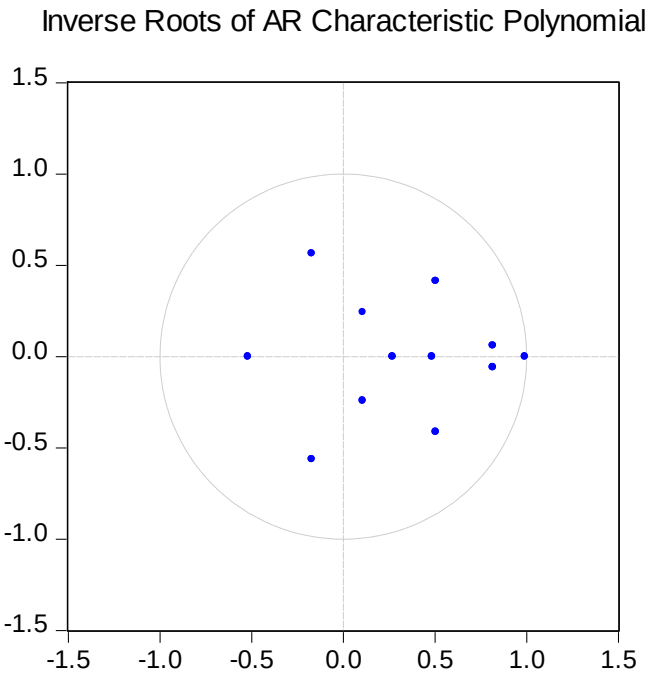
5.5 VAR Diagnostic Test

Following the methodology, some diagnostics tests, namely the normality and autocorrelation tests are conducted in order to ensure that the VAR yields the most robust results possible. The results of these tests are as displayed below.

5.5.1 Stability Test

As seen in Figure 1 below, all the dots fall within the unit circle. This implies that the VAR is stable as it meets the VAR stability condition.

Figure 1: Inverse Root of AR Characteristic Polynomial



Source: Author's computation

5.5.2 Autocorrelation

Serial correlated VAR yields spurious results which are not reliable. For this reason, the Autocorrelation correlation LM test was conducted to rule out the possibility of the VAR exhibiting autocorrelation. The rule of thumb in testing for first order autocorrelation is that if the Durban Watson statistic generated in the estimating of the OLS equation lies between 1.7 and 2.7, then the model is said to not exhibit any

autocorrelation. The model generated a Durban Watson Statistic of 1.88 (see appendix C for results), which lies well within that range and hence it can be concluded that the model does not contain autocorrelation.

As per the results of the diagnostic tests above, it can be concluded that the VAR meets both the stability condition and does not exhibit autocorrelation. Given this, it was concluded that the VAR produces robust results. For this reason, the remainder of the test are conducted in order to test for the nature of the relationship between the variables.

5.6 VAR Estimation

Having established that all the variables are integrated of order zero, are not cointegrated, a standard VAR (without an error correction term) with a 2-period time lag can now be estimated (see Appendix C for results). Based on this, the Granger causality test, impulse response function and forecast error variance decompositions are used to interpret the VAR model and establish the nature of the short run relationships between stock market development and economic growth.

5.6.1 Granger Causality

Granger causality test is conducted to determine whether there is a causal relationship amongst the variables, as well as the direction of causality. Granger causality tests the null hypothesis that the lagged coefficient in each equation is zero. Table 6 below depicts the p-values for the pairwise Granger causality test.

Table 6: Pairwise Granger Causality Results

GDP → MCAP 0.7952	GDP → TVT 0.8403	GDP → TNV 0.5135
MCAP → GDP 0.0077*	MCAP → TVT 0.0085*	MCAP →TNV 0.6617
TVT → GDP 0.0197*	TVT → MCAP 0.152	TVT → TNV 0.9171
TNV → GDP 0.6297	TNV → MCAP 0.9088	TNV → TVT 0.7495
GFCF → GDP 0.0211*	GFCF → MCAP 0.6917	GFCF → TVT 0.6794
EPOP → GDP 0.5494	EPOP → MCAP 0.226	EPOP → TVT 0.2906

GDP → GFCF 0.1183	GDP → EPOP 0.0001*
MCAP → GFCG 0.7276	MCAP → EPOP 0.1836
TVT → GCFC 0.6594	TVT → EPOP 0.0939
TNV → GFCF 0.717	TNV → EPOP 0.6085
GCFC → TNV 0.4465	GFCF → EPOP 0.4548
EPOP → TNV 0.9495	EPOP → GFCF 0.0271*

Source: Author's computations

Notes: H_0: Variable x does not Granger-cause variable y; an asterisk (*) denotes significance levels at 5%.

Table 7: Summary causality table for GDP

Relationship	P-value	Result	Interpretation
MCAP → GDP	0.0077*	Reject H0	MCAP causes GDP
TVT → GDP	0.0197*	Reject H0	TVT causes GDP
TNV → GDP	0.6297	Do not reject H0	TNV does not cause GDP
GDP → MCAP	0.7952	Do not reject H0	GDP does not cause MCAP
GDP → TVT	0.8403	Do not reject H0	GDP does not cause TVT
GDP → TNV	0.5135	Do not reject H0	GDP does not cause TNV

Source: Author's computations

Notes: H_0: Variable x does not Granger-cause variable y; an asterisk (*) denotes significance levels at 5%.

Table 7 displays results from the Granger causality tests. There is significant evidence that market capitalisation Granger causes GDP growth in the short run, evidence by the fact that this is statistically significant at 1% level of significance. The opposite however does not hold as there is not statistically significant evidence that GDP growth causes market capitalisation. This is evidence of a unidirectional relationship between market capitalisation and growth. Similarly, there is evidence that total value traded causes GDP growth as evidenced by a statistically significant relationship at 5% level of significance, whereas there seems to be no causal relationship between running from GDP growth to total value traded. This is once again indicative of a unidirectional relationship between the two variables. With respect to the relationship between GDP growth and turnover, the results show a non-statistically significant causal relationship between the two variables, indicative of independent causality (or no causality) between the two. The results conclude that, based on the relationship between MCAP and GDP and TVT and GDP, it shows that there is causal dependence between stock

market development and economic growth in the short run and that causality runs from stock market development to economic growth and not the other way around.

In terms of theory, these results are consistent with the supply leading hypothesis as was proposed by Schumpeter (1911), which assumes that causality flows from financial sector development to economic growth and not the other way round. This hypothesis supports the idea that stock growth in stock market activities facilitate growth in the real sector and brings about economic growth. This implies that there is a reliance on the stock market to facilitate at least some growth in the real economy.

Empirically, these findings are consistent with several authors such as Boubakari and Jin (2010) who investigated the link between stock market development and economic growth for some Euronext countries. Similar to these findings of this study, the authors found evidence of positive links between the stock market development and economic growth, for Netherlands, France and the United Kingdom. Where causality was present, the authors found that the causality ran from stock market proxies to economic growth showing a significant relation between market capitalization, total trade value and turnover ratio on the GDP and FDI, implying unidirectional causality.

Within the SADC region and closer to the countries in the study, the results are also consistent with Zivengwa, Mashika and Makova (2015) who for the case of Zimbabwe, found evidence of a unidirectional causal link that runs from stock market turnover to economic growth, but no causal relationship between stock market size and economic growth. The authors concluded that stock market has an indirect impact on economic growth through is significant influence on investment, implying that the supply leading hypothesis holds through the investment channel.

Additionally, the results may also be in support of the stage of development hypothesis as was proposed by Patrick (1966). The hypothesis assumes that the direction of causality between financial market development (and by extension, stock market development) and economic growth depends on a country's level of development. It is essentially a combination of both the supply-leading and demand-leading hypothesis. Whether the supply-leading hypothesis holds or the demand-following hypothesis is largely dependent of the developmental stage a country. As according to Patrick (1966), the supply-leading hypothesis will hold in an economy which is in its early stages of development. As the economy grows however, the supply-leading hypothesis fades out and the demand-following hypothesis starts to hold. This could be for reasons that, for countries in their early stages of development, the supply-leading hypothesis holds in that capital formation in the stock market allows for investment in productive activities thus leading to growth in the economy. However, as an economy grows and approaches the developed economy stage, the growth in such an economy allows for excess savings which is then used to invest in stock markets, leading to financial sector experiencing a growth led expansion.

