

**NEXUS BETWEEN CAPITAL MARKETS AND
ECONOMIC GROWTH IN FRONTIER ECONOMIES**

Evidence from Sub-Saharan Africa.

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**A Master of Arts Research Paper Submitted to Partially
Fulfil the Requirements to be Awarded the
Degree of Master of Arts in Economics, School of
Economics, University of Nairobi
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DECLARATION

I confirm the originality of this study and confirm that it has not been submitted for a degree in any other University.

Signed.....Date.....

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X50/6249/2017

I approve this project for submission for examination as the University Supervisor

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DEDICATION

I dedicate this paper to my loving mother, Ms. Lydiah K. Rukaria, my family, friends and colleagues who have been very supportive and gracious throughout this journey.

ACKNOWLEDGEMENT

My sincere appreciation is to my mother, Ms. Rukaria, for her unwavering support during this course.

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Above all, I express my indebtedness to God for the grace to complete this course.

LIST OF ABBREVIATIONS

ARDL	Autoregressive Distributed Lag
ASEA	African Securities Exchanges Association
FE	Fixed Effects
GDP	Gross Domestic Product
GEMS	Growth Enterprise Market Segments
LSDVC	Least Squares Dummy Variable Corrected
MINT	Mexico, Indonesia, Nigeria and Turkey
NSE	Nairobi Stock Exchange
OLS	Ordinary Least Squares
POLS	Pooled Ordinary Least Squares
RE	Random effects
SMEs	Small and Medium Enterprises
SSA	Sub Saharan Africa
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
WB	World Bank

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ABSTRACT

The study was meant to establish the nexus between capital markets and economic growth. A panel of five countries was used for the analysis and the sample period was from 2005 to 2017. In order to determine the most suitable model, the study used the Hausman test and found the fixed effects to be the most suitable model. The study used market capitalization ratio measured as a ratio of market capitalization to GDP, turnover ratio, value traded ratio and number of listed securities as indicators of capital markets. Other control variables used in the study were inflation, foreign direct investment and trade openness.

Findings revealed that market capitalization and the number of listed securities improved economic growth in the five countries. As for the control variables used, inflation was found to have a negative impact on the growth of the economy while foreign direct investment was found to have a positive effect on GDP. The study further estimated a panel Granger causality test to determine the direction of causation between the measures of capital markets and economic growth. The Panel Granger causality test found a unidirectional causality running from market capitalization to economic growth.

The following policy implications were drawn from the study. Firstly, SSA governments should come up with policies that promote capital market development. Secondly, SSA governments should strive at promoting foreign direct inflows in their respective countries since it was found to spur growth, and at the same time keeping the inflation in check.

CHAPTER ONE

INTRODUCTION

1.1 Background

A capital market falls in the larger category of financial markets. A financial market includes both money markets and capital markets. While both markets refers to where securities are traded, securities traded in a capital market have a tenure that extends beyond one year unlike a money market where the tenure is less than a year. (Mishkin, 2004). A capital market is composed of both equity and the debt market. The equity market is where shares (which are units of ownership of a firm or a company) are traded while the debt market involves the raising of funds by either private individuals or the public by issuing corporate bonds and public bonds respectively. Both governments and firms use capital markets to raise funds in order to meet their spending needs i.e. through treasury bonds or corporate bonds respectively. A capital market provides an avenue where the deficit spending units (borrowers) meet the surplus spending units (lenders). McKinnon and Shaw (1973) noted that in the absence of such financial markets then investors will among other things invest their savings into real assets, investments will be limited to self-finance since there will be no external finance and in the event of lumpy investment, then the investment will either be shelved, postponed or the investors will invest in inferior investments.

Capital markets are therefore important in an economy since they help mobilise savings, allocate resources efficiently to where they are desperately needed, help diversify risks

since investors can invest in different financial instruments. These factors will lead to capital accumulation and technological advancement and eventually lead to growth (Levine, 1997). Bekaert and Harvey (1998) observed that the progress of an economy is largely dependent on the existence of a financial sector that is efficient which rallies both domestic savings and foreign capital to be used for investment.

Empirical studies have established that finance and economic growth are mostly positively related. Additionally, when financial markets i.e. banking sector and capital markets are examined separately, they have positive impact on growth. Solow growth model (Solow, 1956) proposes human and physical capital as the key growth factors. The dynamism of the model shows how the level of production affects the changes in the economy positively. Notably, factors such as the increase in savings, investments, technological advancements and organisational improvements enhance the level of production per worker. Furthermore, findings by Demircug – Knut and Levine (1996a) posit that when the stock markets develop, the overall financial system is impacted positively. Rousseau and Sylla (1999) show the pertinent role that the stock markets played in the ballooning of the American economy in the course of the previous century.

One of the factors that has expedited Africa's growth is the inflow of foreign capital to fund large scale transformational projects and infrastructure. Economic efficiency, investment and growth are positively correlated with efficient capital markets. African economies have some of the most impressive growth rates, for instance, Rwanda has recorded over six percent GDP growth rate in the recent years. Therefore, to maintain such

impressive economic growth rates, there has been significant focus on the African capital markets for example, the introduction of fintech and regtech and integration efforts to make the continent’s capital markets an investment destination of choice.

The following is a statistical representation of the interrelatedness between the capital markets development indicators and the growth of the economy.

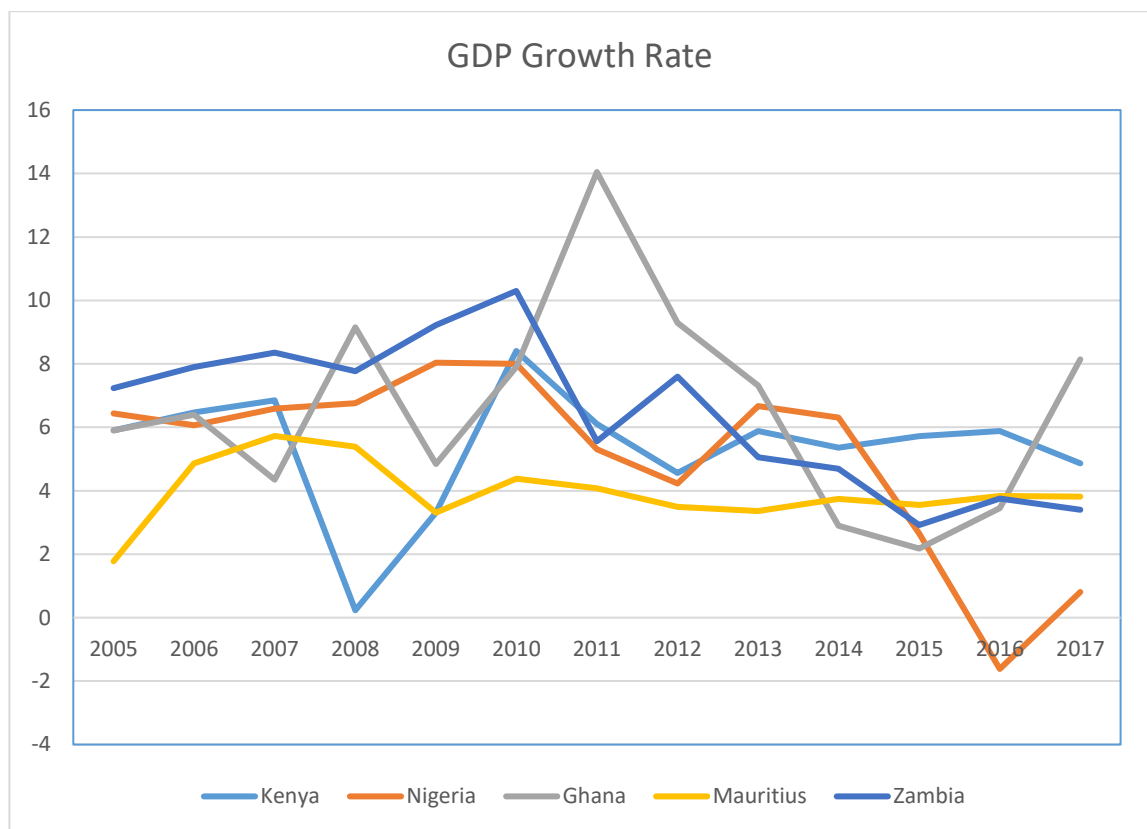


Figure 0.1: GDP Growth Rates of the select SSA Frontier Economies.

