FINANCIAL DEVELOPMENT AND ECONOMIC GROWTH NEXUS: A STUDY OF THE ROLE OF STOCK MARKETS AND BANKING INDUSTRY IN SELECTED AFRICAN COUNTRIES

By

SOLARIN SAKIRU ADEBOLA

Thesis Submitted to the
Othman Yeop Abdullah Graduate School of Business,
Universiti Utara Malaysia,
in Fulfillment of the Requirement for the Degree of Doctor of Philosophy

PERMISSION TO USE

In presenting this thesis in fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library make it freely available for inspection. I further agree that copying this thesis in any manner, in whole or in part for scholarly purpose may be granted by my supervisor or, in his absence by the Dean of Othman Yeop Abdullah Graduate School of Business. It is also understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part shall be addressed to:

Dean of Othman Yeop Abdullah Graduate School of Business
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman Malaysia

ABSTRACT

In this study, we investigate the impact of financial development on economic growth in 11 selected African countries over the period 1990 through 2009, with special emphasis on the contribution of stock market development. Besides, the study examines the relative importance of stock market and banking sector on economic growth; and the existence of supply leading hypothesis in the selected countries. In achieving these objectives, the study includes numerous control variables such as initial income, population growth rate, human capital, government expenditure, money supply, foreign direct investment, interest rates and inflation rate. The methodology is basically divided into two with GMM system approach and panel cointegration techniques utilized on panel data, while ARDL is employed in the time series analysis. The sample includes South Africa, Egypt, Nigeria, Morocco, Kenya, Botswana, Cote D'Ivoire, Tunisia, Ghana, Mauritius and Swaziland. The panel and time series results indicate that stock market, in terms of liquidity, is positively associated with economic growth (except in Morocco, Tunisia, Nigeria and Cote D'Ivoire). The findings further suggest that stock markets perform better than banking sector in most of the countries (with the exception of Botswana, Ghana and Nigeria). There is also evidence for supply leading hypothesis (with the exception of Cote D'Ivoire, Tunisia, Swaziland and Ghana). Generally, the implication is that financial development should be given priority with special emphasis on liquidity of stock markets in Africa. The study has numerous contributions. For instance, to our knowledge, this is first study to simultaneously consider the impact of stock markets and banks on economic growth in African countries.

Keywords: stock markets, banks, Africa, GMM, ARDL

ABSTRAK

Kajian ini menyiasat kesan pembangunan kewangan ke atas pertumbuhan ekonomi di 11 negara terpilih di Afrika dalam tempoh 1990 hingga 2009, dengan penekanan khas di atas sumbangan pembangunan pasaran saham. Di samping itu, kajian ini menguji kepentingan pasaran saham dan sektor kewangan ke atas pertumbuhan ekonomi; dan kewujudan hipotesis bekalan utama di negara-negara yang dipilih. Dalam mencapai objektif, kajian ini memasukkan pelbagai pemboleh ubah kawalan seperti pendapatan awal, kadar pertumbuhan penduduk, modal insan, perbelanjaan kerajaan, bekalan wang, pelaburan langsung asing, kadar faedah, dan kadar inflasi. Kaedah dalam kajian pada dasarnya dibahagikan kepada dua method iaitu pendekatan sistem GMM, dan panel kointegrasi yang digunakan ke atas data panel, manakala ARDL menggunakan analisis siri masa. Sampel kajian adalah Afrika Selatan, Mesir, Nigeria, Morocco, Kenya, Botswana, Cote D'Ivoire, Tunisia, Ghana, Mauritius dan Swaziland. Keputusan panel dan siri masa menunjukkan bahawa pasaran saham, dari segi mudah tunai, adalah positif dikaitkan dengan pertumbuhan ekonomi (kecuali di Marocco, Tunisia, Nigeria, dan Cote D'Ivoire). Selanjutnya, penemuan kajian menemukan bahawa pasaran saham memiliki prestasi yang lebih baik daripada sektor kewangan di kebanyakan negara (kecuali Botswana, Ghana, dan Nigeria). Terdapat juga bukti untuk hipotesis bekalan utama (kecuali Cote D'Ivoire, Tunisia, Swaziland, dan Ghana). Secara amnya, implikasi daripada kajian ini adalah bahawa pembangunan kewangan perlu diberi keutamaan dengan penekanan khas kepada kecairan pasaran saham di Afrika. Kajian ini mempunyai sumbangan yang banyak, sebagai contoh, untuk diketahui bahawa ini merupakan kajian pertama yang mengambil kira kesan pasaran saham dan kewangan ke atas pertumbuhan ekonomi di negara-negara Afrika.

Katakunci: pasaran saham, banks, Afrika, GMM, ARDL

ACKNOWLEDGEMENT

All praises are due to Allah, the Lord and sustainer of the universe, without whom we are nothing. I salute the academic sagacity of my supervisor- Dr Dahalan Jauhari. I was very lucky to have worked under his supervision. Besides, I am sincerely grateful to all my lecturers- in particular Prof. Zaini Abd Karim, Dr. Nur Azam Abd Rasak and Dr. Mohd Dan Jatan- who provided support in numerous ways towards the successful completion of this study.

Beyond the department and even Malaysia, this work has benefitted from the insightful comments of Prof. Ron Smith (of the Department of Economics, Birkbeck College, London); Dr. Bahram Pesaran (the co-author of Microfit 4.1); Prof. Alfonso Novales, (the co-author of Economic Growth: Theory and Numerical Solution Methods) and Prof. Dimitrios Asteriou (the co-author of Applied Econometrics: A Modern Approach).

I appreciate the relentless support of my siblings and pray that God reward them in manifold. In particular, I seek for Allah mercies on my deceased father- Haji S.A Solarin, who died, while I was preparing to start the programme. Finally, I thank my lovely friends who had contributed to my happy stay in the University. God bless you all.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARCH	AutoRegressive Conditional Heteroskedasticity
ARDL	Auto-Regressive Distributed Lag
BSE	Botswana Stock Exchange
BVRM	West Africa Stock Market
CSE	Casablanca Stock Exchange
DF-GLS	Elliott-Rothenberg-Stock Unit Root Test
ECM	Error Correction Model
ECT	Error Correction Term
EGX	Egyptian Exchange
GDP	Gross Domestic Product
GMM	Generalised Method of Moments
GNP	Gross National Product
GSE	Ghana Stock Exchange
HP	Hodrick-Prescott
JSE	Johannesburg Stock Exchange
OLS	Ordinary Least Squares
LM	Lagrange Multiplier
MENA	Middle East and North Africa
PP	Philip-Perron Unit Root Test
OECD	Organisation for Economic Co-operation and Development
SAFEX	South African Futures Exchange
SBC	Schwartz Bayesian Criterion
SEM	Stock Exchange of Mauritius
SMEs	Small and Medium Scale Enterprises
SSX	Swaziland Stock Exchange
TSE	Tunis Stock Exchange
TSLS	Two Stage Least Square
VAR	Vector Autoregression
VECM	Vector Error Correction Model
WDI	World Development Indicator

CHAPTER 1

INTRODUCTION

1.1 Background to the Study

In most economic structure, the importance of stock market cannot be deemphasised as it intermediates equities, as against the banking sector, which provides debt for long-term projects. Stock markets have long played an important role in economic life (Nieuwerburgh, Buelens, and Cuyvers, 2006). In some quarters, stock market development variables are often cited as primary indicators of countries' economic performance. In others, stock market index serves as measurement to changes in the general economic activities, provided the economy has an active stock market (Emenuga, 1997; Adjasi and Biekpe, 2006). Beyond the confines of an economy, regional stock market index serve as indicator of the economic activities of the region (Ratanapakorn and Sharma, 2002). Similarly, many believe that large decreases in stock prices are reflective of future recession, whereas large increase in stock prices may reflect the expectation towards future economic growth (Mun, Siong, and Thing, 2008). Therefore, the stock market is essential for economic growth (Adebiyi, 2005; Levine and Zervos, 1996; Beck and Levine 2004; Arestis, Demetriades, and Luintel, 2001). These are perceptions of the market based proponents that support the existence of stock markets ahead of other components of financial system.

However, there are theories and empirical works that oppose the development of stock markets. One view is that of bank-based proponents that support financial systems, which are mainly banking constituted. The other view is demand following hypothesis[1]. Their arguments are based on several reasons. For instance, Stiglizt (1985) contends that stock markets create a free rider problem, which decreases investors' incentive to conduct costly search. In addition, stock markets decreases savings rate via income and substitution effect; increases the uncertainty associated with investment; increases investors' myopia (Mohtadi and Sumit, 2004) and the liberalisation of stock markets increase income inequality in emerging markets (Das and Mohapatra, 2003). In fact, internationally integrated stock markets can actually reduce saving rates and slow economic growth; and stock market development can hurt economic growth by easing counterproductive corporate takeovers (Azarmi, Lazar and Jeyapaul, 2005). On his part, Singh (1997) argues that one-off programmes such as privatization and government short-lived support influence stock market development. Resulting from these arguments, stock markets are viewed as less attractive.

[1] Demand following hypothesis stipulates that real sector development precedes and induces financial sector development (see Robinson, 1952, Patrick 1966). Hence, demand following hypothesis projects that prompt development of financial system should be dissuaded as economic growth will naturally breed improvement in the financial system. The conversing hypothesis is supply leading hypothesis, which implies that financial system precedes and induces the real sector development. Premised on this proposition, proponents argue that financial development must be prioritised and policy-makers should focus attention on the creation and promotion of modern financial institutions including banks, non-banks, and stock markets in order to promote genuine and enduring economic growth (Darrat, 1999).

In general, some economists known as the neo-structuralists regard stock markets as mere casinos and avenues where many speculative activities and movements of speculative capital thrive, especially during stock trading. Accordingly, stock prices move up and down and in many cases, they have no connection with real economic activities. In other words, stock market boom and slump does not guide long-term investment decision. Therefore, prices become signals with large standard deviations, which make it very difficult to assert whether price changes were temporary or permanent, and markets become more uncertain and prone to attract mostly "gamblers" (Garcia and Liu, 1999). Moreover, activities of this nature are like gambling, which are harmful to the economy. According to Keynes (1936), casinos should, in the public interest, inaccessible and expensive. In support, Robinson (1952) conclusively state that the source of long-term real growth does not lie in the activities of the financial system. Instead, it is the reverse. These positions led to dwindling interest in the subject matter for the first half of the last century.

However, the pioneering and scholastic works of Gurley and Shaw (1955) reignite the interest of economists to focus on the functional relationship between financial markets and economic development. Nevertheless, Gurley and Shaw (1955) are too broad in their approach as they concentrate on the financial system as a whole without considering the peculiar impact of the stock market. They conclude that

financial markets contribute to economic development through enhanced physical capital accumulation.

Subsequently, Goldsmith (1969) starts the empirical study of the relationship between financial markets and economic activities. The study provides evidence for a functional role of financial system in stimulating real long run economic growth. Within the same framework, Shaw (1973) and McKinnon (1973) arrive at the same conclusion. However, with the subsequent triumph of the neo-structuralist in the 1980s, there was another but slighter dwindling of interest especially the empirical study. This trend continued until the seminal works of the World Bank Economists (Bencivenga, Smith, and Starr, 1996; Korajczyk, 1996; Levine and Zervos, 1996; among others), which was partly facilitated by earlier works of Atje and Jovanovic (1993) and the introduction of endogenous growth model in the earliest part of that decade.

These seminal works actually generated subsequent interest in studying the roles of stock markets in the economy. Hence, subsequent studies on developed countries include Filer, Hanousek, and Nauro, (1999), Prabijit (2007), Claessens, Klingebiel, and Schmukler (2006), Levine and Zervos (1998), Arestis et al. (2001) and Rousseau and Watchel (2000). With the exception of Filer et al. (1999) and Parabijit (2007), these studies conclude that stock market has positive impact on economic growth. More studies include Caporale, Howells, and Soliman, (2004,

2005), Garcia and Liu (1999) and Mohtadi and Sumit (2004) for emerging economies study, Durham (2000) for developing countries study, Yartey and Adjasi (2007) for African countries study, and Beck and Levine (2004). All these studies conclude with different findings and some rejected the supply-leading hypothesis.

Stock markets in Africa are relatively new in origin, finite in operation and depth and faced with low price earnings multiplier in addition to improper regulatory framework. As a result, research efforts to unravel the stock market-economic growth nexus are not burgeoning. For example, Yartey (2008), Adebiyi (2005) and Osinubi (2004) note a dearth of research in this area. Ologunde, Elumilade and Asaolu (2006), Udegbunam (2002) and Ayadi, Adegbite and Ayadi (2008) moderately deal with the subject matter.

Despite the lack of interest in this area of research, stock market may play pivot role in the economic development of any nation, including African countries. To the business community, stock markets offer incentives for investors to acquire information about firms, improve corporate control, and affect the efficiency of physical control (Dermiguc-Kunt and Levine, 1996a). Stock markets have a strong positive supportive effect for the formation of entrepreneurial and small to midsize enterprises (SMEs) (Azarmi et al., 2005). The stock market is also important factor in business investment decisions, because the price of shares affects the amount of funds raisable by selling newly issued stock to finance investment spending (Mishkin,

2007). In terms of its transmission mechanism, the channels through which stock markets influence economic development are (a) the savings rate, (b) the volume of investment and (c) the quality of investment (Singh, 1997) and (d) provides a means for the exercise of monetary policy through the issue and repurchase of government securities in a liquid market (Caporale, et al., 2004). The globalization of financial market means gains for the private capital, which can now flow around the world in search of the highest returns (Kwanashie, 1999).

In its operation, equity finance is not subject to adverse selection; as it provides an important channel to access international capital; and it promotes risky, entrepreneurial investments through their risk-sharing and monitoring functions (Bolbol, Fatheldin, and Mohammed, 2005). Stock market is a good mechanism for risk diversification (Obstfeld, 1994). As a complement to other financial institutions, stock markets provide major opportunities for insurance companies and pension funds to become involved through portfolio investment (investment in shares) in productive economic areas (Ilmolelian, 2005). Lastly, stock markets create investment outlets for both domestic and foreign investments (Akinlo and Akinlo, 2009).

With these numerous positive roles of stock markets development in perspective, coupled with the fact that inadequate financial systems is partly responsible for African economic stagnation (Haber, 2008), various governments in

Africa have taken several measures to improve their economies, which have remained the least developed. The economic problem is reflected in statistics provided by various international agencies. For example, in 1990 and 2000, the average economic growth rates were low at 1.56 and 3.42 percent in Africa. For the same periods, the average for developing countries were relatively high at 3.65 percent and 5.63 percent, while the growth rates in Asia were even higher 5.41 percent, and 6.65 percent respectively (IMF, 2000). More recently, while the average gross national income (GNI) of sub-Saharan Africa countries grew from 481.635 dollars in 2001 to 772.706 dollars in 2005, and then to 1149.683 in 2009, it was 3758.724 dollars in 2001, 4510.763 dollars in 2005 and 7134.201 dollars in 2009 for Latin America and Caribbean countries (World Bank, 2010).

The steps taken by Africa countries in using stock market to improve economic development are numerous. These include automation, regional integration, de-indigenisation and relaxation of foreign capital flow barriers in various stock exchanges. For instance, in Morocco, there was the launching of an electronic-based trading system in March 1997, which was followed by the reduction of trade settlement period from T+5 to T+3 in May 2001 and locally developed clearing and settlement system in 2002[2]. Botswana in the year 2008 started automated clearing and settlement system and currently the market is on T+4. In 2007, South Africa initiated

[2] This refers to the number of days required for settlement after each transaction on the stock exchange.

a sophisticated electronic trading for its equities and in 2009 introduced it for derivatives trading (ASEA, 2008, 2009).

1.2 Problem Statement

Though relatively small in size, the African stock markets are generally improving, as evident from all indicators. For example, the stock market capitalisation in Nigeria grew from a meagre 1.37 billion dollars in 1990 to 32.8 billion dollars in 2006 and peaking at 86.3 billion dollars in 2007 before dropping to 33.8 billion dollars in 2009. In Egypt, the stock market capitalisation ratio reached its peak in 2009 at 114 percent of the gross domestic product (GDP) from 5.0 percent of the GDP in 1990. In Morocco, the turnover ratio was 6.7 percent and 13.3 percent in the year 2003 and 2009, respectively (World Bank, 2010; ASEA, 2009).

In terms of world ranking performance, African stock markets have been outstanding. West African Regional Stock Exchange (BRVM), established in 1998, is the first regional stock market in the world and caters for eight francophone countries[3]. Moreover, since 1995 there has been at least one African stock market in the top 10 best-performing markets in the world every year. In the year 2004, six African countries including Kenya, Egypt, Mauritius and Nigeria were among the world's 10 best-performing stock markets, while in the year 2005; Egypt was ranked

[3] These countries are Benin, Burkina Faso, Ivory Coast, Guinea Bissau, Mali, Niger, Senegal and Togo. It is of importance to note that they share the same central bank as well.

among the top five. Ghana and Malawi outperformed every other market in the world in 2004 and 2006, respectively. However, African stock markets are also on the losing side. In particular, the Nigeria stock exchange was the world's worst performing market having fell by 46 percent in 2008 (Massa, 2009).

From the above statistics, it is pertinent to state that the importance of stock markets in Africa is becoming more noticeable. However, literatures on the stock markets development are limited (Naceur and Ghazouani, 2007). This is more apparent when considering literatures on Africa. This becomes most obvious, when the focus is restricted to the relationship between stock market development and economic growth in Africa. Instead, the focus has been on the relationship between stock market and macroeconomic indicators such as foreign direct investment, inflation, interest rate, and productivity: financial intermediaries: and then the market efficiency. Other works have concentrated on individual countries in Africa (see Smith 2008; Jefferis and Smith 2005; Yartey, 2007; Adam and Tweneboah, 2008a, b; Emenuga, 1997; Adebiyi, 2005; Ologunde et al., 2006; Udegbunam, 2002; and Ayadi et al., 2008; Osinubi, 2004).

For the few studies on the relationship between stock market and economic growth in Africa, there are still statistical and conceptual issues unresolved. For example, Sumit (2001) conducts preliminary study on the relationship between stock market development and economic growth. With mere descriptive analysis of nine

countries for a period of six years, Sumit (2001) in the same paper accepts the deficiencies inherent in the work and calls for more detailed studies to unravel the nexus. Subsequently, Adjasi and Biekpe (2006) conduct a more detailed study. However, the work suffers not only from conceptual but also statistical problems[4]. For example, the method adopted- Arrelano and Bond (1991) difference variant of Generalised Method of Moments (GMM) has been shown to be biased in small sample size framework (see Blundell and Bond 1998a, 1998b; Arrelano and Bover, 1995). This is incongruous with the small sample of Adjasi and Biekpe (2006) work. The study coverage period ended in 2001. However, Rousseau and Wachtel (2005) have warned against too much reliance on old dataset. Besides, Azarmi et al. (2005) have shown that old dataset gives bogus positive relationship.

Moreover, an indicator of banking sector was conspicuously missing from the regressors. As Khan (2000), Koubi (2008) Bolbol et al. (2005) and Caporale et al. (2004, 2005) have shown, financial development does not only imply either stock market development or banking sector development but the two institutions. Although they may perform different roles in the process of economic development, their uniqueness is hardly emphasised within the framework of economic growth (Caporale et al., 2005). Constraint with small sample size, previous studies in Africa have ignored the problem of business cycle. Ironically, Fatas (2001) provide evidence that the effect of business cycles on growth is much larger for poor countries or

[4] The sample size is so small that Zambia had just six-year observations therein.

countries with lower degree of financial development. To our knowledge there has been no study on this nexus on Africa that has control for convergence hypothesis.

1.3 Research Questions

Against the backdrop of the preceding sections, the research questions of the study include:

(1) Does stock market promote economic growth in the selected African countries as a panel and at individual country level? However, answering this research question may not lead to the acceptability or the rejection of stock market development, since stock market is not the only financial institution. Therefore, the study proceeds with a second research question.

(2) Does stock market perform better than banking sector in the selected African countries as a panel and at individual country level? Despite being a complement to the first research question, this second research question deals with the relative performance of financial system components, but not the viability of the whole financial system. Hence, the study embarks on another research question, which considers the viability of the whole financial system.

(3) Does supply leading hypothesis exist in the selected African countries as a panel and at individual country level?

1.4 Objectives of the Study

Premised on the enumerated research questions, the objectives of the study include:

(1) To determine the impact of stock market on economic growth in the selected African countries as a panel and at individual country level.

(2) To determine whether the market-based system is more suitable than bank-based system in the selected Africa countries as a panel and at individual country level.

(3) To determine whether supply leading hypothesis exist in the selected African countries as a panel and individually.

(4) To determine the existence of income convergence hypothesis in the selected countries.

(5) To provide for business cycle in the estimation of the panel data.

1.5 Research Hypothesis

In line with the stated objectives, we intend to test the following hypotheses:

(1) Stock market has a positive impact on the economic growth of the selected countries as a panel and at individual country level.

(2) Market based system performs better than bank based system in the selected countries as a panel and at individual country level.

(3) Supply leading hypothesis exists and predominates (demand following hypothesis) in the selected countries as a panel and at individual country level.

(4) Convergence of income hypothesis exists among the selected countries.

1.6 Significance of the study

Stock markets are relatively recent in origin, small by world standards and faced with low price earnings multiplier as well as inadequate regulatory framework (Akinlo and Akinlo, 2009). Despite the size and illiquid nature of the stock markets, their continued existence and development could have important implications for economic activity (Caporale et al., 2005). Hence, this paper contributes to empirical literature on stock markets in Africa by investigating the link between some African stock markets and economic growth. By extension, future work can build upon this to consider other non-banking financial institutions. In addition, various stock markets in Africa can be tested to check the relationship between stock market and economic growth.

In the modern economy, banks and stock markets constitute a major part of the financial system (Caporale et al., 2005). The research may guide the authorities of these respective countries on how to allocate fund or stabilization policy between banks, stock markets and other financial institutions. The coefficients of the estimates are relevant in this regard. The allocation of resources could be distributed, according to these coefficients. Furthermore, it could become a barometer for measuring the health or contribution of these respective subsectors toward economic growth. In some quarters, the aggregate of the coefficients can serve as the overall measure of the health of the financial system in the country. The result may also inform policy

decisions involving the adoption or otherwise of specific types of financial system in the selected countries and Africa at large. Invariably, our research contributes to the literatures on the long-standing issues of bank-based versus market-based financial systems.

Beyond the debate of market based and bank based system is the argument of the viability of the financial system as a whole-supply leading hypothesis. Thus the relative performance of market based over bank based system or otherwise becomes irrelevant, once the evidence for supply leading hypothesis is not supported. As this study intends to investigate the supply leading hypothesis, this may inform some policy decisions. In the event of accepting demand following hypothesis, then, policy efforts to boost financial development would be hasty and in fact counterproductive. However, with the acceptance of supply leading hypothesis, policy-makers should devote attention on the establishment and support of modern financial institutions, which includes stock markets, banks and non-banks. Besides, special attention can then be given based on the relative performance of stock market and banking sector.

For both foreign and local investors, these results might also serve as a yardstick of evaluating the performance of stock markets, apart from the expected return from their investments. Statistics justifies the importance of these investors especially the foreign investors. In Kenya, foreign investors accounted for 55.77 percent of the total value of shares traded in 2009 as against 40.14 percent, a year

earlier. In South Africa, for the year 2009, foreign investors transacted about 17.4 percent of the total value of shares traded. In the year 2009, local investors' participation amounted to 75.96, 81 and 88 percent in Mauritius, Egypt and Tunisia, respectively (ASEA, 2009).