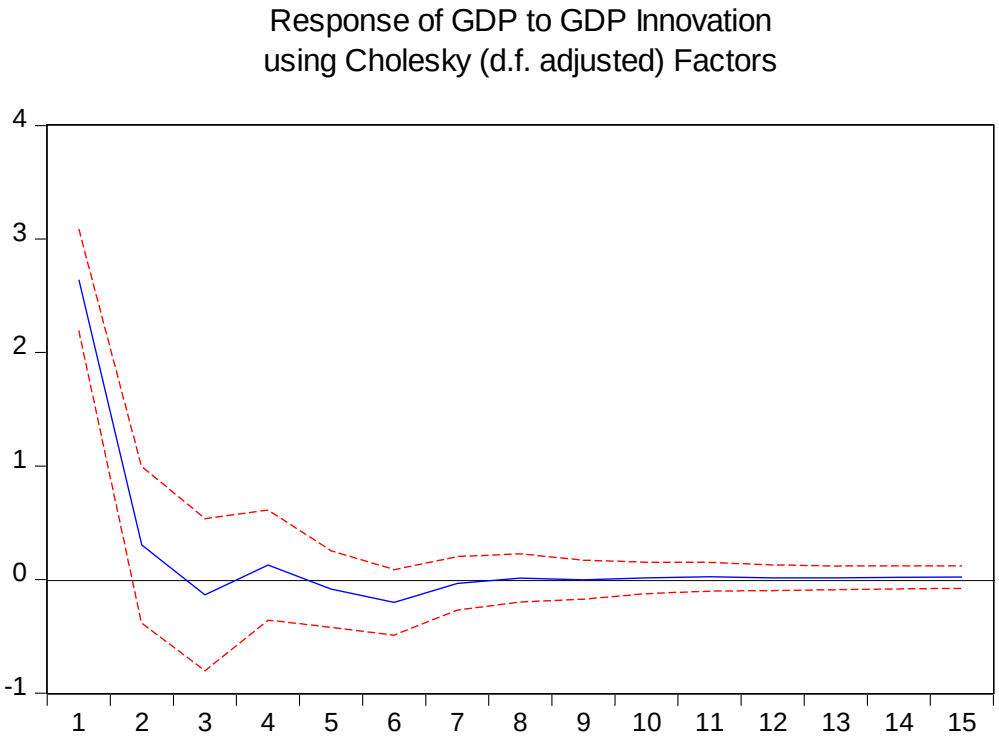
Given that all of the countries in this study are in their initial stages of development the current findings are therefore also consistent with this hypothesis. Whether the second lag of this hypothesis would hold however would be impossible to test for at this stage as it required waiting for these countries to reach a developed country status, and the conducting the same tests in order to establish whether the demand following hypothesis holds. None the less, in as far as both the supply-leading and the stage of development hypotheses are in agreement, it can be said that they both hold for the countries under the study. Therefore, in supporting these two hypotheses, the results are indicative of the importance of stock market development in countries' bid to

increase productivity as measured through GDP growth. To reveal the dynamic interactions in the system however, impulse response functions and forecast error variance decompositions are computed as discussed in the preceding sections.

5.6.2 Impulse Response Functions

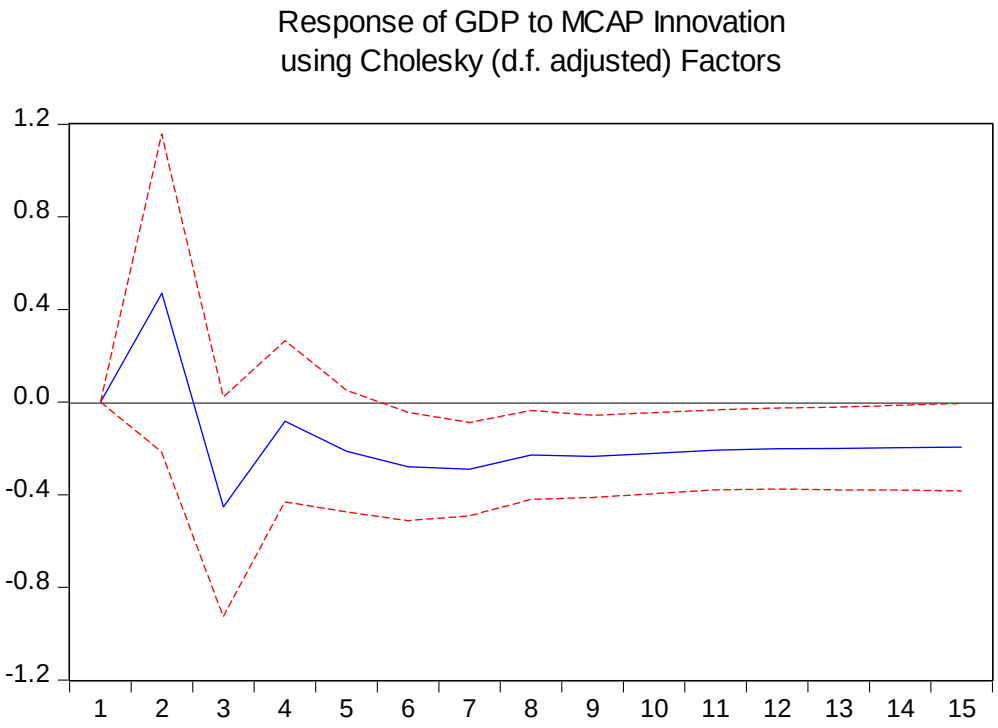
Following the previous steps in the procedure, impulse responses of GDP to shocks in the other variables were derived. In doing this, a on standard deviation increase in the variables in the VAR errors, assuming the errors become zero again in the next period and that all the other errors in the system are equal to zero. This is done using Cholesky ordering of the variables, which as per Iavcoviello (2008) is best as errors should be uncorrelated across equations when changing one error, while holding others fixed. A confidence interval of 95% (or +- two standard errors) band is used and a period of 15 years in used to examine the impulse responses as this is considered sufficiently long to observe the responses of the variables to various shocks. The figures below illustrate the responses of GDP to each of the respective variable, starting with DGP itself.

Figure 2: Response of GDP to Innovations in GDP



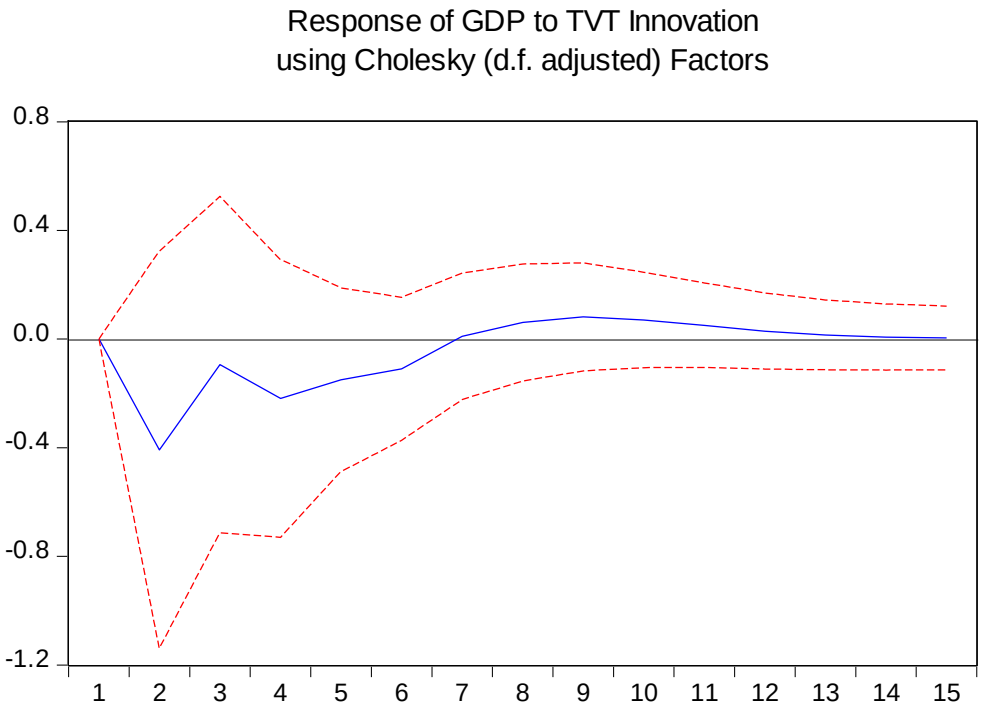
As illustrated figure 2 above, a one standard deviation change or shock from GDP growth in the early period (between year one and period two) results in a sharp decline in GDP growth itself. It further declines fairly gradually between years two and three and sees further gradual fluctuations below and above the steady state until the 7th year where shocks die down and remain constant. This suggests that shocks to GDP growth have a short-term impact on GDP growth whereas it does not have a significant impact in the long term.