Researcher’s illustration using Microsoft Office Excel (2016)

Growth rates for the sample countries has been fluctuating quite a lot with the most notable being Nigeria’s negative growth rate (-1.6%). On the other hand, Ghana attained the

highest growth rate in 2011 i.e. at 14.04% and has had an impressive growth rate track record among the five countries.

An analysis of the number of the listed securities reveals that the numbers have been on a downward trend for Nigeria compared to the other countries whose trend has been fairly stable or increasing at a slow rate. The graph below depicts the trend.

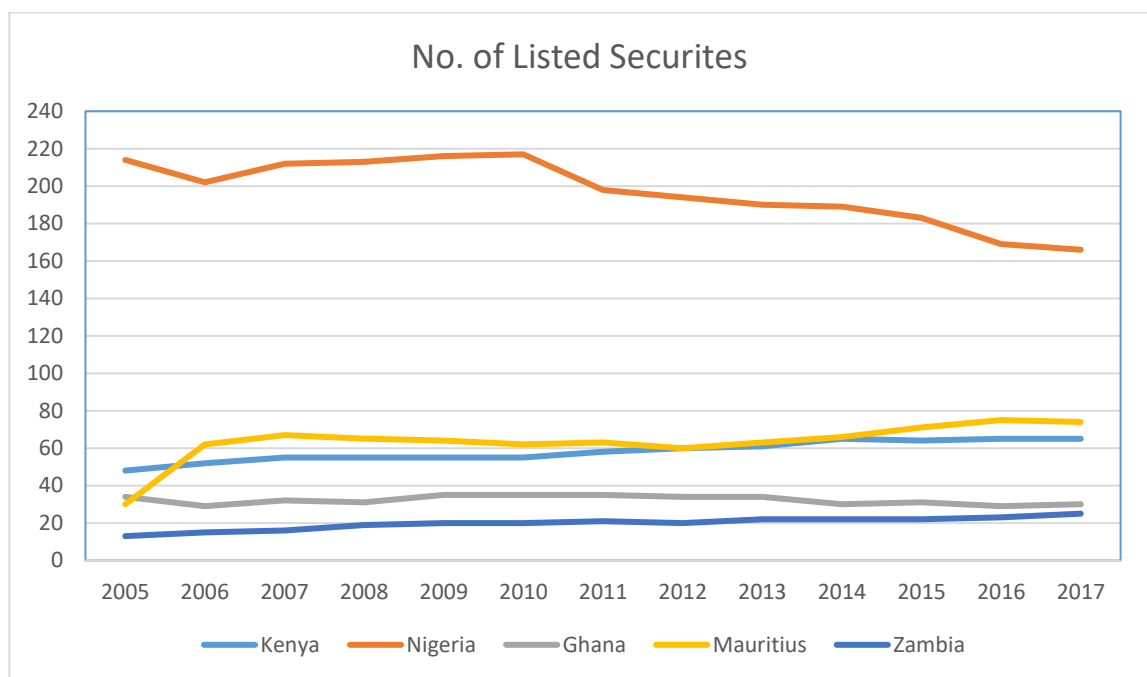


Figure 0.2: Number of Listed Securities in the select SSA Frontier Economies.

Researcher's illustration using Microsoft Office Excel (2016)

Value traded ratio in the frontier economies obtained by dividing the value traded by the GDP and it is a measure of liquidity. A trend analysis for the sampled SSA frontier economies shows an alternating trend i.e. increase and decrease of the ratio over the time period. This is illustrated as follows:

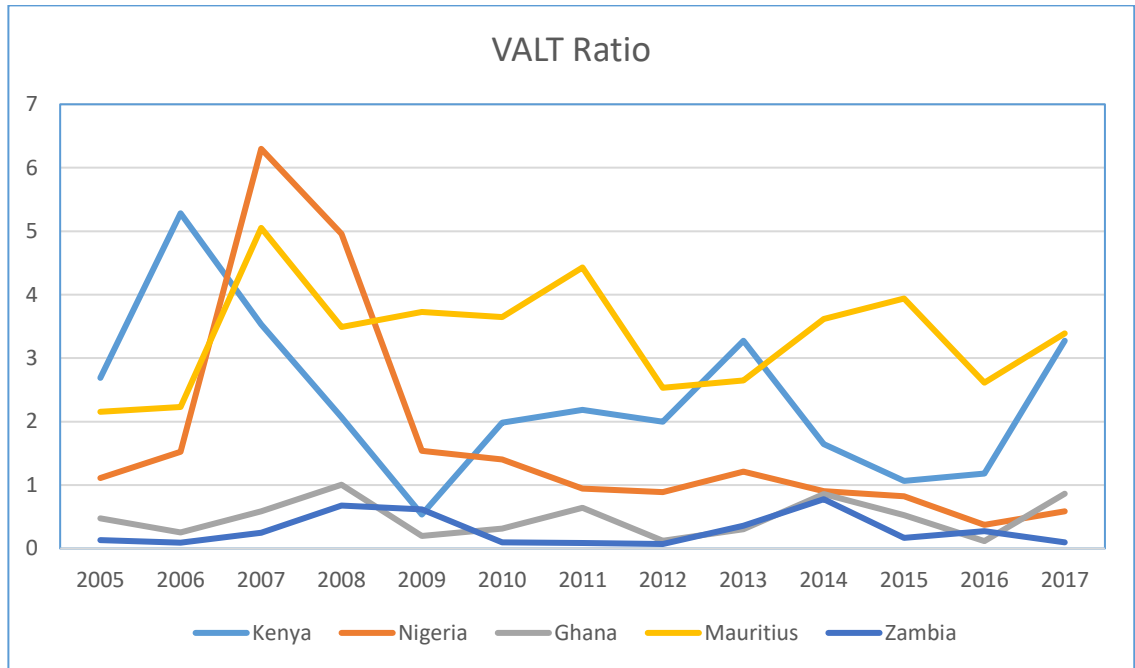


Figure 0.3: VALT Ratio of the select SSA Frontier Economies.

Researcher's illustration using Microsoft Office Excel (2016)

Additionally, a correlation analysis between some variables was conducted. For instance, between GDP growth rate and inflation rate. The graphs below shows the strength of the correlation. Notably, Kenya, Ghana, Zambia & Nigeria have a generally negative correlation between the two aforementioned variables. Mauritius on the other hand initially exhibited a slight negative correlation, followed by a somewhat strong positive correlation between the two variables.