Hence, a healthy stock market- derived from this work- may serve as a prelude or guide to potential investors and reassurance to existing investors in the stock market and vice versa. On the other hand, a healthy banking sector- derived from this work- may serve as a prelude or guide to potential investors and reassurance to existing investors in the banking sector and vice versa. As we will also conduct time series analysis of each country, this may serve as a guide for investors to choose the best stock markets in our sample.

The application of Arrelano and Bover (1995) and Blundell and Bond (1998a) system GMM, is an innovation because of its suitability to small sample size, in addition to its validity in presence of weaker assumption of heteroscedasticity and serial correlation. Hence, this will help to obviate the problem associated with the estimation of short time series data, which is a characteristic of stock market data especially in Africa. This is unprecedented in the study of stock market development in Africa. Related statistical contributions are providing for business cycle and the use of latest dataset.

1.7 Scope of the Study

This study tries to examine the relationship between stock market development and economic growth, and providing for other control variables according to the classic work of Mankiw, Romer and Weil (1992) for the period covering 1990 and 2009, data permitting. The countries of focus include South Africa, Egypt, Morocco, Nigeria, Botswana, Mauritius, Tunisia, Kenya and Cote D'Ivoire[5]. This selection of the sample is due to the size of each market and data availability. For instance, Mahony (2007) shows that in 2007, more than 89 percent of the total market capitalization in Africa (without South Africa) was accounted for, by Egypt (36 percent), Morocco (28 percent) and Nigeria (25 percent). The author further argues that these countries in terms of capital market reform (and South Africa) must take leading roles. The remaining countries are added because of data availability, following the works of Caporale et al. (2005), Arestis et al. (2001), and Atje and Jovanovic (1993) who choose their samples based on the availability of consistent data.

1.8 Methodology of the Study

Our methodology will consist of both descriptive and econometric analyses. The descriptive analysis is to stimulate the econometrics approach. The econometrics approach will comprise time series of each selected country in Africa and panel approach. This is in consonance with the works of Muslumov and Gursory (2000)

[5] This actually includes seven other countries as noted eelier.

and Parabijit (2007). Moreover, Arestis et al. (2001) and Beck and Levine (2004) have argued for either of the approaches.

The dynamic panel data is based on Arrelano and Bover (1995) and Blundell and Bond (1998a) system GMM because primarily it has a better performance in small sample size, in addition to its validity under weaker assumption of heteroscedasticity and serial correlation. We check the robustness of this method with Sargan over- identifying restriction test, among others. This approach is supported with recently panel unit roots and cointegration techniques as proposed by Pedroni (1999, 2004), Kao (1999) and Maddala and Wu (1999), among others.

The study adopts GMM procedures because it is suitable for detecting dynamic change; can better detect and measure effects that cannot be observed in pure cross-section or pure time-series data; enables us to study more complicated behavioural models; and it can minimize the bias that might result, if we aggregate individuals into broad aggregates (Gujarati, 2003:637-638). Moreover, panel cointegration techniques on the one hand afford us the opportunity of detect simultaneous short run and long run relationship between the variables at a panel level. On the other hand, it provides the framework for assess panel causal relationships.

For the time series analysis, we adopt a cointegration test known as the auto-regressive distributed lag (ARDL) approach as proposed by Pesaran and Shin (1999),

and Pesaran, Shin and Smith (2001). The main advantage of the ARDL bounds-testing approach is that it permits testing for the existence of a cointegrating relationship between variables, irrespective of whether the underlying regressors are I(0) or I(1).

1.9 Outline of the Study

The study consists of five chapters: an introductory chapter, literature review and theoretical framework, empirical chapter, and a concluding chapter. Chapter one focuses on the introduction of the study. Chapter two presents the theoretical framework and empirical literature review of the study. Chapter three contains the explanation of data and methodology of the study. In Chapter four, the results and findings from the methodology are reported and lastly Chapter five concludes the study with summary, policy recommendations and limitations of the study.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Background of Theoretical Underpinnings

From the beginning of the last century to the 1950s, economists such as Keynes argued for financial repression and do not consider the special role of the financial system in the process of economic growth. This, in part resulted into dearth of interest on financial development at that particular time. However, with the emphasis that developed countries attain their status with the aid of vibrant financial system, Gurley and Shaw (1955) reignite the study of the relationship between financial markets and real activities. According to Gurley and Shaw (1955), well-developed financial markets could strengthen a borrower's course for investible fund. Hence, financial intermediaries would not only allocate capital for viable projects but also improve the efficiency of trade. Consequently, Goldsmith (1969) pioneers the empirical study of the relationship between financial markets and economic activities. The empirical study includes developing countries such as Ethiopia in the sample. Subsequent works of Shaw (1973) and McKinnon (1973) rely heavily on the traditional growth theory. However, recent studies on finance-growth nexus shift to the endogenous growth model (see Levine and Zervos 1996, 1998; Caporale, et al., 2004; Demetriades and Hussein, 1996; Arestis and Demetriades, 1997; Arestis et al., 2001).

In the following section, we review the salient points of the two theories before proceeding to the derivation of the model.

2.1.2 Neoclassical Theory of Growth

Theoretical and empirical evidences have shown determinants of economic growth to be multifarious. Each succeeding work has tried to either retain the variables adopted by previous works or add new determinants in its growth equation. For example, in the spirit of a neoclassical framework, Solow (1956) in his traditional growth model makes some fundamental assumptions, before asserting that income (output) is related to capital, labour and more interestingly, technical change. In the traditional growth theory, Solow (1956) assumes marginal productivity of capital and marginal productivity of labour are individually decreasing return to scale. When combined, they exhibit a constant return to scale. Besides, technology is time varying and its impact is not felt directly but through its impact on labour. Moreover, money and capital are perfect substitutes in the portfolio of private wealth. Armed with these assumptions, Solow (1956) argues that the rate of capital accumulation determines growth only in the short run as the economy converges to the new steady state output (income) level. Sequentially, capital accumulation is itself determined by the savings rate and the rate of capital depreciation (Solow, 1956).

According to the traditional growth model, technology exogenously determines the growth rate in the long run. However, technology is implicit and

transmitted through labour, popularly called labour efficiency. Therefore, in the model, new capital produced is only enough to make up for depreciation on the amount of existing capital, provided there is no technological progress or effective labour force growth (Solow, 1956).

The model can be criticized on many grounds. One, it neglects institutional characteristics of individual countries. Its assumption of symmetric situation in all sectors of the economy including the productive and financial sectors is unrealistic. Hence, this does not allow the crucial growth-generating reallocation of labour and capital among the sectors that transformed during the process of structural change. Economic growth in developing countries is predominantly riddled with lack of perfect capital and good markets and inefficiencies resulting from poor infrastructural facilities (Todaro and Smith, 2003:184). Because exogenous growth model overlooks these influential factors, its applicability is limited, especially in a cross-sectional analysis. With the Cobb-Douglas specification of the traditional growth model, the share of physical capital is underestimated and while that of the share of the labour is overestimated, due to the absence of human capital share (Valdes, 1999:54). Another pitfall of the model is that technology -which is the most important variable- along with savings and population are treated as exogenous variables in the model. Romer (1986) and Mankiw et al. (1992) further notes that the traditional growth model does not correctly predict magnitudes of other variables nor address neither welfare implication. Empirically, Barro (1991) put the convergence hypothesis into empirical

testing and find that per capita growth rates have little correlation with the starting level of per capita product. With these limitations in the traditional growth theory, the study proceeds with the endogenous growth theory or new growth theory in the next section.

2.1.3 New Growth Theory

Mankiw et al. (1992) and Romer (1986, 1990) attempt to correct some of the problems associated with the Solow growth model. The studies provide a new theoretical framework for analyzing endogenous growth persistent with gross national product (GNP) growth that is determined by the system governing production processes by forces outside that system (Todaro and Smith, 2003:181). Their assumptions include constant return or increasing returns to scale of inputs to output; perfect competition and that capital positively affect output. The implications are that of a model with both increasing marginal productivity of knowledge and decreasing marginal productivity of physical capital (Romer, 1986). Knowledge has two features of - unbounded growth and incomplete appropriability (Romer, 1990). Accordingly, capital stock has a knowledge component, which is spilled from certain firms to other firms across the economy. In other words, the model views ‘’learning by doing as learning by investing’’.

Besides, the theory gives priority to foreign private investment in technical intensive industries and suggests an active role for public policy. According to the

theory, free international trade can act to speed up growth and high rate of return is greatly consumed by lower levels of complementary investments in human capital (education) and infrastructure. Therefore, to augment the traditional growth model, Mankiw et al. (1992), and Romer (1990) add human capital (such as health, education, and freedom) as an additional variable in the determination of economic growth.

Furthermore, the authors postulate that an economy with a larger total stock of human capital will experience faster growth. The model also suggests that low levels of human capital may help explain why growth is not observed in underdeveloped economies that are closed and why a less developed economy with a very large population can still benefit from economic integration with the rest of the world (Romer, 1990). Besides, new growth theory projects that the permanent changes in variables that are potentially affected by government policy lead to permanent changes in growth rates.

The model is not without its own limitations. It neglects the peculiar institutional characteristics of every economy. Cyclical fluctuation, which is a regular phenomenon in the developing countries, is not incorporated into the model. The model presented is essentially a one-sector neoclassical model with technological change, which is practically non-existent**.** In the model, the impact of allocation

inefficiency is neglected due to theory's overemphasis on the determinants of long-term growth rates (Todaro and Smith, 2003:184).

Despite these criticisms, the model has been extended to different areas of economics and popularly utilise by economists in unravelling various economic relationships. For example, Martin and Sunley (1998) argue that endogenous growth theory does have important regional implications when applied to a regional context. In particular, the extensions include: uncertainty (Hek, 1999); bureaucratic corruption (Ehrlich and Lui, 1999); permanent changes policy variables (Jones, 1995); fiscal policy (Saint-Paul, 1992) and research and development (Segerstrom, 1998). Hence, in this study, we simply augment the model by segregating the roles played by physical capital from the supply side into stock market and banking sector development; and also provide for control variables which are assumed to endogenously proxy technology.

2.1.4 Theories on Stock Market and Economic Growth

Within the framework of endogenous growth model as enumerated in the preceding section, there are theoretical evidences for the functional activities of financial intermediaries. Nevertheless, only recently have economists started focussing on the role of financial intermediaries in the process of economic development (Capasso, 2006). Comparatively, literature on the theories that explore the finance and growth nexus is still substantially less than that of its empirical

counterpart. Hence, in this section we review the progress of the literatures on this area. As it will be evident in the following discussion, there are theories that support existence of stock market, while some theories call for a delayed establishment and others persuade against its establishment.

Generally, there are different versions of endogenous growth models. For studies on financial sector, many authors have provided theoretical evidence for the establishment of stock market within the endogenous growth model of Diamond and Dybvig (1983), which focus on overlapping-generations model with production and capital accumulation. Within Diamond nd Dybvig (1983) framework, Levine (1991) shows that by reducing liquidation costs, increasing the average productivity of capital and the rate of savings, capital accumulation and economic growth are spurred by stock markets. Equity markets facilitate the transfer of ownership of investment as many times as possible before their maturity without actually harming the flow of physical production. According to Levine (1991), this does not only attract more resources into long-term investments from short-term investors but also reduces the loss of resources, which would have occurred, with disruption of physical production. Levine (1991) terms the first situation as liquidity shock, while the second is regarded as productivity shock. Combined, these effects will spur growth. As liquidity shock works through increment in saving rate, it is expected that productivity shock impact on growth by reducing the actual resources lost by the premature liquidation of investments.

In the same vein, Bencivenga, Smith and Starr (1996) drawing from Hick's assertion, classifies transaction costs into pure rents and real resources loss. In either of these cases, reduction in transaction costs increases the real return on saving and equity market activities. Depending on the level of technologies employed to generate the capital, long run real activity may either rise or fall. This is because enough savings may or may not be diverted from capital formation into equity so that the long-run capital stock and the level of real activity are actually reduced.

When transaction simply represents pure rents, transaction cost may either raise or lower steady-state welfare. In particular, it is possible that an economy can undertake a socially excessive volume of financial markets transactions. In this case, it will be desirable to raise the fees associated with equity market. This situation is likely in cases with low real interest rate, but large transaction. However, when transaction costs represent real resources loss, it may or may not lead to increased output levels. In this case, an increase in the volume of financial market can be, but need not be associated with an increase in the level of real activity. Besides, their reduction may necessarily leads to higher steady state welfare (Bencivenga, et al., 1996).

There are studies that focus on the stock market integration as a proxy for its development. Theoretically, most of these authors show that higher integration of

stock market tends to foster economic growth. For example, Obstfeld (1994) theoretically shows that an increase in the degree of stock markets integration reduces average investment risk through diversification and leads to a shift in the global portfolio from safe low-yield projects to riskier high-yield projects. According to Obstfeld (1994), this trend spurs a surge in the savings rate, then capital productivity and ultimately an increase in the level of economic growth. The study concludes that stock markets may positively affect capital accumulation and economic growth through risk diversification facilitated by the integration of international financial markets.

In a related work, Korajczyk (1996) develops a measure of stock market integration for developed and emerging markets. Assuming market integration, Korajczyk (1996) constructs a measure of deviations from capital market integration that can be consistently applied across countries. The equilibrium position is referred to as law of one price and the deviations from this position is regarded as a measure of market segmentation. This study indicates that market integration increases as capital accumulates, and shows a positive correlation between stock market integration and economic growth.

Existence of stock markets has been justified based on information efficiency. Authors argue that stock market do not suffer from neither adverse selection nor moral hazard. Based on the structure of the economy, such authors propose a delayed

establishment of stock markets. According to Allen (1993), evolution of equity markets primarily depends on the information gathering costs and the complexity of the production structure. In an efficient market, stock prices tend to reflect the true valuation of underlying investment projects and constitute a clear signal for the actual rates of return on capital. Hence, Allen (1993) posits that stock prices are efficient instruments for correcting resource allocation, which is a clear justification that they can boost economic development and growth. In cases where the production system is more complex, the process of capital accumulation will be more effective through the equity markets (Allen, 1993).

According to Boyd and Smith (1996) lack of equity market activity is not necessarily a signal of any allocative inefficiency and attempts to foster equity market would at best simply benefits some agents at the expense of others. Policies of government – such as changes in tax treatment, removal of interest on dividend income, various interest subsidies, or loan guarantee programs – can affect the real rate of return to savers or the opportunity cost of funds perceived by borrowers. In the model, they show that policies that reduce the opportunity cost of funds to borrowers are likely to depress the level of activity in equity markets and to increase the reliance on debt. According to Boyd and Smith (1996), these policies are predominant in the developing countries because the equity markets are not developed and government will want to interfere.

Contrary to the general belief, which stipulates that equity and debt are substitute, the authors opine that they are complementary. In particular, by using equity markets appropriately, firms in their model reduce their cost of issuing debt as relative cost of monitoring rises over time in the model. Moreover, investment in unobservable return technology is generally associated with the use of debt finance, while the use of observable return technology is associated with equity. Therefore, with these assumptions, they expect the ratio of equity to rise as the economy develops. In addition, the capital markets are set to be more efficient as the economy develops because the quantity of resources consumed by monitoring declines as the economy develops. This process, according to Boyd and Smith (1996) explains the emergence of stock markets at the later stages of economic development.

2.2 Empirical Evidence

2.2.1 Financial Development and Economic Growth

Having review the theories associated with stock market and economic growth, it is rational to move into empirical works on the same subject matter. However, in this section, we try to explain the connection between financial development and economic growth. This is mainly because proper appreciation of stock market development and economic growth is highly connected to proper understanding of financial development and economic growth. Fortunately, there are several empirical works on financial development, with most works supporting the Schumpeter (1911)

assertion that financial development contributes significantly to growth. This is in an apparent extension of Say's Law, which states that supply, creates its own demand. Meanwhile, in consonance with Patrick (1966), few authors have provided evidence for demand following hypothesis. In recent times, researchers have ventured into examining the direction of relationship, but arriving at different conclusions. Some sections believe that relationship is not direct but through intervening variables such as savings, private investment, and total investment (Rousseau and Watchel, 2000, 2005).

The empirical works on the nexus was initiated by Goldsmith (1969), who considers the entire financial sector as a unit. Goldsmith (1969) measures the level of financial development with a variable called the financial interrelations ratio, which is calculated by dividing the size of financial sector by the value of GNP. The sample consists of communist Russia, developing and industrialized countries. Hence, the study provides positive and significant empirical evidence on the relationship between finance and growth for the cross-section of countries. Moreover, the study indicates that financial development affects growth through improvements in both efficiency and the volume of investment. Improvement in the efficiency (quality) of investment is better in transmitting the impact of financial development. Though rudimentary in methodology, Goldsmith (1969) has most importantly stimulated many researches into this area.

One of the stimulated works is that of Fry (1978), who consider seven Asian less developed countries. With Ordinary Least Squares (OLS), the study reports that the real rate of interest has a positive impact on domestic savings and economic growth. Hence, Fry (1978) justifies the McKinnon and Shaw hypothesis, which states that the financial condition resulting from financial liberalization will enhance real activities. Another stimulated work is that of Jung (1986) that focuses on both developed and developing countries. This study is particularly significant because it provides for temporal relationship between financial development and economic growth. Jung (1986) utilises concepts of causality and two alternative measure of financial development – the currency ratio- currency divided by money supply, and money depth- money supply divided by GDP. The study's sample of 56 countries has 37 developed and 19 developing countries. Hence, Jung (1986) shows that while developing countries tend to follow supply leading hypothesis, the developed countries substantially conforms to the demand-following hypothesis. However, King and Levine (1993a) argues that monetary aggregate -as adopted in this study- includes the credit to government, which might blur the relevance of the financial development indicator.

Thus, in a study motivated by Schumpeter's thought, King and Levine (1993a) utilize data of 80 countries over the 1960 and 1989 period to explore the finance-growth nexus. Besides, the study utilises four measures of financial development. One is the ratio of liquid liabilities of the financial system to GDP, which measures

the financial development and similar to Goldsmith (1969) financial interrelation ratio. Liquid liabilities consist of currency held outside the banking system plus demand and interest bearing liabilities of banks and non-bank financial intermediaries.

In order to find another indicator that reflects the peculiar financial services such as risk management and information processing, King and Levine (1993a) construct another financial development indicator- ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets. According to King and Levine (1993a), commercial banks are not the only financial intermediaries that provide these services and government strongly influence commercial banks in many economies so that the difference between commercial banks and central banks is very thin. Hence, King and Levine (1993a) further construct two additional indicators. The third indicator is the ratio of banks claims on the nonfinancial private to total domestic credit and the fourth indicator is the ratio of claims on the nonfinancial private sector to GDP. Besides, the study adopts four indicators of growth. These include; the average long run real per-capita GDP growth, the growth rate of physical capital accumulation, real per capita GDP growth after accounting for the rate of physical capital accumulation, and the ratio of gross national investment divided by output.

After examining the contemporaneous and lagged correlation of the variables, King and Levine (1993a) utilise cross-country regressions to estimate the strength of the partial correlation between financial development and growth indicators. The study subsequently utilise a sensitivity analysis which includes altering the conditioning setting, using subsamples of countries and time periods and examining the statistical properties of the error terms. Based on all these procedures, the study notes that financial development affects economic growth by increasing the rate of capital accumulation and by improving the efficiency with which economies use that capital. Thus, King and Levine (1993a) conclude that Schumpeter might be right. The setbacks of this study include unobserved heterogeneity across countries and the danger of spurious inferences (Haber, 2008). Moreover, it does not include recent dataset as Rousseau and Watchel (2005) have warned against reliance on old dataset.

The problem of current dataset has been addressed in the literatures. For example, Rousseau and Watchel (2005) re-examines the relationship between financial development and economic growth for 84 countries covering between 1960 and 2003. Moreover, the study divides the period covered into 1960 to 1989 and 1990 to 2003. Rousseau and Watchel (2005) indicate that the relationship that seemed so robust in previous studies using data from 1960s to 1980s simply does not extend to 1990 and 2003. The traditional result disappears upon the control for fixed or random effects in the specifications. Hence, Rousseau and Watchel (2005) suggest that measures of financial depth in the standard growth equation may be standing in for

other unobserved country-specific factors. Rousseau and Watchel (2005) also suggest that it would be inappropriate to use data before 1990, as this was a period of unreal or forced financial liberalization. Conclusively, the authors opine that systematic study of the financial development experiences of individual countries becomes the solution to the problems discovered. In another King and Levine (1993a) inspired work, Beck, Demirguc-Kunt, Laeven and Levine (2008) concentrate on the distributional effects of financial development. The authors examine whether industries that are naturally composed of smaller firms grow faster than large firm industries in countries with higher levels of financial development. Beck et al. (2008) focus on the interaction between financial development and small firms' shares.

Based on King and Levine (1993a), the study utilizes more than one financial indicator, and conduct sensitivity analysis and more interestingly adopt the US as a benchmark country, which ''has a frictionless financial system". Therefore, Beck et al. (2008), reports that financial development boosts the growth of small firm industries more than large firm industries, which is contrary to well-established theories. Besides, the study finds that underdeveloped financial systems are particularly detrimental to the growth of firms with the least number of employees. By extension, this may mean that financial development have more impact on small economies than the developed economies. Nevertheless, the study ignores the developing countries.

Moreover, Luintel and Khan (1999), Luintel, Khan, Arestis and Theodoridis (2008) examine the relationship between finance and economic growth for 10 and 14 countries, respectively. In particular, Luintel et al. (2008) employ Fully Modified OLS (FMOLS) time-series analysis and dynamic heterogeneous panel estimator for panel estimates. The studies generally report that financial development spurs economic growth.

The second problem of King and Levine (1993a) associated with methodology has been addressed in the literatures. For example, with the recent developed panel Granger causality test-Homogenous Non Causality (HNC), Hurlin and Venet (2004) investigate the causal relationship between financial development and economic growth; with a sample of 63 industrial and developing countries over the 1960-1995 and 1960-2000 periods. The authors argue that the test provides for heterogeneity between developed and developing countries, on the one hand and on the other hand, among the developing countries. Nevertheless, the results fail to indicate any evidence for supply-leading hypothesis, in both the developed and developing countries sample. On the contrary, the study provides evidence for the demand following hypothesis in both the developed and developing countries sample. Hurlin and Venet (2004) conclude that this might mean that economic growth can actively stimulate the demand for financial services in the developed country. For the developing countries, Hurlin and Venet (2004) attributes the result to the fragility of

financial environment, which prevents the financial system from being isolated of the business cycle.

Moreover, Levine, Loayza and Beck (2000) address the problem of unobserved heterogeneity and causality by using GMM techniques to extract exogenous component of financial development. For the period covering 1960-1995, the sample includes 74 countries. The results show a positive relationship between exogenous components of financial development intermediation and real GDP growth. In other aspects, the issue of threshold effect on the relationship between economic activity and financial development has started to gain momentum among researchers. For instance, Berthelemy and Varoudakis (1996) in an analysis of 90 countries with several origins for poverty traps states that financial development may cause more economic backwardness, where its take-off precondition is not satisfied. Similarly, Christopolous and Tsionas (2004) conduct threshold cointegration tests and dynamic panel data for 10 developing countries. Christopolous and Tsionas (2004) indicate that there is strong evidence for significant long run causality running from financial development to growth and no evidence of bidirectional causality.

