# THE RELATIONSHIP BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN AFRICA

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**SIYANDA MKHIZE**

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ABSTRACT
Over the years there has been a substantial increase in the number of African stock markets. This has generated much interest from local and foreign investors, as these stock markets have had high returns. These conditions have created an interesting scenario for investigating the relationship between stock market development and economic growth. However, this opportunity has largely been neglected as the research on African stock market development is limited in developing economies relative to research conducted in developed countries.

Furthermore, the research that has been conducted on the relationship between stock market development and economic growth in Africa, has generated inconclusive and conflicting results, in addition to this, the institutional quality of African countries is disregarded in most studies when the stock market development and economic growth nexus is analysed. Therefore, this study aims to explore the relationship between stock market development and economic growth, incorporating institution variables to account for the institutional quality of African countries to provide clarity in this context. To achieve this, two sets of research hypotheses were created the first set aims to determine whether stock development has an influence on economic growth. The second set is to determine if there is any causal relationship between stock market development and economic growth.

The study utilizes System Generalized Method of Moments models to examine the effect of stock market development on economic growth, in 18 African countries for the period 2003-2016. The results indicate that market capitalization has a positive influence on economic growth whilst, contrastingly liquidity in the form of value traded has a negative effect on economic growth.

The study further analyses the causal relationship between stock market development and economic growth, by employing the recently developed PVAR-Granger causality test. However, before this is done several Pedroni cointegration tests were first conducted to establish whether a long-term relationship exists between stock market development and economic growth, which revealed that no strong evidence of cointegration exists necessitating the use of a PVAR-Granger causality test.

The PVAR-Granger causality test reveals that stock market development granger causes economic growth, irrespective of the stock market development measure used and there is no feedback effect from economic growth. The unilateral causality established in this study

flowing from stock market development to economic growth supports the supply-leading hypothesis.

The overall results of this study demonstrate that there is ambiguity on the impact of stock market development on economic growth, as the measures of stock market development have contrasting impacts on economic growth. The size component of stock market development in the form of market capitalization has positive influence whilst, liquidity in form of total value traded has a negative effect. However, the causal relationship is clearly shown to be unilaterally flowing from stock market development to economic growth.

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# Chapter 1 Introduction

## 1.1 Background of study

For many years when the interaction between financial development and economic growth has been investigated, it has mainly been in the context of banking system development and not stock market development. However, with the number of stock markets increasing in the world from just over 50 in 1975 to over 160 in 2015 and increasingly having a much more influential role over growth as the 2007/2008 global financial crisis highlighted, the impact of financial markets on economic growth has become a focal area of research (WFE and UNCTAD, 2017). Much attention has shifted to stock market development, but most of the research done on this topic has been concentrated on developed countries (Thangavelu and Ang, 2004; Nieuwerburgh *et al.,* 2005; Antonios, 2010; Ake, 2010) with a limited number of studies on developing countries (Mohtadi and Agarwal, 2006; Kaplan, 2008; Carp, 2012; Caporale and Spagnolo, 2011). Furthermore, with even far less studies focusing specifically on African countries, which is difficult to comprehend as the number of African stock exchanges has substantially increased. In 1992, there were only 9 stock markets and that number doubled to 18 by 2002 (Adjasi and Biekpe, 2006). In 2016 there were 29 stock exchanges (African Studies NTU-SBF, 2016). In addition, this increase in the number of African stock exchanges has been supported by a surge in the market value of African listings, as market capitalisation of African exchanges has grown from 113 billion dollars in 1992 to over 1.5 trillion dollars in 2013 (AFSB, 2014).

The United Nations (UN) recently introduced sustainable development goals which came into effect in January 2016; at the forefront of these goals is poverty alleviation and reduction in economic inequality (UNDP, 2018). Africa being one of the continents with the highest poverty rates in the world has seen a lot of countries try to integrate these sustainable development goals into their national development plans. For African countries to develop economically at quicker rates the financial sector should be put under scrutiny for better policy initiatives to be implemented, with the aim of strengthening the contribution of financial development to economic growth if it is ascertained conclusively that financial development is a fundamental driver of long-term economic growth.

This would be advantageous since investors' perceptions are changing as they are becoming noticeably positive about Africa, which was once referred to as the "Dark Continent" (Brantlinger, 1985:166). This is supported by the recent strong performance of African stock markets. InvestingInAfrica.net, a website that monitors African stock markets, reported that three exchanges had five-year returns in excess of 40% in dollar terms as of January 31, 2017. The exchanges that recorded these high returns were Bourse Régionale des Valeurs Mobilières SA- which is the regional stock exchange serving West African countries, Nairobi Securities Exchange (Kenya) and Namibian Stock Exchange (Hoover, 2017).

Ross and Levine (1996) argue that economic growth could be manipulated by stock markets by altering these several functions which are: liquidity, risk diversification, acquisition of firm-specific

information, corporate control and savings mobilization. Due to these functions, Adjasi and Biekpe (2006) argue that stock market development has assumed a developmental role in global economics, mainly because of the impact on finance and economic activity. This view is supported by Donou-Adonsou and Sylwester (2016) who argue that financial development has the ability to reduce poverty. Moreover, during the period when Africa saw a substantial increase in the number and market capitalisation of exchanges, economic growth in Africa almost doubled from 2.1% (1980-2000) to 3.9% (2000-2007) (Olamosu and Wynne, 2015).

Piketty (2015), however, suggests that the growth of the financial sector is not beneficial to reducing inequality, as he is of the view that one of the main drivers of inequality is the return on capital being greater than the growth rate of the economy (return rate > economic growth) which is symptomatic of financialization. The difference between the return rate on capital and economic growth can be used as one contributing factor to explain why inequality increased in the world up until world war one and why in the 21st century this inequality is poised to be amplified as growth around the world is slowing. This declining growth rate and unequal access to high financial returns increases the gap between the return rate on capital and economic growth which results in uneven development as it becomes increasingly difficult for poor countries to catch up to developed countries.

In addition, Godechot (2015) argues that since financialization advocates for downsize and redistribute policy through dividends or share buybacks, rather than the orthodox approach of retain and reinvest thus this leads to the prioritisation of shareholder remuneration through dividends and share repurchases. Whilst offering generous incentive pay packages to CEOs resulting in a decline in productive investment. Furthermore, as companies restructure, salaries of the middle and lower class shrink promoting inequality as the wealthy receive higher dividends, share prices increase and CEOs receive higher compensation. Ashman *et al.* (2013), support this view as they assert that financialization in South Africa emanated from the liberalization of financial markets. This has resulted in capital being diverted away from much needed investment necessary to diversify the industrial base in the 1990s and instead directed towards finance and consumption. This has altered the country's growth path as companies became more concerned about short-term returns and increased shareholder value, leading to devastating effects on investment and employment, as the country has an unemployment rate of 26.7%.

## 1.2 Problem statement

McKinnon's (1973) and Shaw's (1973), findings showed that the shift from financial repression to financial liberalisation was conducive to economic growth. Their work provided the theoretical justification for the IMF/World Bank' Structural Adjustment Programme, which led to liberalization of the financial sector of many developing countries, particularly in Africa (Adu *et al.* 2013). These

findings subsequently generated great research interest elsewhere, although in Africa no significant research was conducted until after the 1980s, when the liberalisation of many African financial sectors was taking place. Shaw was of the view that stock market development in developing countries would be costly as significant investments would be required to develop stock markets (Ngare *et al.* 2014).

In studies conducted by Thangavelu and Ang (2004), Rousseau and Wachtel (2000), Nowbutsing (2009) and Tachiwou (2010) it is shown that stock markets are important for economic growth, however, other researchers such as; Kletzer and Pardhan (1987), Beck (2002) and Mauro (2003) have supported Shaw's view on stock market development in developing countries. By arguing that stock markets may not necessarily be growth enhancing in relatively poor countries when considering the amount of investment required to develop such a market, rather they are of the view that developing countries should rather promote bank development to promote economic growth. However, this view has been challenged as Minier (2009) argues that stock markets in Africa are growth-enhancing regardless of the development state of the economy.

The limited studies that do explore the relationship between stock market development and economic growth in Africa, have mainly been conducted as cross-sectional or single country studies. These studies produce inconsistent empirical results which can be attributed to many factors, but a prominent issue is estimation methods used and has been acknowledged in many studies (Gondo, 2009; Starkey, 2010; Nyasha & Odhiambo, 2015; Alimi, 2015). The current state of conflicting empirical results makes it difficult to have meaningful policy created and implemented regarding stock markets. Therefore, in an attempt to provide robust findings that might induce an environment that promotes better policy formulation, this study will take a dynamic panel approach, which has the ability to exploit both cross-sectional and time-series properties. Whilst representing an attempt to utilise the data in the most efficient manner as it accounts for the problems of serial correlation, heteroskedasticity and endogeneity including unobserved heterogeneity, which are problems that plague other studies (Starkey, 2010).

Djoumessi (2009), states that the establishment of a suitable financial sector policy is of utmost importance for economic growth and, as such, if the factors underlying differences in financial development can be identified, more effective policy can be formulated and therefore, potentially improve living standards.

## 1.3 Research goals and hypotheses

### 1.3.1 Research goals

The general goal of this research is to critically evaluate the relationship between stock market development and economic growth in African economies.

### 1.3.2 Research hypotheses

Based on the research goal, the following hypotheses have been developed:

A) H0: Stock market development has no effect on economic growth in Africa.

H1: Stock market development has an effect on economic growth in Africa

B) H0: There is no causality between stock market development and economic growth.

H1: There is causality between stock market development and economic growth.

## 1.4 Justification of the study

Early empirical work analysing the financial sector has suggested that bank development and stock market development are both equally important to enhancing economic growth (Rapp and Udoieva, 2018). However, past literature has favoured the banking system and according to the World Bank (2006), African countries should increase their focus on supporting drivers of growth. Therefore, it is imperative to increase the number of studies that focus on economic growth and potential drivers of such growth as, economic growth has been long identified as the most powerful instrument for poverty reduction in developing countries, with the potential to create better living standards and opportunity (OECD, 2007).

In addition, empirical findings report inconclusive results on whether there is a relationship between stock market development and economic growth (Atje and Jovanovic, 1993; Harris, 1997; Durham, 2002; Ake and Ognaligui, 2010). Secondly, the fundamental relationship between stock market development and economic growth is not clear. Furthermore, the number of panel regression studies focusing solely on African countries in terms stock market development and economic growth are limited. This presents an opportunity to explore the relationship between stock market development and economic growth in Africa by factoring in how institution quality of African countries influences the relationship, to the author's knowledge only Adjasi and Biekpe (2006) and Ngare *et al.* (2014) have conducted panel studies with an African focus. This indicates a strong need for further research in the hope of providing clarity to policymakers and appreciation of the importance of stock market development. This study differently approaches the task by including institutional variables such as Corruption Perception Index and Freedom in the World indices. To the author's knowledge only the study by Ngare *et al.* (2014) incorporated institutional variables (Control of Corruption index, the political stability and absence of violence index) which vary from the ones that will be used in this panel analysis on African stock markets and growth as the institutional variables used by Ngare *et al.* (2014) lack reliability. According to Lambsdorff (2007), the Control of Corruption index has reduced validity due to the decision by the World Bank to adopt 'problematic' data sources unlike the data used by Transparency International to formulate the Corruption Perception Index (Malito, 2014). In addition,

Freedom in the world encompasses civil liberties which are neglected (add) by Ngare *et al.* (2014). Institutional variables are relevant as Huang's (2010) empirical study concluded that institutional improvements have a positive effect on financial development in the short term and this effect last longer for low-income countries. By this innovation, the study seeks to contribute to the body of African research.

## 1.5 Organization of the study

This study is divided into six chapters. Chapter One is the introductory chapter, it presents the problem statement, research goals and hypotheses. Five other chapters will follow logically, with each chapter focusing on a specific issue. Chapter Two is an overview of the development and characteristics of African stock exchanges. Chapter Three reviews the related literature and is divided into two main sections. The first section presents a conceptual understanding and review of theoretical literature, whilst in the second section empirical findings are discussed. Chapter four explains the data used and the research methodology. The results of the study are presented in chapter five and finally, chapter six will conclude by summarizing the results and providing policy recommendations.

# Chapter 2 Overview of African Stock Markets and their Characteristics

## 2.1 Introduction

The influx of interested international investors in Africa can be said to be due to, Africa being a continent rich with minerals and arable land that has more people under the age of 35 than any other continent (Mills, 2010; Ighobor, 2013). African stock exchanges offer diversification benefits to international investors, as most African exchanges are not correlated with exchanges from developed countries, albeit African exchanges are becoming increasingly integrated with each other and with the rest of the world over time (Randolph, 2011). Companies in Africa are also seeing the stock exchange as a viable alternative to raising capital at a lower cost relative to traditional bank loans to finance business ventures. In 2015, there were 28 initial public offerings and further offerings (issuances by companies already listed on an exchange) in Africa that raised $12.7 billion in capital (PWC, 2015).

The aim of this chapter is to provide an overview of African stock markets. The chapter is divided into five main sections. Section 2.2 considers the history of African exchanges and how they can be categorized. Section 2.3 examines institutional characteristics, whilst section 2.4 and 2.5 analyse operational characteristics and indicators of stock market development in Africa. Section 2.6 discusses regional integration and section 2.7 concludes.

## 2.2 A brief history of African stock markets

Taking a glance at Table 2.1, the first exchange to be established in Africa was the, Egyptian Exchange which traces its origin to 1883, when the Alexandria Stock Exchange was founded; the Egyptian Stock Exchange (EGX) is the oldest and one of the largest exchanges in Africa, with a rich history spanning 134 years (UNDP, 2003). The youngest stock exchange in Africa is from South Africa, A2X Markets which made its trading debut on the 6th of October 2017. This exchange focuses on secondary listings for companies already listed on the Johannesburg Stock Exchange. Over the years there has been a substantial increase in the number of African stock exchanges. In 1992, there were only 9 stock markets in the whole of Africa, and by 2002 that figure had doubled to 18 (Adjasi and Biekpe, 2006). In 2016, there were 29 stock exchanges representing capital markets in 38 nations (Moin, 2007; ASEA, 2012).

Table 2.1 presents a summary of the history of African stock markets showing the year they were established including their location, name of exchange and the number of companies that are listed on those exchanges. An important feature is that the geographical spread of the exchanges is not concentrated in one region as the stock markets cover four regions that being East Africa (Kenya,

Tanzania and Uganda), North Africa (Egypt, Morocco and Tunisia), Southern Africa (Botswana, Malawi, Mauritius, Mozambique, Namibia, South Africa, Zambia, and Zimbabwe), and West Africa (Cote D'Ivoire, Ghana and Nigeria). Another, noticeable feature is that quite a few countries established stock markets in the 1990s such as Ghana, Malawi, Algeria, Namibia, Nigeria, Sudan, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. Following that, during the period of 2000-2011, four exchanges were established in Cameroon, Cape Verde, Libya, and Seychelles. This surge in the number of new stock markets being founded within Africa was mainly due to the IMF/World Bank' Structural Adjustment Programmes implemented during 1990-2000. The Structural Adjustment Programmes led to liberalization of the financial sector of many developing countries, particularly in Africa (Adu *et al.*, 2013). During this period 13 new exchanges were established. The number of new stock markets also peaked during this period. However, recently there has been a substantial increase in the number of new exchanges opening with 5 new exchanges being established during the period 2012-2017, many of these new exchanges concentrated in South Africa. This could be indicative of financialization of the South African economy, as growth in the economy has been tepid during the period of 2012-2017 however, there has been a substantial increase in the market capitalisation of the JSE and a surge in new exchanges opening. This view is supported by Ashman *et al.* (2013) as they contend that in South Africa real economic activity has been constrained by financial activity.

Apart from stock markets in Egypt and South Africa that are more than 100 years old, most African stock markets are fairly young in comparison to other stock markets in developing countries, such as Brazil and Chile which are 128 and 125 years old respectively. It seems that the age of African stock markets has a direct influence on the number of company listings as the two oldest exchanges Egypt and South Africa account for the most companies listed with a total of 642 companies and young exchanges in countries such as Cameroon, Cape Verde, Libya and Seychelles in total have 30 listings. As of 2017 there were 31 African stock markets with a combined listing of 1676 companies. Smith *et al.* (2002) group African exchanges into four classes based on their level of development:

(1) South Africa has the largest exchange in Africa, which is the Johannesburg Stock Exchange. It's highly sophisticated in terms of technical infrastructure and regulatory framework.

(2) Medium-sized stock markets, for example the Egyptian Exchange, which has been established for 134 years.

(3) Small new stock markets which have grown rapidly, for instance the Ghana Stock Exchange.