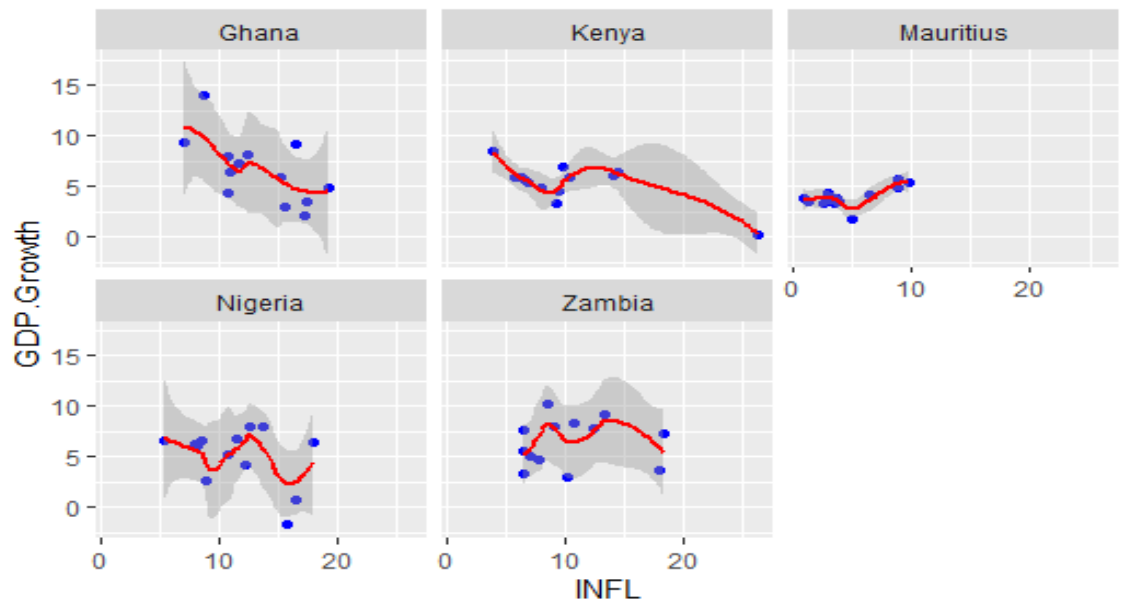


Figure 0.4: Correlation Analysis between the GDP growth and inflation of the select SSA Frontier Economies.

Source: Researcher's illustration using R version 4.0.2

In addition to the above correlation analysis, the author sought to illustrate how strong the general correlation is between market capitalization ratio and the GDP growth rate and established the following. Ghana exhibited a unique strength in the correlation of the two variables since the slope (as illustrated in the comparison below) was quite steep compared to the other four countries. Kenya and Nigeria were on the other end of the spectrum since the slope was almost flat implying a rather weak correlation.

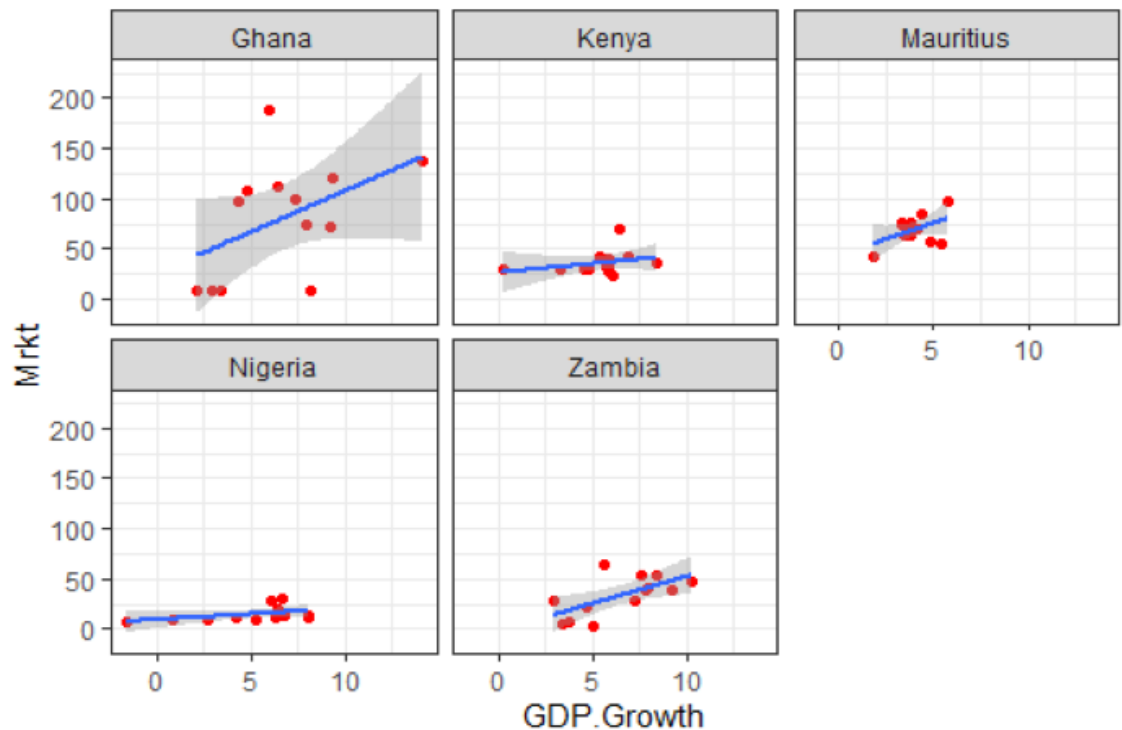


Figure 0.5: Correlation Analysis between the market capitalization ratio and the GDP growth rate of the select SSA Frontier Economies.

Source: Researcher's illustration using R version 4.0.2

1.2 Statement of the Problem

According to the traditional views, capital markets do not lead to economic growth since they are viewed as an avenue that can harm growth through the presence of market failures due to volatility that is present in most developing countries (Singh, 1997). Contrary to this view, the finance-led hypothesis posits that the development of capital markets aids growth via mobilization of savings, efficient allocation of resources and diversification of risks (Levine and Zervos, 1998). Majority of the studies carried out have shown that capital markets enhance economic growth and hence support the finance-led hypothesis.

Previously, we have had country specific studies e.g. (Enisan and Olufisayo, 2008; Aduda et al., 2014 and Enisan et al., (2008) while Mohtadi and Agarwal, (2001) investigated how capital market success relates to growth of 21 emerging economies. Unlike previous studies which have mainly dealt with time series models for instance, Autoregressive Distributed Lag model (ARDL), Ordinary Least Squares (OLS) and the Vector Error Correction Model (VECM), this study has used panel data methods such as the Fixed Effects (FE) Model, the Random Effects (RE) Model and the Pooled OLS Model (POLS). The technique is preferred due to its several merits over both cross-section and time-series data sets. The technique has got greater degrees of freedom and less multi-collinearity and therefore yields more efficient estimates. There is also a higher flexibility when using the panel data technique when modelling differences in behaviour across countries. Consequently, one is able to mitigate against unobserved heterogeneity hence ensuring a better fit (Hsiao, 2005).

1.3 Research Questions

Given the aforementioned study objectives, the research questions below can be drawn:

- i. What is the relationship of measures of capital market development and economic growth in Sub Saharan Africa (SSA) frontier economies?
- ii. What is the direction of causation between capital market development measures and economic growth?

1.4 Objectives

The key objective herein is to examine the link between capital markets and economic growth in frontier markets in SSA. Specifically, the study seeks:

- i. To analyse the relationship between the measures of development in the capital markets and economic growth in SSA frontier economies.
- ii. To establish the direction of causation between capital market development measures and economic growth.

1.5 Significance of the Study

Research outcomes may be of use to the following groups of people;

- i. Sub Saharan African governments will benefit from the findings of this study since governments are mandated to ensure favourable environment for development of sound financial markets in order to ensure that the economy develops.
- ii. The findings from these study may prove to be important to capital market regulatory authorities in SSA. Findings from this study may provide more information to the regulatory authorities on how best to manage the capital markets.
- iii. Finally, findings from this study may also prove to be useful to potential researchers and academicians since it will provide them with a basis for further research.

1.6 Organization of the Study

The organization of the study is enumerated as below: The initial chapter has just discussed the background and objectives of the study, problem statement and the study's significance. The second chapter has presented literature from theory and previous empirical studies by laying out an overview of the literature and the research gap of the study. The methodology used in the study has been discussed in Chapter Three. Analysis

and interpretation of the results has been exhibited in Chapter Four and the summary conclusion and policy implications presented in Chapter Five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Theoretical Literature

The chapter presents both from theory and previous empirical studies that were used in this proposal. The theories that the study has discussed are the supply leading hypothesis, the demand following hypothesis, the mutual theory and the mutual exclusion theory.