Beyond the multi-country analysis, some authors have tried to explain the relationship between financial development and economic growth on individual country basis. For instance, Mihalca (2007) in a Cobb-Douglas production function framework, examine the nexus on Romania for the period 1990 to 2005. Correlation

test and regression conducted show that in Romania there is no relationship between financial development and economic growth. Mihalca (2007) attributes this result to the weakness of the financial development as it has encouraged the inefficient allocation of savings and in turn led to a negative growth in Romania. However, the study suffers from small sample size and crude method of analysis. From the foregoing, it is evident that empirical evidence abounds for positive roles for financial development on the economic growth, with some few exceptions. However, financial development is not complete without the development of a viable stock market (Caporale et al., 2004, 2005). Hence, in the next section, the study reviews empirical literatures on stock markets and economic growth in developed countries.

2.2.2 Stock Market and Economic Growth in Developed Countries

Compared with empirical works on financial development and economic growth, empirical works on stock markets and economic growth relatively began recently. Yet, the evidences provided so far have not been generally similar. While the largest part of literatures indicates positive relationship between stock market and economic growth, others provided evidence to the contrary. Still, few studies argue that the positive relationship only exists in the developed countries (Harris, 1997, Durham, 2000; Minier 2003). In this section, we review some of these literatures in the developed countries.

Under the assumption that both investment and stock market development are endogenous, Atje and Jovanovic (1993) use lagged or initial variable rather than

current value of the variables, as instrumental variables. In the study of 40 countries for the period 1979-1988, labour force serves as the only pure exogenous variable. The findings show that lagged investment is not significant, but the product of investment with initial stock market activity is significant. Thus, Atje and Jovanovic (1993) conclude that stock market do actually spur economic growth by increasing the rate of return on investment.

In a study directly in response to Atje and Jovanovic (1993) assertions, Harris (1997) explores the relationship between stock market development and economic growth with Two Stage Least Square (2SLS). Harris (1997) considers 49 of the 60 countries that had official stock markets in 1991, and the work covers 1980 -1991 period. The omission were based on the fact that their stock markets were only in existence for small part of that period or because of problems of obtaining data on other variables for those countries. Growth in per capita output is measured as the average annual growth rate of GDP per unit of effective labour. Among the independent variables include the lagged growth in per capita GDP, current investment, current investment multiplied by value traded, and labour growth. The instruments for these variables include population growth, initial level of stock market activity and both lagged investment and lagged growth in per capita income. The countries are subsample into developing and developed countries. Consequently, Harris (1997) shows that the evidence in support of stock market enhancement on economic growth by raising the marginal productivity of capital is at very best weak.

In both the entire sample and the subsample of less developed countries, the level of stock market activity does not have much incremental explanatory power. In the subsample of developed countries, the level of stock market activity does have a weak statistical significance. With the publication of the World Bank review on stock markets in 1996[6], the study of the relationship between stock market development and economic growth has not remained the same. In essence, the publication has facilitated series of research in this direction, to the extent that subsequent works cannot afford not to refer to one of publication's articles.

Extending the work of King and Levine (1993a), Atje and Jovanovic (1993), Levine and Zervos (1996) evaluate the finance- growth nexus of 40 countries between 1976 and 1993[7]. Based on Korajczyk (1996) multifactor International Arbitrage Pricing Model[8], Levine and Zervos (1996) generate a composite measure of stock market development. Among the control variables include financial depth, government consumption ratio, rate of inflation, and black market exchange rate premium. In order to extract the predetermined components of the above-mentioned variables, Levine and Zervos (1996) explore a number of instrumental variables. Besides, the authors utilise 2SLS to examine whether predetermined stock market development is closely associated with economic growth. Hence, the results indicate

[6] World Bank economic review, Vol. 10 No.2 1996 edition

[7] To limit the attention to stock markets from the initial focus on financial development

[8] A multifaceted measure of overall stock market development that combines the different individual characteristics of the functioning of stock markets

that stock market is positively correlated with economic growth. Besides, the instrumental variables procedure indicates a strong connection between the predetermined component of stock market development and long run economic growth.

Improvement of this work has been done through Levine and Zervos (1998), Levine et al. (2000), and Wurgler (2000). Though different in methodology-as each subsequent work tend to improve on the econometric deficiency of the previous paper- but the results of all these studies are overwhelmingly similar. However, the danger of spurious inferences remains (Haber, 2008). Further improvement is carried out by Minier (2002) who retains the regression and data of Levine and Zervos (1998) to investigate the possibility of a nonlinear relationship between financial development and economic growth. The study employs the regression tree techniques-which involve splitting of sample size into optimal subsamples- to cater for the seemingly nonlinear relationship. Hence, the study establishes positive correlations between the stock markets and economic growth for countries with advanced stock markets, but fails to establish same for countries with less developed financial sectors. Thus, Minier (2002) concludes that the relationship between stock market development and economic growth may in fact be different in countries with smaller stock markets; and market capitalization may need to reach a certain level before these growth effects are realized. However, the sample is very small, limiting

the precision of the regression estimates. Moreover, asymptotic theory that would allow for more formal testing based on the regression tree procedure is not included.

From the foregoing, it is evident that stock markets have positive role to play in economic growth. However, the studies share a common method-panel approach, which has been criticised on so many grounds. In fact, panel or cross-section approach are said to be broad-brush approach, which obscures many important details and may exaggerate the contribution of stock market to economic growth (Arestis et al., 2001; Luintel et al., 2008).

An alternative approach is definitely the time series approach. The proponents such as Arestis and Dementriade (1997) argue that the relationship between stock market development and economic development is better resolved through time series approach. Subsequently, Arestis et al. (2001) investigate the relationship that exists on stock market volatility, financial development and output. Overall Arestis et al. (2001) realize that market volatility has negative impact on financial development and output. Meanwhile the stock market development fosters economic growth. The need for a long time series data facilitated the use of just five countries (Arestis et al., 2001). Furthermore, Arestis et al. (2001) extend the applicability of the result to developing countries by arguing that ‘‘ our results could be indirectly valuable for less-developed countries, in that they may inform policy decisions relating to the adoption or otherwise of specific types of financial system’’. However, the work has

been criticized on many grounds. One, it is not clear whether the use of quarterly data fully abstract from business factors influencing the stock markets, banks and economic growth paradigm (Beck and Levine, 2004). Besides, the sample coverage among the countries is not uniform. Therefore, an inter-country comparison may be difficult. In addition, adaptation of the results to developing countries may not be economically rationale since the macroeconomic fundamentals differ a lot.

Muslumov and Gursory (2000) examine the causality relationships between stock markets and economic growth based on the time series data compiled from 20 countries from the year 1981 through 1994. At first, panel data covering all countries over the entire analysis period were used to detect the direction of causation. Secondly, Muslumov and Gursory (2000) investigate causal relations for each country. Analysis based on the panel data reveals a two-way causation between stock market development and economic growth. Time series analyses suggest a somewhat stronger link between stock market development and economic growth in developing countries. Findings of this research must be interpreted with caution because of certain setbacks, such as insufficient data for some countries, small number of developing countries included in the research, subjectivity in the selection of time-lag periods, and the shortness of time series used due to the lack of monthly or quarterly information.

In a bid to overcome the data problem in the econometric study of the dynamic interaction between stock markets and economic performance, Rousseau and Watchel (2000) employ the use of panel Vector Autoregression (VAR) based on GMM difference approach. Rousseau and Watchel (2000) cover a set of 47 countries with an annual observation data between 1980 and 1995. The focus is on two aspects of stock market development: the size of the market, which is measured by the total market capitalization: and a combination of the size and liquidity in the market, which is measured by the volume of trading activities. Rousseau and Watchel (2000) argue that there are four reasons for stock market being important institutions even when equity issuance is relatively a minor source of funds. Firstly, an equity market provides entrepreneurs with a potential exit mechanism. Secondly, existence of equity markets facilitate capital inflows- both foreign direct investment and portfolio investment- and the ability to finance current account deficits. Thirdly, it encourages both the international and domestic investors to transfer their surpluses from short-term assets to long-term capital market; the fund can enhance access to permanent for firms to finance firms' large indivisible projects that require large scale of resources. Lastly, it provides less cost of searching, which improves its efficiency.

The result shows that market value of equity and its activities on organized exchanges have strong effect on output, while the effect of market capitalization are weaker. Rousseau and Watchel (2000) do not however cover the Asian financial crises period, despite having Malaysia, Korea, Philippines, Singapore, Thailand and

most notably Indonesia in its sample. As argued by Beck and Levine (2004), the use of annual data does not abstract from business cycle phenomenon. The instruments in the difference panel estimators are frequently weak, which induces biases in finite sample and poor precision asymptotically.

Filer et al. (1999) with consistent data for 70 countries for the period 1985-1997 also examine the nexus. Because of stock prices role in efficient market, they disuse stock market indicators that are stock price dependent. Instead, turnover velocity (ratio of turnover to market capitalization) and the change in the number of domestic shares are adopted. The countries are divided into ‘‘mature’’ and ‘‘emerging’’ markets according to the International Financial Statistics Classification. With the use of Granger causality test, Filer et al. (1999) generate results that indicate that there is a little relationship between stock market and future economic growth, especially for the emerging countries. According to the study, stock market merely causes appreciation in currency rates and real impact on the economic growth. Therefore, Filer et al. (1999) suggest that in a developed economy, stock markets assume several roles, none of which fosters economic growth. On the other hand, in developing countries, where stock markets apparently do not exist, alternative channel appears to have taken the role of allocating capital to enhance economic growth. Singh, Singh and Weisse (2000) arrive at similar conclusions. However, the study does not extend to period beyond the Asian financial crisis.

In a study similar to Filer et al. (1999), Caporale et al. (2004) investigate the direction of causality between stock market and economic growth. In order to resolve the previous studies' statistical problems, Caporale et al. (2004) adopt the causality tests procedures as developed by Toda and Yamamoto (1995). The sample includes seven emerging countries with a quarterly observation between 1977 and 1998. Ratio of private credit and bank deposits ratio are utilised as measure of financial development. For the stock markets, they use the market capitalization and the value traded ratio. Initially, Caporale et al. (2004) run a bivariate test that excludes stock market. The result shows that financial development does not substantially generate economic growth. Upon the inclusion of stock market development indicator – this turns the causality test to a trivariate system – the result changes dramatically. Causality between financial system and economic growth becomes apparent. Hence, Caporale et al. (2004) infer that the bivariate system of previous appear incomplete because of the omission of a stock market variable. Similarly, Bolbol et al. (2005) argues for the widening of financial development to encompass the stock market.

In a latter paper, Caporale et al. (2005) study the relationship of stock market development and economic growth of four countries. The study selects its sample based on countries 50 continuous quarterly observations for the period 1979 to 1998. Caporale et al. (2005) adopts similar stock market indicators and measure the level of investment by the ratio of gross fixed capital formation to nominal GDP. The methodology is also based on Toda and Yamamoto (1995). The findings indicate that

productivity is the channel through which stock markets enhance the growth rate in the long run. Conclusively, Caporale et al. (2005) submit that well-functioning stock market is vital in promoting economic growth in less-developed countries. No African country is however in the sample size. Extending the conclusion therein to Africa may be misleading.

There are more studies on European countries. For instance, Boubakari and Jin (2010) focus on Euronext countries- Belgium, France, Portugal, Netherlands and United Kingdom- for the period 1995 to 2008. With Granger causality test, the study adopts different proxies for stock market development- market capitalization, total trade value, turnover ratio. The results of the study suggest that the stock market growth and economic growth have long-run relationship.

Antonios (2010) investigates the causal relationship between stock market development and economic growth on Germany for the period 1965-2007. With Granger causality test, the paper shows that stock market development causes economic growth, while interest rate causes stock market and economic growth respectively. In a related work, Brasoveanu, Dragota, Catarama, and Semenescu, (2008) show that the capital market development is positively correlated with economic growth, with feedback effect, but the strongest link is from economic growth to capital market. Therefore Brasoveanu et al. (2008) suggest that financial development follows economic growth. In summary, it is apparent stock markets spur

economic growth in the developed countries. However, the nexus in the developing countries may somewhat be different as indicated by some of the literatures reviewed by above. Therefore, in the following section, the study focuses on the interaction between stock market development and economic growth on developing countries.

2.2.3 Stock Market and Economic Growth in Developing Countries

In developing countries stock markets development are more recent than their counterparts in developed countries. Similarly, works on stock market contribution to economic growth are relatively lesser in the developing countries. More importantly, the conditions under which stock market operate in the developed countries are different in the developing countries. Thus, inference from developed countries studies to the developing countries may not be appropriate. Therefore, in this section, we review some of the literatures specifically dealing with stock market and economic growth on developing countries.

For instance, Parabijit (2007), in a study - of 31 developing countries, for the period of 1988-2002- assume that stock market affects economic growth through capital accumulation. Parabijit (2007) utilize the stock market capitalization as a percentage of GDP as an indicator of stock market development, and growth rates of gross fixed capital formation. The methodology includes panel data and time-series analysis. In the panel approach, Parabijit (2007) considers three alternative models - between effects, the country-fixed effect model and the random effect model- but

concentrates on the third model. For the time series, the paper uses the ARDL, which does not require any pretesting of the variables to determine their order of integration. The study finds no positive link between the indicator of stock market development and growth of fixed capital formation, even after controlling for the level of per capita GDP, trade openness, foreign direct investment and banking sector development. In the time series study, the results indicate that there is no relationship between the growth of capital formation and stock market, except for countries with the French civil law category (with low shareholder protection). According to Parabijit (2007), ‘‘given this lack of relationship between market development and capital accumulation, there is a limited usefulness of the policy of promoting stock market for achieving the developmental goals of the developing countries’’. Nevertheless, the sample size is too short for such generalisation. Moreover, the study ignores other indicators of stock market development.

However, Mohtadi and Sumit (2004) overcome this problem, by adding several stock market development indicators such as market capitalization ratio and total value of shares traded ratio. The control variables include investment, secondary school enrolment and foreign investment. The study focuses on the relationship between stock market development and economic growth of 21 emerging markets, for 21 years and generating the data set from a single source. According to the authors, this milestone overcomes the previous consistency and measurement problems.

Methodologically, Mohtadi and Sumit (2004) use two distinct models. The first is to control for the country specific effects as well as one-way or two-way effects. Mohtadi and Sumit (2004) regresses investment on stock market indicators and obtained fitted investment, which they eventually used in the growth model. The second method is the dynamic panel estimation that estimated growth directly on stock market and includes investment as one of the control variables as well as lagged of growth, which is instrumented to yield unbiased and inconsistent estimate. The two methods generate positive result between stock market and long run growth. Therefore, Mohtadi and Sumit (2004) suggest that stock market development contributes to economic growth both directly and indirectly through investment. Besides, Mohtadi and Sumit (2004) suggest that value of shares traded ratio is not an effective measure of stock market liquidity due to high volatile markets in the developing countries.

In a bid to show that substantial positive relationship between stock market development and economic growth reported in the literature is due to the inclusion of higher income countries, Durham (2000) concentrates on lower income countries. Coincidentally, these are countries with nascent stock markets. The actual sample however includes the developed markets. In order to check the intuition, Durham (2000) divides the countries into two categories, according to their initial income. The control variables include initial per capita GDP, the investment ratio, population

growth and the male education rate. The study uses three sets of averaging of regression- (9-year averaging period), which is referred to as long run regression model, (6-year averaging period), or medium-run, and short-run (3-year averaging period). In the long-run regression, Durham (2000) notes that the lower income countries stock markets do not affect the economic development. In the short-run and medium-term, the study suggests contrary findings.

In addition to the panel approaches enumerated above, a handful of authors employ time series approach to unravel the nexus between stock market and economic growth in some individual developing counties. For instance, Shahbaz, Ahmed and Ali (2008) utilize several stationarity tests and cointegartion approaches of Engle-Granger (1987) and ARDL methods to check the short-run and long run status of stock market-economic growth in Pakistan with an annual data that covers 1971 and 2006. The result notes that in the long-run, there is bidirectional causality between stock market development and economic growth. However, for short-run, there exist only one-way causality, i.e., from stock market development to economic growth.

The causality between stock market and economic growth is not limited to Pakistan as Mun et al. (2008) with yearly data for the period 1977-2006 show that in Malaysia, stock market granger cause economic growth but not vice versa. Mun et al. (2008) attribute this to either wealth effect or forward-looking hypothesis of stock

market prices. As economic growth does not granger cause the stock market, Mun et al. (2008) argues that adaptive hypothesis does not hold in Malaysia. Hence the paper conclude that the evolution of financial sector and in particular the stock market tends to be more likely to stimulate and promote economic growth especially when the monetary authorities adopt liberalized investment and openness policies, and improve regulations of the stock market and provide macroeconomic stability.

In another study on a developing country, Azarmi et al. (2005) divides the study's total sample period of 1981-2001 into pre-liberalization and post liberalization periods for India. The result on pre-liberalization period indicates that the stock market development positively contributes to economic growth. However, in the post liberalization period, a negative relationship is found. For the entire period of the sample, the relationship between stock market and economic growth is found to be insignificant. Therefore, Azarmi et al. (2005) concludes that the Indian stock market is a casino for the sub-period of post liberalization.

However, some authors provide evidence for significant relationship between stock market development and economic growth, especially in the post liberalisation period in India. For example, Deb and Mukherjee (2008) adopt Toda and Yamamoto improved version of Granger causality test. The results show bidirectional causality between real GDP growth rate and real market capitalization ratio, but unidirectional causality from real economic sector to both stock market activity and volatility.

According to the authors, the funds raised by the corporate firms from the financial markets during the study period thus played an important role for the appreciable growth registered by the Indian economy. In contrary to Azarmi et al. (2005), Deb and Mukherjee (2008) suggest that stock market development leads to economic growth, for the period under study.

On Nepal, Surya and Suman (2006) examine the existence of causality relationship between stock market and economic growth based on the time series data for the year 1988 to 2005 using Granger causality test. The results indicate that real economic growth does "Granger cause" stock market growth and stock prices do "Granger cause" real economic activity. However, the causality has been observed only in real variables but not in nominal variables and the stock market liquidity effect is not found significant for causation of economic growth. As a caveat to the findings, Surya and Suman (2006) states that the empirical results and conclusions drawn from causality should be considered as suggestive rather than absolute.

Hence, from the analysis of the impact of stock market on economic growth, it is evident that there is a positive role played by stock markets, however with weaker impact when compared with the developed countries. Therefore, the next important question to ask at this junction is on whether stock markets in Africa play significant and positive role in economic development or not.

2.2.4 Stock Market and Economic Growth in Africa

In this section, we try to answer the question raised in the previous section, by considering the few literatures available on Africa. Sumit (2001) conducts a preliminary study on the relationship between stock market development and economic growth in Africa. It is not only the first study but also the first panel study to examine the nexus. In a crude form, the study examines the nine African countries over a period covering 1992-1997. Similar to Mohtadi and Sumit (2004), Sumit (2001) use turnover ratio, economic growth, foreign direct investment, investment but primary school enrolment, instead of secondary enrolment. Due to the paucity of data, Sumit (2001) could only provide a summary statistics.

With the variables representing stock markets developments, the correlation coefficient shows that stock markets correlate with investment, which in turn correlates with growth. Hence, Sumit (2001) suggests that stock markets affect growth, indirectly. The result also shows that foreign direct investment is highly correlated with domestic investment, and growth and GDP variables are highly correlated. Sumit (2001) also suggests that value of shares traded ratio is not an effective measurement of stock market liquidity, which is a sign of high volatility of Africans markets. The paper also posits that government should take active role in the stock market development as they have been doing in the past. Recognizing the shadowy treatment given to the work, Sumit (2001) accepts that more works needs to

be done to better understand the relationship between stock market and economic growth.

Some authors have attempted to carry out a more detailed study. Prominent is the work of Adjasi and Biekpe (2006), who conduct a more detailed study on Africa that includes 14 countries in their sample with varying degrees of time differences. It includes Zambia and South Africa with 6 and 26 years annual data respectively. The study adopts the Arrelano and Bond (1991) GMM difference approach. Adjasi and Biekpe (2006) note that the relatively small sample size for GMM estimation and accepts that a larger sample size is desirable. Three stock markets indicators are considered. In the end, the findings indicate that stock market promotes growth. The result of the work is to be viewed with caution as an indicator of banking sector is conspicuously omitted. As shown by Khan (2000), financial development is actually the development of both stock market and banking sector development. More scholars working on financial sector development have not only included stock market development but the banking sector as well (see Arestis et al., 2001; Caporale et al., 2004, 2005; Beck and Levine 2004; Filer et al., 1999; Rousseau and Watchel, 2000). Moreover, the coverage of the work ends in the year 2001. Therefore, with the availability of new dataset, another study is necessary.

Moreover, the classification is arbitrary as Botswana, Mauritius and South Africa are classified as upper–middle income countries, Morocco and Egypt as low-

income countries. The study classifies South Africa and Mauritius as the moderately capitalized markets ahead of (Nigeria, Egypt and Morocco). However, in Africa, South Africa, Egypt and Morocco are part of the mainstream emerging markets group (Agyare, 2007).

Narrowing down the sample size, Akinlo and Akinlo (2009) explore the relationship between stock markets and economic growth on countries such as Egypt, South Africa, Cote D'Ivoire, Kenya, Morocco, Zimbabwe and Nigeria with time series techniques. For long run analysis, the study adopts ARDL procedures. The results show that there is long run relationship between the two indicators of stock market development and economic growth for Egypt and South Africa. For short run analysis, Akinlo and Akinlo (2009) adopt Granger causality test within the Vector Error Correction Model (VECM) and VAR framework. The VECM shows unidirectional relations running from stock market development to economic growth, for Egypt and South Africa, while the latter shows short run bidirectional causality between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe, with the exception of Nigeria. Hence, Akinlo and Akinlo (2009), opine that the lack of significant long run relationship between stock market and economic growth in these countries might be due to the low level of development of stock markets in many of these countries: and that the level of integration of African stock markets into their economies is still weak.

Further narrowing down the sample size, to a single country analysis, Odhiambo (2010) concentrates on the largest stock market in Africa- South Africa. Using the 1971-2007 data sets, the results show that economic growth is found to Granger cause stock market capitalization, while value of shares traded and turnover ratio Granger-cause economic growth. Therefore, Odhiambo (2010) suggests that causal flow from stock market development to economic growth predominates.

Nzue (2006) conducts a study on the relationship between stock market and economic growth for Cote D'Ivoire for the period 1976 to 2002. With the use of error correction model (ECM) and causality techniques, the study observes that stock market and economic growth are not cointegrated except with the addition of control variables such as public investment, public expenditure, public development aid and foreign direct investment. Moreover, the study shows unidirectional causality running from stock market development to economic growth.

From the above it is obvious that stock markets are not as prosperous as obtainable in the developed economy in terms of the contribution to economic growth. Another puzzle is that stock markets are subset of the complete financial system. Most financial systems are in fact dominated by the banking system in Africa. Thus in the next section we consider literatures that have taken banking development into perspective, while discussing the relationship between stock market and economic growth.

2.3 Stock Markets, Banks and Economic Growth

In the finance-growth debate, it is considerably deemed that financial development lubricates economic growth (see Goldsmith, 1969; King and Levine, 1993a, b; Levine Zervos, 1996, 1998; Beck and Levine 2004 Arestis et al., 2001; Rousseau and Wachtel, 2000, 2005 Khan, 2000; Odedokun, 1996a). In other words, it lubricates the real sector by providing liquidity. Financial intermediaries do not only comprise banks but other non-banking financial institutions such as stock markets. In order to understand the finance-growth nexus, it is rational to dichotomize the specific function of the constituents of the financial sector. This would facilitate a deeper understanding of their relative efficacy. In addition, it would assist in unravelling the intricacies behind their level of contribution to economic growth. Literatures have attempted to tackle these questions. In this regard, literatures provide conflicting predictions about whether banks and stock markets are substitutes, complements, or whether one is more conducive to growth than the other (Naceur and Ghazouani, 2007). Some literatures have suggested that it is banks and stock markets; few works hint that it is stock markets and not banks; others authors opine that it is banks and not stock markets in the economy.