Figure 3: Response of GDP to Innovations in MCAP



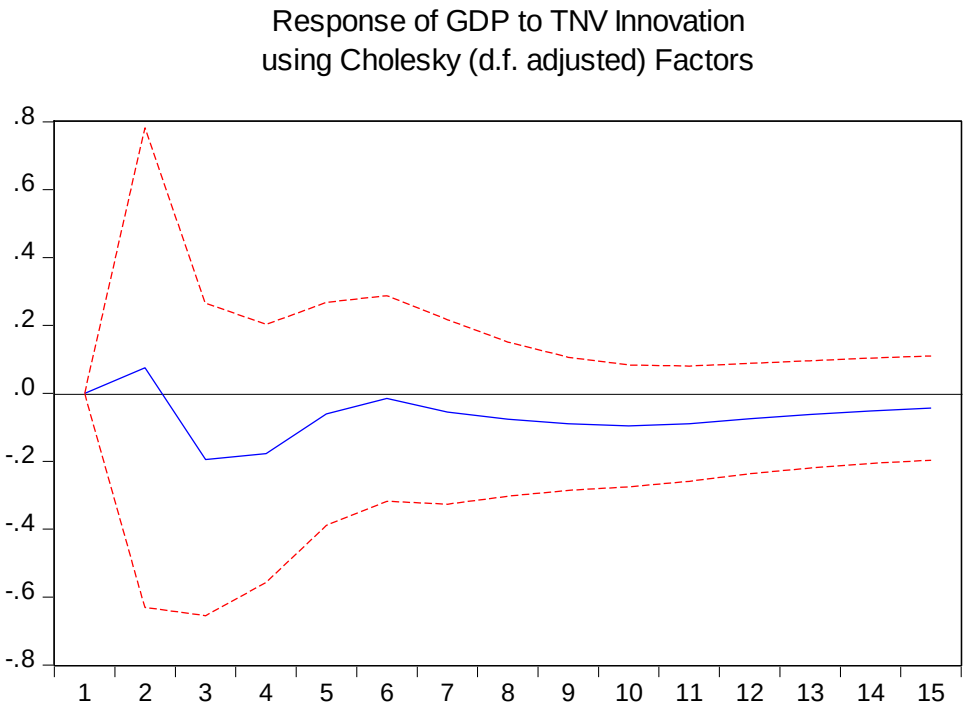
As seen in figure 3 above, between year one and two, a one standard deviation shock to market capitalisation is characterised by sharp increase in GDP growth, leading to a sharp drop below the steady state between year two and three. It further increases until year four but remains below the remains below the steady state. After year four, shocks die down and remain stable thereafter. This implies that shocks to market capitalisation have a significant impact on GDP only in the short run, with a stable negative impact in the long run as evidenced by the results in the graph.

Figure 4: Response of GDP to Innovations in TVT



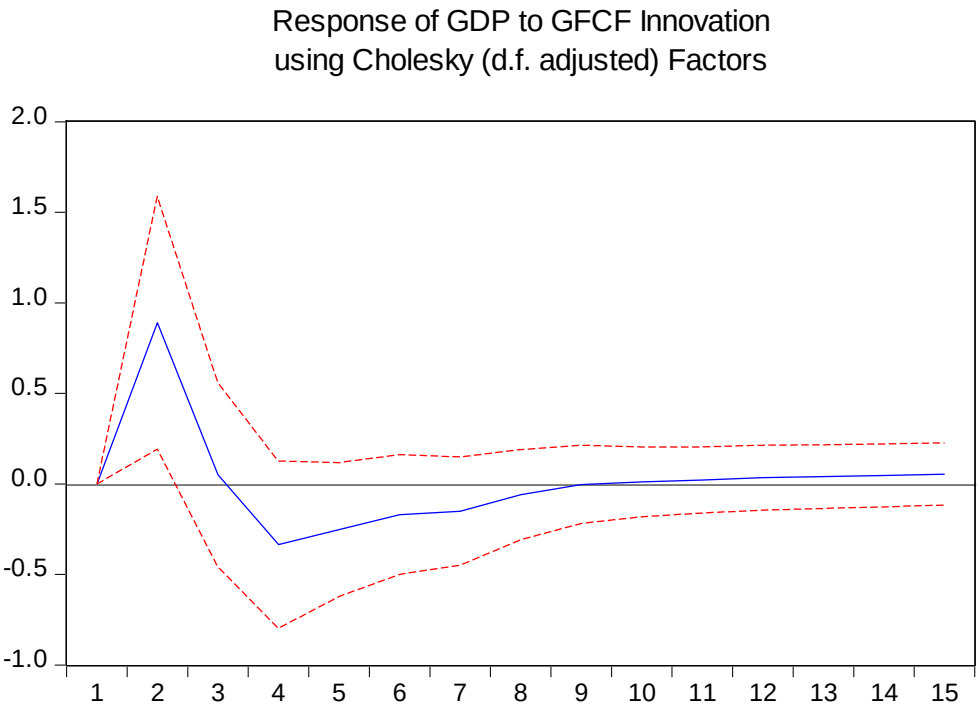
In the initial period, a one standard deviation in TVT sees a decline in GDP from the steady state to below the steady state, as shown in figure 4 above. It sees a further increase between periods two and three, dropping gradually before it begins to see a gradual increase from period four, rising above the steady state in period seven and eventually converging back to the steady state in eventual periods.

Figure 5: Response of GDP to Innovations in TNV



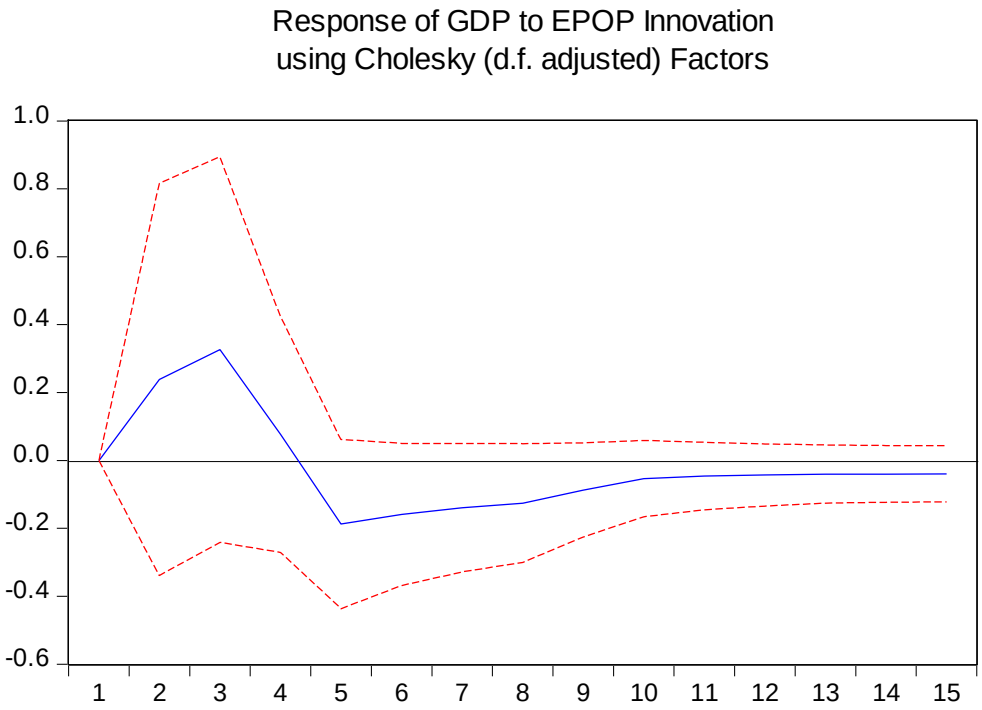
Between year one and two, a one standard deviation shock to turnover is characterised by a small gradual increase in GDP growth, leading to a drop below the steady state between year two and three, as shown in figure 5 above. Shocks gradually converge back to the stead state and remain stable for the remainder to the period. This implies that shocks of stock market turnover, similar to that of market capitalisation and total value traded to GDP growth have a significant impact on GDP growth only in the short run and no significant impact in the long run.