(4) Swaziland and similar countries that have small new stock markets that haven't taken off as yet.

*Table 2.1: African exchanges*

| **Economy** | **Exchange** | **Location** | **Established** | **Company listings** |
|---|---|---|---|---|
| West African Economic and Monetary Union | Bourse Régionale des Valeurs Mobilières | Abidjan ( Côte d'Ivoire) | 1998 | 39 |
| Algeria | Algiers Stock Exchange | Algiers | 1997 | 5 |
| Botswana | Botswana Stock Exchange | Gaborone | 1989 | 34 |
| Cameroon | Douala Stock Exchange | Douala | 2001 | 3 |
| Egypt | Egyptian Exchange | Alexandria/ Cairo | 1883 | 254 |
| Cape Verde | Bolsa de Valores de Cabo Verde | Mindelo | 2005 | 4 |
| Ghana | Ghana Stock Exchange | Accra | 1990 | 43 |
| Kenya | Nairobi Stock Exchange | Nairobi | 1954 | 65 |
| Libya | Libyan Stock Market | Tripoli | 2007 | 10 |
| Malawi | Malawi Stock Exchange | Blantyre | 1995 | 14 |
| Mauritius | Stock Exchange of Mauritius | Port Louis | 1988 | 103 |
| Morocco | Casablanca Stock Exchange | Casablanca | 1929 | 74 |
| Mozambique | Bolsa de Valores de Moçambique | Maputo | 1999 | 6 |

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|---|---|---|---|---|
| Namibia | Namibia Stock Exchange | Windhoek | 1992 | 38 |
| Nigeria | Abuja Securities and Commodities Exchange | Abuja | 1998 | 0* |
| | Nigerian Stock Exchange | Lagos | 1960 | 262 |
| Rwanda | Rwanda Stock Exchange | Kigali | 2008 | 8 |
| Seychelles | Seychelles Stock Exchange | Victoria | 2013 | 23 |
| South Africa | 4 Africa exchange | Johannesburg | 2017 | 3 |
| | A2X | Johannesburg | 2017 | 4 |
| | Equity Express Securities Exchange | Johannesburg | 2017 | 5 |
| | Johannesburg Stock Exchange | Johannesburg | 1887 | 388 |
| | ZAR X | Johannesburg | 2017 | 3 |
| Sudan | Khartoum Stock Exchange | Khartoum | 1994 | 66 |
| Swaziland | Swaziland Stock Exchange | Mbabane | 1990 | 6 |
| Tanzania | Dar es Salaam Stock Exchange | Dar es Salaam | 1998 | 26 |
| Tunisia | Bourse des Valeurs Mobilières de Tunis | Tunis | 1969 | 87 |
| Uganda | Uganda Securities Exchange | Kampala | 1997 | 17 |
| Zambia | Agricultural Commodities Exchange of Zambia | Lusaka | 2007 | 0* |

| | | | | |
|---|---|---|---|---|
| | Lusaka Stock Exchange | Lusaka | 1994 | 22 |
| Zimbabwe | Zimbabwe Stock Exchange | Harare | 1993 | 64 |
| Total | 31 | | | 1676 |

*Source: ASEA, UNDP 2003, a2x.co.za, zarx.co.za, 4ax.co.za, and eese.co.za*
*Trade commodities

## 2.3 Institutional characteristics

The regulation of African stock exchanges is perceived to be weak. According to Mlambo and Biekpe (2007), some of the African exchanges were established on the back of poor regulatory and legislative frameworks. This has led to the prevalence of market abuse such as insider trading and creating a perception of inefficient markets. Although advanced stock exchanges like the Johannesburg Stock Exchange are consistently ranked first in the world in terms of regulation by organisations such as the World Economic Forum. Although other African stock markets have made progress in strengthening regulation, the perception of weak regulatory system in Africa is difficult to shake-off (Masie, 2013). However, Carvajal and Elliott (2007) point to a number of exchanges around the world having weak regulatory systems not just in Africa, albeit the intensity of these weak systems varies from country to country.

Stock exchanges are regulated to ensure market confidence, financial stability, consumer protection and to reduce the risk of financial crime. Regulation of stock markets may vary from a single-agency specialized in securities regulation to a unified regulator that regulates more than one sector. In most African countries, self-regulatory organizations (SRO) such as exchanges and industry associations carry out part of the regulatory function, with SROs playing a significant role (Carvajal and Elliott, 2007).

The African Securities Exchange Association (ASEA) is one of these industry associations that aim to strengthen regulation of African exchanges. ASEA was established in 1993 and represents 27 exchanges in Africa. In 2016 ASEA, partnered with the African Development Bank (AFDB) to launch the African Exchanges Linkage Project. The project aims to create a bigger African financial market and the convergence towards international standards (AFDB, 2016).

On the international context there is the International Organisation of Securities Commissions (IOSCO), which was founded in 1983. IOSCO is an organisation that brings together the world's securities regulators and is recognised as the global standard setter for the securities sector. IOSCO is responsible for promoting the convergence to internationally recognised standards for securities regulation.

Currently IOSCO's members regulate 95% of the world's securities markets in more than 115 jurisdictions.

*Table 2.2: Institutional characteristics of African exchanges*

| **Economy** | **Market Regulator** | **Governing Law** | **Insider trading rules** | **Reporting Requirement** | **Tax rates** | **Foreign participation** |
|---|---|---|---|---|---|---|
| West African Economic and Monetary Union | Conseil Régional de l'Epargne Publique et des Marchés Financiers (CREPMF) | CEMAC Treaty | Y | Half year unaudited and full year audited accounts. | 10% withholding tax on dividends | No restrictions |
| Algeria | Commission d'Organisation et de Surveillance des Opérations de Bourses (COSOB) | Act 93-10 (1993) | Y | Half year unaudited and full year audited | None on capital gains and dividends | No restrictions |
| Botswana | The Botswana Stock Exchange Committee | Botswana Stock Exchange Act (1994) | Y | Half year unaudited and full year audited accounts. | Dividends: 15%; Interest: 15%; Capital gains: 0% | No restrictions |
| Cameroon | Financial Markets Commission (FMC) | Law N° 99/015 of the 22nd December, 1999 | Y | Half year unaudited and full year audited accounts. | dividends 10% (domestic investors) 15% (foreign investors) | No restrictions |
| Egypt | Capital Markets Authority | Capital Market Law | Y | Half year unaudited and full year audited accounts. International Accounting and Auditing Standards. | Dividends: 0%; Interest: 15%; Capital gains: 0% | No restrictions |
| Cape Verde | General Auditor of Securities Market - AGMVM | Decree-Legislative nº1 / 2012, of 27 January 2012 | Y | Half year unaudited and full year audited accounts. International Accounting and Auditing Standards | Dividends:0%; capital: gains 15% | No restrictions |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ghana | Securities Exchange Commission | Stock Exchange Act (1971) | Y | Half year unaudited and full year audited accounts. | Dividends:10 %; Interest: 15%; Capital gains: 0% | Cap on ownership (74% of collective), has been lifted. |
| Kenya | Capital Markets Authority | Capital Markets Authority Act | Y | Half year unaudited and full year audited accounts. International Accounting and Auditing Standards. | Residents: Dividends: 5%; Interest: 15%; Capital gains: 0% Non-Residents: Dividends: 7.5%; Interest:12.5%; Capital gain: 0% | Cap on ownership of (80% collective), has been lifted. |
| Libya | Libya Stock Market Authority | Law No. (11) on the capital market(2010) | Y | Half year unaudited and full year audited accounts | None on capital gains and dividends | No restrictions |
| Malawi | The Stock Exchange Committee | Capital Market Development Act | Y | Half year and full audited annual accounts. International Accounting and Auditing Standards. | Residents: Dividends: Nil; Interest: 20%; Capital gains: 35% Non-Residents: Dividends: Nil; Interest: 15%; Capital gains:35% | Cap of 10% on individual foreign portfolio investor, cap of 49% on total foreign collective investment. |
| Mauritius | Financial Services Commission | The Stock Exchange Act (1988) | Y | Half year and full audited annual accounts. International Accounting and Auditing Standards | None on capital gains and dividends | No restrictions |
| Morocco | Conseil Deontologique des Valeurs Mobilieres. (CDVM) | Article 2 of the Royal Edict as law Nr.1-93-211 of rabia II 4, 1414 | Y | Half year and full audited annual accounts. International Accounting and Auditing Standards | Dividends:15 %; Capital gains: 10% | No restrictions |
| Mozambique | Ministry of finance/Capital Markets Authority | Decree nº 45/07, of 30 October | Y | Half year and full audited annual accounts. | Dividends:10 %; Capital gains: 0% | No restrictions |

| | | | | | | |
|---|---|---|---|---|---|---|
| Namibia | Namibia Financial Institutions Supervisory Authority | Stock Exchanges Control Act | Y | half yearly income statements and audited balance sheets | None on capital gains and dividends | No restrictions |
| Nigeria | Securities and Exchange Commission | Lagos Stock Exchange Act | Y | Half year unaudited and full audited annual accounts.<br><br>International Accounting and Auditing Standards. | Dividends - 10%; capital gains - 0% | No restrictions |
| Rwanda | Capital Market Authority | Law No 11/2011 of 18/05/2011 | Y | Half year unaudited and full audited annual accounts | Dividends 15%; Capital gains 0% | No restrictions |
| Seychelles | Securities Authority | The Seychelles Securities Act 2007 (SSA) | Y | Half year unaudited and full year audited annual accounts | Dividends 0%; Capital gains 0% | No restrictions |
| South Africa | Financial Services Board | Securities Services Act of 2004 | Y | Half yearly and annual income statements and balance sheets | Based on marginal tax rate | No restrictions |
| Sudan | The Central Bank of Sudan | Khartoum Stock Exchange Law of 2016 | Y | quarterly unaudited and full year audited annual financial statements | Dividends 10%; Capital gains 0% | No restrictions |
| Swaziland | The financial Services Regulatory Authority | The Securities Act, 2010 | Y | Half year and full audited annual accounts. | Dividends: 15%; Capital gains: 0% | No restrictions |
| Tanzania | Dar-es-Salam Stock Exchange | Capital Markets and Securities Act (1994) Amended 1997 | Y | Half year and full audited annual accounts. International Accounting | Dividends: 5%; Capital gains: 0% | As of 2014 restrictions have lifted. |

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|---|---|---|---|---|---|---|
| | | | | and Auditing Standards. | | |
| Tunisia | Conseil du Marché Financier | Law N° 94-117 of 14 November 1994 | Y | Annual and semi-annual audited financial results | Dividends: 0%; Capital gains: 0% | As of 2014 cap of 49% on total foreign collective investment been lifted to 66%. |
| Uganda | Capital Markets Authority (CMA) | THE CAPITAL MARKETS AUTHORITY (AMENDMENT)<br><br>ACT, 2016 | Y | Half year and full audited annual accounts. International Accounting and Auditing Standards. | Dividends:15 %; Capital gains: 0% | No restrictions |
| Zambia | The Securities and Exchange Commission (SEC) | The Securities Act (1993) | Y | Half year and full audited annual accounts | Dividends:15 %; Capital gains: 0% | No restrictions |
| Zimbabwe | Securities and Exchange Commission of Zimbabwe (SECZ) | Zimbabwe Stock Exchange Act: Chapter 24:18 (1996) | Y | Half year and full audited annual accounts. International Accounting and Auditing Standards. | Dividends: 15%; Capital gains: 10% | Cap of 10% on individual foreign portfolio investor, cap of 40% on collective foreign investment |

*Source: various exchanges*

The evidence presented in Table 2.2 indicates that most African stock exchanges have removed restrictions on foreign investors, with only three countries remaining that still have restrictions. These countries are Malawi, Tunisia, and Zimbabwe. These reforms have come to pass due to exchanges seeking to increase participation on their platforms, as this can prove to be beneficial. Kariguh (2012), finds that increased foreign investment leads to higher share prices and subsequently higher returns. In order to increase liquidity on their exchanges, some African exchanges have attempted to spur activity by offering tax incentives both to investors and prospect companies seeking to list on their exchanges. Table 2.2 reveals that Seychelles and Mauritius do not tax capital gains and dividends for residents who invest in their local exchanges, this has helped promote liquidity on both exchanges as the Seychelles exchange reported an increase of 175% of local trading accounts in 2016 and total trading volume on the Mauritius stock exchange has been consistently increasing over the years (Nation, 2017). In Kenya companies that have recently listed immediately receive the tax benefit of preferential tax rate of 20%

for 3 years, whilst the standard corporate tax rate is 30% for domestic companies and 37.5% for foreign companies.

A positive feature from Table 2.2 is that in terms of reporting requirements African exchanges have a uniform requirement that stipulates that companies should publish their semi-annual and annual audited financial statement. The exception is Sudan, which requires companies listed on the Khartoum Stock Exchange to publish quarterly unaudited and full year audited annual financial statements. Furthermore, all African exchanges in this study have insider trading rules in order to ensure markets are fair, efficient and transparent. It was imperative for African exchanges move in this direction of adopting a legal framework that is deterrent to market abuse.

Regulation of African exchanges as evidenced in Table 2.2, is mixed between SRO and single-agency specialized in securities regulation and a unified regulator that regulates more than one sector, for example the JSE in South Africa is regulated by an SRO, and the Bourse Régionale des Valeurs Mobilières is regulated by a unified regulator.

The JSE has an innovative approach to ensure that companies meet the continuous obligations associated with being a listed company. The JSE training academy provides both listed and unlisted companies with various training services to prepare them to list. In the future, the JSE plans to partner with other stock exchanges to facilitate training across the African continent in order to ensure the ever-increasing obligations of African exchanges are met (African Exchanges: 2016, p. 25).

2.4 Operational characteristics

*Table 2.3: Operational characteristics of African exchanges*

| **Economy** | **Securities** | **Clearing and settlement** | **Trading system** | **Settlement cycle** | **Trading days** | **Trading hours** |
|---|---|---|---|---|---|---|
| West African Economic and Monetary Union | Equity & debt | Electronic | Automated Trading System | T+3** | Monday-Friday | 09:00-15:00 |
| Algeria | Equity & debt | Electronic | Automated Trading System | T+3 | Mondays and Wednesdays | 09:30-11:00 |
| Botswana | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 10:30-13:30 |
| Cameroon | Equity & debt | Electronic | Automated Trading System | T+4 | Wednesday | 09:00-11:00 |
| Egypt | Equity & debt | Electronic | Automated Trading System | T+1 | Sunday-Thursday | 09:30-15:30 |
| Cape Verde | Equity & debt | - | - | - | Monday-Friday | 08:30-15:00 |
| Ghana | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:30-15.00 |
| Kenya | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09.00-15:00 |
| Libya | Equity & debt | Electronic | Automated Trading System | T+3 | Sunday-Thursday | 10:00–17:00 |
| Malawi | Equity & debt | Transaction by transaction | Manual Trading System | T+5 | Monday-Friday | 09:00-12:00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mauritius | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00-13:30 |
| Morocco | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00-15:40 |
| Mozambique | Equity & debt | - | - | T+3 | Monday-Friday | 08:00-12:00 |
| Namibia | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00-17:00 |
| Nigeria | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 10:00-16:00 |
| Rwanda | Equity & debt | Manual | open outcry/ Over the Counter market | T+2 | Monday-Friday | 09:00-12:00 |
| Seychelles | Equity & debt | Electronic | Automated Trading System | T+0 | Monday-Friday | 10:00-16:00 |
| South Africa | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00-17:00 |
| Sudan | Equity & Islamic bonds | Electronic | Automated Trading System | T+3 | Sunday-Thursday | 10:00–11:30 |
| Swaziland | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 10:00–12:00 |
| Tanzania | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 08:00–17:00 |
| Tunisia | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00–13:05 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Uganda | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 10:00–12:00 |
| Zambia | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 11:00-14:00 |
| Zimbabwe | Equity & debt | Electronic | Automated Trading System | T+3 | Monday-Friday | 09:00-12:30 |

*Source: various exchanges, African Exchanges*

** Whenever a share is sold there are two important dates, the transaction date and the settlement date. The abbreviations T+1, T+3 and T+4 refer to the settlement dates of share transactions which occur on a transaction date plus one day, plus three days and four days, respectively. 'T' is the transaction date.

A prominent feature reported in Table 2.3 is that the majority of African stock markets trade daily, from Monday to Friday. Whilst predominately Muslim countries like Egypt, Libya, and Sudan trade from Sunday to Thursday. However, there are countries that trade on a low weekly frequency, the Algerian stock exchange trades only twice a week. Similarly, Cameroon's Douala Stock Exchange is only open for trading one day a week, on Wednesdays. This does signify an improvement though as more countries in the early 2000s such as Ghana, Tanzania and Uganda were trading two to three days a week. Even though trading on African exchanges has mainly moved to becoming daily, Table 2.3 details trading times as being low with only, five exchanges being in operation starting from in the morning up until late in the afternoon. The vast majority of African stock markets are only open for 1 – 4 hours; these restrictive times prevent investors from fully taking advantage of changing market dynamics.