2.3.1 Stock market Vs. Banks

In this section, we consider the literatures on the relative contribution of stock market and banking development. Starting with the theoretical evidence in support of

banking sector development, Stiglizt (1985) in a model of multiple principals and multiple agents stress that banks and labour union provide better method of resource allocation and corporate governance than stock markets. According to Stiglizt (1985), this situation is more precarious in the developing countries, where banks enjoy economies of scale in lending investible funds as banks can gather information for optimal resource allocation. In contrast, stock markets create free rider problem that decreases investors' incentive to conduct costly search because, investors take decision based on information gathered by merely observing price. However, other authors have argued that banks suffer from moral hazard and adverse selection. For example, Boyd Chang, and Smith et al. (1998) note that moral hazard is worst even in the presence of universal banking, where banks are allowed to take equity position in companies they serve. In another work, Machin and Stewart (1996) have also shown that trade union power has decreased over time.

In some other antagonising studies against stock market development, Singh (1997) and Singh and Weisse (1998) argue that stock market development leads to short-termism and lower rate of development. Accordingly, reforming banking sectors would not only absorb fewer resources directly, but also it would also be an easier option in terms of institutional capacity for the concerned developing countries, compared with the infrastructure required for well-functioning stock markets. To the authors, this makes stock markets and banks substitute. Furthermore, Singh (1997) argues that the relative hike in cost of debt- via sharp rise in international interest

rates plus financial liberalization efforts that several countries embarked in the 1980s-made the costs of equity relatively cheaper than that of debt. In addition, the increasing privatization in these countries at that period also bolstered the stock market. With these arguments, Singh (1997) and Singh and Weisse (1998) conclude that developing countries would do better to reform the institutional structures of their banking systems rather than create stock markets that require sophisticated monitoring systems to enable them to function effectively.

In the same vein, Nagaraj (1996) in a study of India submits that financial liberalization and capital market growth in that country led simply to portfolio substitution from bank deposits to tradable securities instead of greater aggregate national savings. Besides, Nagaraj (1996) argues that stock markets do not actually mean financial development but financial stagnation. In other words, banks are mere substitute and any attempt to develop stock market will stifle the banking sector. In addition to Singh (1997), these studies focus on countries in the Asian countries and were undertaken at the eve of the Asian financial crises. Al-Faki (2007) and Obiyatullah (2007) note that the crisis took place partially due to the relatively underdeveloped bond and stock markets.

There are theories that support the emergence of stock market development. For example, Cho (1986) shows that well functioning equity augments markets financial liberalization in order to achieve efficient resource allocation. According to the study,

contrary to bank borrowings, equity finance is not subject to adverse selection and moral hazard effects, under the conditions assumed. Thus, Cho (1986) posits that adequate development of stock markets is necessary for the successful financial liberalization and in the absence of such markets; there is a case for government intervention. In other words, stock market development must go concurrently, with the banking sector development. Cho (1986) theoretical formulation is not devoid of shortcomings because it does not only fail to notice the probability of agency problems in stock markets resulting from management controlled of large corporations but also the problems arising from asymmetric information between corporate management and investors about the project returns.

Greenwood and Smith (1997) in a theoretical framework-where banks and stock markets are present- show that these institutions engender productive projects by decreasing liquidity risk; increases savings and pools of scarce resources. The study notes that if firms are risk averse then equity markets are more efficient in allocating capital. Hence, the growth rate is likely to be more in this case. The study concludes that equity markets also perform better in an open economy.

There are studies that attribute the relevance of either stock market or banking development to the stage of economic development. Within the context of an endogenous contract choice and capital accumulation, Capasso (2003) provides further insights into the linkage between stock market development and economic

growth. The work is based on a model, in which firms design optimal securities to finance risky investment projects. The model predicts that, when borrowers and lenders face ex ante informational asymmetric, the optimal securities are always of the form of debt or equity. Moreover, Capasso (2003) shows that information asymmetric is not exogenous, but changes, with the incentives of low productivity of firms, which pretend as high productivity firms. Besides, Capasso (2003) distinguish between two financial systems and the level of real economic activity. These are development regime with a relatively low level of economic activity and predominance of debt; and a high development regime with a relatively high level of economic activity and predominance of equity.

Closely related to Capasso (2003) model is the work of Bolton and Frexias (2000). The study suggests costs associated with the optimal security used to finance investments (which firms have private information about the returns on their investments) depend on the degree of information asymmetry. Bolton and Frexias (2000) categorize the optimal capital structure into two main forms of securities: equity and/or debt. Hence, less mature and riskier firms, in equilibrium, opt for bank financing while mature firms prefer securities. Linking this suggestion to our study, this means that bank financing should flourish, since most firms in Africa are immature.

Blackburn, Bose and Capasso (2005) explore the possibility of two-way linkages between stock market development and economic growth in addition to an alternative interpretation of the development of equity markets. The study posits that the evolution of equity markets is the result of lenders' attempt to solve multiple enforcement problems, when a firm's choice and efforts to investment project are private information. Similar to Stiglizt (1985), the analysis is based on a principal-agent framework. Hence, when the lender chooses the project, the optimal financial contract is typically a debt contract. On the other hand, optimal financial structure is a mixture of debt and equity, when the firm chooses the project. According to Blackburn et al. (2005), when the project borrower decides the project, a fixed payment is not enough to induce the best level of efforts, nor the best choice project; in this case, part of the payment must be a function of actual return in order to spur optimal effort from the borrower, which necessitates the emergence of equity.

Moving into empirical studies on the comparison of banking system and stock markets, the study starts with studies that are inclusive of industrialised countries. For instance, Dermirguc-Kunt and Makismovic (1996) find statistically significant negative correlation between stock market developments as measured by market capitalization to GDP and the ratio of both long- term and short-term debt to total equity of firms. Thus, Dermirguc-Kunt and Makismovic (1996) suggest that in advance markets, further development leads to substitution of equity for debt financing, especially for long-term debt. Besides, in the developing markets, large

firms become more levered as the stock markets develop, but small firms are not affected by market development.

Other works that support the development of stock markets and banks include Dermiguc-kunt and Levine (1996a) that argue that countries with developed stock markets have developed banking and non-banking financial intermediaries such as finance companies, mutual funds investment, brokers, and pension funds. Countries with weak stock markets tend to have weak financial intermediaries. Hence, stock market development goes in tandem with other financial institutions development.

In a related work, Dermiguc-Kunt and Levine (1996b) examine the interaction between stock market development and financial intermediaries. The study use variety of indicators of stock markets and financial intermediaries. To describe different characteristics of equity markets, they use measures of stock market size, liquidity, integration with world capital markets, volatility, concentration and features of the regulatory system. To illustrate the development and structure of financial intermediary sector, the measures of financial intermediaries include allocation of credit, the spread between borrowing and lending interest rates, and the size of particular types of financial intermediaries. Hence, Dermiguc-Kunt and Levine (1996b) observe that as countries grow and reach middle-income level (i.e. 2000 per capita in 1990); stock market and non-banks develop rapidly. However, as the

influence of stock markets and non-banks appreciates, banks continuously represent a smaller share of the overall financial system.

In a sample of 48 countries, over 1980-1995, Levine (2002) using an assortments of measures to unravel the relative efficiencies of the bank-based and market-based financial system. The results reject these two conjectures. Instead, the results support the financial service view- this stresses the role of banks and stock markets in researching firms exerting corporate control, creating risk-management devices and mobilizing society's savings for the most productive endeavours. In other words, what really matters is the impact of the overall financial development on economic growth and not the specific contributions of banks and stock markets. To further show that it is the overall financial development that really matters, Beck and Levine (2004) examine the independent impact of both stock market development and bank development on economic growth. Across different estimation techniques - descriptive statistics, OLS and GMM- and across different control variables -such as years of schooling, government consumption, inflation rate and black market premium- the results show that both stock markets and banks independently and significantly affect growth. The findings suggest that stock markets provide different financial services from banks. However, the data used are mere averages, which are not the actual data. Therefore, the results should be viewed with some caution.

Capasso (2006) opines that stock markets are more costly for the overall system than banks. However, they become more convenient when the production system becomes more complex. Banks and financial intermediaries in general do not allow for continuous monitoring. This, Capasso (2006) posits, is responsible for banks prevalence in the economies dominated by agriculture. Stock markets become more important as economies grow and display more articulated and complex productive systems. The work does not specify what happens to banking sector as stock markets grow.

Caporale et al. (2004) argues that the most efficient allocation of capital is achieved by liberalizing financial markets and allowing the market to allocate capital. If financial market is constituted by banks only, market will fail to achieve efficient allocation of capital because of the lopsidedness of debt caused by the asymmetric information, selection effect and incentive effect. According to the study, banks finance well-established and safe borrowers; on the other hand, stock markets can finance risky, productive and innovative investment. Stock markets achieve this because they have liquid trading and price determining mechanism for a diverse range of financial instruments. This allows the spreading of risk among investors and capital raisers because it equilibrates the long-run preferences of capital raisers and short-term preferences of investors. Thus, Caporale et al. (2004) concludes that the development of stock markets must complement banking sector.

Garcia and Liu (1999) work on fifteen countries, including industrialized and developing countries mainly from Latin America and Asian data from 1980 to 1995. The authors utilise both pooled OLS panel techniques and simple correlation coefficients to check the complementary or substitutability of stock market development and banking sector. The study attributes the relatively more developed stock market development in East Asia compared to the Latin America as a sign of more developed banking sector in East Asia. Garcia and Liu (1999) conclude that financial intermediaries and stock markets are complements instead of being substitutes.

Some panel studies have concluded with weaker evidence for stock market growth. One of such works is that of Tadesse (2002) that compare the relative importance of bank-based and market-based systems on the overall economic activities. Tadesse (2002) finds that across countries with developed financial sectors, industries supported by market-based financial system grow faster than with industries supported with underdeveloped financial sectors. Conversely, bank-based financial systems significantly fared better than market-based system across countries with bank-based financial sectors. Hence, Tadesse (2002) submits that stock markets retard economic growth and on the other hand bank-based system promote growth in economies dominated by small firms. Besides, in situations where the requisite legal and institutional preconditions are lacking, economies fare much better through strengthening their banking sector instead of stock markets (Tadesse, 2002).

In an analysis of 47 countries with an annual data from 1980-1995, Rousseau and Wachtel (2000) find that increases in both intensity of activity in traditional intermediaries and the market value of equity traded on organized exchanges have strong effect on output, while the effects of market capitalization are weaker. This can be extended to mean that banks and stock markets move harmoniously in a well-developed country. On the other hand, stock market development is weaker than the banking sector in developing countries.

There are panel literatures on the relationship between banking sector development and stock market specifically on developing countries. This includes the study of Naceur and Ghazouani (2007) that examine the relationship between banks and stock markets development and economic growth on eleven MENA region countries. The study focuses on the independent impact of both equity market and bank development on growth. With the GMM method, the results show that the overall financial development is inconsequential or even harmful for economic growth in the MENA region. Hence, Naceur and Ghazouani (2007) propose the privatization of national banks, strengthening credit regulation and reinforced competition in the banking sector. However, the data used for the countries are not uniform across time, in addition to the data being unbalanced panel. In addition, the time series is so small that a long run interpretation of the result must be done with caution.

Panel studies specifically on Africa include Yartey (2007) who reports that the relationship between banks and stock markets in Africa is positive, therefore the author opines that the existence of a well-developed financial intermediary sector is germane for stock market development in Africa. According to Yartey (2007), liquid inter-bank markets, largely supported by a vibrant banking system are germane for the development of the stock market. Conversely, a passive banking system can impair the development of the stock market.

In a study of the determinant of stock market development in emerging countries, Yartey (2008) employs a deflated market capitalization as dependent variable and value of domestic capital provided by banking system to the private sector relative to GDP as a measure of banking development as one of the independent variables. As a novel introduction, Yartey (2008) include the square of bank credit to the private sector as a percentage of GDP in the regression, which is utilise as a proxy of relatively higher development of banking sector compared to the stock market development. The findings suggest that credit to the private sector is positively correlated with stock market capitalization. Contrarily, the square of credit displays a negative relationship. Equipped with these results, Yartey (2008) concludes that at early stages of its establishment, the stock market is a complement rather than substitute for the banking sector. However, when stock markets are sufficiently developed, they tend to compete with the banking sector.

In recent times, a handful of works have concentrated on the time series procedures of determining the interaction between stock markets and banking development. Prominent among these works is that of Arestis et al (2001) who conduct a time-series study of five developed countries namely Germany, the United States, Japan, United Kingdom and France. The empirical analysis shows that stock markets and banks contribute to long-term output growth: though the influence of stock market is a small fraction of the banking system. This conclusion is at odds with that of Beck and Levine (2004) and Capasso (2006). A deficiency noted in the work is the use of quarterly data, which does not abstract from business cycle (Beck and Levine, 2004).

Moreover, Rousseau and Xiao (2007) study the relationship between stock market, bank and the superb economic growth in China using quarterly data for the period covering 1995-2005. With a series of cointegrated vector autoregressive models, the authors observe that banking sector development significantly influences China's output and fixed investment. On the other hand, the study finds that stock market development, as measured by market size and trading volume, did not contribute significantly to China's output and fixed investment. The author attributes the results to the relative smaller size of the stock market.

Also, in a historical analysis Nieuwerburgh et al. (2006) explore the relationship between stock market and economic growth in Belgium in the period between 1830 and 2000. With series of subsamples, the paper adopts the VECM method. Hence, the results shows strong evidence that stock market development caused economic growth in Belgium, especially in the period between 1873 and 1935, which coincides with the removal of a number of restrictions on the financial markets. Besides, the paper finds that stock market development is a better forecaster of economic growth than bank-based development. However, there are several cases of missing data, which force the authors to resort to various forms of growth rate of the variables.

Ndako (2010) investigates the relationship between banking financial development, stock market and economic growth in South Africa for the period 1983-2007. With several time series techniques, Ndako (2010) observe that in the long-run, there is evidence of bidirectional causality between banking system and economic growth while there is a unidirectional causality from economic growth to stock market system (with turnover ratio and value of shares traded) as stock market variables. The author concludes that the results further indicate that both stock market and banking system contain useful information in predicting the future path of economic growth.

From the literatures above it is glaring that most studies have concentrated on developed countries. The few ones that are dedicated to Africa are insufficient both statistically and conceptually as mentioned earlier. Most studies are statistically deficient because they do not take into consideration the techniques (such as GMM system and ARDL) that are shown to be robust in small sample size. The time series study on stock market, banks and economic growth on any Africa country is on South Africa. Moreover, the dataset include the period before 1990s. However, Rousseau and Watchel (2005), Singh (1997), Azarmi et al. (2005) observe that previous dataset gives bogus positive relationship. Before proceeding with investigating the impact of stock markets on economic growth in some selected countries in Africa, the study reviews the determinants and trends of stock markets development in Africa in the ensuing sections.

2.4 Determinants of Stock Market Development

Final macroeconomic goals include high and smooth economic growth, low unemployment rate, low inflation rate and balance of payment regularization. To achieve these goals, policy makers manoeuvre key macroeconomic variables that include interest rates, government expenditure, productivity, and economic output. Stock market is thought to be one of the intervening forces between these variables and goals. Hence, economists have over the years attempted to unravel forces behind stock market development. In this section, we discuss the determinants of stock market as evident in the literatures.

We start with Garcia and Liu (1999) who focus on fifteen industrial and developing countries from 1980 to 1995 to examine the macroeconomic determinants of stock market development. Hence, the paper finds that: real income, saving rate, financial intermediary development, and stock market liquidity are important determinants of stock market capitalization. However, macroeconomic stability does not prove significant. In a related work but with more samples, Koubi (2008) examines the determinants of financial development and stock market returns that also covers stock returns over 1980-1999, in a scope of 49 countries. According to Koubi (2008), the two main variables-qualities of government and government respect for the rule of law- are both inversely related to the stock market returns and financial development. The control variables include degree of trade openness, output volatility, exchange rate volatility and capital controls to capture the effects of official financial restrictions.

Yartey and Adjasi (2007) establish that GDP, well-developed financial intermediary and good quality institutions are important determinants of stock market development in Africa. According to Yartey and Adjasi (2007), the development of good quality institutions such as law and order, efficient bureaucracy, limited corruption and democratic accountability are therefore crucial for stock market development in Africa.

Beyond the macroeconomic variables, institutions and remittances have been shown to be determinants of stock market development. For example, Billmeier and Massa (2009) extend the trend of literatures by the inclusion of institutions, remittances alongside the macroeconomic variables. Generally, both institutions and remittances are found to have positive and significant impact on market capitalization. Similarly, Cheung and Ng (1998) observe that real stock market indexes are typically cointegrated with measures of five industrialized countries' aggregate real activity such as the real oil price, real consumption, real money stock, and real output. Besides, Miller and Ratti (2009) find evidence for a long run negative relationship between oil price and stock market price. In the same way, Basher and Sadorsky (2006) note that oil price risk is greater in emerging markets than the developed markets. In other words, stock markets in the emerging markets are more sensitive to changes in oil price, when compared with their counterparts in the developed countries.

There are few works on individual countries. For example, on Malaysia, Abdul Rahman, Mohd Sidek, and Tafri, (2009) note that monetary policies variables (proxied by money supply, exchange rate, reserves and interest rate) and domestic supply factor (represented by industrial production) have significant long run effects on Malaysia's stock market. Besides, Azman-Saini, Habibullah, Law, and Dayang-Afizzah (2006) with Granger non-causality test as propose by Toda and Yamamoto (1995) shows that exchange rates lead stock prices in the crisis period. In a related

work, Ibrahim (2000) suggests no long run relationship between stock market and exchange rates. However, Ibrahim (2000) also notes that in the short run, changes in money supply and reserves affect the stock market index.

Evidences abound for the determinants for individual countries in Africa. Solarin and Dahalan (2010a) observe that remittances, RGDP, oil revenue, interest rates, non-oil revenue are major determinants of stock market development in Nigeria. In another study on Nigeria, Rano (2009) examines the long run and short run interactions between stock prices and exchange rate and only establish long run relationship between exchange rate and stock market development. In a study of Zimbabwe stock market, Ilmolelian (2005) shows that exchange rate is an important determinant of stock market development. Adam and Tweneboah (2008b) establish a long run relationship between the lagged values of interest rate and inflation and stock prices in Ghana.

In summary, it is apparent that the macroeconomic determinants of stock market development include interest rate, inflation, exchange rate, saving rate, and financial intermediary development. Non-macroeconomic determinants of stock market development include institutions, remittances, oil and non-oil price. Therefore, the government may concentrate on these in a bid to foster the development of stock market. Hence, in the next section, we briefly review the

institutional efforts aim at promoting stock market development and the consequences in Africa.

2.5 Trend of Stock Market and Economic Development in Africa

Africa is home to 25 percent of the world's resources (Benimadhu, 2010). For example, Ivory Coast and Guinea are the world largest producers of Cocoa and Bauxtile respectively. Libya, Angola and Nigeria are richly blessed with petroleum resources with Nigeria brand-Bonny crude being one of the best quality oil in the world. Despite of all these resources, Africa does not have much to display as sign of development that match these resources. In fact, Africa is the least developed continent in the world. Statistics provide evidence. The average per capita income in 2009 in Africa was 1,126 dollars compared with 22,173 dollars average of High income but non-OECD countries in the same period. In terms of life expectancy at birth, in 2009 the figures for Africa and Euro Area were 52 and 81, respectively. In the same year, the combined GDP for the region was about 946 billion dollars, with a population of almost 840 million people, while the combined GDP for Latin America region was almost 3.996 billion dollars with a less of population of 572 billion people. In comparison with a larger populated region, Africa does not fare better. For instance, while the primary school completion rate was 79 percent in South East Asia, the rate was around 64 percent in Africa (World Bank, 2010).

This precarious situation of Africa is not as recent as the year 2009. For example, the average economic growth rate in Africa in the years 1990 1995 and 2000 were 1.56, 3.11 percent and 3.42 percent. Correspondingly, Asia was able to achieve 5.41 percent, 8.99 percent and 6.65 percent respectively. Even when taking the average of developing countries, in which Africa countries are members, the below-average performance is evident. In the same periods the average of the developing countries are 3.65 percent, 6.11 percent and 5.63 percent respectively (IMF, 2000).

The causes of African economic stagnation are multi-faceted, but one crucial piece of the puzzle is the region's inadequate financial systems (Haber, 2008). Therefore, one way out of this impasse is the development of a viable financial sector, of which stock market development is an integral part. Hence, African policy makers have taken numerous actions to ensure that their respective stock markets do not only complement the banks in provision of liquidity or attract foreign capital inflow but also becoming more integrated to the international capital markets. These reforms include reduction of settlement cycle, automation of settlement and trading systems, regulation, and relaxation of control on foreign participation in the markets.
A summary of the reforms are captured in Table 2.1. The settlement system in the Egypt stock exchange is the best with a cycle of T+2 compare with what is obtainable in Malaysia, where the settlement period is T+3. However, some stock exchanges in Africa are not that fortunate such as the stock exchanges in Kenya and Swaziland

with T+5 settlement cycles. Aside stock exchanges in Swaziland and Botswana, all the stock exchanges have automated trading systems with the stock exchange in Ghana being the latest country to introduce the system in 2009. The authorities in Botswana are currently making frantic effort to ensure that the trading system becomes automated. Evidently, the Johannesburg stock exchange in South Africa appears to be the biggest in terms of market size with 410 listed companies followed by Egypt and Nigeria with 306 and 213 listed companies, respectively (ASEA 2008, 2009). This is confirming Andrianaivo and Yartey (2009) assertion that South Africa and Egypt account for more than 50 percent of all listed companies in the entire continent.

Besides, Table 2.1 indicates that all the stock exchanges in Africa have market regulator. In terms of foreign participation, the stock exchange in Kenya appears to be the best, with 55.8 percent foreign participation in the total value of shares traded. In Botswana stock exchange, foreign investors may own a maximum 55 percent of the share capital issued by a company listed on the exchange (Irving 2005). The table indicates that 39.5 percent of the total transactions are accounted for by foreign individuals and companies. With all these institutional and infrastructural development, there is the need to evaluate the growth of these stock markets in terms of the conventional stock market indicators. Therefore, in Table 2.2, the study moves into trend of these stock market indicators for the period 1990 to 2009.

In Table 2.2, the study start the review of the performances in 1990, because, prior to 1989, there were only eight non-active stock markets in the entire continent of which three were in North Africa and five in sub-Saharan Africa. Currently, there are over 22 stock exchanges in the continent with most stock exchanges still in their embryonic stage. South Africa is obviously different from the other listed stock exchanges, with a market capitalisation ratio of 142.95 percent in 1990-1999 and 216.93 percent in 2000-2009. On the other hand, the average market capitalisation of the other stock exchanges excluding South Africa was 13.62 percent in 1990-1999 and 33.21 percent in 2000-2009. This figure is encouraging in terms of its absolute sense but very meagre compared to emerging country such as Malaysia with an average of market capitalisation of 184.71 percent in 1990-1999 and 151.57 percent in 2000-2009. The statistics of South Africa is thus superior but not surprising as South Africa commands more than 90 per cent of the combined market capitalisation of the entire continent. Moreover, while the total market capitalisation in South Africa was 801.27 billion dollars at the end of 2009, the market capitalisation in Morocco and Ghana were 64.74 billion dollars and 11.15 billion dollars, respectively (Irving 2005; Yartey, 2007; ASEA 2008, 2009; Beck and Demirguc-Kunt, 2009).