Figure 6: Response of GDP to Innovations in GFCF



As per the figure 6 above, in the initial period, a standard deviation shock in GFCF has a positive upward change in GDP growth, dropping to the steady state in period three, and continues to decline gradually below the steady state up to period four. It further sees a gradual increase above the steady state. In the eventual periods, shocks in GFCF remain constant above the steady state. This means that shocks on GFCG have a significant impact on GDP both in the short term and the long run.

Figure 7: Response of GDP to Innovations in EPOP



In the initial periods, shocks in EPOP lead to a positive change in GDP between periods one and two, remaining positive and increasing between periods two and three, as shown in figure 7 above. In period three, shocks in EPOP see a decline falling below the steady state in period four, before gradually increasing as of period 5. As of subsequent periods, a standard deviation shock in the employment to population ratio converges towards the steady state remaining stable below zero. This means that shocks in growth to the employment to population ratio do not have a particularly significant impact on GDP growth in the long run although it does in the short run.

5.6.3 Forecast Error Variance Decomposition

The results of the forecast error variance decomposition are as displayed below.

Table 8: Forecast error variance decomposition of GDP

Period	S.E.	GDP	MCAP	TVT	TNV	GFCF	EPOP
1	2.641	100.000	0.000	0.000	0.000	0.000	0.000
2	2.883	85.050	2.660	2.001	0.069	9.536	0.684
3	2.947	81.554	4.897	2.016	0.502	9.151	1.880
4	2.985	79.715	4.853	2.504	0.842	10.187	1.899
5	3.014	78.235	5.254	2.703	0.866	10.693	2.249
6	3.045	77.114	5.988	2.778	0.851	10.791	2.478
7	3.066	76.054	6.799	2.740	0.872	10.884	2.650
8	3.079	75.404	7.292	2.755	0.926	10.829	2.795
9	3.092	74.792	7.810	2.802	1.003	10.741	2.852
10	3.103	74.280	8.263	2.834	1.092	10.668	2.862

Cholesky Ordering: GDP MCAP TVT TNV GFCF EPOP

As seen in the graph, all the other variables have no contemporaneous effects on GDP growth in the first period. In the short run, which is up to period 3, a shock or innovation in GDP growth accounts for 81.6% of the variation of the fluctuation in GDP growth (own shock). A shock to MCAP (market capitalisation) causes 4.9% fluctuations in GDP growth. The shocks to TVT (total value traded) accounts for 2% fluctuations in GDP growth, whereas a shoch to TNV (turnover) accounts for 0.5% changes in GDP growth. A shock to GFCF accounts for 9.2% changes in GDP growth

whereas a shock to EPOP accounts for 1.9% changes in GDP growth. In the long run, which is up to period 10, a shock or innovation in GDP growth accounts for 74% of the variation of the fluctuation in GDP growth (own shock). A shock to MCAP (market capitalisation) causes 8.3% fluctuations in GDP growth. The shocks to TVT (total value traded) accounts for 2.8% fluctuations in GDP growth, whereas a shock to TNV (turnover) accounts for 1.1% changes in GDP growth. A shock to GFCF accounts for 10.7% changes in GDP growth whereas a shock to EPOP accounts for 2.7% changes in GDP growth.

5.7 Conclusion

The model concludes that there exists no long run relationship between the variables. This is evidenced by the fact that all variables are integrated of order zero and thus do not have a cointegration relationship. In terms of the short-run relationships, the Pairwise Granger Causality test reveals that there is a short-term causal relationship between stock market development and economic growth, evidenced by the statistically significant relationships between market capitalisation and GDP growth as well as total value traded and GDP growth. This is in support of the supply-leading hypothesis and may potentially be in support of the stage development hypothesis, at least given that the results are consistent with the first lag of that hypothesis. These results are indicative of the importance of stock market development for economic growth in the countries under the study.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The majority of stock markets in the region are small and suffer from large scale inefficiencies in comparison to their larger counterparts in the developed world. Given this, it is unclear what the impacts of stock market development is on growth in these economies. The objective of this study is to analyse the relationship between stock market development and economic growth in five SADC countries, namely Botswana, Malawi, Mauritius, Namibia, South Africa, for the period 2004 to 2019. The study has the following specific objective to examine if there exists a long-run relationship between stock market development and economic growth and to determine whether a causal relationship exists between the stock market development and economic growth, and if so, determine the direction of causality. Despite the problems faced, the findings of this study are indicative of the importance of stock markets for achieving greater economic growth. This chapter provides a summary of the study, recommendations for improving stock market activities in the region and recommends areas for further research.

6.2 Summary of the Study and Conclusion

The main objective of the study was to investigate the impact of stock market development on economic growth in 5 SADC countries, namely Botswana, Malawi, Mauritius, Namibia and South Africa. This was done by establishing whether there exists a long run relationship between economic growth and stock market development. Furthermore, the study aimed to determine whether there exists a short-

term causal relationship between economic growth and stock market development. The study used annual data for the years 2004 to 2019 by applying unit root test to determine the nature of integration and subsequent cointegration, and using panel VAR based Granger causality tests, impulse response functions and forecast error variance decomposition. Prior to this, the analysis tested for the time series properties of the data. It further conducted unit root tests and established the optimal lag using the Akaike Information Criterion, which determined that two was the optimal lag to consider. The study further conducted some pre-estimation tests, namely normality and autocorrelation test. These tests determined that the model was fit to be estimated.

The results of the unit root tests indicated that all variables are stationary in levels. The study further proceeded to estimate the VAR model and interpret the results using pairwise Granger causality, impulse response functions and forecast error variance decomposition. As a result of the fact that all variables were found to be stationary in levels, a standard VAR could be undertaken as there was no need for an error correction term. Additionally, resulting from the naught order of integration of the variable, the implication is that there exists no cointegration relationship between the variables and hence there was no need to conduct cointegration testing. The results of the Granger causality tests reveal that in total, there exists a short-term causal relationship between stock market development and economic growth.

These results are consistent with the supply leading hypothesis, as was originally postulated by Schumpeter (1911). Also commonly referred to as the finance-led growth hypothesis or the growth-finance nexus, it assumes that causality flows from financial sector development to economic growth and not the other way round; and thus, stock market development is deemed the driver of economic growth.

Stock markets help firms to raise external finances used to expand operations, and this helps particularly for firms that are mature are considered relatively safe investments on the stock market. Stock markets channel investment capital from households to listed firms, providing these firms with capital to undertake greater investments which in turn reflect in terms of economic growth. The stock exchanges of Botswana, Malawi, Mauritius, Namibia and South Africa are home to a number of blue-chip investments which exhibit the potential to boost economic growth as a result of development in the stock market as evidenced by the results of this study. However, despite the potential that they hold, stock market activities in the developing world and Africa in particular are relatively small and underdeveloped. This is due to several reasons such as low liquidity resulting from the availability of finance by private individuals to invest, bare minimum in terms of investment products, offering only the plain vanilla of investment products. In addition, stock market activities do not always receive the necessary attention they require to ensure greater growth. The current status quo of stock market activities in Botswana, Malawi, Mauritius, Namibia, and South Africa gives the indication that even with some activities, there is still a positive impact made towards economic growth in these countries. Given the positive link between stock market development and economic growth, one may conclude that if the problems faced by these stock markets were address in such a manner that it allows them to perform at their optimal levels, they would be able to make and even greater impact on economic growth. With the potential that the stock market holds for contributing towards economic growth, it is important for African governments as well as the private sector to recognise this potential and ensure that stock markets are positions to achieve such potential. The section below discusses some

recommendations for addressing the problems of stock markets in the region to ensure enhanced performance and thus greater contribution to economic growth.