2.1.1 Supply-Leading Hypothesis

In order to ensure effective allocation of resources in productive areas of the economy, there is need to have a well-functioning financial system which brings about technological advancement (Schumpeter, 1982). Supply-leading hypothesis occurs when accumulated savings by financial institutions are invested which ultimately leads to the development of various economic sectors (Stolbov, 2012). According to Goldsmith (1969), finance can influence growth through increased efficiency and built-up of aggregate investment in the economy. This theory posits that capital markets development are necessary for growth in the economy. According to Lenee and Oki (2017), the progress of capital market precedes the advancement of the economy and that there are activities in the capital markets that can either affect growth negatively or positively. McKinnon (1973) and Shaw (1973) noted that for finance to bring about economic growth, then it should be free from government interference and that government control in the the financial markets through controlling interest rates, high reserve requirements, forced

investment in government debt papers and any other controls could bring about financial repression.

Financial markets could be viewed in two ways: firstly as factors that contribute to technological advancement hence the promotion of economic growth and secondly as being self-sufficient which directly leads to capital accumulation hence leading to economic growth (Stolbov, 2012). Viewed this way, financial markets can be incorporated in the endogenous growth theory advocated by Romer (1990) and Lucas (1988).

2.1.2 Demand-Following Hypothesis

As for this hypothesis, capital market development seems to come after economic growth. The direction of causation is the opposite of what is proposed by the supply-leading hypothesis. Patrick (1966) notes the financial institutions in the economy are created due to their demand by investors in the economy. As per this hypothesis, growth in the financial system is due to a supply response. According to Robinson (1952), financial development was a consequence of the development of the real economy. Stolbov (2012) notes that financial development results from the overall growth in the economy. Miles (2005) noted that the advancement of the financial system follows the growth of the economy and is propelled by demand and that lack of the demand for financial system is a clear indication that the economy is not doing well.

2.1.3 Mutual Causation

According to Aduda et al, (2014) the mutual causation hypothesis is also called the feedback hypothesis. According to this theory, there is a dual causation between finance and growth. According to Schumpeter (1912), a well-developed financial system brings

about technological change, new products and innovations while Levine (1997) observed that a growing economy will ignite the demand for these financial services. Enisan and Olufisayo (2008) defines the feedback hypothesis as a reciprocal causation between economic improvement and the progress of the financial sector. Additionally, the relationship is dependent on the economy's stage. As the economy responds to the demand for financial institutions, more growth is realized. The interdependency between financial institutions and economic growth leads to feedback causality (Luintel and Khan, 1999).

2.1.4 Mutual Exclusion

The mutual exclusion theory theorizes that capital markets and economic growth have no relationship whatsoever. This theory is centred on the premise that there exists no influence of financial markets on the allocation of resources. It views a perfect competitive market where agents have all the information they need to know about the market and no transaction costs. Markets are however marred with information asymmetry and involve transaction costs (Stiglitz and Weiss, 1981). Moreover, some analysts are skeptical about stock markets and have branded them as 'casinos' with nearly no positive effects on economic growth. Hence they view the stock market as an avenue for losing money and are therefore not important for economic growth (Mayer, 1988).

The supply leading theory suggests that capital markets mobilize savings which are used for investment hence leading to the growth of an economy. On the contrary, the demand driven hypothesis posits that the expansion of the financial market results from economic development. According to the mutual causation theory, finance and growth have a feedback effect implying finance leads to growth and growth in turn leads to financial

market development. It is worth noting that finance in isolation can not entirely lead to improved economic growth. Of concern is the presence of a good corporate governance. Sigh (2013) notes that there exists numerous shortcomings associated with corporate governance structure which may culminate to the eventual demise of the capital markets.

2.2 Empirical Literature

Enisan and Olufisayo (2008) researched how equity market relates to economic progression in seven SSA countries. They employed the Autoregressive Distributed Lag (ARDL) bounds test to test for cointegration. Additionally, the Granger causality test was also applied on the Vector Error Correction Model (VECM) model. As measures of equity market development, the study employed the magnitude of the (market capitalisation) and the level of liquidity (value traded ratio) as variables. The study utilized time series data from 1980-2004. Stock market was found to be cointegrated with Gross Domestic Product (GDP) using the ARDL bounds test for cointegration in South Africa and Egypt. Additionally, a positive long run effect exists on the success of the economy by the equity market. As for Granger causality, the test revealed that equity market sparks economic improvement in Egypt and South Africa based on the VECM model while under the VAR framework, a bidirectional relationship was found between stock market for four countries which were; Kenya, Morocco, Zimbabwe and Cote D'Ivoire. As for Nigeria, the growth-led finance did not find a strong evidence.

A study by Mohtadi and Agarwal (2001) investigated how the stock market and economic growth related for 21 emerging countries between 1977-1997. The outcomes affirmed that the stock market had a dual effect i.e. (direct and indirect) on economic prosperity. The

indirect effect was through the positive effect of market capitalization on investments which led to growth while the direct effect is through the positive effect of turn over ratio on economic growth.

Hossain and Kamal (2010) investigated how capital markets influence economic advancement in Bangladesh. The period of study was between 1976 and 2008. Market capitalisation and economic advancement were found to relate in the long run. Further, a Granger causality test was administered and found out that there was a unilateral causality from market capitalization to the expansion of the economy.

Osamwonyi and Kasimu (2013) explored the causal relationship between equity market and economic prosperity in Kenya, Ghana and Nigeria. Using the Granger causality test, the study used the following aspects of development in the stock market namely: market capitalization, turn over ratio, traded volume, count of listed securities and equity market index and used time series data from 1989-2009. As for Kenya, the study established that there was a dual causality between the progress of the stock market and the expansion of the economy. On the flip side, there was no causal relationship for Ghana and Nigeria.

Aduda *et al.*, (2014) carried out a study in Kenya using yearly time series data (1992-2011) to ascertain how capital market success affects the expansion of the economy. GDP was used as the dependent variable while four indicators of capital market development were used as the explanatory variables. These indicators included: equity market size, value traded ratio, market capitalization and bond turn over ratio. Their objectives were addressed by estimating an OLS model. Results revealed that value traded ratio and

market capitalization had an insignificant effect on GDP while stock market size, stock market turn over ratio and bond turn over ratio were found to have a significant effect on GDP.

Khetsi and Mongale (2015) investigated how capital markets impacted economic progression in South Africa. Yearly time series data stretching between 1971 and 2013 was analysed. They used market capitalisation and the transactions value as measures of capital markets. The Johansen test was carried out for cointegration to ascertain that there exists a long run interrelatedness within the variables. Thereafter, they also estimated the VECM model. In a bid to test for causality the Granger test was applied. The VECM model outcomes showed that capital markets leads to improved growth in South Africa. With respect to causality, the study found a unidirectional causality running from market capitalisation to the growth of GDP.

Nordin and Nordin (2016) analyzed how the equity and debt markets influenced the Malaysian economy. The study opted for an annual time series data analysis (1981-2014) and the Johansen Cointegration method and estimated the VECM Model. The study used disaggregated components of the capital markets i.e. equity and debt market. It was established that the two markets affected the growth of the economy positively with a larger proportion from the equity market.

Njemcevic (2017) assessed the significance of the hypothesis that capital markets leads to the growth of the economy in South East Europe. Using secondary capital market indicators, the study used the Least Squares Dummy Variable Corrected (LSDVC) method

of analysis and found that market capitalization as an indicator of capital markets was responsible for increased growth in the South East Europe Countries.

Coskun *et al.*, (2017) sought to discover the nexus between capital markets and the development of the economy in Turkey. They utilized monthly times series data i.e. 2006:M1 to 2016:M6. Capital market components were represented by pension funds, corporate bonds, stocks and treasury bonds markets. Using the ARDL model, the study found that there was cointegration among the variables. All the sub components of the capital markets on economic growth were found to positively affect economic growth save for government bonds. This is mainly due to the fact that overborrowing by the government leads to crowding out of private investments which will eventually hurt the growth trajectory. Finally, they established causality running from capital markets to economic advancement.