If market capitalisation is a problem in stock exchanges in Africa, then liquidity is a greater problem. This is obvious with the value trade ratio and turnover ratio with average values (with the exception of South Africa) of 1.08 percent and 4.37 percent in 1990-1999. In 2000-2009, the ratios marginally improved to 4.37 percent and 9.68

percent, respectively. The exceptions in this case are the largest stock markets in Africa. This includes Egypt stock exchange with average trade ratio of 21.86 percent and turnover ratio of 26.32 percent in the period 2000-2009. This may be partly due to the economic reform drive launched in Egypt in July 2004. Moreover, stock exchanges in Morocco and Nigeria achieve an average turnover ratio of 22.13 percent and 12.37 percent, respectively for the period 2000-2009. Nonetheless, this is less than average value for stock exchange in Malaysia and Mexico with average turnover ratio of 47.17 percent and 29.83 percent, respectively, in 2000-2009. These results are not surprising, as in most of these stock markets, trading occur in only a few stocks which account for a considerable part of the total market capitalization (Yartey and Adjasi, 2007; Beck and Demirguc-Kunt, 2009).

In summary, it is evident that stock markets are improving but are still relatively underdeveloped, despite all the progress made, especially in terms of liquidity. Some identified challenges include political instability in some economies, high volatility in economic growth, macroeconomic uncertainty, liquidity constraints, limited domestic investor base, underdeveloped trading and settlement structures, and limited market information. Bureaucratic inertia, weak regulatory structures and slow clearance procedures are further reasons that these stock markets remain illiquid (Kenny and Moss, 1998). Despite the problems of small size and low liquidity, African stock markets continue to perform remarkably well (Yartey and Adjasi, 2007). For example, between 2007 and 2009, over 10 billion dollar of share capital

was raised across 18 stock exchanges, mostly through the listing of 170 new companies. The ten largest markets in Africa have seen their market capitalization grow from 222 billion dollars to over 700 billion dollars from 2002 to 2008, achieving an annualized growth rate of 18% during this time frame (Benimadhu, 2010). Thus in the next section, we move into the specific efforts of various national stock exchanges in promoting stock market development, starting with the largest market in Africa before proceeding to the other stock exchanges, which are arranged regionally.

2.5.1 Overview of Reforms in National Stock Markets

(a) South Africa-Johannesburg Stock Exchange (JSE)

The Johannesburg Stock Exchange (JSE) was founded in 1887 purposely for the development of the mining industry. A number of initiatives were introduced in the 1990s to improve the efficiency of the exchange. For instance, in 1995, the Stock Exchanges Control Act changed the way in which stocks were traded in South Africa, opening the door to foreigners, and granting the brokers freedom to trade on their own account. Subsequently, a real-time stock exchange news service was launched in 1997 in an attempt to enhance market transparency and investor confidence. In 2000, the Act was updated in line with international best practice prevailing in countries like Australia, Hong Kong, North America and the United Kingdom. Also in the same year, trading system was automated through an electronic clearing and

settlement system- STRATE (Share Transactions Totally Electronic) (Irving 2005; ASEA, 2008, 2009).

In 2001, the JSE merged with the South African Futures Exchange (SAFEX) and thereby becoming the leader in equities, futures and options trading in South Africa. In the same year, new capital adequacy requirements, which have major financial implications for broking firms was developed and are based on European Union requirements and involve the separation of clients' funds from those of brokers. In the year 2002, JSE commenced trading platform arrangements with the London Stock Exchange thus allowing JSE investors access to world-class technology. Hence, the JSE's trading and information systems were replaced with that of the London Stock Exchange. The trading engine and information dissemination feed-handler is hosted in London and connected remotely to the JSE. In December 2003, the JSE launched its Alternative Exchange (AltX) as a specialized tier for high-growth potential SMEs (Irving 2005; ASEA, 2008, 2009). The JSE launched a Social Responsibility Investment Index ('SRI Index') on 19 May 2004 with the announcement of the names of the 51 companies constituting the index. In January and October of the year 2009, new products such as international-referenced commodity offerings were launched (ASEA, 2008, 2009).

(b) Stock Exchanges in North Africa

(i) Egypt-Egyptian Exchange (EGX)

The Egyptian Exchange (EGX) dates back to more than 100 years, as Alexandria Stock Exchange was established in 1883 while Cairo Stock Exchange was established in 1903. For much of its earlier existence however, excessive bureaucracy and regulation render a large proportion of the listed shares illiquid. However, this has changed since the 1990s. For example, Capital Market Law No.95 of the year 1992 was introduced to regulate the capital market in Egypt, which serves as a prelude to the 1993 first phase of Egyptian Privatization Program launched with the successful offering of 75% of Nasr City Housing on the Exchange. Also in 1997, there was a major change in exchange's organization with the appointment of a new board of directors with an ambitious mission to modernize the exchange. In the following year, there was the launching of the exchange's first website. In 1999, the disclosure department was established, whereby investment officers of listed companies can provide timely and useful information to the Exchange. Between the year 2000 and 2003, there was the establishment of Settlement Guarantee Fund to ensure timely settlement of transactions; and Egypt Information Dissemination Company (EGID) to disseminate information to the market (ASEA, 2008, 2009).

Between 2004 and 2009, the stock exchange signed Memorandum of Understanding with nine different stock exchanges including Korea, Shangahi, Muscat, Casablanca, Khartoum and Italian stock exchanges. In 2007, it changed its settlement of securities duration to T+2 instead of T+3 cycles. It remains the only stock exchange in Africa,

on this platform. In order to improve the services to local as well as foreign investors, EGX, in 2009, launched EGX 70 Price Index, which tracks the performance of the 70 active companies, after excluding the 30 most active constituent-companies of EGX 30 Index. In addition, EGX started computing EGX 30 Index in US dollar terms, which helps in comparing stock exchange performances or alternative investment instruments (ASEA, 2008, 2009). Currently, Egypt has the second largest stock market in Africa after South Africa.

(ii) Morocco- Casablanca Stock Exchange (CSE)

Similar to Egypt, Morocco has a relatively old stock exchange, established in 1929 and was inactive for long period. CSE was transformed by developments during the 1990s, with an extensive series of reforms including a new legal framework, reduction of commission rates, introduction of an electronic trading system, and the establishment of a (paperless) central securities depository. For example, in 1993, listed companies were obliged to publish their financial statement. Moreover, in the year 1997, there was the launching of a new electronic-based trading system. In 1998, the central depository was established. Four years later, the CSE exchange adopted a clearing system. Adoption and application of new listing requirements was introduced in 2004 and 2005 for five different types of markets, including bond, equity and futures markets. In April 2009, the CSE officially adopted new corporate governance code. Subsequently in 2010, CSE organised a road show over the major cities in Morocco, which attracted more than 300 companies (ASEA, 2008, 2009).

(iii) Tunisia - Tunis Stock Exchange (TSE)

Actually, TSE was created in 1969 as a public institution. However, TSE remained dormant until 1988, when major reforms process began as part of efforts to liberalize the entire economy. In 1994, the government undertook a detailed reorganization of the financial market especially on overseeing of the stock markets. Subsequently, in 1995, the TSE was turned into a public limited liability company and in 1996 TSE started electronic trading system to ensure efficiency and transparency in the pricing of securities. There was the launching of the index-TUNINDEX in 1998 and in 2007; an Alternative Market for small and medium sized companies was created (ASEA, 2008, 2009).

(c) Stock Exchanges in West Africa

(i) Nigeria- Nigeria Stock Exchange (NSE)

Similar to other former colonies, the British introduced stock markets in Nigeria (Pace and Trimbath, 2002). For instance in 1946, colonial administration floated three hundred British Pounds of Bonds in Nigeria. However, activities in the capital markets began with constitution of the exchange in 1960 and in 1961; a law was enacted to this effect. Most of the reforms in the Nigeria stock exchange started in the 1980s. For instance, second-tier market was introduced in 1985 to ensure small and medium scale enterprises have access to fund on the stock exchange. Subsequently, in 1992, Central Securities Clearing System was introduced in the Nigeria stock exchange. The Exchange was deregulated in 1993 thereby making

prices determination of new issues the responsibility of issuing houses and stockbrokers, while the secondary market prices are made by stockbrokers only. Among the other reforms include the promulgation of Investment and Securities Act of 1999, Trade Guarantee Fund and T+3 settlement cycles in 2000; and e-Business Platforms in 2002. In 2005, the exchange initiated integration with international capital markets by partnering with the stock exchanges of Ghana, Kenya and more interestingly South Africa. The Exchange commissioned the following branches: Ilorin branch, Kwara State Electronic Trading Floor on Monday January 14; Onitsha branch, Anambra State on Friday, February 15; Abeokuta branch, Ogun State on Monday, November 17, 2008 (ASEA, 2008). In order to encourage scholastic works, Nigeria stock exchange launched a new publication titled Nigerian Journal of Securities and Finance (NJSF) in January, 2009. The NSE is an affiliate member of the World Federation of Exchanges (WFE) (ASEA, 2008).

(ii) Cote D'Ivoire West Africa Stock Market (BVRM)

The West African Monetary Union (WAMU) treaty of 1973 culminated in the establishment of West Africa Stock Market (BVRM) in 1998, after a legal constitution was set up in 1996. In the following year, quotations became electronic. In 2001, daily trading was introduced as against the previous 3 days per week trading. Trading is decentralised so member countries can trade concurrently from their national bourse through remote links.

(iii) Ghana-Ghana Stock Exchange (GSE)

Like the Sierra Leone Stock Exchange, the Nigeria Stock Market facilitated the establishment of the Ghana Stock Exchange (GSE) in 1990. Though inaugurated and commenced trading on the November 12, 1990, GSE was officially launched on January 11 1991 and became a public company limited by guarantee in April 1994. A Council governs the GSE Exchange and act as the Board of Directors with all powers and functions of a Board under the Companies Code (ASEA, 2008, 2009).

(d) Stock Exchanges in Southern Africa

(i) Botswana- Botswana Stock Exchange (BSE)

The BSE was officially established in 1989 and has since then remains a fundamental component to Botswana's financial system. The companies listed represent a range of industries and commerce, from banking and financial services to tourism and information technology, wholesaling and retailing. Hence, in 1994, the government of Botswana promulgated the Stock Exchange Act No 11 of 1994. Among the focus of this act includes relations between the Registrar, the exchange and members of the exchange on the one hand and regulatory agencies and the Exchange on the other hand. There are also pre-listing and post-listing requirements imposed on the issuers of listed Securities. In order to promote effectiveness of the exchange, there have been efforts to introduce new ideas and products. For instance, BSE organised Road show in 2008. Besides, dematerialisation of shares have

commenced with over 34 percent of domestic company shares dematerialised as at 31 December 2009 (ASEA, 2008, 2009).

(ii) Mauritius-Stock Exchange of Mauritius (SEM)

Established in 1989, SEM is responsible for the operation and promotion of an efficient and regulated securities market in Mauritius. The SEM has been successfully demutualised. Trading, clearing and settlement on the SEM are fully automated. The exchange's central depository system (CDS), operating since 1997, provides delivery versus payment on a T+3 basis (Irving 2005). The SEM's automated trading system (SEMATS) has been operating since 2001 and is closely linked with the CDS (Irving 2005). In order to ensure parity and transparency in pricing of securities, the Board of the SEM and SEM Management Committee govern the SEM. The SEM has emerged as one of the leading small Exchanges in Africa (ASEA, 2008, 2009).

(iii) Swaziland- Swaziland Stock Exchange (SSX)

In Swaziland, the idea of having a stock market was conceived in 1989. The operations of the stock market soon started but acted as an over the counter-single broker facility, working in the shadow of the much bigger JSE, for eight years. However, in 1999, the stock market in Swaziland became a fully-fledged stock exchange and known as the Swaziland Stock Exchange (SSX). In order to attract foreign participation, non-residents are not subject to any special restrictions on their investments in securities on the SSX.

(e) Stock Exchanges in East Africa

(i) Kenya-Nairobi Stock Exchange (NSE)

Having commenced operations in 1954, the Nairobi Stock Exchange (NSE) is the oldest and largest securities exchange in East and Central Africa. However, there was a lull in market activities until the 1990s. Like the stock markets in GSE, it is limited by guarantee and is at present the sole securities exchange in Kenya, licensed by the Capital Markets Authority (Kenya). With the aim of encouraging foreign participation, in 1995, the government lessen the restriction of foreign ownership in local companies. In 1996, the largest share issue in the history of NSE, the privatization of Kenya Airways, happened in the market, in which NSE had its largest share issue with about 110,000 shareholders acquiring stake in the airline. With a view to further attract more foreign participation, in the year 1998, a number of incentives were introduced by the government, which include tax-free venture capital funds, removal of capital gains tax on investments by insurance companies and allowance of beneficial ownership by foreigners in local stockbrokers and fund managers. In 2006, live trading on the automated trading systems of the Nairobi Stock Exchange was implemented. The exchange has three market tiers: Main Investments Market Segment, Alternative Investment Market Segment, and Fixed Income Securities Market Segment (Irving, 2005). The process of demutualisation is in progress (ASEA, 2008, 2009).

CHAPTER 3

DATA AND METHODOLOGY

3.1 Derivation of the Model[9]

The chapter commences with the derivation of the model in consonance with the theoretical framework and survey of literatures in the previous chapter. The traditional Solow growth model can be specified as follows:

$$Yt = f\,(K(t)L(t)A(t)) \tag{3.1.1}$$

, which shows that the aggregate output (Y_t) depends on capital stock $K(t)$, labour $L(t)$ and technology $A(t)$. According to the model, these are the three sources of improvement in aggregate output. However, in the model, it is believed that technology is labour augmenting and does not affect output directly. Hence, we have:

$$Y(t) = f\,(K(t)\,(A(t)L(t)) \tag{3.1.2}$$

The $A(t)L(t)$ shows labour efficiency, which measures the labour factor, is not in physical units, but in terms of the efficiency of those physical units of labour.1 However, in order not to overstate the contribution of labour, Mankiw et al. (1992) introduce the human capital component.

[9] We appreciate the comments of Prof. Alfonso Novales, of Departamento de Economía Cuantitativa Universidad Complutense Campus de Somosaguas, Spain (the co-author of Economic Growth: Theory and Numerical Solution Methods, Springer-Verlag Berlin Heidelberg) on the earlier draft of this section.

$$Y(t) = f\,(K(t)H(t)\,(A(t)L(t)) \tag{3.1.3}$$

$H(t)$ is the human capital variable. We further augment the model in order to cater for stock market development. Hence we assume that capital is contributed by two sectors- banking sector and stock markets in line with studies of Khan (2000), Koubi (2008), Bolbol et al. (2005), Caporale et al. (2004, 2005) and Cooray (2010). We divide $K(t)$ into $S(t)$ and $B(t)$, where $S(t)$ is the stock market development variable and $B(t)$ is the banking development variable. This leaves us with:

$$Yt = f\,(S(t)\,B(t)\,H(t)\,(A(t)L(t)) \tag{3.1.4}$$

In the line with Cobb-Douglas production function, (3.1.5) can be rewritten as:

$$Y(t) = S(t)^{\alpha}B(t)^{\beta}\,H(t)^{\gamma}(A(t)L(t))^{1-\alpha-\beta-\gamma} \tag{3.1.5}$$

Taking log on both sides of (3.1.5)

$$\ln y(t) = a_0 + \alpha \ln S(t) + \beta \ln B(t) + \gamma \ln H(t) + 1 - \alpha - \beta - \gamma\,(A(t)L(t)) + e_t \tag{3.1.6}$$

Then the steady state level of per capita output in logarithmic form is

$$\ln\left[\frac{Y(t)}{L(t)}\right] = \ln A(0) + gt + \frac{\alpha}{1-\alpha-\beta-\gamma}\ln ss + \frac{\beta}{1-\alpha-\beta-\gamma}\ln sb + \frac{\gamma}{1-\alpha-\beta-\gamma}\ln sh - \left(\frac{\alpha+\beta+\gamma}{1-\alpha-\beta-\gamma}\right)\ln\,(n+g+\delta) \tag{3.1.7}$$

The study denotes the share of stock market development in the physical output with ss, the share of banking sector in the physical output is denoted with sb and the share of human capital development is denoted with sh. Besides, $A(t)$ and $L(t)$ grow exogenously at g and n respectively. The rate of capital depreciation is δ. In line with Mankiw et al. (1992), we assume that the growth rate of technology is country specific, so that we have:

$$\ln A(0) = a_0 + e_t , \tag{3.1.8}$$

where a_0 is constant and e is country specific effect. Hence, we have successfully dumped technology into the regression error term. After taken care of technology, the following equation is plausible

$$\ln\left[\frac{Y(t)}{L(t)}\right] = a_0 + a_1 \ln ss + a_2 \ln sb + a_3 \ln sh + a_4 \ln(n + g + \delta) + e_t \tag{3.1.9}$$

In the long run, steady state is assumed where all variables are assumed to grow at the same rate. Initially, the convergence hypothesis clearly deals with economies that have such characteristics[10]. However, this has been refined to accommodate countries with different steady states (Valdes, 1999:61; Novales, Fernandez and Ruiz, 2009:73), which is called conditional convergence in literature, because convergence is conditional on the different structural characteristics (Martin and Sunley, 1998). Therefore, the speed of convergence is expressed as:

[10] The is referred to club convergence-that is, the hypothesis that only countries that are similar in their structural characteristics and that have similar initial conditions will converge to one another

$$\frac{d \ln y(t)}{dt} \cong (1-\alpha-\beta-\gamma)(n+g+\delta)(\ln y^{*} - \ln y(t)) \quad (3.1.10)$$

While y^{*} is the steady state level of output per worker, y is the level of output per worker. Then the relationship between the two levels of output per worker can formally be written as

$$\ln y(t) = \left(1 - e^{-\lambda t}\right) \ln(y^{*}) + e^{-\lambda t} \ln y(0). \quad (3.1.11)$$

Therefore, we have the following equation:

$$\ln y(t) - \ln y(0) = \left(1 - e^{-\lambda t}\right) \frac{\alpha}{1-\alpha-\beta-\gamma} \ln ss + \left(1 - e^{-\lambda t}\right) \frac{\beta}{1-\alpha-\beta-\gamma} \ln sb +$$
$$\left(1 - e^{-\lambda t}\right) \frac{\gamma}{1-\alpha-\beta-\gamma} \ln sh - \left(1 - e^{-\lambda t}\right) \frac{\alpha+\beta+\gamma}{1-\alpha-\beta-\gamma} \ln (n+g+\delta) - \left(1 - e^{-\lambda t}\right) \ln y(0) \quad (3.1.12)$$

The study re-presents (3.1.12) as follows:

$$\ln y(t) - \ln y(0) = a_0 + a_1 \ln ss + a_2 \ln sb + a_3 \ln sh + a_4 \ln y(0) + a_5 \ln (n+g+\delta) + e_t \quad (3.1.13)$$

This is the simple conditioning information set as described by Beck and Levine (2004). It represents the basic elements that determine the growth rate of per-capital income. These are the initial income, banking sector development, stock market development, human capital development and population growth. However, the study provides for other important variables, which are not completely relegated into error term. According to Valdes (1999:66), inclusion of additional variables into the policy conditioning information set should be based on how they relate to the level of technology. In other words, instead of dumping all the country specific

technology into the error term altogether it should be proxy by an appropriate combination of variables. Hence,

$$e_t = z + u \tag{3.1.14}$$

However, we make the assumption that z varies and affects the per capital income, while u is country specific. Therefore, this leads us into the policy conditioning information set equation.

$$\ln y(t) - \ln y(0) = a_0 + a_1 \ln ss + a_2 \ln sb + a_3 \ln sh + a_4 \ln y(0) + a_5 \ln (n + g + \delta)$$

$$+ a_6 \ln z + u \tag{3.1.15}$$

z is the vector of other important variables that include foreign direct investment, investment, inflation rate, interest rates and government consumption expenditure. Both (3.1.13) and (3.1.15) are utilized in our empirical study of the relationship between the stock markets and economic growth in some selected countries in Africa. The framework is graphically represented in Figure 3.1 in the appendix.

3.2 Data

The variables enumerated in the preceding section are given cursory look in this ensuing section. For example, following the work of Durham (2000) and with the exception of the initial income for each sub-period, we construct a panel with data averaged over 3-year interval from 1990 to 2009[11][12]. According to Beck and Levine

[11] The last interval 2008-2009 is an exception as it is only a two-year period. In this case, we construct data averaged over 2-year interval.

(2004), using data over such a long interval addresses the problem of business cycle as against the use of annual or quarterly data do not provide for business cycle. The study uses the resulting data for the panel data analysis. However, some authors have tagged the panel or cross-section frameworks as having broad-brush picture of the relationship between financial development and growth; misses out many important details and may exaggerate the contribution of stock market to economic growth (Arestis et al., 2001; Luintel et al., 2008). Therefore, we also conduct time series analysis based on quarterly data, which we construct according to the procedures introduced by Gandolfo (1981) and Lisman and Sandee (1964)[13]. Before moving into the details of the methods, we discuss the variables in details as contained in the subsequent section.

3.2.1 Economic Growth

In this study, our dependent variable is real growth rate of per capita income as contained in the *World Development Indicators* (2010) data set. We utilize the real growth rate denominated in dollars because of the cross sectional nature of the study.

[12] However, data on Botswana and Ghana are available for 1991-2009 period, while that of Swaziland are available for 1990-2008 period. Therefore, we utilize two-year interval for Botswana and Ghana for the 1991-1992 period and one-year interval for Swaziland for 2008-2009 period

[13] The procedures simply involve the disaggregation of three consecutive annual observations of a continuous flow variable to produce quarterly data, base on integral procedures. We resort to disaggregation due to shortage of annual data to conduct our time series analysis.

3.2.2 Stock Market Variables

There are many indicators of stock market development. Nevertheless, there is no theoretical justification for the superiority of any of these variables[14]. Moreover, using a variety of measures provides a richer picture of the potential links between stock market and growth than if a single measure is used (Mohtadi and Sumit, 2004). As evident in past literatures, three variables are eminent. Therefore, we initially utilise three different measures as evident in past literatures in our panel analysis.

(a) Market Capitalisation

This refers to the market value of listed shares divided by GDP[15]. The rationale behind this measure is that the overall market size is positively correlated with the ability to mobilize capital in an economy (Yartey, 2007). The measure is not entirely reliable, as theory does not suggest that mere listing of shares will influence resource allocation and growth and market capitalisation is not a good predictor of economic growth (Levine and Zervos, 1998; Beck and Levine, 2004). Nevertheless, there are empirical evidences on the usage of this indicator as proxy for stock market development[16].

[14] While Beck and Levine (2004) support turnover ratio, Rousseau and Watchel (2000) prefer market capitalisation ratio and value of shares traded ratio.