6.3 Recommendations

The study aimed to explore whether stock markets are important for economic growth. In doing so, the goal is to give indication to countries as to whether to endeavour to prioritise and improve stock market growth as a driver for economic growth or not. The results of the study indicate that stock market development is important for economic growth in the countries under the study. This is in support of the supply-leading hypothesis. Considering that all the countries under the study are developing countries, results may also be in support of the stage development hypothesis, at least given that they are consistent with the first lag of that hypothesis. Given this, the recommendation can be made that countries under the study can and should consider prioritising stock market activities as an important driver for economic growth in these countries. This can be done by undertaking certain interventions to address the shortcoming that stock markets in the region are faced with, and in that manner, position them to contribute further to economic growth.

Similar to Yartey and Adjasi (2007), these interventions include increasing automation, demutualization of exchanges, regional integration, promotion of institutional investors, regulatory and supervisory improvements, involvement of foreign investors and educational programs. These are as discussed further below.

(a) Automation

Some countries under this study, namely Mauritius, Namibia and South Africa already have in place automated and central depositary systems in place. Automation is said to have the benefits of reducing the costs and inefficiencies associated with manual

systems increases trading activity, improving market transparency and liquidity in the stock markets by speeding up operations. This is likely to lead to higher turnover and thus the implementation of automation in the regional stock exchanges is an excellent step towards promoting the development of stock markets in the SADC region. All these operational advantages of automation translate into improved market efficiency which can undoubtedly bring great benefits to the stock market activities.

(b) Demutualisation

In the region, the JSE is the only demutualised stock exchange. Judging by the success of the JSE relative to other exchanges in the region, one may potentially be able to attribute some of its success to its status as a demutualised stock exchange. Demutualisation holds several benefits such as a flexible governance structure, greater investor participations, greater response to competition from other trading systems, greater access to global market, amongst other (Hughes & Zargar, 2006). For this reasons, regional exchanges stand to benefit greatly from implementing demutualisation.

(c) Regional Integration

As with many other developmental objectives, countries in a regional cluster tend to benefit greatly from regional integration. Regional integration of stock exchanges provides opportunities for countries to harmonise efforts, providing greater experience for less established stock exchanges. Integrated stock exchanges promote greater efficiency, have greater potential for attracting investment and therefore greater liquidity. The JSE and the NSX have also advanced further in harmonizing systems where the NSX uses the trading and settlement systems of the JSE. The two exchanges

are also linked on the regulatory side in that the NSX rules and requirements are based on that of the JSE, which can be seen as a move towards some form of harmonisation. Integration is thus recommended for all of the benefits that it holds.

(d) Promote Institutional Investors

Institutional investors often have greater potential and ability to grow a country's stock market compared to private individuals. This is because they often have greater access to large sums of capital to invest. They also have greater bargaining power and thus typically are in a better position to demand for greater transparency, market integrity, seek lower costs and thereby promoting greater efficiency in stock market activities. Therefore, to help stock market activities to grow, it is recommended that countries engage in efforts to encourage greater participation by institutional investors.

(e) Strengthen Regulation and Supervision

Good regulatory and supervisory conditions are essential for the growth and development of stock market activities in any country. This is because they create incentive for investors to participate in stock market activities as well as help foster greater investor confidence. For this reason, it the study recommends that countries ensure that stock market activities are well regulated and supervisory institutions are in place to undertake this role.

(f) Attract Capital Flows and Encourage Foreign Participation

As is inherent to many developing economies, domestic residents have a limited means to undertake the kinds of investments required to grow an economy or develop the country's stock market. For this reason, it is essential to attract foreign capital and encouraging foreign participation. This can be done mainly by ensuring that countries

foster a conducive business environment. This will include ensuring that countries have sound regulatory and legal institutions to protect investor amongst others.

(g) Strengthen Education

Given that stock market activities are sufficiently new in Africa, there is very little knowledge about it, and more so for individual investors. People in developing countries have limited understanding of stock markets and their investment benefits and therefore do not consider it as an investment option. For this reason, the study recommends greater education and awareness raising of stock markets as a form of investment for private individuals as well as institutional investors. By encouraging greater participation, stock markets have the opportunity to grow and reach greater development.

6.4 Further Research

Additional to the recommendations above, the study recommends further research on the topic, particularly by studying more countries of SADC in order to be able to draw inference for those countries whose stock market activities are much too new and cannot be covered in the study.

REFERENCES

Acaravci, S. K., Ozturk, I., & Acaravci, A. (2009). Financial development and economic growth: Literature survey and empirical evidence from Sub-Saharan African countries. *South African Journal of Economic and Management Sciences*, *12*(1), 11-27.

Acquah-Sam, E., & Salami, K. (2014). Effect of capital market development on economic growth in Ghana. *European Scientific Journal, 10*(7), 511-534.

Adeyeye, P. O., Fapetu, O., Aluko, O. A., & Migiro, S. O. (2015). Does Supply-leading Hypothesis Hold in a Developing Economy? A Nigerian Focus. *Procedia Economics and Finance, 30,* 30-37.

African Securities Exchange Association (2021). Who are we https://african-exchanges.org/who-we-are/ Last accessed on 29 October 2021

Agarwal, S., & Mohtadi, H. (2004). Financial markets and the financing choice of firms: Evidence from developing countries. *Global Finance Journal, 15*(1), 57-70.

Ake, B. (2010). The role of stock market development in economic growth: evidence from some Euronext countries. *International Journal of Financial Research, 1*(1), 14-20.

Ali, M, A,, & Aamir, N. (2014). Stock Market Development and Economic Growth: Evidence from India, Pakistan, China, Malaysia and Singapore. *International Journal of Economics, Finance and Management Sciences*. 2 (3), 220-226.

Ali, H. S., Zubairu, A. N., & Abdullahi, Y. J. (2015). Does Supply-Leading Hypothesis Holds in South Africa? Evidence from ARDL Estimation Technique. *Journal of Economics Bibliography*, *2*(4), 194 - 200.

Arestis, P., & Demetriades, P. (1997). Financial development and economic growth: assessing the evidence. *The economic journal*, *107*(442), 783-799.

Azam, M., Haseeb, M., binti Samsi, A., & Raji, J. O. (2016). Stock market development and economic growth: Evidences from Asia-4 countries. *International Journal of Economics and Financial Issues*, *6*(3), 1200-1208.

Azarmi, T., Lazar, D., & Jeyapaul, J. (2011). Is the Indian stock market a casino? *Journal of Business & Economics Research (JBER)*, vol. 3, no. 4, 2011.

Badr, O. M. (2015). Stock market development and economic growth: Evidences from Egypt. *International Journal of Trade, Economics and Finance*, *6*(2), 96-101.

Bahabwa, R., (2015). An empirical study on the relationship between stock market development and economic growth in Namibia [Masters' thesis. University of Namibia] UNAM Scholarly Repository

Bayar, Y., Kaya, A., & Yildirim, M. (2014). Effects of stock market development on economic growth: Evidence from Turkey. *International Journal of Financial Research*, *5*(1), 93-100.

Beck, T., & Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking & Finance*, *28*(3), 423-442.

Beck, T., & Levine, R. (2002). Industry growth and capital allocation: does having a market-or bank-based system matter? *Journal of financial economics*, *64*(2), 147-180.

Benimadhu, S. (2003). Challenges facing African capital markets. In *Presentation at UNECA Forum. Johannesburg. Retrieved October* (Vol. 8, p. 2011).

Bundoo, S.K. (2017). Stock market development and integration in SADC (Southern African Development Community*). Rev. Dev. Finance*, http://dx.doi.org/10.1016/j.rdf.2017.01.005

Caporale, G. M., Howells, P. G., & Soliman, A. M. (2004). Stock market development and economic growth: the causal linkage. *Journal of economic development*, *29*(1), 33-50.

Caporale, G. M., & Spagnolo, N. (2011). Stock market integration between three CEECs, Russia, and the UK. *Review of International Economics*, *19*(1), 158-169.