Over the years, there has been pressure for African exchanges to conform to international standards, brought upon by local and international investors' fears of losing money due to settlement risk and inefficient markets. In order to increase trading on their markets, African exchanges had to address these issues to increase activity on their exchanges. This was achieved by replacing manual trading systems such as call-over in Nigeria to automated trading system. Settlement, clearing and delivery have become mainly uniform to being performed electronically except for Rwanda and Malawi in which they are still manual. This move has led to settlement cycles becoming T+3, which is the international norm, resulting in countries with settlement cycles of 8 days like Sudan drastically reducing settlement only to three days. The Seychelles' Trop-X exchange was the first in Africa to offer a fully automated end to end trading, clearing, settlement and registry system with T+0 real time gross settlement. This is quite impressive for an exchange that has only been in operation for 4 years. The Trop-x exchange is also exploring disruptive technology such as block chain settlement to further increase operational efficiency (African Exchanges, 2016: 6). This innovation which will result in a decrease to transaction

costs for traders takes heed from the transaction cost approach which emphasizes the economizing of transaction cost within organizations (Williamson, 1981).

The world's first automated exchange began in 1984 at the International Futures Exchange in Bermuda (Horcher, 2005:18). In Africa an automated exchange was first adopted in Egypt in 1992 (Omuchesi and Bosire, 2014). On June 1996, the Johannesburg Stock Exchange (JSE) replaced open outcry trading with an automated platform, known as the Johannesburg Equities Trading (JET) system. Shortly after that in 2002, the JET system was converted to Stock Exchange Trading (SET) system, a system developed and used by the London Stock Exchange (Paul Vecchiatto, 2002). In 2012, the JSE migrated to the Millennium Exchange; this change has led to greater execution speeds and overall efficient functionality. Zito (2014), finds that once the Millennium Exchange was implemented on the JSE, algorithmic trading increased by as much as 24%. Ghana and Namibia have also adopted the JSE's trading system; however, automation does affect stock market price volatility.

## 2.5 Indicators of stock market development in Africa

*Table 2.4: Indicators of stock market development in Africa (2016)*

| Economy | Market cap (USD billions) | Value traded (USD millions) | Turnover ratio (%) | Newly listed companies | Market Cap. (% of GDP) | Value Traded (% of GDP) |
|---|---|---|---|---|---|---|
| West African** Economic and Monetary Union | 14 | 584mil | 4 | 1 | 15 | 0.63 |
| Algeria | - | - | - | 1 | - | - |
| Botswana | 39 | 235 | 0.6 | 2 | 255 | 15 |
| Cameroon* | 0.302 | 3.8 | 1 | 0 | 1 | 0.012 |
| Egypt | 33 | 12 | 0.04 | 4 | 10 | 4 |
| Cape Verde | 0.646 | 13 | 2 | 0 | 40 | 1 |
| Ghana | 12 | 58 | 1 | 2 | 27 | 0.14 |
| Kenya | 19 | 2,0691 | 11 | 0 | 27 | 3 |
| Libya | - | - | - | 0 | - | - |
| Malawi | 1 | 8.643 | 1 | 1 | 17 | 0.16 |
| Mauritius | 6 | 410 | 7 | 1 | 48 | 3 |
| Morocco | 64 | 8,030 | 13 | 1 | 62 | 8 |
| Mozambique | 0.427 | 2 | 0.35 | 0 | 4 | 0.014 |
| Namibia | 2 | 1,015 | 45 | 0 | 21 | 9 |
| Nigeria | 53 | 2,314 | 4 | 0 | 13 | 0.57 |
| Rwanda | 2. | 27 | 1 | 0 | 21 | 0.32 |
| Seychelles | 0.1 | 2 | 2 | 0 | 7 | 0.13 |
| South Africa | 1,141 | 400,870 | 35 | 7 | 386 | 136 |
| Sudan | - | - | - | 0 | - | - |
| Swaziland | 0.298 | 6 | 2 | 0 | 8 | 0.15 |
| Tanzania | 10.43768 | 323 | 3 | 4 | 22 | 0.68 |
| Tunisia | 8 | 1,161 | 14 | 1 | 19 | 1 |
| Uganda | 6 | 506 | 9 | 0 | 23 | 2 |
| Zambia | 7 | 449 | 7 | 0 | 32 | 2 |
| Zimbabwe | 4 | 194 | 5 | 1 | 25 | 1 |
| Total | 1,422 | 429 | - | 26 | - | - |

*Source: various exchanges, ASEA, World Bank, UN. Calculations by author*

**2014 data used*

***2015 data used*

****Turnover Ratio (%) = value traded of listed securities/market capitalization*

Table 2.4 encapsulates the development levels of African stock markets, revealing size of exchanges, liquidity and accessibility of the stock markets for companies in the number of new listings. Table 2.4 sheds light on how low the level of development of African stock markets is in terms of market capitalisation as a percentage of GDP. For example, 86% of the stocks markets in Table 2.4 have market capitalisations as a percentage of GDP lower than 50%. However, countries such as South Africa, Botswana and Morocco have high percentages which are 386%, 255% and 62% respectively, and is a good sign of development for these country's exchanges. In terms of liquidity as measured by total

value traded as percentage of GDP, Table 2.4 reveals that, few shares are traded on African stock markets, having less than 20% for value traded as percentage of GDP. However, South Africa has a high percentage of 135%, higher than some stock markets in developed countries such as England which had a percentage of 69% in 2014.

Considering turnover ratio another measure of liquidity, which gauges how often shares change hands during a particular period, table 2.4 indicates turnover ratio is low in Africa nonetheless the measure is significant for a number of countries such as South Africa, Namibia, Tunisia, Morocco and Kenya. Aawaar (2017), is of the view that liquidity on African stock markets is low owing to limited number of financial instruments as a result of limited innovation. Furthermore, due to a limited number of retail investors and a weak institutional investor base (pension schemes, insurance companies, mutual funds), this small investor base thus results in a characteristic trading practice of "buy and hold" which restricts trading and subsequently liquidity. The number of newly listed companies is relatively low as the number of global IPOs was more than 900. In addition, African IPOs 2016 raised proceeds of just 1.5 billion dollars which is a 3-year low in terms of nominal value and number of IPOs. The market capitalisation of the South Africa's stock market in Table 2.4 makes up 80% of total African market capitalisation whilst its share of total African share value traded is 93%; these figures alone are a big indicator that African stock markets need to develop more.

## 2.6 Regional Integration

The Bourse Régionale des Valeurs Mobilières (BRVM) located in Abidjan (Côte d'Ivoire) is Africa's only regional exchange. The BRVM was launched in 1998 and seeks to serve the 8 French speaking member countries of the West African Economic and Monetary Union (UMOEA), namely Benin, Burkina Faso, Cote d'Ivoire, Guinea Bissau, Mali, Niger, Senegal and Togo (Yartey and Adjasi, 2007).

Most African exchanges are fragmented and lack economies of scale, therefore integrated markets are more beneficial, not only because they are more efficient but also because they encourage information sharing across financial institutions, offer more choices for investors, stimulate innovation amongst institutions and most importantly offer companies more financing opportunities (Ncube and Mingiri, 2015).

However, the successful integration of more regional markets has been hindered by governments which regard their exchanges as symbols of national pride similar to airlines and just like national airlines even if they come at a cost and are rationally unjustifiable, they represent progress for these countries. Thus, the symbolic significance of national stock market has restricted the development of more regional exchanges (Moss, 2004).

## 2.7 Conclusion

In conclusion, it can be said African stock markets over the years have substantially increased with the trend still strongly in place, as of late new exchanges have been launched. There is an indication that African stock markets are more open to foreign investments, as foreign restrictions have been decreased or removed altogether. There has been a major drive to conform to international standards in order to reduce transaction cost and increase efficiency which will ultimately increase trading activity. Even with strong regulatory frameworks African stock exchanges still can't seem to shake off the perception of weak regulation. In Africa self-regulatory organizations (SRO) play an important role be that as it may be a single-agency specialized in securities regulation or unified regulators that regulate more than one sector are also relevant. However, it is apparent that regional integration should be implemented more aggressively.

# Chapter 3 Literature Review

## 3.1 Introduction

In the past research has focused on the development of the banking sector and its contribution to economic growth, but in recent years the role of stock markets has increasingly become more important, as they are more developed and influential on the global economy than in the past. This has led to current research focusing on examining the relationship between stock market development and economic growth. This chapter is divided into three sections. The first section captures the theoretical underpinnings of the study. Although the aim of the study is to examine the relationship between stock market development and economic growth, due to rudimentary nature of theoretical work on stock market development; the theoretical literature will be in the context of financial development since stock markets along with banks comprise the financial system. The second section will review empirical studies and distinguish between methodologies used in past studies, and the last section will conclude.

## 3.2 Theoretical Literature review

### 3.2.1 Theories on growth

Kuznets (1973), refers to economic growth as the long-term increase in the productive capacity of a country, and in the progressive production of an increasingly diverse bundle of goods to its population. Kuznets explains that this rising capacity may be based on ideological and institutional adjustments as well as progress in technology. To this it can be inferred that economic growth is the rate of change of output or income over a year in an economy, calculated as the percentage increase in real gross domestic product (GDP). Thus, economic growth implies increases in real per-capita GDP, which may be viewed as an increase in the efficient utilization of the available economic resources in a country to produce goods and services. Numerous growth theories have been developed over the years to explain economic growth. This theoretical literature review will focus on two macroeconomic growth theories, namely: neoclassical and endogenous growth theories. These theories will provide a possible link between financial markets and economic growth.

#### *3.2.1.1 Neoclassical growth theory*

The neoclassical growth model also known as the Solow growth model, which was developed independently by Robert Solow (1956) and Trevor Swan (1956), is sometimes referred to as the Solow-Swan model. The model hypothesises how steady state growth is driven mainly by rates of population and capital growth, in addition labour and technological progress (Palley, 1996).

This model is paramount for understanding theories on economic growth because when other models with differing principles from the Solow growth model are compared to it, they become better understood.

The Solow growth model supersedes the Harrod-Domar model which was first developed by Roy Harrod in 1939 and later improved upon by the contribution of Evsey Domar in 1946 (Easterly, 1997). The Solow growth model is based on the following Cobb-Douglas type production function in which output is denoted by Y(t), capital is denoted by K (t) and labour is denoted by L (t), while A (t) represents technological progress:

$$Y(t) = K(t)^{\alpha} (A(t) L(t))^{1-\alpha} \qquad 0 < \alpha < 1 \qquad (3.1)$$

The key assumptions of the model are that the production function exhibits constant returns to scale, doubling of inputs leads to a doubling of output, whilst capital and labour experience decreasing marginal returns. In the model, an increase in technological progress leads to an increase in output through its influence on labour. This suggests that the steady state growth rate of output depends on technological progress which augments labour. This model considers technological progress as exogenous and assumes that the total output continues to grow at the rate of labour force, while the output per capita is constant without technological progress. An important feature of this model is that the rate of capital accumulation is only influenced by household savings and is independent of firm's investment spending, as the savings rate is considered to be exogenous. However, from the model a high savings rate can temporarily lead to increases in growth, but this is offset in the long-run by depreciation and population growth (Vukeya, 2015). Therefore, the model essentially ignores, the ability of the financial sector to influence capital accumulation through the investment-saving nexus and ultimately growth (Palley, 1996).

### *3.2.1.2 Endogenous growth theory*

Opposed to the neoclassical growth model is endogenous growth theory, which sets itself apart from neoclassical growth theory by highlighting that the sources of growth are endogenous, rather than being exogenous in the economic system (Romer, 1994). The endogenous growth theory suggests that economic growth is not only affected by government policies, which have the potential of raising a country's growth rate through the promotion of more intense competition, which in turn stimulate product and process innovation but also holds that investment in human capital and knowledge are significant contributors to economic growth (Sengupta, 2011:22). The theory internalizes technological progress as a vital determinant for growth.

To illustrate, consider the AK- endogenous model proposed by Pagano (1993), where aggregate output is a linear function of aggregate capital stock. The output ($Y_t$) is produced during the period ($t$) by one factor, which is capital ($K_t$):

$$Y_t = F(AK_t) \qquad (3.2)$$

(A) Represents the social marginal productivity of capital. $K_t$ is a combination of both physical and human capital as suggested by Lucas (1988). For ease of understanding, Pagano (1993) assumes that the population is fixed and that the economy produces only one good that can either be consumed or invested, if invested it depreciates at a rate of δ per period. The gross investment is expressed as follows:

$$I_t = K_{t+1} - (1-\delta) K_t \qquad (3.3)$$

In a closed economy with no government intervention, capital market equilibrium is determined by equating gross savings ($S_t$) to gross investment ($I_t$). In addition, it can be assumed that a proportion of savings (1 -φ) is lost in the financial intermediation process. Due to a proportion of the savings being lost in the financial system, only a fraction of total savings can be used to finance investments.

$$\varphi S_t = I_t \qquad (3.4)$$

Using equation (3.2) above, the growth rate at t+1 can be expressed as follows:

$$G_{t+1} = Y_{t+1}/Y_{t-1} = K_{t+1}/K_{t-1} \qquad (3.5)$$

Using equation (3.3) integrating it first and then dropping the time indices, the steady-state growth rate can be written as below:

$$G = A\frac{I}{Y} - \delta = A\varphi s - \delta \qquad (3.6)$$

Equation (3.6) shows that rate of growth (G) is equal to the product of the social marginal productivity of capital (A), the rate of savings (s) and the proportion of savings funnelled to investments (φ) minus δ. Thus, revealing how growth may be affected by financial development, as improvements in (A), (s) and (φ) affected by a higher level of financial development leads to higher growth rate. In addition, in the model a higher level of investment, which includes both physical and human capital, does not only affect per capita income, but can also sustain high and rising rate of income growth over the future. The theory is able to explain short-run and long-run growth due to the factors of production being endogenous. Caporale *et al.* (2005), in a study of endogenous growth models and stock market development, find that stock market development promotes growth in the long-run through the investment-productivity channel. Therefore, this study will rely on the endogenous growth model, as it implies a positive link between stock market development and economic growth based on the analysis of the AK model proposed by Pagano.

### 3.2.2 Stock market development and economic growth nexus

Bagehot (1873), is credited with identifying the possible link between financial development and economic growth. Schumpeter (1911), advanced these earlier findings by arguing that the financial sector plays a meaningful role in promoting economic growth (Levine and Zervos, 1998). In contrast,

Lucas (1988) contends that financial development has no significant impact on economic growth (this point will be returned to later). In an attempt to try and explain the direction of the relationship between financial development and economic growth, Patrick (1966) posits three possible hypotheses to explain the direction of the relationship between financial development and economic growth: namely, the supply-leading hypothesis, the demand-following hypothesis, and the feedback (stage of development) hypothesis. The supply-leading hypothesis takes place when the creation of financial institutions and markets results in increased financial services thus leading to real economic growth, this hypothesis could be viewed as the application of Say's law in financial markets (Calderon and Liu, 2002; Patrick, 1966).

The demand-following hypothesis suggests that as the economy grows demand for financial services will increase and possibly inducing the expansion of the financial sector (Calderon and Liu, 2002; Patrick, 1966).

The feedback hypothesis postulates that financial development and economic growth cause each other. Initially, there are supply-leading characteristics of financial development and over time they decrease, and demand-following characteristics of financial development dominate (Calderon and Liu, 2002; Patrick, 1966). In addition to these three hypotheses, a fourth hypothesis exists called the independent hypothesis originally proposed by Lucas (1988), who was of the view that the role played by financial development in determining growth has been overstressed. The independent hypothesis argues that there is no causal relationship between financial development and economic growth (Abdullah *et al*., 2012).

Furthermore, there are three theoretical propositions that suggest a direct link between the stock market and economic growth and the three theories seem to support the supply-leading hypothesis. The first is the Q theory, a theory proposed by James Tobin (1969), which suggests that the rate of investment is a function of q, q is formulated from a ratio between market value of capital and replacement cost of capital as shown below:

$$Tobin's\ Q = \frac{Market\ value\ of\ capital}{replacement\ cost\ of\ capital} \qquad (3.7)$$

In the stock market, share change hands nearly daily. This exchange leads to changes in their prices and subsequently the valuation of companies changes and indirectly the value of productive capital of the company changes also. These constant revaluations create a discrepancy between the market value and replacement cost of capital. In response to these discrepancies, new businesses will be formed, and existing business will expand. In equilibrium q is equal to one for reproducible assets and less than one for others. When the value of q is above unity it provides an incentive, as there is an opportunity to profit from the excess of market value over replacement cost. Thus, stimulating investment over and

above the requirements of normal growth and when q is less than one it discourages investment (Tobin and Brainard, 1976; Goolab, 2009; Duvander and Forsberg, 2017).