[15] We source part of the data from Beck and Demirgüç-Kunt, (2009) that provide for stock-flow problem between the numerator (market capitalisation, which is a stock) and denominator (GDP, which is a flow). Where applicable we extended the same techniques to the data sourced outside Beck and Demirgüç-Kunt, (2009). The deflation technique is as:{(0.5)*[Ft/P_et + Ft-1/P_et-1]}/[GDPt/P_at] where F is stock market capitalization, P_e is end-of period CPI, and P_a is average annual CPI

[16] See Arestis et al. (2001), Caporale et al. (2004, 2005) and Adjasi and Biekpe (2006)

(b) Trade Ratio

This refers to total value of shares traded on the stock market exchange divided by GDP. This stock market indicator complements and improves the market capitalization ratio as it considers the trading on the stock market to the economy at large. In essence, the total value traded ratio complements the market capitalization ratio because the market may be large, but trading might be insignificant. This indicator is noticeable in previous literatures[17].

(c) Turnover Ratio

Building upon the deficiencies of the previous methods, this measures the total value of shares traded divided by market capitalization[18]. Literatures view high turnover ratio as an indicator of low transaction costs on the one hand and on the other hand, as an internal measure as its derivation does not require any variable outside the stock markets. The turnover ratio further complements the market capitalization ratio. This is because an inactive market may have large market capitalization ratio but a small turnover ratio. Turnover also complements the total value traded ratio. This is due to the fact that a small liquid market will have a high turnover ratio but a small total value traded ratio. Hypothetically, liquid stock market

---

[17] Rousseau and Wachtel (2000), Adjasi and Biekpe (2006) and Mohtadi and Agarwal (2004)

[18] The approach is similar to the market capitalisation ratio.

attracts large amount of savings and consequently an increase in economic growth via investment. Previous literatures adopt turnover ratio as an indicator of stock market development[19].

3.2.3 Bank Credit (Higher Bank Credit)

In this study, we adopt bank claims on the private sector by deposit money banks divided by GDP as banking development indicator, following the works of Levine and Zervos (1998), Arestis et al. (2001), and Beck and Levine (2004)[20]. Unlike the ratio of money supply to GDP as an empirical proxy of banking development, the variable isolates bank credit to the private sector and therefore excludes credits by development banks and loans to the government and public enterprises. In Africa, banks are more developed, matured and advanced than the stock markets (Kenny and Moss, 1998). To this extent, most countries traditionally depended on the banking system (Hearn and Piesse, 2010). Hence, in line with Yartey (2008), we provide for a higher level of banking development by including the square of banking development ratio in the panel analysis.

3.2.4 Mortality Rate

Conventionally, human capital development is always proxy by education attainment figures, especially with the school enrolment rate. This is not appropriate

[19] See Beck and Levine (2004) and Yartey (2007)

[20] The deflation techniques of Beck and Demirgüç-Kunt, (2009) are also applied in this case.

in all situations. A good example is Africa. Firstly, enrolment does not mean accomplishment of that level of education. This is because dropout is prevalent in Africa. In fact it is estimated that in 2001, 325 million children dropout of school. In Ghana, the ratio of trained male teachers was about 45 percent and 40 percent in 2007 and 2008 respectively (World Bank, 2010). Moreover, health issues are more serious than education. For example, in 2007, number of people living with HIV in Africa was 22 million compared to the global toll of 33 million. In South Africa alone, the toll was 5.7 million for the same period. Besides, the percentage of adult living with the disease was 5.0 percent in Africa compare with 0.8 percent in the world (Kaiser, 2008). Fortunately, this measure may capture other elements of human capital development, as lower rates of infant and child mortality and higher literacy rate are correlated in most countries. Therefore, we measure the human capital development as infant mortality. We expect a negative relationship between the human capital development indicator and economic growth.

3.2.5 Initial Income

Convergence hypothesis implies that subsequent per capita incomes have negative relationship with the initial income level. The hypothesis is attributable to Solow (1956) in which countries are expected to catch-up with each other in the development process. In the empirical works on financial development including stock markets, initial income featured prominently as part of the control variables. For example, Berthelemy and Varoudakis (1997), Rousseau and Sylla (2001), Beck et

al. (2000) and Guiso, Sapienza and Zingales (2002) provide for convergence. Hence, in the study we provide for convergence by including the initial income in the panel baseline model.

3.2.6 Population Growth Rate

In the classical growth models, population growth rate is assumed to have a negative relationship with the economic growth (see Solow 1956; Mankiw et al., 1992). In the empirical literatures of finance-growth nexus, many authors have included population as control variable. The works include Guiso et al. (2002), Atje and Jovanovic (1993), Harris (1997) and Bassanini, Scarpetta and Hemmings (2001). Therefore, we consider the importance of population growth in our model[21].

3.2.7 Control variables

(a) Government Consumption Expenditure

The proxy variable is the ratio of government consumption expenditure divided by the GDP. The variable measures the level of government involvement in the economy. Boyd and Smith (1996) argue that a fundamental characteristic of a developing country is government control, which is measured by the level of government expenditure. Besides, Beck et al. (2000) add a proxy for the size of government in their work on the relationship between stock market and economic

[21] It actually consists of three components-population growth rate, the growth rate of technology, and the rate of depreciation. We follow the works of Mankiw et al. (1992) Keller and Panu (2005), Ram (2007) by assuming that technology growth is 0.02 and depreciation 0.03, which are added to the population growth rate.

growth. Nzue (2006) shows that for Cote D'Ivoire stock market and economic growth are only cointegrated with the addition of control variables, including the government expenditure. We expect the government consumption variable to capture public expenditures that do not directly affect productivity but entail distortions on private decisions i.e. crowding out effect. Therefore, in our study, we expect the coefficient to be negative (see Naceur and Ghazouani, 2007).

(b) Foreign Direct Investment

As against the concept of autarky, most economies are opened. However, openness differs across countries. Opened economies attract more capital inflow than the less opened ones. Literatures expect the openness to spur economic growth through the stock markets or other means (see Adam and Tweneboah, 2008a). Foreign direct investment is an indicator of the degree of openness. The significance of the variable implies that foreign direct investment does not affect growth through the stock market (Mohtadi and Sumit, 2004). Hence, we use foreign direct investment as a control variable since foreign direct investment is a determinant of economic growth. Studies that adopt foreign direct investment include Sumit (2001) and Mohtadi and Sumit (2004) who utilize it as a measure of capital inflows. Besides, Nzue (2006) shows that for Cote D'Ivoire stock market and economic growth are not cointegrated except with the addition of control variables, including the foreign direct investment.

(c) Macroeconomic Stability

Macroeconomic indicators, which in some cases serve as conduit for monetary and fiscal policies affect economic growth. Prominent among these indicators are interest rates and inflation. While a limited amount of inflation is necessary for the economic growth, however, excessive inflation might mitigate economic growth with or without stock markets. Moreover, Bruno and Easterly (1998) and Easterly (1996) have suggested that the negative relationship between inflation and growth holds only for high-inflationary economies. Inflation does not seem to be equal among countries with different economic structure. For example, Khan and Senhadji (2001) demonstrate that the inflation threshold tends to be higher in developing countries, with threshold estimates falling in the 7-11 percent range against a conservative 1-3 percent for industrial countries, indicating that inflation is more prevalent in developing countries of which Africa is a subset. In the finance-growth parlance, key studies that included inflation are Berthelemy and Varoudakis (1997), Garcia and Liu, (1999), Levine, et al. (2000), Beck, Loayza and Levine (2000) and Rousseau and Watchel (2002). It is expected that interest rates will have negative relationship with the economic development through investment. This is because interest rate is usually lowered by the authorities to stimulate the economy and vice versa. To this extent, interest rates serve as tool of monetary policy. In this study, we adopt current inflation and real interest rates as measure of macroeconomic stability (see Garcia and Liu, 1999; Yartey, 2008). We expect these two measures to be negative.

(d) Investment

Levine (1991) suggests that stock market can indirectly affect economic growth through investment. Due to the importance of investment studies such as Japelli and Pagano (1994), Berthelemy and Varoudakis (1997), De Gregorio and Guidotti (1995) Atje and Jovanovic (1993) and Harris (1997) add proxies of investment as control variable. Therefore, we consider investment as a control variable in the model. The study proxies investment with the ratio of real capital formation divided by the GDP.

(e) Money Supply

The money supply ratio to the GDP is an indicator of the banking sector size in relation to the economy as a whole (Garcia and Liu, 1999). The indicator has been used in past literatures to serve as banking development indicator, despite its deficiency that it does not separate credit to the government from those to the private sectors (see King and Levine, 1993a; Levine and Zervos, 1998). Hence, in this study we adopt this variable to complement the banking claim on private credit.

3.3 Sources of Data

The study obtains substantial portion of the data from *World Development Indicators* (2010) of the World Bank, *Global Market Information* and the financial structure database of Beck and Demirguc-Kunt (2009). The additional sources include central bank of Nigeria for data on government consumption expenditure and

investment in Nigeria. Besides, we augment the data on the stock market indicators with those available in the websites of Swaziland, Mauritius and Casablanca stock exchanges, central bank of Nigeria and African Securities Exchanges Association Yearbook, 2008 and 2009 editions. We also source the interest rates data for Ghana and Tunisia from International Financial Statistics (IFS) and those of Cote D'Ivoire from United Nation Development Programme (UNDF).

3.4 Data Processors

In this study, we utilise EViews 6.0 for the panel unit roots and cointegration techniques, PCGIVE 10 to process the dynamic panel properties of the data, and Gretl 19.3 for the static panel analysis. In addition, we use the Microfit 4.1 for the ARDL and to process the time series dimension of the data.

3.5 Research Methods

3.5.1 Descriptive Analysis

We stimulate our econometrics approach with a battery of descriptive analysis, which includes the use of correlation coefficients and graphs to determine the dimension of key variables.

3.5.2 Panel Data Approach

Traditionally, analysis on panel data are substantially based on the pooled OLS, fixed effect or the random effect methods (see Yartey, 2008). However, these

methods have some methodological problems. The first problem is that the estimates of the pooled OLS method suffer from biasness and inconsistency resulting from correlation of the lagged dependent variable (in our case the initial income) with individual specific effects and probably with the residuals. On the other hand, the fixed effect method eliminates the individual specific effects; however, the lagged dependent variable (in our case, the initial income) by design, remains correlated with residuals. Besides, inference with the fixed effect estimator is potentially more sensitive to nonnormality, heteroscedasticity, and serial correlation in idiosyncratic errors (Wooldridge, 2009:488). Lastly, demeaning used in generating transformed variables for random effect model causes the correlation of quasi-demeaned dependent variable with the quasi-demeaned residuals thus leading to possibility of biasness and inconsistency of the random effect model (Asterious and Hall, 2007:357). Another problem faced by these methods is that they do not provide for spurious regression. From the knowledge of time series analysis, it is obvious that using the results generated from non-stationary data may lead to inconsistency, invalid statistical inference and therefore incorrect conclusions. The problems associated with the conventional panel data techniques are solvable in several ways. In this study, we adopt two advanced methods.

3.5.2.1 GMM Methods

In the first step, we employ the internal instrumental procedures as proposed by Arrelano and Bond (1991), Arrellano and Bover (1995) and Bundell and Bond

(1998a) popularly called the GMM estimation. Initially formalized by Hansen (1982), GMM are called internal instruments because they rely on previous realizations of the explanatory variables. According to Baum, Schaffer and Stillman (2003), GMM estimator is more efficient than the simple instrumental variables. Moreover, the use of exclusively strictly exogenous explanatory variables has been imperfect, fairly due to the complexity in finding truly exogenous variables that can be convincingly regarded a priori as being uncorrelated with the individual effects, and partly due to the difficulty in finding strictly exogenous variables at all (Arrelano and Bond, 1998b). Besides, GMM does not require complete knowledge of the distribution of the data. Only specified moments derived from an underlying model are needed for GMM estimation. As against the traditional panel techniques, GMM relaxes the assumptions of both serial correlation and heteroscedasticity. Thus, under weak distributional assumptions, the methods of moments are ideal in obtaining parameter estimators that are unbiased and consistent. Hence, in cases where these are present then GMM is more efficient (Wooldrigde 2001).

Procedurally, it simply works by adding moment conditions under the assumption that past values of explanatory variables or even past values of the dependent variables are uncorrelated with the error term (Wooldrigde, 2001). To control for the potential endogeneity of the variables we intend to use the dynamic panel estimator of Arellano and Bover (1995) and Blundell and Bond (1998a). In our case, this dynamic panel estimator also allows us to control for econometric problems

that arise from the inclusion of the initial per capita income as an explanatory variable. This estimator involves estimating the equations in levels and in differences. Next, we review some highlights of the GMM. Hence, we specify the basic equation as below;

$$y_{1,t} - y_{i,t-1} = (\alpha - 1)y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{it} \quad (3.2.1)$$

where y denotes the logarithm of real per capita GDP, X is the set of explanatory variables (other than lagged per capita GDP), η is an unobserved country-specific effect, ε is the error term, and the subscripts *i* and *t* represent country and time period, respectively.

$$y_{1,t} = \alpha y_{i,t-1} + \beta' X_{i,t} + \eta_i + \varepsilon_{it} \quad (3.2.2)$$

In order to eliminate the country-specific effect, Arrelano and Bover (1991) suggest the first difference as follows:

$$(y_{1,t} - y_{i,t-1}) - (y_{i,t-1} - y_{i,t-2}) = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta'(X_{i,t} - X_{i,t-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (3.2.3)$$

Like the fixed-effect method, the differencing has removed the country-specific, however it has also succeeded in creating a new bias in the new error term $\varepsilon_{it} - \varepsilon_{it-1}$, which by default is correlated with the lagged dependent variable $y_{i,t-1} - y_{i,t-2}$. With the assumption that the explanatory variables, *X*, are weakly exogenous and the error term is not serially correlated, Arrelano and Bover (1991) suggest the following moment conditions:

$$E[y_{i,t-s} - \Delta(\varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2;\ t = 3,.....T \quad (3.2.4)$$

$$E[X_{i,t-s} - \Delta(\varepsilon_{i,t})] = 0 \quad \text{for } s \geq 2;\ t = 3,.....T \quad (3.2.5)$$

However, this difference estimator is not without its own shortcomings. For example, Blundell and Bond (1998a) show that when the explanatory variables are persistent over time, then lagged levels of these variables are weak instruments for the regression equation in differences. This weakness affects the asymptotic and small-sample performance of the difference estimator. Asymptotically, the variance of the coefficients increases. In small samples, the instruments can produce biased coefficients (Arrelano and Bover, 1995; Blundell and Bond, 1998a). Besides, cross-country relationship is eliminated in the difference estimator (Beck and Levine, 2004).

In contrast, our study involves a small sample and tries to examine cross-country relationship. Therefore, we adopt an alternative estimator that merges the regression in differences with the regression in levels in a system (Arellano and Bover, 1995; Blundell and Bond, 1998a). The instruments for the regression in differences are similar to those pinpointed above. However, the instruments for the regression in levels are the lagged differences of the corresponding variables.

Based on the assumption that there is no correlation between the differences of these variables and the country-specific effect, which may correlate with the levels of the right-hand side variables Arrellano and Bover (1995) suggest the following additional moments

$$E\left[y_{i,t-s} - y_{i,t-s-1}\left(\eta_i + \varepsilon_{i,t}\right)\right] = 0 \quad \text{for s = 1; t = 3,……..T} \tag{3.2.6}$$

$$E\left[X_{i,t-s} - X_{i,t-s-1}\left(\eta_i + \varepsilon_{i,t}\right)\right] = 0 \quad \text{for s = 1; t = 3,…..…..T} \tag{3.2.7}$$

Relying on these four moment conditions- (3.2.4), (3.2.5), (3.2.6), and (3.2.7), we use the one-step GMM estimator because Arellano and Bond (1991) and Blundell and Bond (1998a) have shown that the two-step estimators are biased downwards[22]. In addition, Monte Carlo evidence suggests that one-step GMM estimator in most cases produces more efficient estimates than the alternative two-step estimators (Rousseau and Watchel, 2000).

In order to check the robustness of our estimators, we consider five specification tests. We start with the Wald tests. The first Wald test (Wald Joint) is for the joint significance of all the variables except the constant (which has its own dummy). Thus, this is analogous to the overall F-test. Therefore, the rejection of the null hypothesis of this test implies that the variables are jointly significantly, though individually this may not be so. The second Wald test (Wald Dummy) concentrates on the significance of the constant term, and is just the squared t-value. The third Wald test (Wald Time) focus on the joint significance of the time dummies, which are added to the regressors to account for time-specific effects. Besides, we consider the Sargan test of over-identifying restrictions to test the overall validity of the instruments in the system[23]. Large number of instruments might bias Sargan test

[22] small sample size

[23] The null hypothesis of Sargan test is that the instrumental variables are uncorrelated with the residuals.

downward (Beck and Levine, 2004). In order to control for this, we only include one additional policy variable at a time rather than including them at once.

The last test is to ensure that our results are serial correlation free. Therefore, we conduct autoregressive tests on whether the errors in the first-difference regression exhibit serial correlation. In line with previous works, we test whether the models show signs of first-order serial correlation and second-order serial correlation. The failure to reject the null hypotheses, especially of no second-order serial correlation validates the model.

3.5.2.2 Panel ECM

In addition to the GMM method enumerated above, we examine the panel stationarity and cointegration properties of the variables under study in order to determine possible panel short run and long run relationships. Hence, analogous to the time series, it is important to know the stationarity properties of the data to ensure that incorrect inferences are not made. Besides, Blundell and Bond (1998a) show that biases can be dramatically reduced by exploiting reasonable stationarity restrictions on the initial conditions process. However, the conventional panel data techniques do not provide for these properties. Hence, in this study we supplement the GMM – system approach with the methods that examines the stationarity and cointegration properties of panel data. The methods allow for determining the short run and long run structure of our growth function in a panel setting. Most importantly, these

innovative panel data techniques allow for heterogeneity in coefficients and dynamics across countries, and allow one to test directly for the existence of long run equilibrium (Kelly and Mavrotas , 2003).

In this study, we adopt three types of panel unit root tests, which include Levin, Lin, and James-Chu, (2002), ADF Fisher as proposed by Maddala and Wu (1999) and ADF-PP as proposed by Choi (2001). The beauty of all these tests is that they tend to improve on each other. The Levin et al. (2002) test is simply the (usually) augmented Dickey Fuller tests for unit roots, with the assumption that there is a common unit root process across cross-sections. Besides, Fisher-ADF and PP tests allow for individual unit root processes so that stationarity may vary across cross-sections. Therefore, the alternative hypothesis in the case of the Fisher-ADF and PP tests is that some cross section are without unit roots and that of Levin et al. (2002) is that of no unit root. Specifically, Maddala and Wu (1999) relax the assumption of balanced panel data. With critical values that are less sensitive to the choice of lag lengths in the ADF regression, a non parametric unit root test is introduced as follows:

$$\lambda = -2\sum \ln(\pi_i) \tag{3.2.8}$$

In (3.2.8) π_i is the probability value of the test statistic for a unit root in unit i, and λ is asymptotic and distributed as χ^2 with 2N degrees of freedom. Next is cointegeration test, which affords the opportunity of identifying possible long run relationships. In this study, we use two methods of cointegration tests, which are Pedroni (1999, 2004) and Kao (1999). These are generalizations of Engle and

Granger (1987) residual approach. In particular, Pedroni (1999, 2004) provide for heterogeneous panels and employs the residuals resulting from the panel mimic of the Engle and Granger approach, to construct the following test statistic:

$$\eta = [k_{NT} - \mu\sqrt{N}]/\sqrt{v} \quad (3.2.9)$$

where μ and v are Monte Carlo generated adjustment terms.

With the cointegration tests, we generate a VECM, which on the one hand is subjected to various diagnostics test and on the other hand is used to produce a panel based Granger Causality test.

3.5.3 Time Series Approach

For the time series study, we apply the ARDL approach as enunciated by Pesaran and Shin (1999) and extended by Pesaran et al. (2001). There are several reasons for the adoption of this technique. As against the conventional Johanssen cointegration method that uses system of equation to estimate the long run relationship, ARDL employs a single reduced form equation. The application of the ARDL and the Granger Causality is an innovation that helps to obviate the problem associated with the estimation of short time series data (Akinlo and Akinlo, 2009). ARDL approach does not require pre-testing variables, hence it could be implemented regardless of whether the underlying variables are I(0), I(1), or fractionally integrated, thereby reducing the task of establishing the order of integration amongst the variables. Moreover, the long and short-run parameters of the model are estimated simultaneously. As a result, the inability to test hypotheses on

the estimated coefficients in the long-run associated with the Engle-Granger method is avoided.

Procedurally, the long run economic growth is specified as:

$$(Growth)_t = \alpha_1 + ln(Turnover\ ratio)_t + \ ln(Bank\ credit)_t + ln(Mortality\ rate)_t + \varepsilon_t \tag{3.2.10}$$

Except for growth, all the variables are in natural logarithm. Before estimating the long-run model, we must establish the presence of long run relationship through the equation specified below:

$$\begin{aligned}\Delta(Growth)_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\Delta(Growth)_{t-i} + \sum_{i=0}^{p} \alpha_{2i}\Delta\ ln(Turnover\ ratio)_{t-i} + \sum_{i=0}^{p} \alpha_{3i}\Delta\ ln(Bank\ credit)_{t-i} \\ + \sum_{i=0}^{p} \alpha_{4i}\Delta\ ln(Mortality\ rate)_{t-i} + \delta_1(Growth)_{t-i} + \ \delta_2 ln(Turnover\ ratio)_{t-i} \\ + \ \delta_3 ln(Bank\ credit)_{t-i} \ + \ \delta_4 ln(Mortality\ rate)_{t-i} + \ v_t\end{aligned} \tag{3.2.11}$$

Where Δ is first-difference operator and p is the optimal lag length.

Procedurally, the determination of the existence of long run relationship amongst the variables in (3.2.10) is regularly done by means of bounds testing procedure of Pesaran and Pesaran (1997). The bounds testing procedure is the first stage of the ARDL cointegration method and is based on the F-test or Wald-statistics. Hence, a joint significance test, which implies no cointegration, (H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$), is conducted on (3.2.11). The F-test utilised in the bound test has a non-standard

distribution. Therefore, two bands of critical values are computed by Pesaran and Pesaran (1997) for a given significance level. The lower band assumes that all variables are I(0) and the upper band assumes they are all I(1). If the computed F-statistic exceeds the upper critical value, then there is cointegration. If the F-statistic falls within the two bands of critical values then the test becomes inconclusive. Finally, if the F-statistic is below the lower critical value, it implies no cointegration. Once the long-run relationship is ascertained, then the short run and error correction estimates of the ARDL model can be computed from (3.2.11), which are formulated below.

$$\Delta(Growth)_t = \alpha_0 + \sum_{i=1}^{p} a_{1i}\Delta(Growth)_{t-i} + \sum_{i=0}^{p} \alpha_{2i}\Delta\ ln(Turnover\ ratio)_{t-i} + \sum_{i=0}^{p} \alpha_{3i}\Delta\ ln(Bank\ credit)_{t-i} + \sum_{i=0}^{p} \alpha_{4i}\Delta\ ln(Mortality\ rate)_{t-i} + \lambda ECT_{t-1} \quad (3.2.12)$$

where λ is the speed of adjustment parameter and ECT is the residuals that are obtained from the estimated cointegration model of (3.2.10). Furthermore, the study utilizes the resulting Granger causality tests to investigate the causalities among the variables both in the long run and the short run. Granger (1988) integrates the concept of cointegration into causality. Therefore with cointegrated variables, causal relations among variables should be examined within the framework of the ECM.