Lenee and Oki (2017) assessed the link between capital markets and the development of the economy in Mexico, Indonesia, Nigeria and Turkey famously referred to as the MINT countries. The study used panel data from 2000 to 2012. As a measure of capital markets, the study used three variables which were; market capitalization as a ratio of GDP, count of listed securities and transaction value as a ratio of GDP. Gross Domestic Product, Gross Domestic Savings and Gross Fixed Capital formation were used as measures of growth. Using panel fixed effects, the study revealed that market capitalisation and the count of listed securities had positively affected the gross capital formation. At the same time the value of transactions affected the gross capital formation negatively. The relationship

between capital market development measures and gross savings was found to be insignificant while market capitalization did not significantly determine/affect economic growth. It was also revealed that tally of listed securities and the transactions value was positively connected to economic progress.

In pursuit of determining how equity market development interacts with Nepal's economic improvement, Bist (2017) analysed yearly time series data i.e. (1993 – 2014). The set research questions were answered by estimating an ARDL model and cointegration was determined using the bounds test for cointegration. The bounds test established that the variables relate in the long-run. The study found out that market capitalisation was responsible for promoting economic growth. Inflation, a control variable in the study, was found to have a negative but insignificant effect on the expansion of the economy.

2.3 Overview of Literature

From the above reviewed empirical literatures, majority of the studies have supported the finance-led growth hypothesis (Aduda *et al.*, 2014; Mohtadi and Agarwal, 2001; Bist, 2017; Lenee and Oki, 2017) while few have found a bidirectional causation associated with the growth of the capital market and the development of the economy (Osamwonyi and Kasimu, 2013). Majority of these studies have used time series models such as the ARDL, OLS and the VECM models. This study has employed panel data models such as the FE model and the RE model to answer the study objectives. The use of panel data models takes care of time specific effects and offers more degrees of freedom hence leading to better estimates in comparison to the cross sectional and time series data models.

CHAPTER THREE

METHODOLOGY

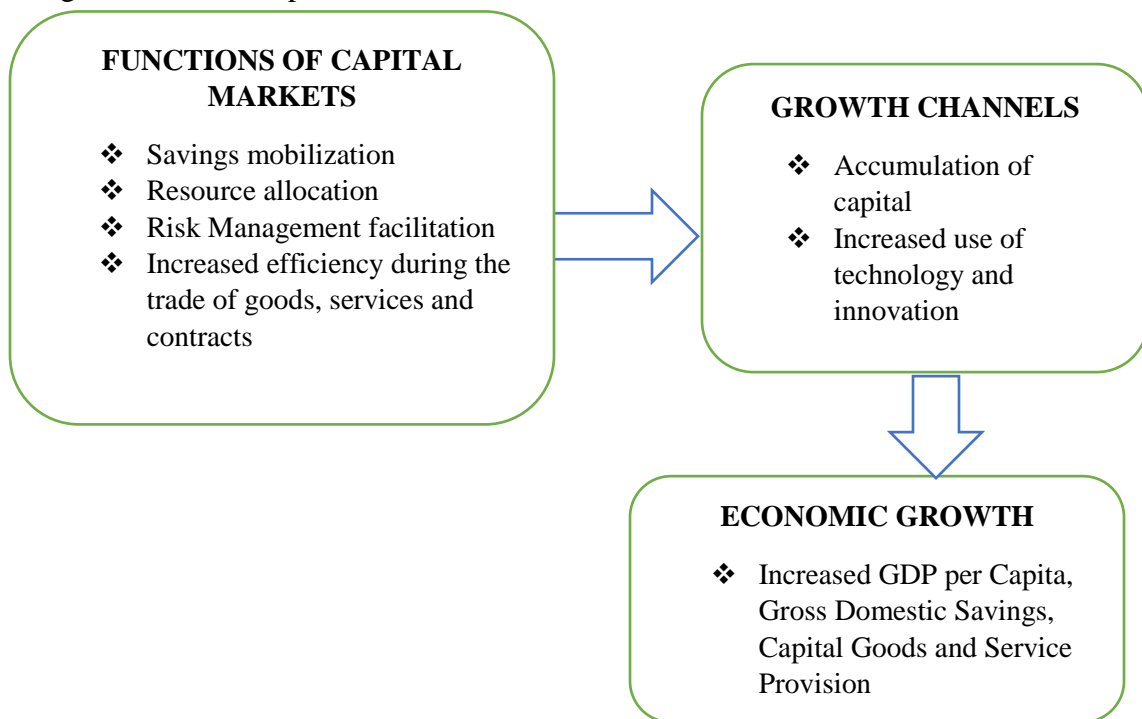
3.1 Design of the Research

A quantitative technique has been adopted to ascertain the nexus between capital markets and economic growth in frontier economies in SSA.

3.2 Conceptual Framework

The tie-up between capital markets and the progression of the economy can shown in the diagram below (Levine, 1997).

Figure 0.1: How Capital and Economic Growth Relate

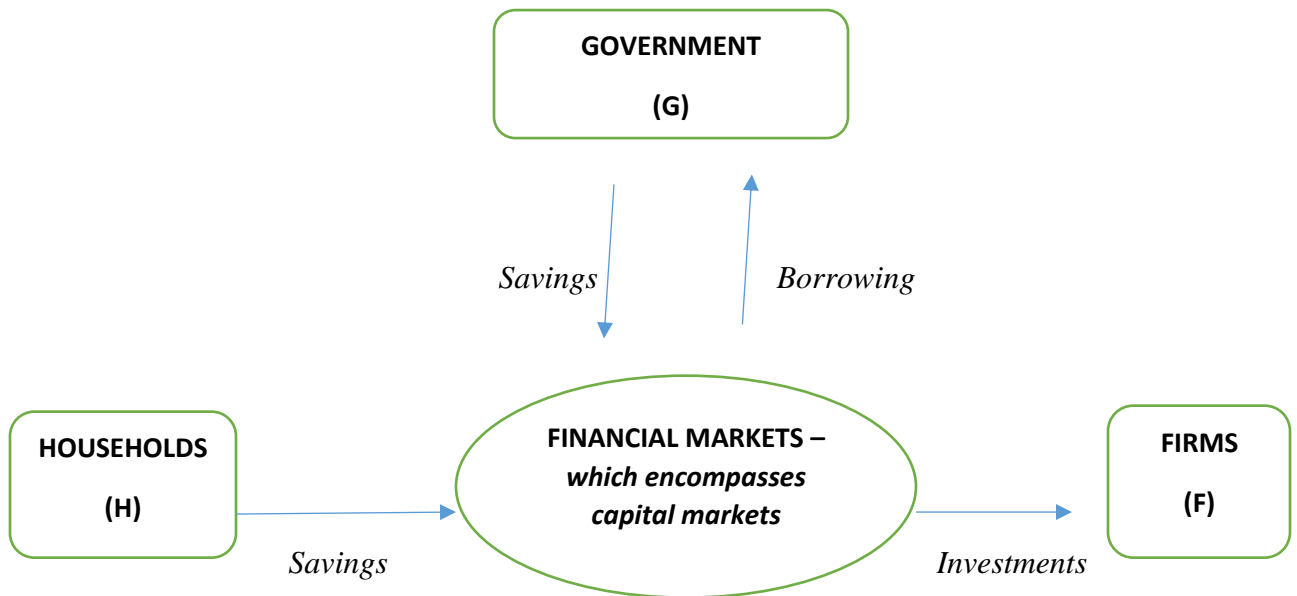


The functions of the capital markets are briefly presented in Figure 3.1 above. Capital markets among other things mobilize savings and allocate the mobilized savings into

avenues of investment (Stolbov, 2012). The accumulated savings lead to capital accumulation and technological advancement. Both capital accumulation and technological advancement fuel growth (Romer, 1990; Lucas, 1988). The accumulated capital and technological advancement leads to economic growth through, for instance, increased GDP per capita, increased savings, provision of services and capital goods.