However, in the long-run, when all adjustments have been exhausted, the value of q is 1. Thus, the ability of this theory to link stock market activity and economic growth as a subsequent consequence of investment adjustments, promotes the idea that stock market development leads to economic growth. Fisher (1933, in Cleary, 1998), shared the same sentiment, as he was of the view that the stock market crash of 1929 increased the severity of the Great Depression in the United States of America.

The second suggestion of a direct link between the stock market and the real economy was proposed by Ando and Modigliani (1963). Ando and Modigliani (1963), postulate that through the effect of wealth on consumption, an increase in share prices result in an increase in the individual's wealth. Through the life-cycle hypothesis, Ando and Modigliani (1963), argue that consumers even out their consumption, with the main purpose of maximizing their utility. A rise in income driven by an increase in share prices will consequently enable consumers to raise their consumption levels in each period resulting in higher private consumption which will ultimately have a positive impact on economic growth (Duca, 2007).

The third suggestion of how real economy is affected by the stock market is referred to as the financial accelerator, proposed by Bernanke and Gertler (1989) as well as by Kiyotaki and Moore (1997). This theory stresses the importance of stock prices on firms' balance sheets, due to the existence of asymmetric information in debt markets. The capability of firms to raise money depends largely on the collateral they can assure. The collateral value firms can bid increases in situations where their stock price value increases. As the security they can put forward increases, higher credit can be acquired on better terms, which can be utilized for more investments and doing so subsequently results in an increase in economic growth (Duca, 2007).

### 3.2.3 Role of Stock markets

Levine (1997), proposed a functional approach that describes how financial development through five major financial functions encourages growth through three channels, which are: capital accumulation, investment and the savings rate. Levine (1997), suggests that these functions arise as a result of market frictions primarily transaction cost and information cost. Levine was of the view that the functioning of equity markets affects liquidity, risk diversification, acquisition of firm-specific information, corporate control and savings mobilization. This in turn may result in economic growth if stock markets alter these services (Levine and Zervos, 1996a). These major functions of the equity market are briefly discussed next.

#### *3.2.3.1. Liquidity*

Liquidity is the stock market's ability to convert investments into cash at a low cost. Savers do not like to relinquish control of their savings for long periods, therefore liquid stock markets boost investor's

confidence, enabling them to make investments into projects that are of a long-term nature with a high return that would otherwise have liquidity risk. The stock market's ability to transform cash into long-term capital investments in illiquid production processes promotes growth (Levine, 1997).

#### *3.2.3.2. Acquisition of information and allocation of resources*

It is difficult and costly to assess firms, managers and market conditions. Individual savers do not have time, nor do they possess the means to collect and analyse information on a wide variety of companies, managers and economic conditions. This information acquisition cost makes savers less likely to invest in ventures that they have little information about, thus preventing capital from being efficiently allocated. The stock market improves acquisition and dissemination of information, resulting in an improvement in resource allocation and ameliorating quality of investments which can have an expansionary effect on economic growth (Ang, 2007; Levine, 1997). This function underpins the efficient market hypothesis which proposes that stock markets efficiently reflect all information regarding individual stocks and the stock market and is also parallel to Hayek's (1945) views about how decentralised knowledge can be used to coordinate resource utilization through the price system.

#### *3.2.3.3. Corporate control*

Besides helping reduce the cost of acquiring information, stock markets influence the monitoring of firm mangers and exerting control *ex post*. Through the mechanism of takeovers, poorly performing management can be removed. This mechanism acts as a disciplinary tool since it enables outsiders who identify companies that are underperforming to buy controlling stakes and to benefit from any gains associated with transferring control from an inefficient management to an efficient one (Maher and Andersson, 2000). The threat of takeover helps align managerial interests with those of owners and possibly promoting efficient production which may promote economic growth (Levine, 1997).

#### *3.2.3.4. Pooling and diversifying risk*

Investing is inherently risky due to imperfect information and external events beyond the investor's control such as, natural disasters and political risk. Therefore, a well-functioning stock market has the ability to minimise risk, as it provides investors with the opportunity to invest in multiple firms in different sectors resulting in firm-specific risk being drastically reduced (Djoumessi, 2009). Baele *et al.* (2007), argue that stock markets promote long-term economic growth by enhancing efficient risk sharing, which facilitates risk diversification, consequently optimising the savings rate and resource allocation within the economy.

#### *3.2.3.5. Mobilising savings*

Mobilization of savings is one of the most fundamental functions of financial markets. Individual savers on average cannot finance the capital deficit of firms completely on their own. Sirri and Tufano (1995: 88-91), highlighted, that production processes would be restricted to inefficient scales without access to multiple investors. Therefore, the agglomeration of capital from disparate savers for

investment is vital even if doing this is costly. Mobilising the savings of many disparate savers involves (a) overcoming the transaction costs associated with collecting savings from different individuals and (b) overcoming the informational asymmetries associated with making savers feel comfortable about relinquishing control of their savings. As cited in Levine (1997), Bagehot (1873) contends that besides the direct benefit savings mobilisation on capital accumulation, better savings mobilisation can improve resource allocation and technological innovation.

Due to these functions, Adjasi and Biekpe (2006) argue that stock market development has assumed a developmental role in global economics, mainly because of the impact on finance and economic activity. However, the view of financial development having a positive impact on economic growth is not shared by all researchers. Singh (1997), posits that stock market development is more likely to slow down economic growth in developing countries rather than be a driver of economic growth. He states that first, the stock market pricing process facing developing countries makes it an inadequate guide to efficient investment allocation as it is plagued by volatility and arbitrariness. Secondly, when there is a negative economic shock in the economy the interplay between the stock and currency markets may compound macroeconomic instability and reduce long-term growth. Thirdly, existing banking systems in developing countries are within the bounds of the possibility of being undermined by stock market development, which has been influential in the late 1990s financial crisis in East Asian economies. Graaf (2003), considers financial development to have a negative effect on economic growth, particularly stock markets which may produce financial crises as a result of their destabilizing effect.

Galbraith (1990), examines this destabilizing effect of stock markets through the lens of financial euphoria. Galbraith (1990:43-51), goes back in history to the 18th century to examine one of the earliest recorded stock market crashes that occurred in England. Joint-stock companies emerged as the new financial innovation with the euphoria surrounding the financial instruments. Speculative forces took over the market causing a bubble but eventually the bust came generating a financial crisis which further led to an economic crisis as the country swung into an extended recession. Through his investigation of this event Galbraith (1990:18-24) concludes that all financial crises share similar basic factors. The first one is the appearance of financial innovation, but this rewarding discovery has an element of pride and ego as the innovators deem themselves ahead of everyone. Eventually, other people adopt this innovation, and this provides confirmation to the insights of the innovators. Secondly, these financial innovations are just better mouse traps and somewhat in a more unstable form. That they leverage through the creation of debt secured by limited real assets is the element that is always present in financial innovation. The level of debt creation just increases significantly over time and will inevitably lead to a market crash. Lastly, after the crash, there will be immense scrutiny on the once praised financial innovations and talk of regulation and reform, but speculation will be ignored. This is due to two reasons; it is more acceptable to blame one individual or a particular corporation than to blame the whole financial community. Secondly, is the free-market doctrine that is widely accepted during times

of financial euphoria, the market is assumed to be neutral and is supposed to be free of inherent and internal dynamic error (Galbraith 1990:18-24). This framework can be accurately used to explain what happened leading up to and after the Great Recession.

Researchers, like Mauro (2003), postulate that countries with far more developed stock exchanges in terms of higher market capitalization, a larger number of domestic listings and initial public offerings, tend to have a notably stronger positive association between economic growth and stock returns. However, Rousseau and Wachtel (2000) are of the view that the stock market plays a minor role in the financial system as a whole even in developed countries. Most new investment is funded internally from company retained earnings, or through banks and financial intermediaries or rather the bond market. Equity issuances collectively make up a small proportion of total sources of funds. Kalecki (1943) espoused similar views as he argued that profit generated by a company plays a huge role in determining investment undertaken, rather than stock exchanges. Kalecki (1943), went on to assert that the relationship between profit and investment is complex in nature, due to the existing bidirectional feedback from investment to profits and vice versa. Profits induce investment, but actual investment expenditure will cause capital stock to increase. Therefore, leading to expected profits to be reaped in the future (Alexiou, 2010).

The stock market is still important for four reasons, which, as Rousseau and Wachtel (2000) state, are: first, providing an exit mechanism for entrepreneurs and potential investors. Countries with adequately functioning stock markets will always seem attractive for venture capital investments. Second, capital flows are an important source of finance for emerging and transitioning countries. Third, increased supply of liquidity through stock exchanges encourages domestic and international investors to transfer surplus funds from short-term investments to long-term assets, that provide relatively higher returns and permanent capital to fund large projects that provide economies of scale. Fourth, the stock market provides information that is vital to enhancing the efficiency of financial intermediation. As the flow of information from management to owners improves, market evaluation of company developments is quickly produced (Rousseau and Wachtel, 1998).

### 3.2.4 Financial liberalization

Financial liberalization has been one of the fundamental national policy decisions of the past few years that have promoted financial deepening and it is underpinned by the savings-constraint assumption. Advocates of financial liberalization like McKinnon (1973) and Shaw (1973) assert that there is a strong link between savings and investment. They are of the view that developing countries lack savings and access to foreign capital, which should have led to an increase in investment, henceforth driving growth. They challenged the Keynesian perspective of low interest rates promoting investment and growth, and they proposed that high real interest rates would increase savings and have a positive effect on growth (Hassan *et al.*, 1993; Molho, 1986). McKinnon's (1973) and Shaw's (1973) work was the basis for the

IMF/World Bank' Structural Adjustment Programme, which led to liberalization of the financial sector of many developing countries, particularly in Africa (Adu *et al*., 2013). This resulted in many African countries establishing stock markets and furthermore listing parastatals.

Rodrik and Subramanian (2009), dispute the notion of capital flows being good for developing countries. They perceive developing countries to be investment-constrained rather than the general assumption promoted by the Washington consensus that developing countries are savings-constrained. Under the savings-constrained assumption, it is believed that provision of foreign finance results in increased investments and long-run economic growth. Rodrik and Subramanian (2009), are in disagreement with this as they believe foreign finance aggravates the investment-constraint by working through the exchange rate as it appreciates the domestic currency as capital flows increase, leading to reduced profitability and investment opportunities in the tradable goods sector, ultimately having adverse long-run growth consequences. They also argue that institutions are a determinant of long-run development patterns. Weak institutions have the ability to hamper investment and entrepreneurship, as companies are not able to capture profits generated by investments to the full extent, resulting in lower profits and potential investments (Rodrik and Subramanian, 2009).

The endogenous growth theory unlike the neoclassical growth theory provides a basis of how financial development can positively influence economic growth and, in addition, sustain high and rising rate of income growth in the long-run. In terms of causality the Q theory, life-cycle hypothesis and the financial accelerator theory offer strong support for the supply-leading hypothesis. However, with the likes of Singh (1997), Galbraith (1990), Graaf (2003) arguing against the positive influence of stock market development this, therefore, exhibits the need for this study to further investigate the relationship between stock market development and economic growth.

## 3.3 Empirical Literature review

The conflicting views on the stock market development and economic growth nexus have led to a range of empirical studies. Studies on the relationship between stock market development and economic growth can be classified into four categories that is: Cross-country, panel method, microeconomic studies and single country research (Demirguc-Kunt and Levine, 2008). Past studies are dominated by cross-country, panel and single country studies. This section of the study will review empirical literature on both the direction and nature of the relationship between stock market development and economic growth, with a focus on these three dominate studies for developed and developing countries, as well as for Africa.

### 3.3.1 Developed Countries

Atje and Jovanovic (1993), undertook a cross-country regression on 40 developed and developing countries from 1980 to 1988. They used two proxies for financial development, one measuring bank intermediation and the other approximating stock market activity. They reported that only the stock market indicator had a significant positive influence on economic growth after controlling for lagged investment. Therefore, they concluded that stock markets improve long-term growth in per capita GDP. Similarly, Levine and Zervos (1996b) examine a sample of 41 countries over the period 1976 to 1993, they demonstrate that an index comprised of stock market development indicators is positively and significantly correlated with long-run economic growth.

However, Harris (1997) argues that the relationship between stock market development and economic growth is weak. Harris (1997), conducted a cross-country study of 49 countries for the period between 1980-1991 in a direct response to Atje and Jovanovic (1993). The author used essentially the same regression model as Atje and Jovanovic but employed current investment instead of lagged investment in the model and concluded that the stock market indicator did not seem to affect economic growth, in the sample of 49 countries which includes both developed and developing. Harris also split the sample of 49 countries into two subsamples: developed and developing countries, which yielded a different result. In terms of developing countries, the result was similar to the full sample, whereas the result from the developed countries the level of stock market activity did have some explanatory power and its statistical significance was weak and not robust.

Durham (2002), holds the view that the relationship between stock market development and economic growth varies from country to country depending on the size of the economy. Durham (2002), studied a sample 64 developed and developing countries from 1981 through 1998. His findings are comparable to Harris (1997) as Durham (2002) finds that stock market development promotes growth in high income countries, but not in lower income countries. Similarly, Minier (2003) was of the same view when he conducted a study on 42 countries, dividing them into two groups based on the level of market capitalization to GDP ratio. The study found that the countries in the higher capitalization group had a positive relationship between financial development and growth, while the low capitalization group indicated a negative relationship.

However, in another study Minier (2009) examines countries that have small economies that opened exchanges between 1960 and 1998. In this study the researcher analysed countries that opened exchanges and compared them to similar countries, in terms of economic characteristics, that did not have exchanges and did not open exchanges in that period of the study. Minier (2009), finds that within a time frame of 5 years the countries that opened exchanges grew faster, however on a long-term basis the results were ambiguous. This could be due to lack of activity on the exchanges as initial activity was driven by government privatisation programmes especially on African exchanges. Minier (2009),

concluded that opening small exchanges still had a positive impact on economic growth as total factor productivity growth is realized through better efficient allocation of investment. The ambiguity of the role of stock market development on influencing economic growth in the long-run points to support Lucas's (1988) view of giving too much importance to financial development as being a fundamental driver of long-term economic growth.

In Australia, Thangavelu and Ang (2004) investigate the dynamic relationship between financial development and economic growth in a time series study that covered the period from 1960 to 1999. Employing a Vector Auto Regression (VAR) model and the study concluded that there is a positive relationship between financial development and growth. However, banks and stock markets tend to have different roles in promoting growth in the economy, for example for the banking measures of financial development the causal relationship runs from economic growth to financial development, indicating that Australian banks do not drive economic growth but, are rather reactive to growth. Stock market measures of financial development, however, indicate the reverse, that is the causal relationship runs from the stock market to economic growth. This indicates stock market development as a driver of growth in Australia.

In a similar study, Nieuwerburgh *et al.* (2005) examine the long-term relationship between financial market development and economic development in Belgium for the period starting from 1830 to 2000. The researchers argue that stock market development drives economic growth in Belgium and this relationship is notably more prominent between 1873 and 1935. The time-varying nature of the link between stock market development and economic growth can be explained by institutional changes that affected the stock exchange. Between 1830 to 1873 legislation regarding the Belgian exchange was restrictive, the issuance of stocks and bonds were restricted, effectively hampering the development of the exchange. However, from 1873 to 1914 new legislation that was less restrictive was passed resulting in the Brussels stock exchange experiencing its fastest development.

Duca (2007), explores the causal relationship between stock market performance and economic growth using quarterly data for five countries for different periods namely United States of America (USA) ranging from 1957:Q1 to 2005:Q2, Japan 1957:Q1 to 2004:Q4. For France, Germany and the United Kingdom (UK) utilises data from 1970:Q1 to 2004:Q4 and concludes unilateral causality is found flowing from stock market development measures to economic growth for all the countries except Germany. In Germany stock market development and growth are found to be independent of one another. The author is of the view that this is due, to the fact that the stock market capitalization for Germany is relatively small in relation to economic growth. In contrast Antonios (2010) examined the causal relationship between stock market development and economic growth for Germany for the period 1965-2007, using a Vector Error Correction Model (VECM). The author finds a unidirectional relationship running from stock market development to economic growth. The contrasting results could

be due to methodological differences as Antonios (2010) uses VECM and in addition incorporates a proxy variable for bank development whilst Duca (2007) focuses only on economic growth and stock market development.