Thus we denote a denote a four-component vector with the following representation;

$$W_t = ((Growth)_t\ ln(Turnover\ ratio)_t ln(Bank\ credit)_t ln(Mortality\ rate)_t)' \quad (3.2.13)$$

Therefore, a four variable equation (with a deterministic term) can be depicted as follows:

$$\Delta W_t = \beta_0 + \beta(L)\Delta W_{t-1} + \delta EC_{t-1} + \varepsilon_t \quad (3.2.14)$$

where β_0 is constant term and $\beta(L)$ is a 4 X 4 of the polynomial matrix of coefficients to be estimated EC_{t-1} is the vector of EC, which represents residuals or deviation from the long run relationships and ε_t is a vector of error term. Thus, there are two channels of causality: one is through individual elements of ΔW_{t-1}, which is referred to as the short run causality and the other is through EC_{t-1} which is referred to as the long run causality.

In addition, we intend to conduct diagnostics tests such as Breusch-Godfrey test to test the null hypothesis of no autocorrelation, as against the use of Durbin Watson test, which loses its power in the presence of a lagged dependent variable. Besides, we adopt the Jarque and Bera (1980) tests popularly called the Jarque and Bera (1980) test for the normality test. The test encompasses the other forms of detecting normality- Skweness and Kurtosis. In fact, it is a weighted average of the squared sample moments corresponding to Skweness and excess kurtosis. Under the null

hypothesis, it is distributed as Chi-Squared with two degree of freedom (Verbeek, 2004:185). In testing for the functional form of the equation, we adopt the Ramsey (1969) test (regression equation specification error tests), which tests whether additional terms of the regressors variables are significant in the auxiliary regression. The significance of these additional variables indicates that the model is misspecified (see Gujarati 2003:523). The diagnostic tests include Autoregressive Conditional Heteroscedasticity (ARCH) test for heteroscedasticity.

3.5.3.1 Disaggregation Procedures

Although our time series analysis is based on quarterly data, actual quarterly data are unobtainable. To this end, there are several types of disaggregation techniques available in literatures[24]. However, in this study, we employ the disaggregation procedures introduced by Gandolfo (1981) and Lisman and Sandee (1964) to disaggregate the obtained annual data into quarterly data. The procedure introduced by Gandolfo (1981) has been recorded in the literature to confer several advantages. For example, Ogun (2010) argues that it is quite robust and is based on order statistical theory which is not confined to any variable type, whether stock or flow[25]. As a result, many authors utilized Gandolfo (1981) procedure in the past.

[24] These include Santos and Cardoso (2000), Goldstein and Khan (1976) and Boot, Feibes and Lisman, (1967). Infact, we experimented with but the method produces severe multicollinearity results.
[25] However, we provide for the stock- flow problem by multiplying the disaggregated stock variables - such as the turnover ratio and bank credit - by 4. This is also done to the countries that we applied Lisman and Sandee (1964)

These include Ogun (2010) to study infrastructure and poverty reduction in Nigeria; Baharumshah, Lau, and Khalid (2006) who test twin deficits hypothesis in Indonesia, Malaysia, the Philippines and Thailand; Baharumshah and Lau (2007) who examine regime changes and the sustainability of fiscal imbalance in East Asian countries; and Goh and Wong (2010) who examine the effect of market size and government policy on Malaysia's outward foreign direct investment. Other works include Tang (2010) that examines the relationship between electricity consumption and economic growth in Malaysia; Poon (2009) that investigates the importance of monetary condition index indicator for Malaysia; Lau, Baharumshah and Haw (2006) that study the behaviour of five East Asian countries' current accounts.

Procedurally, in deriving the Gandolfo (1981) disaggregation formulae, the observed (annual) values are assumed to be integrals. Hence, they are integrated within quadratic function framework in order to obtain the quarterly formulae. To calculate each quarterly series from the quarterly formulae, the procedure requires three continuous annual observations of each variable. In other words, the current, lag and lead values of the annual data are utilized in generating quarterly data for the current year (for further discussion, see Gandolfo, 1981). On the other hand, Lisman and Sandee (1964) introduced a numerical technique for constructing synthetic quarterly data based on annual data. The quarterly data are assumed to be a weighted sum of the lag, lead and current year observations. Further assumption is that the quarterly data changes by a fixed proportion to changes in the annual data. With these

assumptions, Lisman and Sandee (1964) proceed to formulate quarterly data based on annual data.

Lisman and Sandee (1964) method has not only been tested but also adopted in previous works. Feijoo, Caro and Quintana (2003) conduct a Monte Carlo simulation on Lisman and Sandee (1964) and conclude it performs better than trivial models. In terms of its use, Fielding (2003) utilise the method in the study of consumption, saving and political instability on Israel; Ramlogan (2004) utilises it in the study of transmission mechanism of monetary policy in Caribbean countries; Fielding and Shortland (2005) utilise the method in studying the relationship between political violence and confidence in a local currency in Egypt; Koga (2006) use the method to disaggregate data, in the study on the decline of Japan's saving rate; and Malik (2010) adopt the technique in the study of oil prices and economic activity in Pakistan. In terms of its usefulness it has the advantage of simplicity, plausibility and practical usefulness (Lisman and Sandee 1964).

3.5.3.2 Smoothing Procedures

Asterious and Hall (2007:17) cautions on the reliance on transformed data such as disaggregated data. Hence, in order to be safe, we filter the disaggregated data using the exponential smoothing techniques as contained in Bowerman and

O'Connell (1979)[26]. Exponential smoothing is a smoothing or forecasting technique that hinges on a weighted average of historical data values, with more weight attached to recent values. It is a recursive based technique in which new smoothened or forecast series are updated for each new observation. Exponential smoothing method is a very popular scheme to produce a smoothed time series (Pyo and Choi, 2009) and has different variants. These include single exponential smoothing technique, double exponential smoothing technique; Holt-Winters-no seasonal (two parameters) exponential smoothing technique; Holt-Winters-additive exponential smoothing technique; and Holt-Winters-multiplicative exponential smoothing technique. Specifically, we adopt the Holt-Winters-no Seasonal (two parameters) version for data transformed with Gandolfo (1981) and double exponential smoothing technique for data transformed with Lisman and Sandee (1964)[27].

These methods confer several advantages. They assign exponentially decreasing weights as the observation get older; the methods react more quickly to changes in data patterns than the moving average; the methods excel more in managing data with trend; they do not require as much data as other econometric

[26] An alternative is the Hodrick-Prescott filter (HP filter) method. However, we experienced acute multicollinearity with this method. Therefore we discarded it. Also, there is moving average method, but literatures have shown that the moving average is inferior to exponential smoothing see Pyo and Choi (2009).

[27] For South Africa, Egypt, Tunisia, Mauritius, Botswana, Cotevoire, and Swaziland, we employ Gandolfo (1981) and the Holt-Winters-no Seasonal (two parameters) version on the annual data. For Nigeria, Morocco, Kenya, Ghana, we adopt Lisman and Sandee (1964) and the double smoothing (one parameter) method on the annual data as there is no cointegration with the use of Holt-Winters-no seasonal (two parameters). Moreover, we observe that only these combinations are serial correlation free and homoscedasticity (except for the estimates of Ghana that are found to be heterosecdastic).

modelling technique (Pyo and Choi, 2009; Mohd Nasir, Hwa and Mohammad, 2008). On the other hand single exponential smoothing technique does not deal with trend. Moreover, the basic form of additive exponential smoothing technique does not give good estimates for the level and seasonal features of a time series (Lawton, 1998).

The chosen methods are utilised with the basic assumption of trend existence. Thus, for each data, two components-level and trend- of the variable are updated at end of a period. The level is a smoothed or forecasted estimate of the data's value at the end a period. On the other hand, the trend is the smoothed or forecasted estimate of the average growth of the data's value at end of a period. While double exponential utilises a single parameter for the components, Holt-Winters-no seasonal (two parameters) utilises two parameters for the components. In either case, the current value of the series is used to estimate its smoothed replacement value (for further note, see EViews 6.0 User's Guide; Bowerman and O'Connell, 1979). In practice, an exponential smoothing technique is one of the methods employed to calculate core inflation in Malaysia (BNM Annual Report, 2008). In addition, Mohd Nasir et al. (2008) utilise the double exponential smoothing technique on an initial study of unemployment in Malaysia. The results are presented in Table 3.1.1 to Table 3.1.11 in the Appendix.

CHAPTER 4

EMPIRICAL RESULTS AND FINDINGS

4.1 Panel Data Analysis

4.1.1 Descriptive Analysis of Stock Markets, Banks and Economic Growth.

In Table 4.1.1, the descriptive analysis of the major variables in the study is presented. These are the three stock market development indicators- market capitalisation, trade ratio and turnover ratio- banking development indicator-bank credit- and economic growth. There are wide variations among the indicators across our sample. For the period 1991 to 2009, the average market capitalisation ratio, trade ratio and turnover ratio to GDP for South Africa are about 180 percent, 67 percent and 29 percent, respectively. In Nigeria, the ratios are 13 percent, 1.5 percent, and 7.2 percent, respectively. For the bank credit, the ratio is 57 percent for Tunisia, 44 percent for Morocco, and 24 percent for Kenya. However, market capitalisation, trade ratio and turnover ratio are relatively more volatile as compared to economic growth. With the least standard deviation of 12.58, we note that the turnover ratio is the least volatile of the stock market indicators.

Furthermore, we utilize three methods of testing for normality. Firstly, the Skewness test indicates that all the variables are positively skewed with the exception

of economic growth[28]. Once again, the turnover ratio is the least skewed among the stock market indicators. Secondly, from the Kurtosis statistics, we observe that with the exception of turnover ratio, all the stock market indicators are leptokurtic relative to the normal distribution, while the variable for banking development exhibits platykurtic relative to the normal distribution and growth is normally distributed[29]. However, turnover ratio is the least leptokurtic among the stock market variables. The most encompassing normality test is the Jarque-Bera statistic, which further reinforced the earlier tests by showing that we can reject the null hypothesis of normality for all the variables. Our finding on normal distribution is in line with previous researches, which states that most of the stock market variables are usually not normally distributed (such as Solarin and Dahalan 2010b; Diamandis, 2009). Hence, we need to transform the data to remove the non-normality for subsequent analysis. Fortunately, one way of doing this is the use of natural logarithm.

4.1.2 Spearman Rank-Order and Correlation Analysis

In Table 4.1.2, the correlation values are reported above the probability values for each pair wise relationship. With Spearman's rank correlation coefficient, there is the easiness of identifying the strength and direction (whether the correlation is positive or negative) of each pair-wise relationship. Noticeable from the results, the stock market variables display high correlation with each other. However, of the

[28] The benchmark is zero.

[29] The benchmark is three.

financial variables, the turnover ratio is the most correlated with economic growth of around 22 percent. The study observes that all the stock market variables are highly correlated with the banking development, with the least being market capitalisation at more than 53 percent. The only non-financial variables -mortality rate- has a negative correlation with economic growth.

Therefore, on the one hand, we reject the null hypothesis of no correlation between the stock market indicators and economic growth and on the other hand, we reject the null hypothesis of no correlation between banking development and economic growth. Generally this implies that stock markets are positively associated with economic growth, evidence similar to the findings of Sumit (2001).

4.1.3 Pooled OLS Regressions Estimates[30]

Table 4.1.3 shows the results of the pooled OLS regressions. The dependent variable is real per capita GDP growth. The columns are arranged according to each of the three proxies for stock market development. Following the works of Akinlo and Akinlo (2009), Arestis et al. (2001), Rousseau and Watchel (2000), Yartey (2007) and Beck and Levine (2004), these stock market indicators include market capitalisation, trade ratio and turnover ratio. In the initial three columns, we test the

[30] On the section, we acknowledge the comments from the participants of the Fourth International Borneo Business Conference (IBBC), Miri, Sarawak, Malaysia

effect of the simple conditioning information set[31] on economic growth by including each stock market variable per column, banking development variable, and proxy for the initial real GDP per capita to control for convergence of income. The other variables are mortality rate to control for human capital and population growth rate as contained in the standard growth model (see Mankiw et al., 1992; Cooray, 2010).

The three different proxies of stock markets produce different results. Market capitalisation and trade ratio have negative impact on economic growth, but significant and insignificant entries, respectively. For example, in eq. (1), it is estimated that for every 1 percent increase in market capitalisation, economic growth decreases by 0.45-point, holding the other variables constant. However, turnover ratio turns out to have a positive but insignificant effect on economic growth. This is evident as turnover ratio is insignificant at even 10 percent significance level. These outcomes are similar to the findings of Fink and Haiss (1999) who observe that stock markets have weak or even negative impact on real growth for EU countries.

The coefficients of banking development are negative in all the three regressions. For instance, in eq. (3), it is calculated that for every 1 percent increase in bank credit, economic growth plummets by 1.191 percent, after holding the other independent variables constant. This result is significant at 5 percent significance level. Extending the Beck and Levine (2004) analogy, this implies that banking

[31] As specified in Beck and Levine (2004)

development and stock market produce substitutability roles in our sample countries. Considering the other variables in the simple conditioning set, mortality rate and population growth rate have negative effect on the economic growth with population growth rate appearing to be a less significant factor. The result for the population growth is in contrast with that of Guiso et al. (2002) on Italian provinces for the period 1860-2000. Clearly, there is no evidence for convergence of income of the sample countries, as all the coefficients of the initial income are positive, which is in contrast with the findings of Levine et al. (2000).

In columns (4) through (9), we introduce more control variables to form the policy conditioning information set[32]. These variables include inflation rate, share of government consumption expenditure to GDP, share of foreign direct investment to GDP, real interest rates, the ratio of real capital formation divided by the GDP and ratio of money supply to GDP. In line with Beck and Levine (2004), the control variables are sequentially introduced.

Hence, market capitalisation retains its significant and negative signs. Moreover, trade ratio enters the regressions with negative and insignificant signs. Turnover ratio substantially appears with positive signs. For instance, in eq. (6), in which foreign direct investment is introduced as an additional control variable to the simple conditioning information set, it is estimated that for every 1 percent increase

[32] As specified in Beck and Levine (2004)

in turnover ratio, economic growth increases by 0.38 percent, a result which is significant at 10 percent significance level. Therefore, this may imply that it is the transaction on the stock markets that actually promote economic growth and not mere listing of companies on the stock exchanges, as depicted by market capitalisation.

In the other financial variable, bank credit shows a negative role to economic growth in the presence of each proxy for stock markets development. In consonance with theories, population growth and mortality rates appear to possess strong negative and positive impact on economic growth, respectively. Numerically, eq. (8) shows that 1 percent decrease in mortality rate boosts economic growth to the tune of 1.514 percent at 1 percent significance level.

Moving to the control variables, in contrary to theory, the results indicate that interest rate has a positive effect on economic growth. Nonetheless, this is in line with the findings of Solarin (2010) that attribute it to paucity of interest rates. Another reason for this may be due to the use of real interest rates as against the nominal interest rate in our study. Many Africans are not conscious of the nominal interest rates let alone the real interest rate that is even harder to monitor. Moreover, the insignificance of the interest rates may be because of the fact that monetary policy actually transmits through the stock market in consonance with Bernanke and Kuttner (2005), He (2008), Kholodilin, Montagnoli, Napolitano and Siliverstovs (2009), Thorbecke (1997) and Rigobon and Sack (2004). Aligned with Naceur and

Ghazouani (2007), the sign of government consumption expenditure is found to be negatively significant. Money supply appears positively and significantly related to economic growth, while the bank credit is negatively insignificant. This is attributable to the fact that the two measures are proxies for financial development. In other words, money supply ratio to the GDP is an alternative measure of financial development as the bank credit (King and Levine, 1993a; Rousseau and Watchel, 2000). Alternatively, this can be interpreted to mean that stock market does not transmit the signal of monetary policy via changes in money supply unlike the interest rates, as the coefficient of the stock market development is significant.

In Africa, banks are more matured and advanced than the stock markets (Kenny and Moss, 1998) and most countries traditionally depended on the banking system (Hearn and Piesse, 2010). Thus, we control for this obvious fact by introducing the square of bank credit against the normal bank credit in column (10) through (12), in line with the work of Yartey (2008). In the presence of the three indicators of stock market development, the coefficient of the new indicator banking development retains its negative posture to economic growth. In eq. (12), it is estimated that 1 percent increase in bank credit at a higher level of banking development will decrease economic growth by 0.19 percent, holding other factors constant.

In summary, stock market development (considering the market capitalisation because trade ratio and turnovers are generally insignificant, even at 10 percent

significance level) has a negative impact on economic growth. This indicates that stock market development is inimical to economic growth. Nevertheless, banking sector shows a negative impact on economic growth. In most cases the negative coefficients of banking sector (when significant) are larger than stock market development. Therefore, the study concludes that stock market performs better than banking sector in the selected countries. In essence, there is an evidence for market based system over bank based system. These results are contrary to most previous studies; even those pertaining to Africa (see Akinlo and Akinlo 2009; Adjasi and Biekpe, 2006). As the coefficients of mortality predominantly turns out negative, hence there is evidence for positive relationship between human capital accumulation and economic growth. Moreover, there are substantial evidences of divergence of income in our sampled countries. In other words, the countries are not catching-up with each other in terms of economic growth. Government expenditure and money supply appear to have negative impact on economic growth. Foreign direct investment has a significant positive impact on economic growth.

For the sake of uniformity and comparison, we report the F-statistics as most dynamic panel methods utilize Wald-test, analogous to F-statistic in the pooled OLS results. From the result, the variables in all the regressions are jointly significant even at a conservative significance level of 1 percent. Secondly, there is no evidence that the inclusion of initial income (lagged dependent variable) in the model is correlated

with the residuals[33]. This indicates that the inclusion of initial income does not cause biasness or inconsistency. However, based on the low level of the Adjusted R^2 (the highest is 0.364 in the twelve regressions) and the fact that these methods do not provide for individual specific effects, we cannot exclusively rely on these estimates or at best, we need other methods before we reach our conclusion.

4.1.4 Random Effect Regressions Estimates

In Table 4.1.4, the study presents the results of the random effects model. The baseline regressions of the simple conditioning information are presented in column (1) through column (3). The dependent variable is the real per capita GDP growth. In the baseline regressions of the simple conditioning information set, the results indicate that market capitalisation and trade ratio have positive but insignificant impact on the economic growth in line with Harris (1997) and Durham (2000).

On the other hand, turnover ratio has a positive and significant impact on economic growth. In particular, 1 percent increase in turnover ratio increases the economic growth by 0.475 percent, at 10 percent significance level. The banking credit shows an insignificant and negative relationship with the economic growth. Hence, these results are similar to Atje and Jovanovic (1993) who find strong evidence for significant impact of market turnover on growth but insignificant

[33] Based on the ordinary and Spearman rank order correlation tests, we reject the null hypothesis that the initial income is not correlated with the residual, at 1 percent significance level for the baseline regressions.

banking intermediation. Other studies with similar findings include Deidda and Fattouh (2002) for low-income sample in a period of 1960-1998; Berthelemy and Varoudakis (1997) for 85 countries; Japelli and Pagano (1994) for a study of 30 countries.

Against the evidence provided by Fink and Haiss (1999) and Guiso et al. (2002), population growth continues to show negative and significant impact on the economic growth. For instance, in eq. (3), 1 percent increase in population growth depresses economic growth by 0.0847-point, after holding other independent variables constant at 5 percent significance level. On the other hand, the study observes that coefficient of mortality rate is negative. Unlike the pooled OLS, there is evidence for convergence of income, because the coefficient of the initial income is negative in line with the works of Levine et al. (2000) and Beck and Levine (2004). Nonetheless, this does not necessarily means that the countries in Africa are catching-up with other emerging markets outside the continent, even including South Africa.

Introducing the other control variables to the baseline regression in column (4) through column (9), the results change slightly[34]. While market capitalisation changes to negative sign but not significant, turnover ratio turns out to be significant with positive signs. However, trade ratio stays insignificant with positive signs. Once

[34] These variables include as foreign direct investment, inflation, interest rate, government expenditure, and investment.

again, contrary to theory, the results indicate that interest rate has a positive effect on economic growth. Another recurring plausible finding is that the coefficient of the bank credit becomes insignificant upon the introduction of money supply into the equation. As money supply is significant at 10 percent significance level, we attribute the insignificance of bank credit to the fact that both variables serve as financial development indicators.

Looking at other control variables, we obtain evidence in support of Boyd and Smith (1996) hypothesis and empirical findings of Beck et al. (2000) that government expenditure negatively contributes to economic growth. In eq. (4), it is estimated that for every 1 percent increase in government expenditure, the economic growth depresses by 0.00473-point, at 5 percent significance level. This is not surprising as government expenditures in Africa are characterised by cronyism, rent-seeking and corruption. Considering other variables, foreign direct investment enters with a positive impact on economic growth at 5 percent significance level, which means that the foreign direct investment affects the economic growth through other channels other than the stock market (Mohtadi and Sumit, 2004).

Meanwhile, in controlling for the higher level of banking development in column (10) through column (12) the study observes that turnover ratio has positive and significant effect on the economic growth, while market capitalisation and trade ratio have insignificant positive relationship with the economic growth. Like the

earlier findings, the bank credit indicates a negative effect on economic growth. Literally, at a higher level of banking development, 1 percent increase in the turnover ratio will lead to 0.49 percent decrease in economic growth. The evidence for convergence of income, negative impact of population growth and mortality rate continues.

In summary, stock market development has positive impact (looking at turnover ratio because market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level) on economic growth. This may imply that it is the transaction on the stock markets that actually enhances economic growth and not mere listing of companies on the stock exchanges, as depicted by market capitalisation. The positive impact of turnover ratio on economic growth is similar to the findings of (Beck and Levine 2004). On the other hand, banking development appears to have a negative impact even at higher level of banking development on economic growth. Therefore this implies that market based system is more suitable than bank based system in the selected countries. This results is not surprising because in Africa, banking services penetration is as low as 5 percent, access to banks in most countries is limited to the urban centres; and the fact that the ratio of M1 to M2 is the highest in the world means that cash is still the dominant financial instrument (Andrianaivo and Yartey, 2009). There are evidences for higher human capital accumulation; higher foreign direct investment; lower government expenditure, and population growth rate for economic growth.

The diagnostics tests provide mixed results. In testing for efficiency, the Breusch-Pagan test indicates the variances of the unit-specific errors of six regressions are not equal to zero or are not efficient. For instance, eqs. (2), (3), (5), (10), (11), and (12) are all inefficient because we fail to reject the null hypothesis of variance of the unit-specific error, at 10 percent significance level. In these six regressions, this also means that the pooled OLS model estimates are inadequate, thus random effect model provides better estimates.

The consistency of the random effects estimates are checked with the Hausman test, which has the null hypothesis that the estimates of random effect model are consistent. Evidently from the results, we reject the null hypothesis that eqs. (1), (2), (4), (5), (6) and (7) estimates are consistent at 10 percent significance level. This further indicates that differences in coefficients are not systematic. Therefore, there is the need to consider the fixed effect method.

4.1.5 Fixed Effect Regressions Estimates

Next, the analysis proceeds with a method that provide for individual specific effects- fixed effect model. For uniformity sake, the outputs in Table 4.1.5 are fashioned in line with the format of previous tables. The dependent variable is the real per capita GDP growth. Like the previous analysis, the baseline regressions of the simple conditioning information are presented in column (1) through column (3).