Carp, L. (2012). Can stock market development boost economic growth? Empirical evidence from emerging markets in Central and Eastern Europe. *Procedia Economics and Finance*, *3*, 438-444.

Cavenaile, L., Gengenbach, C., & Palm, F. (2014). Stock markets, banks and long run economic growth: A panel cointegration-based analysis. *De Economist*, *162*(1), 19-40.

Chang, S. C. (2001). Stock market development and economic growth: A panel data approach. *Asia Pacific Management Review*, *6*(3), 357-376.

Chang, T. (2002). Financial development and economic growth in Mainland China: a note on testing demand-following or supply-leading hypothesis. *Applied Economics Letters*, *9*(13), 869-873.

Demirgüç-Kunt, A., & Levine, R. (1996). Stock market development and financial intermediaries: stylized facts. *The World Bank Economic Review*, *10*(2), 291-321.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366a), 427-431.

Djankov, Simeon, Glaeser, Edward, La Porta, Rafael, Lopez-de-Silanes, Florencio and Shleifer, Andrei, (2003), The new comparative economics, *Journal of Comparative Economics*, 31, issue 4, p. 595-619, https://EconPapers.repec.org/RePEc:eee:jcecon:v:31:y:2003:i:4:p:595-619.

Dubey, R. K., Chauhan, Y., & Syamala, S. R. (2017). Evidence of algorithmic trading from Indian equity market: Interpreting the transaction velocity element of financialization. *Research in International Business and Finance*, *42*, 31-38.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic modelling*, *29*(4), 1450-1460.

Enisan, A. A., & Olufisayo, A. O. (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. *Journal of economics and business*, *61*(2), 162-171.

Hailemariam, A., & Guotai, C. (2014). Stock market development and economic growth: empirical evidence for emerging market economies. *International Journal of Economics Finance and Management Sciences*, *2*(2), 171-181.

Halova, K., (2013). Bank Liquidity Creation and Real Economy: VAR Analysis. Bachelor thesis. Charles University in Prague.

Haque, M. E., & Hossain, M. (2011). Impact of stock market development on economic growth: Evidence from SAARC countries. *Eastern University Journal*, 3(3), 1-13.

Hughes, P. S., & Zargar, E. (2006). Exchange demutualization. Paper presented at the APEC Financial Regulators Training Initiative Regional Seminar Demutualization of Exchange, Manila.

Im, K. *M.. Pesaran H, and Y. Shin. 1995." Testing for Unit Roots in Heterogenous Panels."*. Working Paper 9526 (June). Department of Applied Economics, University of Cambridge.

Irving, J. 2005 Regional Integration of Stock Exchanges in Eastern and Southern Africa: Progress and Prospects. IMF Working Paper WP/05/122, Washington: International Monetary Fund.

Ishioro, B. O. (2013). Stock market development and economic growth: Evidence from Zimbabwe. *Ekonomska misao i praksa*, (2), 343-360.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: journal of the Econometric Society*, 1551-1580.

Kadenge, P. G., & Tafirei, F. (2014). The impact of bank and stock market developments on economic growth in Zimbabwe: 1988 To 2012. *Botswana Journal of Economics*, *12*(2), 74-94.

Kagochi, J. M., Nasser, O. M. A., & Kebede, E. (2013). Does financial development hold the key to economic growth? The case of Sub-Saharan Africa. *The Journal of Developing Areas*, 61-79.

Levine, R., & Zervos, S. (1996). Stock market development and long-run growth. *The World Bank Economic Review*, *10*(2), 323-339.

Levine, R., & Zervos, S. (1998). Stock markets, banks, and economic growth. *American Economic Review*, 537-558.

Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: asymptotic and finite-sample properties. *Journal of Econometrics*, *108*(1), 1-24.

Liu, X., & Sinclair, P. (2008). Does the linkage between stock market performance and economic growth vary across Greater China?. *Applied Economics Letters*, *15*(7), 505-508.

Marques, L. M., Fuinhas, J. A., & Marques, A. C. (2013). Does the stock market cause economic growth? Portuguese evidence of economic regime change. *Economic Modelling*, *32*, 316-324.

Matadeen, S. J., & Seetanah, B. (2019). Assessment of the Economic Impact of Stock Market Development: An African Perspective. In *HANDBOOK OF GLOBAL FINANCIAL MARKETS: Transformations, Dependence, and Risk Spillovers* (pp. 571-589).

Matadeen, J., & Seetanah, B. (2015). Stock market development and economic growth: Evidence from Mauritius. *The Journal of Developing Areas*, *49*(6), 25-36.

Mazur, E. A., & Alexander, W. R. J. (2001). Financial sector development and economic growth in New Zealand. *Applied Economics Letters*, *8*(8), 545-549.

Mehra, P. (2010). Demutualization of Stock Exchanges, From the Selected Work of Poonam Singh Mehra, NITIE (USA). Available from: http://www.works.bepress.com/poonam_mehra/14

Mohtadi, H., & Agarwal, S. (2001). Stock market development and economic growth: evidence from developing countries. *On line, Available at: http//www. uwm. edu/mohadi/PA-4-01. pdf*.

Naceur, S. B., & Ghazouani, S. (2007). Stock markets, banks, and economic growth: Empirical evidence from the MENA region, *Research in International Business and Finance*, vol. 21, no. 2, pp. 297-315

Naik, P. K., & Padhi, P. (2015). On the linkage between stock market development and economic growth in emerging market economies. *Review of Accounting & Finance*, *14*(4), 363-381.

Nazir, M. S., Nawaz, M. M., & Gilani, U. J. (2010). Relationship between economic growth and stock market development. *African Journal of Business Management*, *4*(16), 3473-3479.

Odhiambo, N. M. (2007). Supply-leading versus demand-following hypothesis: Empirical evidence from three SSA countries. *African Development Review*, *19*(2), 257-280.

Olweny, T. O., & Kimani, D. (2011). Stock market performance and economic growth Empirical Evidence from Kenya using Causality Test Approach. *Advances in Management and applied Economics*, *1*(3), 177-220.

Omuchesi, J., Bosire, M., & Muiru, M. (2014). The Effect of Automation on Stock Market Efficiency: A Case of Nairobi Securities Exchange. *A Research Journal of Finance and Accounting*, *5*, 71-79.

Osamwonyi, I. O., & Kasimu, A. (2013). Stock market and economic growth in Ghana, Kenya and Nigeria. *International Journal of Financial Research*, *4*(2), 83-98.

Ozturk, I. (2008). Financial development and economic growth: evidence from Turkey. *Available at SSRN 1127114*.

Pagano, M. (1993). Financial markets and growth: an overview. *European economic review*, *37*(2-3), 613-622.

Pan, L., & Mishra, V. (2018). Stock market development and economic growth: Empirical evidence from China. *Economic Modelling*, *68*, 661-673.

Patrick, H.T. (1966). "Financial Development and Economic Growth in Underdeveloped Countries", Economic Development and Cultural Change, 14, 174-189.

Hearn, B. A., & Piesse, J. (2008). Pricing Southern African shares in the presence of illiquidity: A capital asset pricing model augmented by size and liquidity premiums. *Kings College London Department of Management Research Paper*, (47).

Pirrong, C. (2000). A theory of financial exchange organization. *The Journal of Law and Economics*, *43*(2), 437-472.

Rousseau, P. L., & Wachtel, P. (2000). Equity markets and growth: Cross-country evidence on timing and outcomes, 1980–1995. *Journal of Banking & Finance*, *24*(12), 1933-1957.

Schumpeter, J.A. (1911) The Theory of Economic Development. Harvard University Press, Cambridge.

Seetanah, B., Sawkut, R., Sannasee, V., & Seetanah, B. (2008). Stock market development and economic growth in developing countries: Evidence from Panel VAR Framework. CSAE Working Paper 041, University of Oxford, UK. Available from: http://www. csae. ox. ac. uk/conferences/2010-EDiA/papers/041-Seetanah. pdf

Southern African Development Community SADC. (2006). Finance and Investment Protocol

Sukcharoensin, P., & Sukcharoensin, S. (2013). The Analysis of Stock Market Development Indicators: Evidence from the ASEAN-5 Equity Markets. *International Journal of Trade, Economics and Finance*, *4*(6), 343-346.