Further, the central role played by financial markets (of which capital markets is part of) can be shown in the simple diagrammatic illustration below:

Figure 0.2: The Central role of financial markets (by extension capital markets) in the circular flow of income.



From Figure 3.2 above, at the heart of economic growth is financial markets. The households are involved in the financial market by savings. The financial markets pool

savings from the households which are in turn used for investment by firms. The government is also involved in the financial markets through three primary aspects: regulation, intervention and the government's own financing needs.

3.3 Empirical Model

The study has adopted the model used by Lenee and Oki (2017) to establish the nexus between capital market development and economic growth in a group of frontier¹ economies in SSA.

$$Growth = f(MrktCap, VALT, NoLS, FDI, INFL, OPEN, Turn Over)$$

Econometrically, the equation can be expressed as follows

$$Growth_{it} = \alpha_0 + \alpha_1 MrktCap_{it} + \alpha_2 VALT_{it} + \alpha_3 NoLS_{it} + \alpha_4 FDI_{it} + \alpha_5 INFL_{it} + \alpha_6 OPEN_{it} + \alpha_7 Turn Over_{it} + \omega_i + \varepsilon_{it}$$

Where;

Growth is the economy's growth rate

MrktCap is the market capitalisation ratio

VALT is the value traded ratio

¹ These are economies that are more developed than LDCs but less developed than emerging economies. The list included in this category from SSA are Uganda, Zambia, Cote d'Ivoire, Ethiopia, United Republic of Tanzania, Ghana, Angola, Kenya, and Nigeria (Keeler, 2014). Though the study will use five countries which are Kenya, Ghana, Mauritius, Nigeria and Zambia due to constraints in data availability.

NoLS	is the number of listed securities
FDI	is foreign direct investment
INFL	is inflation rate
OPEN	represents the trade openness of the economy
Turn Over	represents the turn over ratio
ω	is the time fixed specific effects
ε	is the error term
i	is the country cross section
t	is time

3.4 Definition and Measurement of Variables

Growth is the rate of expansion of the economy i.e. the percentage change in the GDP.

MrktCap is the annual capital market capitalisation which is measured as a ratio of the GDP. Market capitalisation is the sum value of capital markets. This value is used to represent market size. We anticipate a positive effect on GDP growth as suggested by the supply leading hypothesis.

NoLS is the total number of listed securities traded by investors in the frontier economies capital markets. Again, the number of listed securities just like the market capitalization is anticipated to have positive ramifications on GDP gains/expansion.

VALT is the value traded ratio in the frontier economies obtained by dividing the value traded by the GDP. It measures liquidity and shows how much trading has taken place relative to the economy's size. Since the value traded ratio is among the measures used for capital market progress, like Market Cap and NoLS, it is anticipated to affect the GDP growth positively.

OPEN is how easily an economy trades. It is captured by the summation of export and imports as a ratio of the GDP. The effect of how open trade is, on economic growth is ambiguous. Some economists have found trade openness to promote growth while others have established that it may be harmful to the growth of the economy.

Turn Over is the market turn over ratio i.e. divide the total value traded by the market capitalisation. Unlike the value traded ratio which measures trading with respect to the economy's size, the turn over ratio relates trading to the market. A high turn over ratio signals minimal transaction costs in a market. Since the high turn over ratio implies minimum transaction costs, the variable is deemed to positively affect growth.

FDI is the foreign direct investment. It is estimated by how much foreign companies have invested in resident countries as a proportion of the GDP. FDI is anticipated to positively affect growth.

INFL is the rate of inflation i.e. the percentage change in the consumer price index. Inflation is expected to negatively affect growth since among other things, inflation reduces the real income of the households hence reducing their aggregate demand. Reduced aggregated demand leads to a subdued economic growth.

3.5 Estimation Techniques

Since the study has used panel data, RE, FE and POLS models are the most common estimation techniques. In order to determine the most efficient model, the Hausman test has been conducted to decide the most suitable model between FE and RE (Hausman, 1978).

Diagnostics test have been used to check how reliable the estimates are after model estimation. The following diagnostics test have been carried out: the Shapiro Wilk test for normality, the Wooldridge's test for auto correlation (Wooldridge, 2010) and the Breusch Pagan test for heteroscedasticity. Granger test has also been employed to ascertain causality between economic growth and capital market.

3.6 Data Type and Sources

The study has utilized panel data from the following five SSA frontier economies: Kenya, Nigeria, Mauritius, Ghana and Zambia for the period starting from 2005 till 2017. The choice of these countries from the larger set of frontier economies is mainly based on data availability. The main data sources that have been used are: the World Bank Development Indicators and database, the African Securities Exchanges Association (ASEA).

CHAPTER FOUR

RESULTS AND INTERPRETATIONS

4.1 Introduction

This presentation and discussion of the findings have been captured herein. It starts by presenting the summary statistics of the data. It also provides the correlation matrix which shows the association degree among the variables used. After correlation matrix, the chapter presents and discusses the pre-estimation tests to be carried out before model estimation can be done. Thereafter, it presents the model results and their interpretation, diagnostics tests and concludes by providing granger causality test which shows the causation direction between measurements of capital markets and GDP growth.

4.2 Summary Statistics

The summary statistics provided includes measures of central tendency i.e. (mode, mean and median) while the measures of dispersion are the standard deviation, skewness, range, and kurtosis.

Table 4.1 summarizes the statistics of the variables used by country.

Table 0:1: Summary Statistics by Country

		Ghana	Kenya	Mauritius	Nigeria	Zambia
GDP Growth	mean	6.60	5.35	3.95	5.10	6.44
	std	3.24	1.95	1.01	2.87	2.36
	min	2.18	0.23	1.78	-1.62	2.92
	max	14.05	8.41	5.73	8.04	10.30
Mrkt	mean	80.46	35.93	68.97	14.90	33.06
	std	57.49	11.50	13.48	7.23	19.65
	min	8.37	24.32	43.18	7.36	3.42
	max	189.15	69.39	96.50	30.80	63.54

VALT	mean	0.48	2.36	3.34	1.74	0.29
	std	0.30	1.26	0.87	1.78	0.25
	min	0.12	0.54	2.15	0.37	0.07
	max	1.01	5.28	5.05	6.30	0.78
Turn Over	mean	0.72	11.86	6.48	14.27	1.12
	std	0.77	8.68	1.33	5.86	0.94
	min	0.01	4.59	4.97	7.32	0.34
	max	2.40	38.54	9.66	28.21	3.11
NoLS	mean	32.23	58.31	63.23	197.15	19.85
	std	2.35	5.53	11.02	17.37	3.39
	min	29.00	48.00	30.00	166.00	13.00
	max	35.00	65.00	75.00	217.00	25.00
FDI	mean	6.33	1.20	3.10	1.72	5.80
	std	2.31	1.09	1.23	0.77	1.97
	min	1.35	0.11	0.64	0.62	3.16
	max	9.52	3.46	5.05	2.93	9.42
INFL	mean	13.33	10.06	4.69	11.55	10.36
	std	3.74	5.74	2.92	3.71	4.09
	min	7.13	3.96	0.98	5.39	6.43
	max	19.25	26.24	9.73	17.86	18.32
OPEN	mean	74.68	50.00	112.33	35.65	70.16
	std	11.25	8.33	9.40	9.57	9.50
	min	61.69	36.18	97.59	20.72	56.12
	max	98.17	60.45	127.06	53.28	84.60

Source: Author's Computation from R version 4.0.2

In terms of GDP growth, Ghana reached the highest growth of 14.5 percent followed by Zambia at 10.3 percent and Kenya at 8.41 percent. Nigeria and Kenya recorded the lowest growth rates over the study period at -1.62 percent and 0.23 percent respectively.