Ake (2010), investigates the relationship between stock market development and economic growth for five European countries that have companies listed on the integrated Euronext exchange namely Belgium, France, Portugal, Netherlands and United Kingdom. For the period 1995: Q1 to 2008: Q4, Ake (2010) reveals that for France and the United Kingdom there is a unidirectional relationship that flows from the stock market to economic growth. For the Netherlands, the results are slightly similar, but are less significant however and for Belgium and Portugal there is no causal relationship between stock market development and economic growth found.

### 3.3.2 Developing Countries

Rousseau and Wachtel (2000), probe the importance of the equity market on economic growth for a sample of 47 developing countries over the period 1980 to 1995. The study was innovative, as it applied a two-stage least squares regression model to account for the effects of simultaneity between growth and finance. The findings of their cross-sectional regressions suggest an impact of liquidity (value of shares traded), but not of market capitalisation, on growth. Using a panel vector-auto regression model, they found evidence for causality running from both stock market indicators to economic growth. Before 2000, the most common econometric model used was the cross-country regression. However, Arestis *et al*. (2001) suggest that cross-country regressions tend to overstate or exaggerate the contribution of stock markets to economic growth. Arestis *et al.* (2001), undertook a study which controlled for the effects of the banking sector, as well as for stock market price volatility and found that although both the banking sector and the stock market were positive promoters of economic growth, the former was a more significant contributor.

Levine and Thorsten (2001), conducted a similar study concerning the effect of stock market and banking sector development on economic growth by means of panel data method for 42 countries. They found that there exist a positive and meaningful correlation between stock market development, bank development and economic growth, yet the effect of stock market development on economic growth was higher than the effect of the banking sector. Mohtadi and Agarwal (2006), employ a dynamic panel method to study the relationship between stock market development and economic growth for 21 emerging markets over the period 1977 to 1997. The results of the study suggest a positive relationship between different indexes of stock market and economic growth, in addition to that the result also show that stock market development encourages private investment.

In Turkey, Kaplan (2008) used quarterly data for Turkey over the period 1987 to 2006 to assess the relationship between stock market development and economic growth. Kaplan (2008), employs the

Johansen cointegration test and Granger causality test, within the framework of a vector autoregressive (VAR) model, and the results of the study showed the existence of a long-run cointegrating relationship between stock market and economic growth. In addition, the causality test showed the existence of unidirectional causality running from the stock market to economic growth.

Carp (2012), explores the relationship between stock market development and economic growth for Romania using data over the period 1995 to 2010, employing a VAR model. The results of the study are interesting as the stock market development indicators produce different results for instance there is an absence of a long-run causal relationship between economic growth and two indicators namely: market capitalization and stock value traded. However, there is a bidirectional relationship between economic growth and the turnover ratio.

Caporale and Spagnolo (2011), utilise a bivariate VAR- generalized autoregressive conditional heteroscedasticity (GARCH) (1, 1) model, to investigate the causal relationship between stock market development and economic growth for three Central and Eastern European countries namely; the Czech Republic, Hungary and Poland. Using monthly data over the period 1/1996 to 4/2011, and with statistical robustness the findings of the study indicate that there is a unidirectional causation running from stock markets to economic growth. The results also show that this relationship became stronger as these countries joined the European Union (EU).

Seetanah *et al.* (2012), argue that there is no significant relationship between stock market development and economic growth as predicted by the independent hypothesis. The authors conducted a study on 10 least developed countries; Bangladesh, Sudan, Uganda, Zambia, Nepal, Tanzania, Senegal, Cambodia, Lesotho and Malawi from 1995 through to 2009. Employing a dynamic panel method, their findings indicate that bank development is much more conducive for growth in these countries. These findings echo Singh's (1997) views about bank development being more beneficial to economic growth in developing countries.

### 3.3.3 African Countries

Ngare *et al.* (2014), conducted a panel study where they analysed 36 African countries, 18 of which had stock markets and the rest without. They drew several conclusions, not least that African countries with stock markets tend to grow faster in comparison to countries that do not have stock markets; that small African countries grow faster than countries that are relatively developed and that stock market development has a positive effect on economic growth. They also found that countries which have political stability tend to grow faster, supporting Huang's (2010) empirical study, which found institutional improvements have a positive effect on financial development in the short term and this effect lasts longer for low-income countries. Enisan and Olufisayo (2009), examined 7 sub-Saharan African countries using an autoregressive distributed lag (ADRL) bounds test. They found that for

Egypt and South Africa, there is unidirectional relationship flowing from stock market development to economic growth. However, the researchers also present evidence of a bidirectional relationship between stock market development and economic growth for; Cote D'Ivoire, Kenya, Morocco and Zimbabwe. In the case of Nigeria, they argue that the evidence of causality is weak.

Tachiwou (2010), explores the relationship between stock market development and economic growth in the West African monetary union, which is made up of seven countries (Benin, Burkina-Faso, Ivory Coast, Mali, Niger, Senegal, Togo and Guinea Bissau). Using the Bourse Régionale des Valeurs Mobilières (BRVM), which is the regional stock exchange of West Africa, Tachiwou (2010) constructed an error correction model (ECM) to examine the short and long run for the period 1995-2006 and concluded that stock market development positively influences economic growth for the region. Similarly, Nowbutsing (2009) also uses an ECM to analyse the relationship between stock market development and economic growth in Mauritius for the period 1989-2006. Nowbusting's results agree with Tachiwou (2010) that stock market development positively affects growth in the short and the long run.

Ake and Ognaligui (2010), conducted a Granger causality test to examine the causality relationships between stock market development and growth in Cameroon for the period 2006-2010. The study found that there is no relationship between the stock market and growth. However, the researchers noted that the study had been constrained, due to limited data as the Cameroon stock exchange was fairly new at the time of the study it was only established in 2001.

Odhiambo (2009), analysed the causal relationship between stock market development and economic growth for South Africa, using the ADRL-bounds test. Using data sets for the period 1971-2007, Odhiambo (2009) found that the causal relationship between stock market and growth is sensitive to the proxy used to measure stock market development. However, overall the study determined that the causal relationship from stock market to economic growth to be prevalent in both the short-run and long-run. Ndako (2009), who uses a similar time series as Odhiambo (2009) for his study on South Africa finds that unidirectional causality is seen from economic growth to stock market development in the long-run. The conflicting results could be due to Ndako (2009) investigating a larger data sample, which might have elucidated more, as the author was using quarterly data instead of annual data as Odhiambo (2009) did. In addition, Ndako (2009) used the banking sector as a control variable, a variable Odhiambo (2009) omitted, which is relevant as the banking sector is highly significant in the South African financial sector as Ndako (2009) points out that the banking sector constitutes 120% of GDP.

Kolapo and Adaramola (2012), investigate the impact of Nigerian capital markets on economic growth over the period 1990 to 2010. Kolapo and Adaramola (2012), use a unique set of variables to proxy for capital markets namely; market capitalization, total new issues, the value of transactions and total listed equities and government stocks. They apply Johansen co-integration and Granger causality tests and

conclude that a long-run relationship exists between capital markets and economic growth. Furthermore, they found differing causality relationships between the unique variables used to proxy stock markets and growth for instance; the findings imply bidirectional causation between economic growth and the value of transactions and unidirectional causation from market capitalization to growth. However, no causation is found between growth and total new issues similarly, also for growth and total listed equities and government securities. The authors are of the view that this is a positive indication of the impact of capital markets on economic growth.

## 3.4 Conclusion

A large number of studies have been conducted to investigate the relationship between stock market development and economic growth. However, from the selected literature it can be established that both from a theoretical and empirical standpoint the results are inconclusive and conflicting. Take for instance the following researchers Atje and Jovanovic (1993), Levine and Zervos (1996b), Thangavelu and Ang (2004), Rousseau and Wachtel (2000), Mohtadi and Agarwal (2006), Ngare *et al.* (2014), Tachiwou (2010), Nowbutsing (2009) found evidence to support the supply-leading hypothesis, whilst Ndako (2009) the demand-following hypothesis. The independent hypothesis is supported by the research conducted by Harris (1997), Minier (2009), Ake and Ognaligui (2010), Seetanah *et al.* (2012) However, researchers such as Durham (2002), Duca (2007), Ake (2010) work contained mixed results and found unilateral relationship flowing from the stock market to the economy in developed countries and found an independent relationship between the stock market and economic growth, in either developed or developing countries. Lastly Carp's (2012) work observed a bidirectional relationship between the stock market and economic growth. Overall, the empirical literature demonstrates that the results are dependent on the period under investigation; the countries used within data sets; the analytical framework that is used and the variables used to measure stock market development. In addition, the small number of African studies focusing on the relationship between stock market development and economic growth in comparison to developed countries further justify this study.

# Chapter 4 Data and Methodology

## 4.1 Introduction

This chapter outlines the empirical framework used to analyse the relationship between stock market development and economic growth. The study will cover 18 African countries for an 18-year period from 2003-2016, which is a time that has shown significant economic growth and stock market development in Africa (Olamosu and Wynne, 2015). This chapter is divided into five sections, the first section presents the research methodology chosen to answer the research objectives. Followed by sections on validity test and robustness checks, section four provides a brief description of the variables that will be utilized and indicates where the data will be sourced from and section five concludes.

## 4.2 Methodology

### 4.2.1 System GMM

A dynamic panel data approach is utilized in this study that covers 18 countries on the African continent. Since the data may involve both country-specific effects and time effects that may be correlated with covariates and result in errors and biases; this therefore requires the model to be estimated in a manner that is dynamic so as, to remove all country specific effects and time effects. This will help the study to control for possible errors and biases, thereby avoiding inconsistency of the standard estimators of the estimates.

Specifically, the study uses the System Generalized Method of Moments estimator. This follows a similar approach taken by Rousseau and Watchel (2000); Beck and Levine (2004); Khadraoui and Smida (2012). Dynamic panel data approaches have become more commonly applied than the cross-sectional approach in growth studies, as both time-series and cross-sectional variations in data can be taken advantage of in panel data, thus giving the opportunity for inherent biases associated with cross-sectional regressions to be avoided due to the consideration of the country fixed effect (Alimi, 2015).

In studies that examine the relationship between financial development and economic growth the System Generalized Method of Moments is most frequently used as it solves the problems of serial correlation, heteroskedasticity and endogeneity of some variables (Leitao, 2010). To the author's knowledge Levine (1999), Rousseau and Watchel (2000), Beck, Levine and Norman (2000) and Levine *et al.* (2000) were the first to use the dynamic panel analysis to analyse the relationship between financial development and economic. These researchers considered the work of the following Holtz-

Eakin, Newey, and Rosen (1988), Arellano and Bond (1991) and Arellano and Bover (1995) to have contributed to the early development of Generalized Method of Moments (GMM) estimators.

Levine *et al.* (2000), were the first researchers to specifically use the System Generalized Method of Moments estimator to examine the relationship between financial development and economic growth. The system GMM has been proven to be more efficient than other GMM estimators as the approaches by Arellano & Bover (1995) and Blundell and Bond (1998) are built in two equations, the original equation and the transformed equation, resulting in less biased results than the rest of the GMM estimators. The approach can be described as follows:

$$Y_{i,t} - Y_{i,t-1} = (\alpha - 1)Y_{i,t-1} + \beta' X_{i,t} + n_i + \epsilon_{i,t} \qquad (4.1)$$

Where Y is the logarithm of real GDP per capita, the set of explanatory variables other than the lagged Y are represented by X. n is the unobserved country-specific effect and Є is the error term whilst the subscripts i and t represent country and time-period. The above equation can be rewritten as:

$$Y_{i,t} = \alpha Y_{i,t-1} + \beta' X_{i,t} + n_i + \epsilon_{i,t} \qquad (4.2)$$

In equation (4.2) the lagged dependent variable enters as an independent explanatory variable, which is correlated with the country-specific component of the error term. To resolve this Arellano and Bond (1991) propose to difference the above equation to eliminate the country-specific effect:

$$Y_{i,t} - Y_{i,t-1} = \alpha (Y_{i,t-1} - Y_{i,t-2}) + \beta' (X_{i,t} - X_{i,t-1}) + (\epsilon_{i,t} - \epsilon_{i,t-1}) \qquad (4.3)$$

Differencing results in the elimination of the country-specific effect however, it introduces a new problem. The new error term in the difference equation ($\epsilon_{i,t} - \epsilon_{i,t-1}$) and the lagged dependent variable $Y_{i,t} - Y_{i,t-1}$ are correlated. Hence, Arellano and Bond (1991) propose the following moment conditions:

$$E [ Y_{i,t-s} (\epsilon_{i,t} - \epsilon_{i,t-1}) ] = 0 \text{ for } s \geq 2;\ t = 3,\ldots T, \qquad (4.4)$$

$$E [ X_{i,t-s} (\epsilon_{i,t} - \epsilon_{i,t-1}) ] = 0 \text{ for } s \geq 2;\ t = 3,\ldots T. \qquad (4.5)$$

Equations (4.4) and (4.5) formulate assumptions that the error term, Є, is not serially correlated, and that the independent variables, X, are weakly exogenous. This is commonly referred to the difference estimator.

Applying these moment conditions, Arellano and Bond (1991) propose a two-step difference GMM estimator. In the first step, the error terms are assumed to be independent and homoscedastic across countries and over time. While in the second step, the residuals retained in the first step are used to construct a consistent estimate of the variance-covariance matrix, thereby relaxing the assumptions of independence and homoskedasticity.

There are, however, statistical shortcomings to this estimator as Alonso-Borrego and Arellano (1996) and Blundell and Bond (1998) illustrate that when the explanatory variables are persistent over time, lagged levels of these variables are weak instruments for the regression equation in differences. This results in the asymptotic and small-sample performance of the difference estimator being adversely influenced as, their properties perform poorly with bias and imprecision.

Therefore, Arellano and Bover (1995), and Blundell and Bond (1998) suggested the system GMM estimator as it aims to decrease the potential for bias and imprecision expected to be found with the difference estimator. The System GMM estimator achieves this by combining in a system the regression in differences with the regression in levels. The authors utilise the lagged differences of the explanatory variables as instruments under two conditions. First, the error term is not serially correlated. Second, although there may be correlation between the levels of the explanatory variables and the country-specific effect there is no correlation between the difference in the explanatory variables and the error term. This yields the following stationarity properties:

$$E [ Y_{i,t} + {}_{p}n_i ] = E [ Y_{i,t} + {}_{q}n_i ] \text{ and } E [ X_{i,t} + {}_{p}n_i ] = E [ X_{i,t} + {}_{q}n_i ] \text{ for all p and q}$$

The additional moment conditions for the second part of the system which is the regression in levels are:

$$E [ (Y_{i,t-s} - Y_{i,t-s-1}) (\mu i + \epsilon_{i,t})] = 0 \text{ for } s = 1$$

$$E [ (X_{i,t-s} - X_{i,t-s-1}) (\mu i + \epsilon_{i,t})] = 0 \text{ for } s = 1$$

The System estimator is used as it allows for more instruments and can dramatically improve efficiency compared to difference GMM. Secondly, any gaps in a panel are magnified by the difference GMM estimator when compared to system GMM (Roodman, 2009).

### 4.2.2 Granger causality test

This study progresses to analysing the direction of causality between stock market development and economic growth as any common relationship between these two variables doesn't necessarily imply causation. Granger (1969) formalized the idea of granger causality, the premise of this concept is that if there are two variables X and Y. X exerts a causal influence on Y if past values of X are useful in predicting the current value of Y, even though past values of Y have been factored in the model. Therefore, if the prediction of Y is improved by including X as a predictor, then X is said to Granger cause Y.

The direction of causality between stock market development and economic growth has attracted a lot of empirical scrutiny from researches such as Rousseau and Wachtel (2000), Mohtadi and Agarwal (2006), Seetanah *et al.* (2012), Carp (2012) and Ngare *et al.* (2014), albeit inconclusive results. To

tackle this controversial issue this study employs the Panel Vector Autoregression (PVAR)-granger causality Wald test.

The estimation of granger causality through the PVAR model is decomposed into the following analytical procedures: Panel unit root test, co-integration test, lag length selection and finally PVAR-Granger causality test.