Treaty of the Southern African Development Community. Angola, Botswana, Congo, eSwatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia, Zimbabwe (1993) *Printing and Publishing Company Botswana* ISBN 99912-0-178-5

Yartey, C. A. (2008). *The determinants of stock market development in emerging economies: is South Africa different?*. IMF Working Papers, Available at: https://www.imf.org/external/pubs/ft/wp/2008/wp0832.pdf.

Yartey, C. A., & Adjasi, C. K. (2007). *Stock market development in Sub-Saharan Africa: Critical issues and challenges* (No. 7-209). International Monetary Fund.

Zivengwa, T., Mashika, J., Bokosi, F, N., Makova, T., (2011). Stock Market Development and Economic Growth in Zimbabwe. *International Journal of Economics and Finance* 3(5), 140-150.

APPENDICES

Appendix A: Variable Description and Data Sources

Table 9: Variable Description

Variable	Description	Computation
Y	**Percentage change in gross domestic product** Is used as a measure of economic growth. It measures the change in economic activity from one period to another - in this case - from one year to another.	$Y = C + I + G + NX$ $GDP = \frac{Y_t - Y_{t-1}}{Y_{t-1}}$
MC	**Change in domestic market capitalisation as a percentage of GDP** Growth in domestic Market capitalisation (MCAP) is the value of all outstanding domestic shares in the market. It is calculated as the total number of shares outstanding (SO) multiplied by the stock price (SP), and subsequently calculated as a ratio of GDP (MR). From this, change in market capitalisation (MC) is derived.	$MCAP = \frac{SO \times SP}{GDP} \times 100$
VT	**Change in total value traded as a percentage of GDP** Total value traded (TVT) is the value of stocks traded (ST) in a year multiplied by the share price (SP) during that year, subsequently calculated as a ratio of GDP	$TVT = \frac{ST \times SP}{GDP} \times 100$
TO	**Change in turnover value as a percentage of GDP** Is the total value of stocks traded divided by the value of stocks listed on the (domestic) stock market	$TNV = \frac{TVT}{MCAP}$
CF	**Change in gross fixed capital formation at a percentage of GDP** Is the net increase in physical assets (investment minus disposals) within the measurement period FI = fixed investments	$GFCF = \frac{FI_t - FI_{t-1}}{FI_{t-1}}$
LP	**Growth in labour force participation** Labour force participation is used in this study as a proxy for capital. It measures the	$EPOP = \frac{EPR_t - EPR_{t-1}}{EPR_{t-1}}$

active portion of an economy's labour force. It is calculated as the ratio of the labour force to the total population.

Table 10: Data Sources

Country	Range	GDPG	MCAP	TVT
Botswana	2005 - 2019	WDI	BSE	BSE
Malawi	2005 - 2019	WDI	MSE	MSE
Mauritius	2005 - 2019	WDI	WDI	WDI
Mozambique	2005 - 2019	WDI	BVM	BVM
Namibia	2005 - 2019	WDI	NSX	NSX
South Africa	2005 - 2019	WDI	WDI	WDI

Country	Range	TNV	CFG	EPOP
Botswana	2005 - 2019	BSE	WDI	WDI
Malawi	2005 - 2019	MSE	WDI	WDI
Mauritius	2005 - 2019	WDI	WDI	WDI
Mozambique	2005 - 2019	BVM	WDI	WDI
Namibia	2005 - 2019	NSX	WDI	WDI
South Africa	2005 - 2019	WDI	WDI	WDI

Appendix B: Descriptive Statistics

Table 11: Descriptive Statistics

Descriptive Statistics	GDP	MCAP	TVT	TNV	GFCF	EPOP
Mean	3.96	75.74	17.42	25.24	22.00	0.54
Median	4.11	31.94	3.30	5.42	20.93	0.16
Maximum	12.27	352.16	135.80	227.84	36.23	6.95
Minimum	-7.65	4.84	0.16	0.90	6.55	-6.50
Std. Dev.	2.94	92.73	30.52	42.44	6.45	2.11
Skewness	-0.40	1.53	1.99	2.86	0.28	0.09
Kurtosis	5.70	3.92	6.10	11.35	2.69	5.31
Jarque-Bera	26.33	34.22	84.72	341.73	1.36	17.93
Probability	0.00	0.00	0.00	0.00	0.51	0.00
Sum	316.54	6059.31	1393.24	2019.03	1760.19	43.41
Sum Sq. Dev.	681.93	679371.60	73576.99	142290.30	3291.26	353.36
Observations	80	80	80	80	80	80

Appendix C: Test Output Tables

Table 12: VAR Estimates

Vector Autoregression Estimates
Date: 10/24/21 Time: 21:44
Sample (adjusted): 2006 2019
Included observations: 70 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDP	MCAP	TVT	TNV	GFCF	EPOP
GDP(-1)	0.113127	-1.593165	-0.427738	0.032560	0.089166	0.357450
	(0.12223)	(1.32375)	(0.45937)	(0.71890)	(0.12664)	(0.08270)
	[0.92554]	[-1.20353]	[-0.93114]	[0.04529]	[0.70411]	[4.32230]
GDP(-2)	-0.125335	-0.660138	-0.073184	0.838664	0.079869	-0.204761
	(0.12229)	(1.32445)	(0.45962)	(0.71928)	(0.12670)	(0.08274)
	[-1.02488]	[-0.49842]	[-0.15923]	[1.16598]	[0.63036]	[-2.47466]
MCAP(-1)	0.032058	0.336963	-0.012752	0.116378	0.010540	0.012810
	(0.01712)	(0.18541)	(0.06434)	(0.10069)	(0.01774)	(0.01158)
	[1.87255]	[1.81735]	[-0.19819]	[1.15576]	[0.59418]	[1.10592]
MCAP(-2)	-0.032797	0.677630	0.183085	-0.082876	-0.002974	0.000175
	(0.01735)	(0.18788)	(0.06520)	(0.10203)	(0.01797)	(0.01174)
	[-1.89063]	[3.60681]	[2.80817]	[-0.81227]	[-0.16545]	[0.01493]

TVT(-1)	-0.050142	0.796450	0.857472	-0.245974	-0.008588	0.024201
	(0.04945)	(0.53555)	(0.18585)	(0.29085)	(0.05123)	(0.03346)
	[-1.01401]	[1.48716]	[4.61381]	[-0.84572]	[-0.16762]	[0.72334]
TVT(-2)	0.018719	-0.975448	-0.407022	0.202324	-0.018375	-0.063979
	(0.04864)	(0.52675)	(0.18279)	(0.28606)	(0.05039)	(0.03291)
	[0.38488]	[-1.85183]	[-2.22668]	[0.70727]	[-0.36464]	[-1.94419]
TNV(-1)	0.002744	-0.003559	0.043509	1.126922	-0.012568	-0.023251
	(0.02318)	(0.25107)	(0.08713)	(0.13635)	(0.02402)	(0.01569)
	[0.11837]	[-0.01418]	[0.49938]	[8.26495]	[-0.52325]	[-1.48237]
TNV(-2)	-0.007162	0.022119	0.024652	-0.235003	0.019243	0.032411
	(0.02259)	(0.24464)	(0.08490)	(0.13286)	(0.02340)	(0.01528)
	[-0.31705]	[0.09042]	[0.29038]	[-1.76884]	[0.82223]	[2.12067]
GFCF(-1)	0.298030	-0.619692	-0.145421	0.707189	1.005584	-0.084883
	(0.12880)	(1.39498)	(0.48409)	(0.75758)	(0.13345)	(0.08715)
	[2.31382]	[-0.44423]	[-0.30040]	[0.93348]	[7.53518]	[-0.97400]
GFCF(-2)	-0.331260	-0.146693	-0.049308	-0.761999	-0.163706	0.109443
	(0.11902)	(1.28904)	(0.44733)	(0.70005)	(0.12332)	(0.08053)
	[-2.78317]	[-0.11380]	[-0.11023]	[-1.08849]	[-1.32753]	[1.35902]
EPOP(-1)	0.146971	1.470127	0.571109	-0.134153	0.386829	0.305037
	(0.17755)	(1.92292)	(0.66730)	(1.04430)	(0.18396)	(0.12013)
	[0.82777]	[0.76453]	[0.85585]	[-0.12846]	[2.10282]	[2.53919]