With respect to market capitalization as a percentage of GDP, Ghana recorded the highest market capitalization in the study period with a value of 189.15 followed by Mauritius at 96.50 then Kenya at 69.39. With regards to foreign direct investment flows to the countries as a percentage of GDP, Ghana recorded the highest flows in the study period with a value

of 9.52 followed by Zambia at 9.42. The countries with the lowest flows of FDI as a percentage of GDP are Kenya, Nigeria and Mauritius with 0.11, 0.62 and 0.64 respectively. All the countries had recorded double digits inflation except Mauritius which had the highest inflation of 9.73 percent. Nigeria, Zambia and Ghana had highest inflation rates of 17.86 percent, 18.32 percent and 19.25 percent with Kenya hitting a high inflation rate of 26.24 within the study period.

Table 0:2: Overall Summary Statistic

	GDP.Growth	Mrkt	VALT	Turn.Over	NoLS	FDI	INFL	OPEN
n	65	65	65	65	65	65	65	65
mean	5.49	46.66	1.64	6.89	74.15	3.63	10.00	68.56
sd	2.53	36.88	1.55	7.20	64.75	2.61	4.96	27.83
median	5.56	37.84	1.01	5.90	55.00	3.12	9.23	65.35
min	-1.62	3.42	0.07	0.01	13.00	0.11	0.98	20.72
max	14.05	189.15	6.30	38.54	217.00	9.52	26.24	127.06
range	15.66	185.73	6.23	38.53	204.00	9.40	25.26	106.34
skew	0.21	1.29	1.03	1.84	1.26	0.61	0.58	0.41
kurtosis	1.24	2.02	0.14	4.75	0.02	-0.66	0.34	-0.76
se	0.31	4.57	0.19	0.89	8.03	0.32	0.62	3.45

Source: Author's Computation from R version 4.0.2

The overall inflation summary is also provided in Table 4.2. The mean GDP growth was 5.49 percent while market capitalization as a percentage of the GDP had a mean value of 46.6 percent. Other measures of the capital markets such as value trade ratio, turnover ratio and number of listed securities had mean values of 1.64, 6.89 and 74.15 respectively. The mean foreign direct investment flows as a percent of GDP and inflation were 3.63 percent and 10 percent respectively.

4.2.1 Correlation

Table 4.3 shows the correlation matrix which shows how the variables used are associated. From the table, GDP growth was found to be weakly but positively correlated with market capitalization. Other measures of the stock market such as turnover ratio, number of listed securities and value traded ratio were found to be negatively correlated with growth. Inflation and trade openness have a negative relationship with GDP growth.

The correlation coefficient was between the turnover ratio and the number of listed securities with a correlation of 0.63 while inflation and the number of listed securities had the lowest correlation with a coefficient of 0.03.

Table 0:3: Correlation Matrix

	GDP.Growth	Mrkt	VALT	Turn.Over	NoLS	FDI	INFL
GDP.Growth							
Mrkt	0.29*						
VALT	-0.12	0.09					
Turnover	-0.15	-0.31*	0.52***				
NoLS	-0.1	-0.38**	0.24	0.63***			
FDI	0.39**	0.27*	-0.39**	-0.56***	-0.49***		
INFL	-0.07	-0.18	-0.37**	-0.12	0.03	0.12	
OPEN	-0.07	0.53***	0.26*	-0.43***	-0.51***	0.31*	-0.40**

Source: Author's Computation from R version 4.0.2

4.3 Pre-Estimation Tests

4.3.1 F Test for Individual Effects

Before the model could be estimated, there was the need to carry out pre-estimation tests so as to determine the best model. First, the study tested for the occurrence of fixed effects. The F test was employed for individual effects. The null hypothesis is that the OLS estimator is better than the fixed model. The results in shown in Table 4.4.

Table 0:4: F Test for Individual Effects

F Statistic	df1	df2	p value
3.6992	4	53	0.0010

Source: Author's Computation from R version 4.0.2

Since the p value is significant, then the null hypothesis that the OLS model is better than the fixed effects model is rejected. This therefore implies that the most efficient model is the fixed effects model.

4.3.2 Hausman Test

Since, the F test for individual effects has revealed that the fixed effects model is the most efficient, we also need to make a decision between the fixed effects model and the random effects model. The test used to make a decision between the two models is the Hausman test (Greene, 2003). The null hypothesis of the Hausman test states that the random effects is the preferred model. The results are shown in Table 4.5.

Table 0:5: Hausman Test

Chisq	df	p-value
16.451	7	0.0213

Source: Author's computation from R version 4.0.2

From Table 4.5, since the p-value is significant, then we have enough evidence to reject the null hypothesis. This implies that the preferred model is the fixed effects.

4.3.3 F Test for Individual Effects (Testing for the Necessity of Time-Fixed Effects)

Having identified that the fixed effects is the most preferred, we need to test whether time fixed effects are really needed in the fixed effects model. A fixed effects model with time-fixed effects is estimated by running the year's categorical variable as one of the regressors. The fixed effects model with time-fixed effects is presented in Appendix-A, while the random and the Pooled OLS are presented in Appendix-B and Appendix-C respectively. The results of whether to include time effects model are presented in Table 4.6.

Table 0:6: Lagrange Multiplier Test- time effects (Breusch-Pagan) for Balanced Panels

F Statistic	df1	p-value
1.3401	1	0.247

Source: Author's computation from R version 4.0.2

The null hypothesis states that there are time-fixed effects needed. Since we cannot reject the null hypothesis from the p-value, we conclude that we estimate the fixed effects model.

4.4 Fixed Effects Model

The fixed effects model is now estimated after the pre-estimation tests have been done.

The results of the model are enumerated in Table 4.7.

Table 0:7: Fixed Effects Model

	<i>Dependent variable:</i>
	GDP.Growth
Mrkt	0.027*** (0.009)
VALT	0.318 (0.282)
Turn.Over	-0.063 (0.060)
NoLS	0.059** (0.029)
FDI	0.387** (0.166)
INFL	-0.134** (0.063)
OPEN	0.009 (0.027)
Observations	65
R ²	0.425
Adjusted R ²	0.306
F Statistic	5.598*** (df = 7; 53)

Note:

* ** *** p<0.01

Source: Author's Computation from R version 4.0.2

From the above results, the model has a coefficient of determination of 0.425 i.e. 42.5 percent of the variation in GDP growth is attributed to the variations in market capitalization, value trade ratio, and turnover ratio, number of listed securities, foreign direct investment, inflation and trade openness.

The study found market capitalization, number of listed securities, foreign direct investment and inflation to be significant variables in influencing GDP growth. Market capitalization is significant at 1 percent level of significance while the rest of the variables are significant at 5 percent level of significance.

It was established that the market capitalization had a positive effect on GDP growth with a coefficient of 0.027. This implies that a unit increase in market capitalization leads to a 0.027 increase in the growth of GDP. The number of listed securities having a coefficient of 0.059 implies that a unit increase in number of listed securities leads to about 0.059 increase in GDP growth.

With regards to control variables in the model, foreign direct investment has a positive effect on GDP growth with a coefficient of 0.387. The interpretation as follows: a unit increase in foreign direct investment leads to a 0.387 units in GDP growth. This clearly indicates that foreign direct investment is indeed a stimulus to growth. Of interest is the effect of inflation on GDP growth. Inflation negatively affects GDP growth. Specifically, a unit increase inflation leads to 0.134 units decline in growth.

4.5 Diagnostic Tests

The study hereby presents some diagnostic tests which show the reliability of the coefficients. The tests presented are the Wooldridge test for serial correlation, the Studentized Breusch-Pagan test for heteroscedasticity and the Shapiro-Wilk test for normality. The results are shown in the three tables below. With regards to serial correlation, the Wooldridge tests finds no evidence of serial correlation since the test has an insignificant p-value hence failing to reject the null hypothesis of no serial correlation.