#### *4.2.2.1. Panel unit root test*

The study will apply panel unit root test to determine order of integration, this is an imperative procedure that must be undertaken before a cointegration test can be applied. This is due to non-stationary data being able to cause bias results, therefore, to avoid reporting spurious results stationary data must be utilized (Ngotho, 2016). Panel unit root tests can be grouped into two categories mainly first-generation test and second-generation test. The first-generation test's main limit is the assumption of cross-sectional independence across units, whilst the second-generation test rejects the assumption of cross-sectional independence (Barbieri, 2005). In order to determine which group of panel unit root test to utilize a cross-section independence test will be undertaken. Due to the limiting nature of this study's data set of it being unbalanced and with gaps if cross-section independence is established. This study will use the fisher type first-generation unit root test as they can accommodate the unique nature of the data. If cross-section dependency is detected the CADF test will be applied as suggested by Pesaran (2007) that accounts for cross-section dependence.

#### *4.2.2.2. Cointegration test*

After determining the order of integration, the following task is to establish whether a cointegrating relationship exists between stock market development and economic growth. To accomplish this the Pedroni cointegration test will be used, this is a residual based test first introduced by Pedroni in 1995 (Orsal, 2009). The Pedroni cointegration test is chosen as it allows for heterogeneity among individual members of the panel, in addition it accounts for heterogeneity in both the long-run cointegrating vectors and heterogeneity in the dynamics associated with short-run deviations from these cointegrating vectors (Pedroni, 1999). The test is based on the following model:

$$Yit = \alpha i + \delta it + \beta iXit + \epsilon it \qquad (4.6)$$

Where the parameters αi and δi account for country specific effects and individual linear effects respectively. Xit represents the vector of explanatory variables for each member I, Yit is the dependent variable. Both set of variables are assumed to integrated order of one. The Pedroni cointegration test consists of seven different test statistics, which can be categorized into two groups. The first group is the within-dimension group as it focuses on the within aspects of the panel data and comprises four test statistics namely; panel parametric-ADF, panel-V, panel-non-parametric and panel-rho. The second

group is the between-dimension group due to its emphasis on between panel data aspects the three test statistics are group-pp, group-ADF, and group-rho.

The within-dimension test statistics the null hypothesis of no cointegration for the panel cointegration test is:

$H_0$ : yi = 1 for all i

$H_1$ : yi = y < 1 for all i

The between-dimension test statistics the null hypothesis of no cointegration for the panel cointegration test is:

$H_0$ : yi = 1 for all i

$H_1$ : yi = y < 1 for all i

#### *4.2.2.3. PVAR-Granger causality test*

PVAR-Granger causality test was developed by Abrigo and Love (2016) as an improvement on the PVAR procedure initially advanced by Love and Zicchino (2006). The PVAR-Granger causality test has the advantages of accounting for endogeneity and allows for unobserved heterogeneity (Girma, 2017). This is due to the PVAR model being a hybrid of the classical panel model and the conventional VAR model (Love and Zicchino, 2006).

Abrigo and Love (2016), illustrate that the optimal lag length that is selected is determined by consistent moment and model selection criteria (MMSC) vectors (MMSC- Bayesian information criteria (MBIC), MMSC- Akaike information Criteria (MAIC) and MMSC- Hannan-Quinn information criteria (MQIC)) that provide the smallest values as proposed by Andrews and Lu (2001).Within a PVAR-Granger causality test framework, variables are tested together with anticipation of either these results: Unidirectional causality, Bidirectional causality or no causality.

## 4.3 Specification tests

The study applies two standard tests for checking the validity of GMM estimation which are the Sargan/Hansen test and the Arellano-Bond autocorrelation test; these are subsequently briefly discussed below:

### 4.3.1 Sargan and Hansen test

The Sargan and Hansen test are used for over-identifying restrictions, and for the two tests a hypothesis is utilized in order to determine if excluded instruments are serially correlated with the error term. On the condition that the null hypothesis, which states that correlation between the error term and

instruments is not present, is rejected the model is miss-specified (Arellano and Bond, 1991). When a GMM estimation is run results for both tests are produced however, the Sargan test is generally applied when an estimation has homoscedastic weight matrix whilst the Hansen test is adequate when a heteroscedastic weight matrix is considered (Labra and Torrecillas, 2018 ).

### 4.3.2 Arellano-Bond autocorrelation test

This second test examines whether the null hypothesis that the error term is serially uncorrelated is rejected or cannot be rejected. Arellano and Bond (1991), are of the view that when the Sargan test is compared to the autocorrelation test (which was formulated by the two researchers), the Sargan is second class when it comes to sensitivity to autocorrelation. This implies that the two tests sometimes disagree, with the Sargan test being sensitive to other types of violations of assumptions but being less sensitive to specific violations associated with autocorrelation. Subsequently, to detect for the presence of any residual autocorrelation in this study the Arellano-Bond autocorrelation test will be taken advantage of and utilized. If the null hypothesis is rejected this gives further support to miss-specification of the model, this autocorrelation test has proven to be valid under many forms of dynamic panel model estimations as it is a standard validity test for GMM estimation (Seetanah *et al.*, 2012).

## 4.4 Robustness

As a robustness check, this study will present multiple system GMM models which will consist of different specifications to examine whether the regression coefficients change drastically. The first model will consist of the lagged dependent variable and only the stock market development variables and no control variables. Moving on to the second model improving upon model one three control variables will be introduced. Whilst model three advances from model two by including one more control variable. Model four is the last model and incorporates a time dummy variable to remove the impact of the global financial crisis that occurred around 2007. If there are no significant divergences from the results of the multiple models and consistency is apparent this will confirm the results are robust for the 18 African countries. This approach of using several models to ascertain robustness follows similar methods applied by researchers such as Saci *et al.* (2007) and Leitao (2010).

## 4.5 Description of variable and data sources

### 4.5.1 The dependent variable

Economic growth is the rate of change of output or income over a year in an economy, calculated as the percentage increase in real gross domestic product (GDP). In this study, economic growth is measured by GDP per capita (annual %), following the approach taken by similar panel data empirical

research such as Beck and Levine (2004), Seetanah *et al.* (2009), Adjasi and Biekpe (2006) and Ngare *et al.* (2014) amongst others.

### 4.5.2 Stock market development variables

It has been identified that stock markets cover a variety of functions such as; corporate control, risk management and mobilisation of capital. However, no set of variables can measure all the functions, therefore researchers who study the relationship between stock market development and economic growth, such as Rousseau and Wachtel (2000) and Seetanah *et al.* (2012) have settled on identifying the size of the stock market, as well as the liquidity. These are important factors in its ability to stimulate economic growth. This study will also use the same approach as the following three variables will be utilized:

Size

Market capitalization ratio: is a variable that measures the size of a stock market. This is calculated by adding all the values of listed companies and dividing by the GDP.

Liquidity

Total value of shares traded ratio: This variable is equivalent to total value of shares traded on the stock market divided by the GDP. Elliot (2008) indicates that the ratio of organised equity trading as a share of GDP positively reflects liquidity on an economy-wide basis.

Turnover ratio: This variable also measures liquidity, to be precise the variable equals the value of total shares traded divided by market capitalisation. Michael (2011), points out that a high turnover ratio implies low transaction cost which facilitates the ease at which investors can change their financial positions.

### 4.5.3 Additional Variables

Any country's economic growth can be influenced by other variables that are not included in the model, causing biased results on the link between economic growth and stock market development. Therefore, to control for biased results additional variables are inputted into the model as control variables (Greene, 2002: 149-150). In this study, the following variables have been inserted into the model:

Foreign direct investment (FDI): FDI is proxied by inflows of FDI as a percentage of GDP. This study includes FDI as a control variable, as it has been found to have a significant influence on economic growth.

Population growth rate: is employed as proxy for population growth. The population growth rate is measured as an exponential rate of growth of midyear population from the previous year to the relevant current year expressed as a percentage.

Corruptions Perception Index: This index is a good proxy of corruption in the world. It ranks countries on an annual basis according to the perception of corruption in the public sector. The index uses a scale of 0 to 100, where 0 implies that the country in question is highly corrupt and 100 points to a country that is considered “clean-free of corruption”.

Freedom in the World rating: Is utilized as a proxy for the protection of property rights and personal freedom. The rating is obtained by adding the scores of property rights index and civil liberties index together and then dividing the final score by two. The rating system assign countries numerical scores that range from 1 to 7, with 1 indicating a country with a highly free society that upholds the protection of property rights and respects its citizens civil liberties, with 7 representing the extreme opposite of the former . However, Anwar and Cooray (2012) suggested that the rating system be reversed, to allow for easier comparability between the institutional variables therefore, this study will follow suit and a rating of 1 will indicate the lowest measure of freedom and 7 will represent the opposite measure.

### 4.5.5 Priori expectations

The literature on the stock market development measures provides conflicting outcomes therefore, the stock market development measures in this study are expected to either have a positive, negative or no effect at all on economic growth. FDI is expected to have a positive correlation with economic growth, as it capitalizes internal production and is a crucial instrument in mobilizing technology. In addition, when FDI is compared with domestic investments, it contributes highly to an increase in productive activity translating into higher economic growth (Chonjo, 2017; Muba, 2016). The population growth rate is expected to either have a negative or positive impact on economic growth this is due to the divergent views from literature on population growth and economic growth. Researchers such as Sethy and Sahoo (2015) and Tumwebaze and Ijjo (2015) argue that population growth has a positive impact on growth whilst Yao *et al.* (2013) and Banerjee (2012) dissimilarly find population growth to have a negative effect on economic growth.

Corruption is usually expected to be detrimental to economic growth as researcher such as Anoruo and Braha (2018) conclude that on the African continent corruption has directly decelerated economic growth by lowering productivity, and indirectly by restricting investment. However, Sindzingre and Milelli (2010) demonstrate that the effect of corruption on growth is susceptible to threshold effects , therefore if countries are subject to threshold effects corruption might not be negative for growth but actually, enhance growth below certain thresholds. This leads us to expect that if the Corruption Perception Index is low economic growth can be affected either negatively or positively. Lastly, Freedom in the World rating is expected to have a positive correlation with economic growth as an improvement in property rights and civil liberties has been found to enhance economic growth, through the interaction with the financial sector Anwar and Cooray (2012).

### 4.5.5 Data sources

Data will be collected from various secondary sources for 18 African countries, seen on table 4.1 below, for a 14-year period spanning from 2003-2016. Stock market development data will be collected from the World Bank and Reuters DataStream. FDI and primary school enrolment data will be sourced from the IMF, World Bank, and UNESCO. Corruptions Perception Index and Freedom in the World rating data will be collected respectively from Transparency International, and Freedom House. Lastly, real GDP per capita data will be obtained from the World Bank.

Table 4.1: List of African countries

| | |
|---|---|
| Botswana | Nigeria |
| Cameroon | Rwanda |
| Egypt | South Africa |
| Ghana | Swaziland |
| Kenya | Tanzania |
| Malawi | Tunisia |
| Mauritius | Uganda |
| Morocco | Zambia |
| Namibia | Zimbabwe |

## 4.6 Conclusion

This chapter has highlighted how the study will conduct its empirical research in examining the relationship between stock market development and growth for 18 African countries for the period 2003-2016. First, a system GMM regression will be undertaken to indicate the relationship between these variables, and then this will be followed by PVAR-Granger causality test to determine the direction of relationship. In addition, validity tests and robustness checks will be included to ensure the results are robust. Lastly, the variables used in this study are provided with justification and it has been indicated where the data will be sourced.

# Chapter 5 Empirical Results

## 5.1 Introduction

The previous chapter put forth the empirical framework that will be used to address the research objectives of this study. Hence, this chapter progresses to presenting and analysing the empirical findings. Subsequently, this chapter is divided into four sections, the first section deals with pre-estimation diagnostic checks namely descriptive statistics and correlation analysis. Section two follows with results from the system-GMM in addition, post-estimation and robustness checks are included. Section three presents the PVAR-Granger causality test results and lastly section four concludes.

## 5.2 Pre-estimation diagnostic analysis

### 5.2.1 Descriptive statistics

Saunders *et al.* (2009: 444), elucidate that descriptive statistics are a statistical tool that allows the researcher to provide a description and numerically compare variables. The two main types of descriptive statistics that can be outlined are central tendency and dispersion. Central tendency provides an estimate of the centre of the distribution of the data whilst, dispersion details how close the data fall to the centre (Saunders *et al.*, 2009: 444). The tabulated statistics below will look at these main descriptive statistics and look at the shape of the data.

Table 5.1: Descriptive summary

| | CPI | FDI | FR | GDP | POP | Market | TR | TVT |
|---|---|---|---|---|---|---|---|---|
| Mean | 35.80 | 3.43 | 4.33 | 2.8 | 2.08 | 47.82 | 11.1 | 7.54 |
| Median | 33.00 | 2.96 | 4.5 | 2.96 | 2.28 | 26.46 | 4.65 | 1.19 |
| Maximum | 65 | 10.16 | 7 | 30.36 | 3.48 | 510.37 | 111.46 | 136.07 |
| Minimum | 14 | -2.74 | 1.5 | -19.06 | 0.07 | 0.04 | 0.01 | 0.001 |
| Std. Dev. | 11.56 | 2.53 | 1.54 | 3.98 | 0.87 | 68.06 | 15.85 | 18.6 |
| Skewness | 0.52 | 0.79 | -0.1 | 0.05 | -0.36 | 3.35 | 2.55 | 3.67 |
| Kurtosis | 2.34 | 3.16 | 1.82 | 19.35 | 2.08 | 16.47 | 12.21 | 18.07 |
| Observations | 223 | 225 | 225 | 225 | 225 | 206 | 202 | 208 |

*CPI = Corruptions Perception Index, FDI = Foreign direct investment as a percentage of GDP, FR = Freedom in the World rating, GDP = GDP per capita growth (annual %), POP =Population growth rate, Market = Market capitalization ratio, TR = Turnover ratio, TVT = Total value of shares traded ratio.*

According to Table 5.1 the average GDP per capita growth rate for the 18 African countries in this study is 2.8% suggesting a low-level of economic growth. This, however, ignores the variations amongst the countries. The range is significant as the values vary from a minimum of -19.07% to a maximum of 30.36%, this due to Zimbabwe experiencing hyperinflation which led to economic collapse and the high economic growth rate of 30.36% is attributed to Nigeria . In the case of the institutional variables the average is low for the Corruptions Perception Index and Freedom in the World rating with values of 35.8 and 4 respectively indicating a relatively high level of corruption and weak property rights. The institutional variables also seem to possess huge gaps in terms of maximum and minimum values in the panel however, if three main countries are removed that being Botswana, Mauritius and South Africa the variation is decreased as the values for the institutional variables tend to be low which seems to indicate the weakness of the institutional quality of the African countries in this study. The same thing can be observed with the stock market variables as the averages for the Market capitalization ratio, Turnover ratio and Total value of shares traded tend to be low at 47.8%, 11.3% and 7.54% respectively.

On average the rate of foreign direct investment is low in Africa at 3.4% and this variable is not susceptible to huge variations as the maximum value is 10% and minimum value is -2.7%.

The standard deviation is one of the most widely used measures of dispersion, as depicted in table 5.1 the variable that has the highest standard deviation is the Market capitalization ratio which is depicted as being 68%, this correlates with a huge range as the maximum and minimum values stand at 510% and 0.04%. In comparison to the other stock market variables the turnover ratio and total value of shares traded ratio have lower standard deviations of 15.9% 18.6% . This could be suggestive of low liquidity on African exchanges as high valuations are not supported by increased activity on exchanges.

In terms of skewness, besides FR, all the variables are skewed to the right, suggesting a long right tailed distribution. GDP and FR have skew values of 0.04 and 0.15 which is close to zero these variables could be viewed to have a normal distribution however, FR is moderately skewed negatively. As illustrated above on the kurtosis table CPI, FR and Human have kurtosis values less than 3, this implies that these variables are platykurtic. Whilst GDP, Market, TR and TVT have kurtosis values above 3 indicating that these variables are leptokurtic. On the other hand, FDI has a kurtosis value that is close to 3 implying this variable is mesokurtic which is similar to a normal distribution.

### 5.2.2 Correlation analysis

Correlation analysis is an analytical tool that is employed to analyse the linear relationship between two variables. The correlation coefficient ranges from -1 to +1 with a positive coefficient sign indicating that two variables move in the same direction and a negative sign vice versa. The numerical value of the correlation coefficient quantifies the strength of the linear relationship with a low value such as 0.3 (irrespective of the sign it has) suggests a weak association and a strong association represented by a high value such as 0.8. Hair *et al.* (2013: 196) are of the view that the simplest and most prominent way of detecting collinearity is by employing and analysing a correlation matrix therefore, this study employs a Pairwise correlation matrix as the data panel is unbalanced.