EPOP(-2)	0.006280	3.224871	0.870195	-0.352343	-0.032487	-0.189376
	(0.16479)	(1.78467)	(0.61932)	(0.96921)	(0.17073)	(0.11149)
	[0.03811]	[1.80699]	[1.40508]	[-0.36354]	[-0.19028]	[-1.69853]
C	5.261865	27.09618	1.006487	-2.194331	2.473208	-1.265644
	(1.59631)	(17.2884)	(5.99947)	(9.38892)	(1.65390)	(1.08006)
	[3.29628]	[1.56731]	[0.16776]	[-0.23371]	[1.49538]	[-1.17182]
R-squared	0.335853	0.924547	0.920468	0.883537	0.844036	0.437483
Adj. R-squared	0.196033	0.908662	0.903724	0.859018	0.811201	0.319058
Sum sq. resids	397.5123	46625.86	5614.932	13751.49	426.7146	181.9772
S.E. equation	2.640814	28.60066	9.925099	15.53236	2.736096	1.786780
F-statistic	2.402031	58.20309	54.97415	36.03541	25.70568	3.694185
Log likelihood	-160.1113	-326.8752	-252.7898	-284.1399	-162.5924	-132.7642
Akaike AIC	4.946036	9.710721	7.593995	8.489713	5.016926	4.164692
Schwarz SC	5.363614	10.12830	8.011573	8.907291	5.434503	4.582269
Mean dependent	3.854937	78.70904	18.48873	24.30353	22.53730	0.473372
S.D. dependent	2.945226	94.63474	31.98718	41.36718	6.296969	2.165289

Determinant resid covariance (dof adj.)	1.29E+09
Determinant resid covariance	3.75E+08
Log likelihood	-1286.933
Akaike information criterion	38.99809
Schwarz criterion	41.50355
Number of coefficients	78

Table 13: Pairwise Granger Causality

Pairwise Granger Causality Tests
Date: 10/24/21 Time: 22:30
Sample: 2004 2019
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
MCAP does not Granger Cause GDP	70	5.25664	0.0077
GDP does not Granger Cause MCAP		0.22999	0.7952
TVT does not Granger Cause GDP	70	4.17669	0.0197
GDP does not Granger Cause TVT		0.17442	0.8403
TNV does not Granger Cause GDP	70	0.46581	0.6297
GDP does not Granger Cause TNV		0.67334	0.5135
GFCF does not Granger Cause GDP	70	4.09891	0.0211
GDP does not Granger Cause GFCF		2.20595	0.1183
EPOP does not Granger Cause GDP	70	0.60451	0.5494
GDP does not Granger Cause EPOP		10.7148	0.0001
TVT does not Granger Cause MCAP	70	1.93925	0.1520
MCAP does not Granger Cause TVT		5.13659	0.0085
TNV does not Granger Cause MCAP	70	0.09574	0.9088
MCAP does not Granger Cause TNV		0.41554	0.6617
GFCF does not Granger Cause MCAP	70	0.37074	0.6917
MCAP does not Granger Cause GFCF		0.31958	0.7276
EPOP does not Granger Cause MCAP	70	1.52169	0.2260
MCAP does not Granger Cause EPOP		1.73991	0.1836
TNV does not Granger Cause TVT	70	0.28965	0.7495
TVT does not Granger Cause TNV		0.08661	0.9171
GFCF does not Granger Cause TVT	70	0.38890	0.6794
TVT does not Granger Cause GFCF		0.41910	0.6594
EPOP does not Granger Cause TVT	70	1.25968	0.2906
TVT does not Granger Cause EPOP		2.45360	0.0939
GFCF does not Granger Cause TNV	70	0.81644	0.4465
TNV does not Granger Cause GFCF		0.33445	0.7170
EPOP does not Granger Cause TNV	70	0.05189	0.9495
TNV does not Granger Cause EPOP		0.50051	0.6085
EPOP does not Granger Cause GFCF	70	3.81604	0.0271
GFCF does not Granger Cause EPOP		0.79757	0.4548

Figure 8: Impulse Response Functions

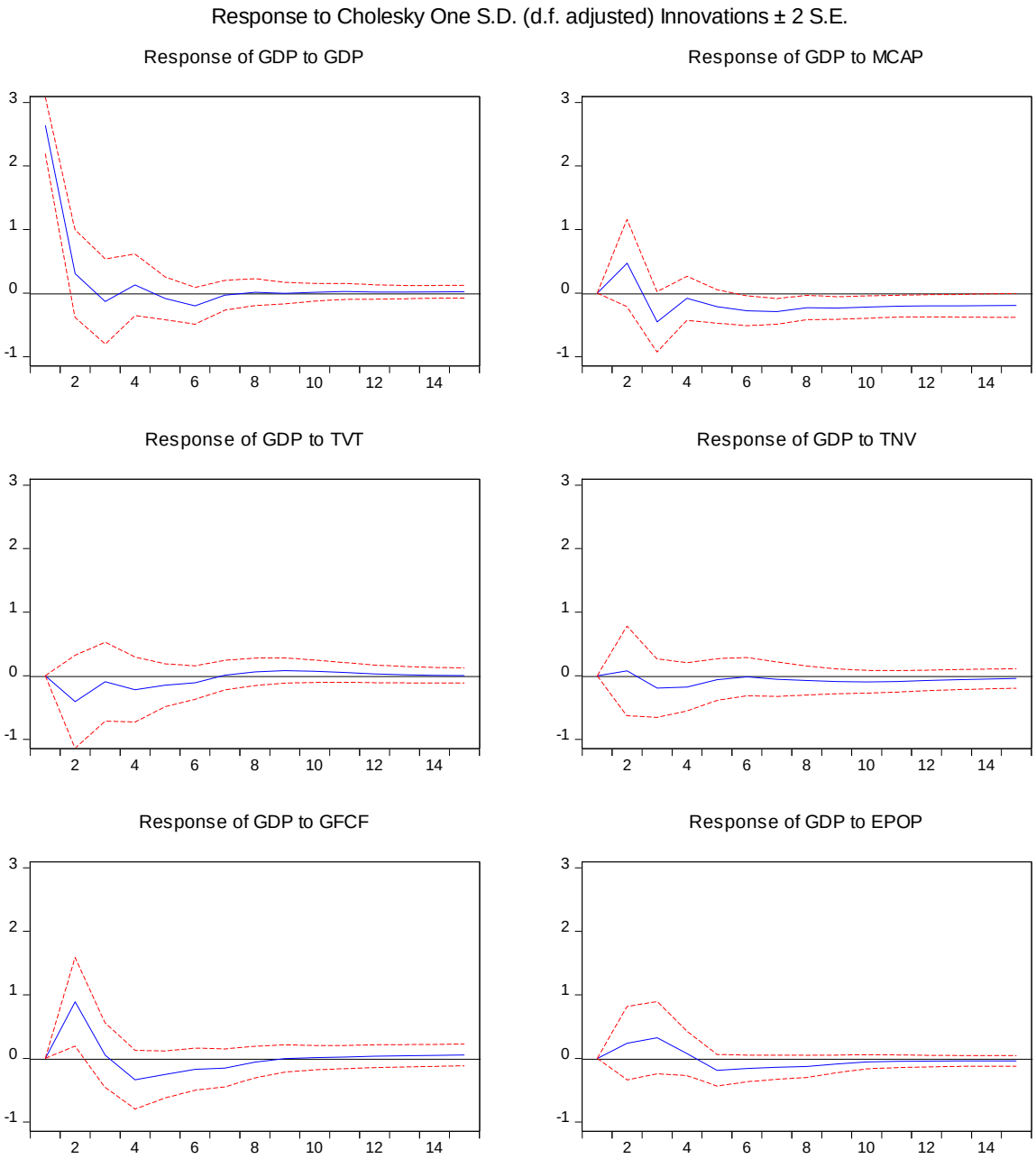


Figure 9: Forecast Error Variance Decomposition Tables