No heteroscedasticity was detected as depicted by the insignificant values of the p-value from the Studentized Breusch Pagan test. With an insignificant p-value, we fail to reject the null hypothesis of constant variance.

The study adopted the Shapiro-Wilk normality test to determine whether the residuals from the model were normally distributed. Results from the test show that the p-value from the test is significant which implies that the residuals are normally distributed because we fail to reject the null hypothesis of normally distributed residuals.

Table 0:8: Breusch-Godfrey/Wooldridge test for Serial Correlation in Panel Models

Chisq	df	p-value
11.059	13	0.6059

Source: Author's Computation on from R version 4.0.2

Table 0:9: Studentized Breusch-Pagan Test

BP	df	p-value
6.9608	7	0.433

Source: Author's Computation from R version 4.0.2

Table 0:10: Shapiro Wilk Test for Normality

W	p-value
0.98883	0.8266

Source: Author's Computation from R version 4.0.2

4.6 Granger Causality Test

For us to gauge the direction of causation between GDP growth and the measurements of capital markets development, the study used the Panel Granger causality test. A display of the results are as follows. A unidirectional causation running from market capitalization to GDP growth was found. This is confirmed by the p-value of 0.0425 which is significant hence rejecting the null hypothesis.

Table 0:11: Panel Granger (Non-) Casualty Test (Dumitrescu/Hurlin (2012))

Null Hypotheses	Ztilde	p-value
Market Capitalization does not Granger cause GDP growth	0.38145	0.0425
GDP growth does not Granger cause market capitalization	0.2875	0.7029
Number of listed securities does not Granger cause GDP growth	0.38697	0.6988
Value trade ration does not Granger cause GDP growth	0.71371	0.4754
Turnover ratio does not Granger cause GDP growth	0.99227	0.3211

Source: Author's Computation from R version 4.0.2

CHAPTER FIVE

SUMMARY, MAJOR FINDINGS AND POLICY IMPLICATIONS

5.1 Summary

The main intention was meant to investigate the nexus between capital markets and economic growth in SSA frontier economies. Panel data from 2005 to 2017 was analysed. The study used the Hausman test to determine the most reliable model between fixed effects and random effects. The fixed effects was found to be the most reliable. Granger causality test was also carried out to reveal the direction of causation between measures of capital market and economic growth.

5.2 Major Findings

The study found the fixed effects model to be the most reliable. With regards to the effects of the measurement of capital market variables on economic growth, market capitalization and number of listed securities were found to positively influence GDP growth. Value traded ratio and turnover ratio were found not to have a significant effect on economic growth.

With regards to causality, the study used the panel Granger causality test to determine the direction of causation between the measurements of capital market and the growth of the economy. The test revealed granger causality running from market capitalization to economic growth implying that market capitalization is responsible for improved

economic growth in the five SSA countries. This is in tandem with the supply leading hypothesis.

5.3 Policy Implications

After analyzing and interpreting the findings of the study presented in the preceding chapter, the following policy implications can be drawn.

First, since market capitalization and the number of listed securities have been found to positively affect the GDP growth, then SSA governments should strive at formulating policies than favor capital market development. They should oversee the implementation of pro-market policies which incentivize listing of SMEs in their respective securities exchanges. This would directly impact the number of listed securities and ultimately the market capitalization. For instance, the Growth Enterprise Market Segments (GEMS) was rolled out by the NSE in 2013 to provide more avenues for SMEs to raise capital. The SMEs are given special consideration with respect to favorable listing requirements such as less capital requirements, less stringent tax requirements and a lower compliance burden during their listing period as they transition to the main counter. Additionally, different regulators in the region have embraced fintech and innovation by establishing regulatory sandboxes where upcoming innovators and startups can conduct tests in a live but controlled environment under the regulator's ambit and guidance. The ultimate goal is to have the firms listed in the country's securities exchange for instance, in Kenya.

Additionally, the governments in the respective SSA frontier economies should consider formulating policies that ensure the stability of the economy. Consequently, the capital

markets would provide attractive returns and exit prospects for companies exiting from private equity. Generally, the exit route for most firms/companies in the private equity space is either via capital markets (i.e. listing on the security exchange) or through buy outs via private placements. The result would be increased number of listed securities and the market capitalization.

Second, foreign direct investments and inflation have been shown to affect the growth of the economy positively and negatively respectively. There is need for SSA governments to increase their foreign direct investment inflows and control their inflation levels since inflation was found to negatively affect the expansion of the economy.

Generally, the evidence from this study posit that capital market development has to be expedited through a mix of fiscal, regulatory & legal policies to ease the barriers to growth in the capital markets and foreign direct investments; and keeping inflation in check as discussed by Enisan and Olufisayo (2009). The right mix has to be achieved so as to encourage savings and investments leading to a higher demand for capital markets products and ultimately leading to increased economic growth.

5.4 Limitations of the Study and Areas for Further Research

The salient limitation of study was the small sample size of the data used to carry out the analysis. A large sample size could give better results because of the asymptotic property of the estimates.

The study suggests that other studies in the area should focus on using other methods of analysis such as the Pooled Mean Group Model since this model allows for the error

variance and the short run coefficients to vary across groups and restricts the long run coefficients to be similar across the groups since there is no basis to expect the coefficients of the models to be similar across groups as presented by the GMM, the RE and FE models (Pesaran *et al.*, 1999)

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APPENDICES

Appendix-A: Fixed Effects Model with Time-Fixed Effects

	<i>Dependent variable:</i>
	GDP.Growth
Mrkt	0.011 (0.011)
VALT	0.205 (0.318)
Turn.Over	-0.057 (0.063)
NoLS	0.066** (0.029)
FDI	0.401** (0.198)
INFL	-0.219*** (0.075)
OPEN	-0.027 (0.032)
factor(Year)2006	-0.466 (1.216)
factor(Year)2007	-2.038 (1.416)
factor(Year)2008	-0.663 (1.330)
factor(Year)2009	-1.804 (1.302)

factor(Year)2010	-0.480 (1.357)
factor(Year)2011	-0.795 (1.330)
factor(Year)2012	-2.257 (1.399)
factor(Year)2013	-2.001 (1.341)
factor(Year)2014	-3.003** (1.352)
factor(Year)2015	-3.949*** (1.357)
factor(Year)2016	-3.156** (1.369)
factor(Year)2017	-2.630* (1.377)

Observations	65
R ²	0.599
Adjusted R ²	0.374
F Statistic	3.224*** (df = 19; 41)

Note:

* ** *** p<0.01

Source: Author's Computation from R version 4.0.2

Appendix-B: Pooled OLS Model

	<i>Dependent variable:</i>
	GDP.Growth
Mrkt	0.027***

	(0.009)
VALT	0.341 (0.267)
Turn.Over	-0.065 (0.064)
NoLS	0.001 (0.006)
FDI	0.503*** (0.131)
INFL	-0.134** (0.063)
OPEN	-0.060*** (0.016)
Constant	7.620*** (1.684)
<hr/>	
Observations	65
R ²	0.374
Adjusted R ²	0.297
F Statistic	4.868*** (df = 7; 57)

Note: * p < 0.1, ** p < 0.05, *** p < 0.01

Source: Author's Computation from R version 4.0.2

Appendix-C: Random Effects Model

	<i>Dependent variable:</i>
	GDP.Growth
Mrkt	0.027*** (0.009)
VALT	0.341 (0.267)
Turn.Over	-0.065 (0.064)
NoLS	0.001 (0.006)
FDI	0.503*** (0.131)
INFL	-0.134** (0.063)
OPEN	-0.060*** (0.016)
Constant	7.620*** (1.684)
Observations	65
R ²	0.374
Adjusted R ²	0.297
F Statistic	34.074***

Note:

* ** *** p<0.01

Source: Author's Computation from R version 4.0.2