Table 5.2: Pairwise correlation matrix

| | CPI | FDI | FR | GDP | POP | Market | TR | TVT |
|---|---|---|---|---|---|---|---|---|
| CPI | 1 | | | | | | | |
| FDI | 0.199*** | 1 | | | | | | |
| FR | 0.538*** | 0.233*** | 1 | | | | | |
| GDP | 0.042 | 0.191*** | 0.124* | 1 | | | | |
| POP | -0.565*** | 0.189*** | -0.20*** | 0.064 | 1 | | | |
| Market | 0.140** | -0.209*** | 0.118* | -0.169** | -0.33*** | 1 | | |
| TR | 0.012 | -0.103 | -0.262*** | -0.031 | -0.36*** | 0.355*** | 1 | |
| TVT | 0.136* | -0.155** | 0.146** | -0.100 | -0.28*** | 0.760*** | 0.555*** | 1 |

*Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively.*

Having established the basic characteristics of the data we now examine if there are any collinearity issues. Table 5.2 above presents the correlation matrix between all the variables in the study. Multicollinearity concerns are reduced as none of the correlation coefficients are significantly high. The stock market variables Market and TVT have a correlation coefficient of 0.760 whilst TR and TVT have a correlation coefficient of 0.555 which is high also but not suggestive of multicollinearity as the

rule of thumb is 0.8 and above. It is surprising to find that all the stock market variables have negative correlation coefficients with GDP which seems to support the views of Galbraith (1990), Graaf (2003) that stock market development has a negative effect on economic growth. However, it is premature to assert this as the pairwise correlation matrix is not controlling for the effect of other variables that affect growth.

## 5.3 System-GMM

This section of the study provides several System-GMM regressions results of empirical tests on the relationship between stock market development and economic growth. The study used Stata to conduct the System-GMM regressions under the xtabond2 command developed by Roodman (2006). The xtabond2 command makes it easier to control instrumental variables that are used in the several models. Roodman (2009), notes that the issue of instrument proliferation is not fully appreciated as the System-GMM may generate too many instruments. It is important to keep the number of instruments low however; a high number of instrumental variables does not cause inconsistency of the two-step System-GMM.

This study runs the xtabond2 command employing several options that are available on the command. All the models in this study make use of the two-step option instead of the one-step default option. This is due to two-step models being asymptotically efficient, in addition since some of these models have a relatively high number of instruments the Windmeijer finite-sample correction for the two-step covariance matrix is employed through the robust option in order to prevent down-ward bias in the coefficient standard errors (Windmeijer, 2005).

The models in this study are transformed by forward orthogonal deviations through the orthogonal option instead of first-difference since the data panels are unbalanced and contain gaps, transformation by first-difference leads to gaps being magnified, this could possibly lead to the data panels disappearing (Roodman, 2006). For the following models the endogenous, predetermined and the exogenous variables contain different lags through the gmm-style and iv-style options. The gmm-style option has a collapse option which is utilized to control the number of instruments by not creating instruments for each time period, variable and lag distance but instead just create one per variable and lag distance (Jurena, 2017).

From the results displayed in Table 5.3 below, starting with model one that consists of the lagged dependent variable and only the stock market development variables. The lagged dependent variable GDP per capita and the following stock market development variables Market cap and TR have positive coefficients that are significant however, TVT is found to have a negative statistically significant effect

on economic growth. Model one has no control variables, it could be argued that the results from model one are biased as they don't take account of other variables that could influence economic growth. Therefore, we move to model two on Table 5.3 which introduces three control variables: FDI, CPI and POP. This results in the improvement of the significance of some of the stock development variables as the level of significance of Market cap and especially TVT is much higher at the 5% and 1% level.

Table 5.3: Results from system GMM models

| **GDPPC** | **Model 1** | **Model2** | **Model 3** | **Model 4** |
|---|---|---|---|---|
| **$GDPPC_{t-1}$** | .68918*** | .62274** | .66487** | .35369* |
| **Market Cap** | .15008* | .11467** | .12287** | .10777* |
| **TR** | .16175*** | .09274 | .07875 | .16656* |
| **TVT** | -.41257** | -.263*** | -.27482*** | -.3266* |
| **FDI** | | .19837 | .25979 | .20829 |
| **CPI** | | -.1071** | -.09861** | -.1111** |
| **Freedom** | | | -.18788 | .20740 |
| **POP** | | .3479 | .34219 | .09375 |
| **Fincrisis** | | | | .62322 |
| **No. of instruments** | 11 | 16 | 17 | 18 |
| **No. of groups** | 17 | 17 | 17 | 17 |
| **A-B AR (2) test P-value** | 0.270 | 0.309 | 0.312 | 0.507 |
| **Sargan test P-value** | 0.011 | 0.033 | 0.034 | 0.029 |
| **Hansen test P-value** | 0.588 | 0.288 | 0.309 | 0.788 |

Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively.

FDI and POP enter with positive signs and this was expected for FDI although both of the variables are statistically insignificant. However, CPI has an interesting effect on economic growth this is attributed

to model two indicating that a decrease in corruption has a negative impact on growth, since the CPI uses a scale of 0-100 where an increase on the index represents a reduction of corruption. An alternative interpretation of this would be a decrease of the CPI representing an increase in the level of corruption leading to increased economic growth which affirms the threshold effect hypothesis proposed by Sindzingre and Milelli (2010). This is in contrast to the conventional view of corruption being negative for growth.

Model 3 includes one more additional control variable, Freedom which has a negative coefficient this was not expected however it is not significant at any level. The other variables don't change much from model two in terms of sign and statistical significance. Moving to model four in Table 5.3, the model incorporates a time dummy that takes account of financial crises in the form of the Fincrisis variable. The variable has the correct sign as in the absence of any financial crisis economic growth would be expected to be affected positively, although the variable is not statistically significant. All the other variables in model four models maintain the same signs with varying levels of statistical significance, and CPI is the only variable that maintains its statistical significance at the 5% level whilst Market cap, TVT and lagged GDP per capita decrease to a significance level of 10%.

The validity of the models is examined by two tests that being the Arellano-Bond autocorrelation test and the Hansen test (since heteroscedastic weight matrix is applied) displayed in table 5.3. The Arellano-Bond autocorrelation test is important as it detects for the presence of any residual autocorrelation whilst the Hansen test determines if excluded instruments are serially correlated with the error term. The results show that the p-values for the A-B AR(2) test and the Hansen test are higher than 0.05, thus the null hypothesis that there is no autocorrelation of order two for the A-B AR(2) test and the null hypothesis that the instruments used are not correlated with the residuals for the Hansen test cannot both be rejected affirming validity of the moment conditions.

The results can be confirmed to be robust as throughout the several models the results proved to be consistent and there was no general drastic change that would cast doubt on the results. The study concludes that stock market variables: market capitalization and TVT have differing effects on economic growth these findings are at variance to Rousseau and Wachtel (2000) as the researchers found market capitalization to have no impact on economic growth and argued that only liquidity has a positive effect on growth whilst this study found liquidity to have a negative influence on economic growth.

TVT has a negative effect on economic growth due to possible threshold effects being present as trading volumes is low in Africa with the majority of the African countries in this study only being open for 1 – 4 hours to trade on their exchanges; these restrictive times handicap trading volumes and prevent the stock markets from being dynamic.

## 5.4 Causality analysis

In the previous section it was determined that the stock market development variables used in this study have either a positive or negative influence on economic growth depending on whether the variables were either size or liquidity components of stock markets. However, the causal direction of these relationships is not certain therefore, this section aims to ascertain whether there is any causality between stock market development and growth and if there is what direction it flows.

### 5.4.1 Cross-section independence test

A cross-section independence test is first conducted as is suggested by Pesaran (2004) in order to avoid spurious results from panel unit root tests and the results are presented in table 5.4. The CD-test can be applied to different panel data models including stationary and non-stationary dynamic heterogeneous panel. The CD-test assumes a null hypothesis of cross-section independence, table 5.4.1 reveals that this null hypothesis is rejected for all variables at the 1 % level except for freedom with a p-value of 0.422. Therefore, second generation unit root test must be applied for all the variables excluding freedom.

Table 5.4: CD-test results

| | CD-test | p-value |
|---|---|---|
| GDP | 6.998 | 0.000 |
| Market cap | 8.242 | 0.000 |
| TVT | 7.717 | 0.000 |
| TR | 5.174 | 0.000 |
| FDI | 3.34 | 0.001 |
| CPI | 5.839 | 0.000 |
| Freedom | -.803 | 0.422 |
| POP | 7.773 | 0.000 |
| Exchange | 26.288 | 0.000 |
| Inflation | 5.54 | 0.000 |
| Gov | 2.635 | 0.008 |

### 5.4.2 Unit root test

This study applies a combination of first- and second-generation unit root tests. As guided by the Cross-section independence test preceding this sub-section. For the variables that displayed cross-section dependence, Cross Sectionally Augmented Dickey Fuller (CADF) test as advanced by Pesaran (2007) is utilized as the second-generation unit root tests whilst for the first-generation test the fisher type tests are used. As it has been expressed that the panel used in this study is unbalanced these unit root tests accommodate the panel data of this study.

The null hypothesis of the CADF test assumes non-stationarity, the results on table 5.5 indicate that for the majority of the variables where the CADF-test was applied are integrated at the order of one, except for the exchange variable which is integrated at the order of two. The remaining variables Freedom, CPI and POP are analysed using the fisher type first-generation test which has a similar null hypothesis to the CADF-test. Freedom is shown to be stationary at first difference for both tests. POP and CPI have cross-section dependence however, due not being able to generate results with the CADF-test the fisher type unit root test where applied. To account for the detected cross-section dependence the demean option on Stata was used to achieve this. The results go on to indicate that CPI is stationary at levels and that POP is stationary at first difference only for the fisher PP test.

Table 5.5: Unit root test results

| Variables | CADF constant | | | |
|---|---|---|---|---|
| | Level | 1st Difference | 2nd Difference | |
| GDP | -0.265 | -6.000*** | | |
| Market cap | 1.924 | -5.315*** | | |
| TR | 0.137 | -3.171*** | | |
| TVT | 1.122 | -6.304*** | | |
| FDI | -1.392 | -6.216*** | | |
| Inflation | 1.566 | -4.665*** | | |
| GOV | 2.071 | -2.829*** | | |
| Exchange | 12.967 | 3.211 | -3.026*** | |
| | Fisher ADF constant | | Fisher PP constant | |
| | Level | 1st Difference | Level | 1st difference |
| FREEDOM | 1.325 | -5.995*** | 1.014 | -9.942*** |
| CPI | -1.920** | | -1.723** | |
| POP | -3.641*** | | 0.5615 | -2.419*** |

*Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively*

### 5.4.3 Pedroni cointegration test

Having established the integration order of the variables used, this study advances to the Pedroni cointegration test however, excluding the variables that weren't integrated order of one that being Exchange and CPI, due to the Pedroni cointegration test assuming that the independent variables to be used are I(1) . Three cointegration test have been completed examining each stock market development variable individually. Each variable will have three different tests done, hence the results report the Pedroni cointegration test including the individual intercept only, the Pedroni cointegration test with individual intercept and individual trend and the Pedroni cointegration test with no intercept or trend. EViews was used to perform the Pedroni cointegration test this led to eleven panel statistic being generated instead of seven which have a null hypothesis of no cointegration. In addition, the lag length selection for the Pedroni cointegration tests was automatic based on the Schwarz information criteria (SIC).

Market capitalization

Table 5.6: Pedroni cointegration results including Market capitalization

| | Individual intercept | Individual intercept and individual trend | No intercept or trend |
|---|---|---|---|
| Panel statistic | | | |
| Panel v-Statistic | -1.066 | -1.921 | -2.29 |
| Panel rho-Statistic | 2.682 | 3.336 | 1.59 |
| Panel PP-Statistic | -4.292*** | -11.453*** | -5.166*** |
| Panel ADF-Statistic | -3.798*** | -8.429*** | -5.035*** |
| Weighted Statistic | | | |
| Panel v-Statistic | -2.302 | -3.482 | -2.530 |
| Panel rho-Statistic | 2.294 | 3.419 | 2.253 |
| Panel PP-Statistic | -13.135*** | -25.774*** | -7.429*** |
| Panel ADF-Statistic | -8.334*** | -10.243*** | -6.208*** |
| Group Statistic | | | |
| Group rho-Statistic | 3.593 | 4.73 | 3.273 |
| Group PP-Statistic | -21.886*** | -30.941*** | -14.513*** |
| Group ADF-Statistic | -10.055*** | -10.170*** | -9.395*** |

*Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively. 1. Excluded countries: Cameroon, Ghana, Rwanda, Swaziland, Uganda, Zambia and Zimbabwe*

These cointegration test report results for 11 countries as $7^{(1)}$ countries have been dropped. As can be seen on table 5.6 for all three tests the null hypothesis of no cointegration is rejected for six out of the eleven panel statistics.

TVT (Total value traded)

Table 5.7: Pedroni cointegration results including TVT

| | Individual intercept | Individual intercept and individual trend | No intercept or trend |
|---|---|---|---|
| Panel statistic | | | |
| Panel v-Statistic | -2.095 | -2.720 | -3.458 |
| Panel rho-Statistic | 3.304 | 4.140 | 2.033 |
| Panel PP-Statistic | -4.065*** | -7.617*** | -15.024*** |
| Panel ADF-Statistic | -3.556*** | -5.852*** | -12.318*** |
| Weighted Statistic | | | |
| Panel v-Statistic | -3.525 | -4.767 | -3.424 |
| Panel rho-Statistic | 3.355 | 4.399 | 2.504 |
| Panel PP-Statistic | -11.047*** | -18.793*** | -9.949*** |
| Panel ADF-Statistic | -7.127*** | -8.736*** | -7.297*** |
| Group Statistic | | | |
| Group rho-Statistic | 4.727 | 5.651 | 3.875 |
| Group PP-Statistic | -20.397*** | -24.026*** | -17.081*** |
| Group ADF-Statistic | -7.603*** | -7.644*** | -8.938*** |

*Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively. 1. Excluded countries: Cameroon, Rwanda, Swaziland, Zambia and Zimbabwe.*

The cointegration tests on table 5.7 report results for 13 countries as 5[(2)] countries have been dropped. Just like the previous Pedroni cointegration test including the stock market variable Market capitalization, for all three tests the null hypothesis of no cointegration is rejected for six out of the eleven panel statistics.

TR (Turnover ratio)

Table 5.8: Pedroni cointegration results including TR

| | Individual intercept | Individual intercept and individual trend | No intercept or trend |
|---|---|---|---|
| Panel statistic | | | |
| Panel v-Statistic | -2.443 | -1.874 | -3.557 |
| Panel rho-Statistic | 3.238 | 3.634 | 2.515 |
| Panel PP-Statistic | 0.065 | -8.775*** | -8.182*** |
| Panel ADF-Statistic | -0.306 | -7.458*** | -7.874*** |
| Weighted Statistic | | | |
| Panel v-Statistic | -2.746 | -3.649 | -3.008 |
| Panel rho-Statistic | 3.079 | 4.059 | 2.608 |
| Panel PP-Statistic | -5.038*** | -12.044*** | -7.916*** |
| Panel ADF-Statistic | -4.799*** | -8.122*** | -7.358*** |
| Group Statistic | | | |
| Group rho-Statistic | 4.169 | 4.829 | 3.805 |
| Group PP-Statistic | -13.286*** | -21.911*** | -12.536*** |
| Group ADF-Statistic | -5.342*** | -8.421*** | -6.711*** |

*Note: *,**,*** denote statistical significance at 10, 5 and 1 percent respectively. 1. Excluded countries: Cameroon, Egypt, Rwanda, Swaziland, Uganda, Zambia and Zimbabwe.*

Referring to table 5.8 the cointegration tests report results for 11 countries as $7^{(3)}$ countries have been dropped similar to results for Market capitalization. However, for TR the results for the Pedroni cointegration test including the individual intercept only, statistics for four panels out of eleven reject the null hypothesis of no cointegration . Although for the other cointegration tests the results correlate to the other tests for the other stock market variables, the null hypothesis of no cointegration is rejected for six out of the eleven panel statistics.

In this study the majority of the Pedroni cointegration tests for all stock market variables reject the null hypothesis of no cointegration. However, it can be argued that there isn't strong evidence of cointegration since the results for the panel statistics were close for all tests as not more than six panel statistics rejected the null hypothesis whilst five panel statistics could not reject the null hypothesis. This, therefore, influences the study to examine causality through the pvargranger framework.

The findings of this research are contrast to Babayami *et al.* (2013) who found strong evidence that African stock markets have a long-run relationship with economic growth and other macroeconomic variables where both the Pedroni and Westerlund cointegration tests robustly confirmed this.

### 5.4.4 Lag length selection

In order to determine the optimal lag order for the panel vector autoregression model pvarsoc is utilised. Pvarsoc provides summary measures to aid in panel VAR model selection. The selection criteria for the lag order is the based on the three model selection criteria proposed by Andrews and Lu (2001), who suggested that the lag order to be chosen should be the lag with the smallest MBIC, MAIC and MQIC values. Looking at table 5.9 below lag 1 has the smallest values therefore, lag order of one will be used for the pvar model.

Table 5.9: PVARSOC results

| lag | CD | J | J pvalue | MBIC | MAIC | MQIC |
|---|---|---|---|---|---|---|
| **1** | .9303871 | 56.25617 | .1932864 | -169.3669 | -39.74383 | -92.31964 |
| **2** | .9797122 | 32.7814 | .4285059 | -117.634 | -31.2186 | -66.26914 |
| **3** | .9023404 | 18.56098 | .2920846 | -56.6467 | -13.43902 | -30.96429 |

### 5.4.5 PVAR-Granger causality test

Table 5.10 below presents the results of the pvar-granger causality test for all the stock market development variables and FDI between economic growth. The other variables are still utilized but only as exogenous variables in the PVAR model, following with the study's categorization of endogenous and exogenous variables from the System-GMM. The findings in table 5.10 report interesting results, between market capitalization and growth there is unidirectional causality flowing from market capitalization to economic growth.

This seems to be a consistent causal relationship amongst the stock market variables and economic growth. As for the remaining stock market development variables TVT and TR indicate similar results. For both the variables there is a unidirectional flow from either TVT or TR running to economic growth. FDI displays a causal relationship between economic growth that runs from FDI to economic growth no feedback effect is detected in this study. Surprisingly these findings correlate to the findings of Rousseau and Wachtel (2000) who concluded that unilateral causality is found flowing from stock market development measures to economic growth regardless of divergent effects on growth.

In addition, the results in table 5.9 provide support to the supply-leading hypothesis proposed by Patrick (1966). Similarly, researchers such as Thangavelu and Ang (2004), Nieuwerburgh *et al.* (2005), Antonios (2010) provide findings that reinforce the conclusions of this study. However, contrasting findings have been put forward by Ake and Ognaligui (2010), who found evidence to support the independent hypothesis. While Carp's (2012) results argue that the feedback hypothesis is valid.

Table 5.10: PVAR GRANGER Results

| | p-value | Accept/Reject | Direction |
|---|---|---|---|
| Market cap does not Granger-cause GDP | 0.000 | Reject | Unidirectional |
| GDP does not Granger-cause Market cap | 0.639 | Accept | |
| Value traded does not Granger-cause GDP | 0.000 | Reject | Unidirectional |
| GDP does not Granger-cause Value traded | 0.231 | Accept | |
| Turnover ratio does not Granger-cause GDP | 0.000 | Reject | Unidirectional |
| GDP does not Granger-cause Turnover ratio | 0.666 | Accept | |
| FDI does not Granger-cause GDP | 0.000 | Reject | Unidirectional |
| GDP does not Granger-cause FDI | 0.125 | Accept | |

## 5.5 Conclusion

This chapter began by presenting descriptive statistics of the variables involved in the study and was followed by four System-GMM models. Beginning with model one, which consists of no control variables it was shown that Market cap and TR have significant positive impacts on growth however, TVT is found to have a statistically negative significant effect on economic growth. Model two, which introduces three control variables: FDI, CPI and POP. Reveals that the level of significance of Market cap and especially TVT improve drastically with the added control variables. FDI and POP enter with positive signs, however, both are statistically insignificant. Furthermore, model two indicates that a decrease in corruption has a negative impact on growth. Moving to model three, this introduces Freedom as an additional control variable. The results from model three highlight that when another control variable is incorporated there is not much deviation in results when compared to model two. Lastly, model four shows that even when controlling for the recent global financial crisis all the stock market development variables and CPI maintain a consistent influence on economic growth.

The study went on to ascertain whether there was a causal relationship between stock market development and economic growth. However, before causality could be tested the following tests were first conducted: a cross-section independence test, panel unit root test and three Pedroni cointegration

tests. The results from the cross-section independence test revealed that for all variables, except for Freedom, were exhibiting cross-section dependency. Prompting the study to employ a mix of first- and second-generation unit root tests. For the variables that displayed cross-section dependence, a Cross Sectionally Augmented Dickey Fuller (CADF) test is utilized as the second-generation unit root tests, whilst for the first-generation test the fisher type tests are used. However, even though the variables POP and CPI have cross-section dependence the fisher type unit root test was applied for these variables due to not being able to generate results with the CADF-test. The CADF-test indicates that all the variables excluding the exchange variables are stationary at first difference, whilst the Exchange variable is stationary at second difference. The results of the fisher type tests show that Freedom and POP are stationary at first difference however, CPI is stationary at levels.

Thereafter, the study presented the findings of the Pedroni cointegration test. The three Pedroni cointegration test results illustrate that there isn't strong evidence of a long-run relationship between stock market development and economic growth. Therefore, the study undertook to examine causality through the pvargranger framework. The pvarsoc results indicated that the optimal lag was the lag order of one. The PVAR-Granger causality test results go on to show that between stock market development and economic growth, there is unidirectional causality flowing from stock market development to economic growth. Similarly, FDI displays a causal relationship between economic growth that runs from FDI to economic growth.

This chapter has revealed that size and liquidity variables of stock markets development have differing effects on economic growth. Since market capitalization was found to have a positive impact on growth and in contrast total value traded displayed a negative influence on economic growth. The direction of causality for all the stock market variables were determined to be unidirectional flowing from the stock market variables to economic growth. Alternatively, the result can be interpreted as size of stock markets indicates a positive causal relationship, with economic growth flowing from capitalization to economic growth. Whereas liquidity in the form of total value traded influences economic growth negatively without any feedback effects for the African countries examined in this study.

# Chapter 6 Discussions, Conclusions and Policy Recommendations

## 6.1 introduction

This chapter provides a summary, the limitations inherent to this study and presents policy recommendations. The present section introduces the chapter; subsequently section 6.2 details the summary and section and section 6.3 provides a discussion and conclusion while, section 6.4 outlines the limitations of this study. Lastly, section 6.5 provides policy recommendations.

## 6.2 Summary

Previously, research that has been conducted on the relationship between stock market development and economic growth in Africa, has generated inconclusive and conflicting results. In addition to this, the institutional quality of African countries is disregarded in most studies when the stock market development and economic growth nexus is analysed. The literature indicates that institutional variables are relevant when analysing drivers of growth in Africa.

Therefore, to empirically examine the relationship between stock market development and economic growth within a panel of 18 African countries from 2003-2016. This study formulated two objectives; the first to determine the effect of stock market development on economic growth and the second objective was to ascertain the causal relationship between stock market development and economic growth whilst incorporating institutional variables in the empirical tests.

The study began with an overview of African stock markets and it was determined that the number of African exchanges have increased significantly over the years; there are now 31 exchanges in Africa. This increase in African exchanges has been partly driven by the IMF/World Bank' Structural Adjustment Programmes implemented during 1990-2000. During this period 13 stock exchanges were established, after this period the number of new exchanges being established substantially decreased. It is only until recently that new exchanges have started trading; with 5 new exchanges being established during the period 2012-2017.

In addition, the growth of the African stock markets has been supported by high returns on the exchanges which has courted the interest of foreign investors. The oldest exchanges in Africa namely: the Johannesburg exchange (South Africa) and the Egyptian Exchange, are the exchanges with the highest market capitalization and trading activity- whilst the younger exchanges have miniscule trading activity and low levels of market capitalization. Smith *et al.* (2002), illustrates that African stock markets can be categorized into four different groups based on their level of development:

- highly sophisticated in terms of technical infrastructure and regulatory framework.
- Medium-sized stock markets, which has been established for 134 years.

- Small new stock markets which have grown rapidly.
- Small new stock markets that haven't taken off as yet.

The majority of African stock markets place in group 3 and 4, while South Africa has the most advanced exchange. Surprisingly, South Africa has experienced a substantial increase in the number of new exchanges being established. This was shown to indicate financialization as the country has experienced tepid growth, yet the majority of new exchanges being established during the period 2012-2017 were from South Africa. In addition, there has been a substantial increase in the market capitalisation of the JSE. This view of financialization in South Africa is supported by Ashman *et al.* (2013) as they contend that in South Africa real economic activity has not been promoted by financial development but has instead been constrained by financial activity.

The institutional characteristics of African stock markets reveal that African countries are opening up to foreign investors, as more and more African countries have removed restrictions on foreign investors, with only a few countries remaining that still have restrictions on foreign participation. In addition, there has been a drive to conform to international reporting standards to accommodate investors and remove investing fears by legislating insider trading to be illegal. Furthermore, the regulation of African stock markets has improved by implementing a variation of regulatory organisations that range from a single-agency specialized in securities regulation, to a unified regulator that regulates more than one sector.

African stock markets have been enterprising in an attempt to increase the level of activity on their exchanges; they have increased the number of trading days to five days a week as most exchanges now trade from Monday to Friday. This is an improvement as more countries in the early 2000s such as Ghana, Tanzania and Uganda were trading two to three days a week. However, the number of trading hours per day is far too low with the majority of exchanges just operating for four hours per day.

Moreover, settlement, clearing and delivery have become mainly uniform in Africa to being performed electronically- except for Rwanda and Malawi in which they are still manual. This shift has led to settlement cycles becoming T+3, which is the international norm, resulting in countries with settlement cycles of 8 days like Sudan drastically reducing settlement only to three days.

However, regardless of the African exchanges attempts to increase the liquidity levels on their exchanges, trading activity is still far too low, with the majority of trading on African exchanges being generated in one country that being -South Africa.

As the study progressed it reviewed the neoclassical and endogenous growth theories. It was illustrated that the endogenous growth theory was more fitting to explain the relationship between stock market development and economic growth. The neoclassical growth theory ignores the ability of the financial sector to influence growth through investment; due to the assumption that the rate of capital

accumulation is only influenced by household savings in and is independent of firm's investment spending. Furthermore, the savings rate is considered to be exogenous, the theory implies that a high savings rate can temporarily lead to increases in growth, but this is offset in the long-run by depreciation and population growth. Contrastingly, the endogenous growth theory indicates that the drives of growth are endogenous suggesting that investment by companies or governments in human capital and knowledge can significantly contribute to economic growth.

To understand the causal relationship between stock market development and economic growth four hypotheses were reviewed namely: the supply-leading hypothesis, the demand-following hypothesis, and the feedback hypothesis and the independent hypothesis. The supply-leading hypothesis takes place when the creation of financial institutions and markets results in increased financial services, thus leading to real economic growth. The demand-following hypothesis suggests that as the economy grows demand for financial services will increase and possibly inducing the expansion of the financial sector

The feedback hypothesis postulates that financial development and economic growth cause each other. Initially, there are supply-leading characteristics of financial development and over time they decrease, and demand-following characteristics of financial development dominate. The independent hypothesis argues that there is no causal relationship between financial development and economic growth.

Three theories were brought forward to support the supply-leading hypothesis namely; Tobin's Q theory, the life-cycle hypothesis and the financial accelerator theory. Levine (1997) suggests that through five major financial functions (liquidity, Acquisition of information and allocation of resources, Pooling and diversification of risk, Corporate control and Mobilization of savings ) stock market development encourages growth through three channels, which are: capital accumulation, investment and the savings rate.

The empirical literature of the study illustrated that the past studies have produced conflicting results with Atje and Jovanovic (1993), Levine and Zervos (1996b), Thangavelu and Ang (2004), Rousseau and Wachtel (2000), Mohtadi and Agarwal (2006), Ngare *et al.* (2014), Tachiwou (2010), Nowbutsing (2009) showing evidence to support the supply-leading hypothesis, whilst Ndako (2009) the demand-following hypothesis. The independent hypothesis is supported by the research conducted by Harris (1997), Minier (2009), Ake and Ognaligui (2010), Seetanah *et al.* (2012). However, researchers such as Durham (2002), Duca (2007), Ake (2010) work contained mixed results and found a unilateral relationship flowing from the stock market to the economy in developed countries and found an independent relationship between the stock market and economic growth, in either developed or developing countries. Lastly Carp's (2012) work observed a bidirectional relationship between the stock market and economic growth.

Following the empirical strategy which was formulated from the theoretical and empirical literature, the empirical results were presented . Beginning with the system-GMM models the results indicate that

for the stock market development measures, only market capitalisation seems to influence growth positively and contrastingly, total value traded has a negative impact on economic growth. To check for the validity of these results the Hansen test is used, and results are confirmed to be valid, robustness is confirmed by the consistency of the results across several models. The models also include control variables (Corruption Perception Index, Foreign Direct Investment, Freedom in the world rating , Financial crisis time dummy and Population growth rate). A decrease in the level of corruption represented by Corruption Perception Index was found to have a negative effect on growth, confirming the threshold effect hypothesis, which is interesting as the conventional view on corruption suggests that decrease in corruption would affect growth positively.

In order to prevent spurious results being presented in the study, a cross-section independence test was employed to determine the appropriate panel unit root tests to be utilized for the variables. The results of the cross-section independence test dictated that the study should apply a combination of first- and second-generation unit root tests. Once the integration order of the variables was established at order of one the Pedroni cointegration test was utilized to determine whether a long-term relationship exists between stock market development and economic growth. The results revealed no strong evidence of cointegration is apparent therefore, influencing the study to examine causality through the pvargranger framework.

When the causal relationship was examined it was determined that all the stock market development variables exhibited a strong uniform causal relationship, running from the stock market development measures to economic growth. These results are compelling, as when the empirical literature was reviewed mixed findings on the causal relationship were revealed between stock market development and economic growth. This study therefore supports the supply-leading hypothesis. Similarly, researchers such as Thangavelu and Ang (2004), Nieuwerburgh *et al.* (2005), Antonios (2010) provide findings that reinforce the conclusions of this study.

## 6.3 Discussions of the findings and contribution

The study specified System GMM models that found contrasting results on the impact of stock market development on economic growth, as size and liquidity variables of stock markets development have differing effects on economic growth. This creates ambiguity on the overall impact of stock market development on economic growth and seems to suggest that the impact of stock market development in Africa on economic growth is ambiguous correlating with Minier's (2009) finding that the long-term impact of stock market development in Africa is not clear.

The ambiguity of the role of stock market development on influencing economic growth in the long-run revealed in this study provides support to Lucas's (1988) view of giving too much importance to financial development as being a fundamental driver of long-term economic growth. Thus,

contradicting the larger part of existing literature that find stock market development to either a positive influence on economic growth (Levine and Thorsten (2001); Mohtadi and Agarwal (2006); Tachiwou (2010)).

The majority of the studies focusing on Africa (Tachiwou (2010); Nowbutsing (2009); Ake and Ognaligui (2010); Odhiambo (2009); Ndako (2009); Kolapo and Adaramola (2012)) neglect to control for institution quality of African countries. However, this study accounted for this and concluded differing results than the majority of studies done in Africa, highlighting that if the relationship between stock market development and economic growth is researched institutional control variables should be incorporated. Lastly, Ngare *et al.* (2014) findings are disputed as this study argues that institutional improvements have a negative effect on economic growth.

## 6.4 Limitations of the study

The study was limited by the availability of data; the study initially intended to study a panel of 25 countries from the period 1999-2016. However, the following countries; Algeria, Cape Verde, Libya, Mozambique, Seychelles and Sudan had to be excluded from the study due to no data being available on the stock market development variables. If some data was available it was just for one or two years. In addition, the countries that could be included had quite a few years of missing data this leading to the structure of the panel being unbalanced and containing gaps. Hence the study had to rely on forward orthogonal deviations instead of using first-difference to transform the System GMM models to prevent gaps being magnified.

## 6.5 Policy recommendations

The findings of the study provide mixed results on the effect of stock market development on economic growth. However, the study concludes that there is a causal relationship between stock market development and economic growth, which supports the supply-leading hypothesis. Therefore, the study offers the following recommendations:

• African countries and the relevant exchanges should consider formulating policies to enhance awareness of their stock markets and educate people on how to invest. Thus, removing the perception of investing in stocks as being highly risky.

• In order to increase trading volumes African exchanges should consider increasing operating times of exchanges. In addition, tax incentives should be offered to both investors and prospective companies seeking to list on their exchanges. In Seychelles and Mauritius similar tax incentives have boosted liquidity by as much as 175%.

• African countries that still have restrictions on foreign participation on their exchanges should consider removing them. Literature finds that increased foreign investment leads to higher trading activity and returns on exchanges.

• The unavailability of good quality data on African stock markets is worrisome. African exchanges should consider making it much easier to access their data; so as to improve the quality of research on the relationship between African stock market development and economic growth. As there is a need to conduct research on the threshold effects of African stock market development.

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