From the baseline regressions of the simple conditioning information, the market capitalisation and trade ratio enter the equations with a positive and insignificant signs providing support to the works of Fink and Haiss (1999), and the small markets subsample of Adjasi and Biekpe (2006). On the other hand, turnover has positive effect and significant impact on the economic growth. In eq. (3), it is shown that for every 1 percent improvement in stock markets in terms of turnover ratio, economic growth is to improve by 0.46 percent. Throughout the three equations, the bank credit turns out to have positive but largely insignificant coefficients, except in eq. (2). Thus, eq. (2) indicates that 1 percent increase in the ratio of bank credit will lead to 0.0086-point fall in the economic growth. In this case, we have evidence for limited complementary roles for both banks and stock markets.

Considering the other variables in the simple conditioning set, we find that mortality rate produces negative and significant coefficients in the regressions. For example, in eq. (2), it is estimated that for every 1 percent increase in mortality rate, economic growth will fall by 0.0143-point. However, population growth enters the equation with negative but insignificant signs. Besides, in line with expectation, the results indicate that there is strong convergence of income among the countries in our sample.

Control variables are introduced in column (4) through column (9). The sign and insignificance of market capitalisation and trade ratio remain indifferent to all the

control variables as they retain positive and insignificant signs. Similarly, the signs of population and mortality rate do not change in the regressions. Inflation, government expenditure, interest rates enter the equation with a negative and but insignificant signs. The coefficient of investment is positive and significant. Following the works of Mohtadi and Sumit (2004), this means that investment influences the economic growth through other channels other than stock markets, because investment and turnover ratio are significant at 5 percent significance level. Foreign direct investment is positively and significantly related to economic growth.

Providing for a relatively higher banking development in column (10) through column (12), only the turnover is significant with a positive sign. In eq. (12), it is estimated that after providing for a higher level of banking development and other control variables, for every 1 percent increase in turnover ratio, the economic growth is boosted by 0.455 percent. The other stock markets indicators-market capitalisation, trade ratio- and bank credit are positive but insignificant.

Summarily, stock market development has positive impact (considering turnover ratio because market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level) on economic growth. This may imply that it is the transaction on the stock markets that actually boosts economic growth and not mere listing of companies on the stock exchanges, as depicted by market capitalisation. The positive impact of turnover ratio on economic growth is similar to

the findings of (Beck and Levine 2004). On the other hand bank developments are positive but not generally significant. Therefore, we once again conclude that market based system is more appropriate than bank based system in the selected countries and by extension African stock markets. Other results indicate that higher foreign direct investment, low population growth, higher human capital accumulation and investment are essential in boosting economic growth. Moreover, there is evidence of convergence of income in our sample countries.

Next, we turn to the estimates' validity. It is obvious that the Adjusted R^2 has improved a lot compared with those of the Pooled OLS estimates. In eq. (6), the Adjusted R^2 is 0.527 compared with the highest Adjusted R^2 of the Pooled OLS estimates of 0.364. Thus this means that in eq. (6) of the fixed effect model, the regressors explain about 53 percent of variation in economic growth.

In the literatures, the null hypothesis of the F-test indicates that the cross-sectional units all have a common intercept. From the results it is obvious that we can reject the null hypothesis that the cross-sectional units all have a common intercept. In another sense, this is an indication that the fixed effect model is superior to the pooled OLS model, which assumes that cross sectional units have a common intercept. The time specific effects are jointly significant at 1 percent significance level.

The conclusion of fixed effect model may be biased because of the presence of the initial income, which may be correlated with the residuals (Asterious and Hall, 2007:357). Therefore, the study tested for possible correlation between for the initial income and residual but results indicate no correlation between the residuals and the initial income, unlike the Pooled OLS estimates[35]. However, the inference with the fixed effect estimator is potentially prone to nonnormality, heteroscedasticity, and serial correlation in idiosyncratic errors (Wooldridge, 2009:488). Besides, fixed effect estimate do not provide for spurious estimates. Therefore, the study proceeds to methods that tackle these problems.

4.1.6 GMM-Difference Regressions Estimates

The GMM-difference one-step results are displayed in Table 4.1.6. Similar to the previous tables, the dependent variable is the real per capita GDP growth. Likewise, the study presents the baseline regressions of the simple conditioning information set in column (1) through column (3). From the baseline regressions of the simple conditioning information, the market capitalisation impact negatively on economic growth whereas turnover ratio impact positively on economic growth with both variables having insignificant entries. Also, trade ratio has insignificant and positive effect on the economic growth. In the baseline regressions, we observe that the coefficients of banking development are negative and insignificant. Thus, this

[35] To this extent, we could not find evidence that the residuals are correlated with the initial income using the ordinary and Spearman rank order correlation tests, on the baseline regression at 1 percent significance level for the baseline regressions.

implies that in the presence of banking development, the stock market has a weak positive role in the economy. The results indicate convergence of income among the sample countries, as the coefficients of initial income are negative. Mortality rate shows a negative effect on growth rate. In line with the previous results, the study observes that population growth spurs negative economic growth.

Subsequently, the study proceeds with sensitivity analysis with the inclusion of control variables in column (4) through column (9). The results do not significantly change as the signs of the stock market variables persist with same signs and levels of significance, except the turnover ratio. For example, in controlling for foreign direct investment among other variables, 1 percent increase in turnover ratio spurs 0.47 percent increase in economic growth. Considering other variables, foreign direct investment enters with a positive effect on economic growth at 1 percent significance level, indicating that foreign direct investment affects the economic growth through other channels other than the stock market (Mohtadi and Sumit, 2004). The findings indicate that the equation with money supply, the banking development indicator appears to be insignificant. Once again, this may be because both variables are measure of financial development. Moreover, the negative entry of money supply may imply seignorage by the government. This refers to the act of government (here in Africa) of increasing money supply, which are not usually fallout of any productive reason but attempt for governments to derive revenue through inflation

tax. On other variables, inflation rate and interest rates enter with positive signs, which are contrary to a prior expectation.

For higher level of banking development, the findings are reported in column (10) through column (12). Hence, the stock market variables indicate different results with both turnover ratio and trade ratio turning out with positive signs, while market capitalisation appears to have a negative impact on economic growth. However, all the variables are insignificant. In addition, the coefficient of the bank credit, mortality rate and population growth rate remain insignificant.

In sum, considering the coefficient of turnover ratio (as market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level), it appears that stock market has a positive but weak impact on economic growth. Once again, it seems it is transaction or liquidity on the stock markets that actually drive economic growth and not mere listing of companies. The positive impact of turnover ratio on economic growth is similar to the findings of (Beck and Levine 2004). The banking sectors turns out to be more insignificant, which conform to the argument of Andrianaivo and Yartey (2009) who argue that bank penetration is low and Kenny and Moss (1998) that opines that banks operations are mired in scandal, thus not actually boosting economic performance. Therefore, we conclude that market based system is more appropriate than bank based system for the selected countries in Africa. Important variables from the findings include foreign direct investment and

money supply. While the former display a positive role in boosting economic growth, the latter is negatively related to economic growth, which has been attributed to seignorage practiced by government in Africa.

Checking the methods performance and validity, the Wald test shows that the coefficients are jointly significant even at conservative significance level of 1 percent. Additional tests suggest that the dummy and time-specific effects are significant. Besides, from the serial correlation tests, the study cannot generally reject the null hypothesis that the errors in the first-difference regression exhibit no first-order serial correlation for some of the regressions. However, in support of the models, the study generally accepts the null hypothesis that the errors in the first-difference regression exhibit no second-order serial correlation. This is because the absence of second-order serial correlation validates the model, which is still valid in the presence of first-order serial correlation. Moreover, the model passes the Sargan test as the study strongly accept the null hypothesis that the instruments used are not correlated with the residuals. However, the methods do not afford the opportunity of differentiating between long run and short run conditions. In addition, the method is not fully acceptable because as it is argued that GMM difference instruments are often weak which causes biases in small sample size (Arrelano and Bover, 1995). Therefore, further econometrics methods are needed that control for these problems.

4.1.7 GMM- System Regressions Estimates

The GMM-system results are reported in Table 4.1.7a, b. The GMM-system is intended to solve most of the econometrics issues associated with the previous methods. The baseline regressions of the simple conditioning information set are presented in column (1) through column (3). Hence, from the baseline model, it is obvious that the market capitalisation and trade ratio have positive impact on the economic growth. However, the two variables are insignificant. On the other hand, the turnover ratio is positive and significant, in line with Mohtadi and Sumit (2004), Sumit (2001) and Boubakari and Jin (2010). From the third regression, it is estimated 1 percent increase in turnover ratio spurs more than 1.01 percent increase in economic growth and vice versa. This can be interpreted that turnover ratio is the best indicator of stock market development in support of the argument of Beck and Levine (2004). Turning to bank credit, it enters the second and third regressions with negative and significant coefficients. Thus, in eq. (3), this is interpreted as 1 percent rise in the bank credit will have adverse effect on economic growth to the tune of 2.437 percent. Coefficients of population growth and mortality rate turn out negative and significant in just one of the three regressions.

In column (4) through column (20), the study conducts sensitivity analysis by including more variables. Unlike the previous methods, all control variables are introduced sequentially for each of the stock market variables. With foreign direct investment and money supply serving as control variables, turnover ratio appears as

the only stock market indicator with significant entries. Column (15) indicates that for every 1 percent increase in turnover ratio, economic growth increases by 0.999 percent, at 5 percent significance level. Generally, the coefficients of bank credit turn out with negative but few significant entries. For example, column (15), we observe that 1 percent rise in bank credit will have negative 2.358 percent effect on economic growth. Moving to the control variables, we observe that while foreign direct investment and inflation produce positive and significant coefficients, government expenditure produce negative and significant coefficients. Interest rates and investment are mostly with positive and negative entries, respectively. Unlike most of the previous methods, the money supply appears insignificant.

Again, we examine the situation of higher level of banking development. The findings are presented in column (22) through column (24). All the stock market indicators are positive, yet only turnover ratio yields significant output at 5 percent significance level. On the other hand, the indicator of higher level of banking sector development remains negative. Interpreting eq. (24), 1 percent change in turnover ratio and higher banking development changes the economic growth by 1.08 percent and 0.39 percent respectively but with opposite effects. These findings provide evidence for other studies such as Atje and Jovanovic (1993), Odedokun (1996b) for

71 developing countries; Berthelemy and Varoudakis (1997) and Japelli and Pagano (1994)[36].

In sum, considering the coefficient of turnover ratio (as market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level) in the baseline model, it appears that stock market has positive impact on economic growth. Once again, this supports the notion that it is actually transaction or liquidity on the stock markets that boost economic and not mere listing of companies. Conversely, the banking sector coefficients turn out to be negative. Hence, this is an indication that stock market performs better than banking sector in the selected countries. Therefore we conclude that market based system is more compatible with economic growth than the bank based system. This is not surprising as activities of banking sector in Africa are composed of debt, which is inimical to growth because it gives priority on the payback over the substance of the project. Moreover, banking activities in Africa are mired with corruption and scandal as argued by Kenny and Moss (1998) or low penetration as put forth by Andrianaivo and Yartey (2009). This could also be attributed to stringent collateral conditions imposed by banks, information asymmetry, and the huge public sector role in the banking industry, which persists in some African countries even after liberalisation (Misati and Nyamongo, 2011). Human capital appears to be major determinants of economic growth. While

[36] As against the economic growth, Odedokun (1996b) utilise marginal capital productivity as the regreessand.

government expenditure appears to negatively impact on economic growth, foreign direct investment has positive relationship on economic growth. Inflation rates and interest rates are significantly related to growth.

Next, the study turns to the examination of the performance and validity of the method. Starting with the Wald test, the findings indicate that coefficients of the variable are jointly significant even at conservative significance level of 1 percent. Additional tests suggest that the dummy and time-specific effects are significant. Moreover, the Wald tests on time-specific effect show that the effects are jointly significant. From the serial correlation tests, we cannot generally reject the null hypothesis that the errors in the first-difference regression exhibit no first-order serial correlation for some of the regressions.

However, in support of our model, we can generally accept the null hypothesis that the errors in the first-difference regression exhibit no second-order serial correlation. This is because the absence of second-order serial correlation validates the model. The model passes the Sargan test as it fails to reject the null hypothesis that the instruments used are not correlated with the residuals (see Beck and Levine, 2004). However, the method does not differentiate between long run and short run conditions. Moreover, the supply leading hypothesis cannot be examined within the framework of GMM. Finally, the inclusion of large stock market in a cross section may exaggerate the impact of stock market on economic growth. Therefore, in the

next section, the study removes the large stock market from the cross section and re-estimates the equation.

4.1.8 GMM- System Regressions Estimates (Without South Africa)

The previous analysis includes South Africa that has the largest stock market in Africa. In fact, the Johannesburg Securities Exchange (JSE) in South Africa has over 90 per cent of the combined market capitalization of the entire continent (Yartey, 2007). Besides, the exchange has significant presence in stock markets of Botswana and Namibia (ASEA, 2009). However, according to Harris (1997) and Durham (2000), the inclusion of developed stock markets in any sample exaggerates the importance of stock market to economic growth. Therefore, before proceeding to analysis that differentiate between short and long run situations, in Table 4.1.8a,b the study reports findings on a sample that excludes South Africa. In consonance to the previous tables, the dependent variable is the real per capita GDP growth. Likewise, the baseline regressions of the simple conditioning information set are reported in column (1) through column (3).

Market capitalization enters the regression with positive and insignificant signs. On the other hand, trade ratio and turnover appear to be significantly and positively related to economic growth. One fascinating point to note is that the coefficient of trade ratio becomes significant only after South Africa is removed from our sample in contrast to the submission of Harris (1997) and Durham (2000). Another interesting

point is that turnover ratio, which is a better measure of transaction or liquidity (Beck and Levine, 2004) on the stock market has a better sign and significance. For instance, for every 1 percent increase in trade ratio, economic growth increases by 1.034 percent. On the other hand, turnover ratio needs to increase by just 0.610 percent to achieve similar economic growth. Moreover, while trade ratio is significant at 10 percent, turnover ratio is superiorly significant at 1 percent. Also, the coefficient of bank credit is negative and insignificant. These results are similar to the findings of Atje and Jovanovic (1993), Berthelemy and Varoudakis (1997) and Bassanini et al. (2001) who obtained better estimates of stock markets for a study of 21 OECD countries. In line with Mankiw et al. (1992), the study provides evidence for negative mortality rate and population growth impact on economic growth; and weak convergence of income among the sample countries are evident from the findings.

Furthermore, the study performs sensitivity analysis with the inclusion of control variables in column (4) through column (20). The turnover ratio remains significant throughout with at least 5 percent significance level. For example, in controlling for foreign direct investment among other variables, 1 percent increase in turnover ratio spurs 1.304 percent increase in economic growth. Coefficients of population growth and mortality rate are insignificant. Contrary to theories, the coefficients of both inflation and interest rates are positive. However, foreign direct investment and government expenditure (except with eq. (6), in which government expenditure is insignificant) enter the equations with expected positive and negative

signs, respectively. For instance, in eq. (4), it is estimated that for every 1 percent increase in government expenditure economic growth falls by 0.569 percent, at 1 percent significance level.

In column (22) through column (24), the study reports the findings for higher level of banking development. At such level, the stock market variables indicate different results with both turnover ratio and trade ratio turning out positive while market capitalisation appears to have a negative impact on economic growth. On the one hand, all the variables are significant, with the exception of market capitalisation. On the other hand, the coefficient of the banking sector remains insignificant. Thus in the case of eq. (24), it is calculated that for every 1 percent increase in turnover ratio, economic growth increases by 1.706 percent, when the banking sector is more developed.

From the results above, it is apparent that stock market (considering the trade ratio and turnover ratio, as market capitalisation is insignificant even at 10 percent significance level), without the inclusion of South Africa in the baseline model boosts economic growth. Hence, this support the impression that transaction or liquidity actually impacts on economic growth and not mere listing of companies. On the other hand, the impact of banking sector appears to be weak as most of the coefficients are weak even at a relatively higher developed banking sector. Similar to the previous results, the study conclude that market based system is more suitable than bank based

system. Foreign direct investment and government expenditure are important variables in determining economic growth.

On the method performance and validity, the Wald test shows that coefficients are jointly significant at 1 percent significance level, with the exception of eq. (1), which is significant at 5 percent significance level. Additional tests suggest that the dummy and time-specific effects are significant. Besides, from the serial correlation tests, we cannot generally reject the null hypothesis that the errors in the first-difference regression exhibit no first-order serial correlation for some of the regressions. However, the results indicate the acceptance of the null hypothesis that the errors in the first-difference regression exhibit no second-order serial correlation. This is because the absence of second-order serial correlation validates the model. Additionally, the model passes the Sargan test as it strongly accept the null hypothesis of no correlation of the instruments with the residuals.

In the passing, it is observed from GMM-system results that stock market (based on turnover ratio) is positively associated with economic growth. This is corroborated with the findings of other techniques (with the exception of Pooled OLS, which indicate that market capitalisation is positively associated with economic growth) such as random effect, fixed effect GMM-difference and GMM-system without South Africa. Summarily, this implies that stock market is positively related to economic growth.

On the other hand, bank credit is found to be negatively and in some cases, insignificantly associated with economic growth in the GMM-system. With the exception of fixed effect estimates, these GMM-system results are similar to those obtained from other methods. Therefore, this is an evidence of market based system as against bank based system.

According to the GMM-system estimates, there is weak evidence for convergence hypothesis. Moreover, GMM-system demonstrates negative (though with few insignificant estimates) impact of mortality rate and population growth rate on economic growth. These observations are generally similar to the findings of other procedures. Based on GMM-system, foreign direct investment is positively related to economic growth while government expenditure is negatively related with economic growth. This is confirmed by other methods (with the exception of fixed effect and GMM-difference, which produce insignificant estimates). Similar to other estimates, inflation and interest rates are positively associated with economic growth. Despite the advantages of GMM-system over the other methods, it is impossible to differentiate between long run and short run conditions. Moreover, the supply leading hypothesis cannot be examined within the framework of GMM.

4.1.9 Panel Unit Root Tests.

Differentiating between long run and short run relationship among the variables is a task that the previous methods are unable to achieve. Fortunately, with the recent development of panel cointegration techniques, such difficulty can be easily overcome. However, the short sample size is a disadvantage in this direction. Hence, we have to reduce the number of variables to be utilised in the panel cointegration techniques, which are sensitive to degree of freedoms. Therefore, the study selects few variables to be used in panel cointegration techniques based on several yardsticks, which include the subject matter, theoretical foundation, relevance and significance from the previous methods. Thus, the variables selected include turnover ratio (subject-matter and significance) because it appears to be the most significant of all the stock market indicators; bank credit because it is best measure (relevance and theoretical foundation) of banking development; mortality rate (relevance and theoretical foundation) because of its importance to endogenous growth model[37].

Therefore the study proceeds with the results of the panel unit root tests, which are reported in Table 4.1.9. In this direction, the study employs three different stationarity tests. In all, none of the variables achieves stationarity at level, when tested with LLU, ADF-F, and PP-F stationarity tests, at 1 percent. However, at 1

[37] Moreover population growth rate is also conspicuously missing from the works of Beck and Levine (2004), Arestis et al. (2001), and Rousseau and Watchel (2000). Secondly, the initial income is missing as time series utilise another technique for investigating convergence of income hypothesis (see Bernard and Durlauf, (1996), Greasley and Oxley (1997).

percent significance level, all the variables become stationarity at first difference, even after going through all the stationarity tests. Therefore, the study progresses with the panel cointegration tests.

4.1.10 Panel Cointegration Tests

The panel cointegration tests point to the existence of a long run relationship among the variables. Clearly, from Table 4.1.10, the null hypothesis is rejected by Kao (1999) test. Moreover, four of the seven Pedroni (1999) tests reject the null of no cointegration at 1 percent significance level. Hence, the study concludes that long run relationships exist among the variables.

4.1.11 Panel ECM

Given that economic growth and other variables are cointegrated, procedures suggest that the dynamic relation between these variables should be examined within the framework of the panel ECM as contained in Table 4.1.11. Before proceeding to the ECM estimates, the long run estimates are reported in the upper panel of the Table 4.1.11. Turnover ratio is found to have a positive impact on economic growth in the long run. Conversely, the bank credit and mortality rate are negatively and significantly related with economic growth in the long run.

Proceeding to the short run estimates in the lower panel of Table 4.1.11, the results indicate that economic growth negatively responds to the first-order stock

market variable but positively to the subsequent-orders in the short run. From the findings, it is observed that for every increase of 1 percent in first-order and 1 percent in second order of turnover ratio, economic growth is expected to grow at 0.839 percent and 1.570 percent respectively. As observable from the results, the sign of bank credit enter with negative and insignificant signs; the second-order bank credit shows a positive and significant sign. Interpreting the results, for every 1 percent increase in second-order of bank credit, economic growth is expected to improve by 2.535 percent in the short-run. According to the adjusted R^2 the regressors explains about 49 percent of the variation of economic growth.

The estimated coefficient of the ECT of 0.738 is statistically significant at the 5 per cent level and with the appropriate (negative) sign indicating existence of long run relationship. This implies that about 73.8 percent of disequilibrium is corrected in the following period. Nonetheless, there is no way of checking for the reciprocal impact of economic growth on the selected variables. Thus, the study ventures into procedure that account for bidirectional relationship among variables.

4.1.12 Panel Granger Causality Tests

Having established a long run relationship with the cointegration tests and VECM, the study turn to panel Granger causality tests in Table 4.1.12, which reveals that turnover ratio granger causes economic growth in both the short run and long run. However, there is no feedback from economic growth to turnover ratio. Thus,

this implies that there is unidirectional causality from stock market to economic growth. Considering the bank credit, we observe that there is flow of causality from the bank credit to economic only in the long run. However, there is no feedback from economic growth to bank credit. The findings on mortality rate indicate that it granger causes economic growth in the short run and long run without any feedback from economic growth. Therefore there is a unidirectional causality from mortality rate to economic growth.

Summarily, it is evident that stock market (in terms of turnover ratio) is positively associated with economic growth in both the long run and in the short run (though insignificant in the long run). However, the banking sector does not possess such impact on economic growth, as it enters the equation with a negative sign in the long run. Therefore, it can be concluded that stock market performs better than banking sector. In other words, there is evidence for market based system over bank-based system in selected African countries. Based on the Granger causality test, the study provides evidence for supply leading hypothesis, without any evidence for demand following hypothesis because there is unidirectional causality from the stock market and banking sector to economic growth. Abu-Bader and Abu-Qarn (2008) provide similar evidence for supply leading hypothesis on a study of six MENA countries. In addition, Christopolous and Tsionas (2004) show that there is strong evidence for significant long run causality running from financial development to growth on panel data for 10 developing countries.

Further findings show that in the selected African countries, human capital development is germane for economic growth. These results are not significantly different from the previous panel results, above. However, the particular characteristics of each country may not make the findings to be applicable to all countries especially, when it comes to policy making. Moreover authors have argued for time series estimation[38]. Therefore, the study proceeds with time series estimation of each country.

4.2 Time Series Analysis

In conformity with the panel cointegration tests yardsticks, the time series study includes stock turnover ratio, bank credit and mortality rate as the independent variables. This is because the procedure employ–ARDL is also sensitive to short sample size. In regards to the arrangement of sampled countries, the study starts with the South Africa stock market, then it proceeds to the stock markets in the Northern part of the continent (Egypt, Morocco, and Tunisia), after which the study ventures into the stock markets in the West Africa (Nigeria, Cote D'Ivoire, and Ghana), then into the other stock markets in Southern region of Africa (Mauritius, Botswana and Mauritius) and lastly the Eastern region of the continent (Kenya). The arrangement has been done based on the size of each region.

[38] Such as Arestis et al. (2001)

4.2.1 South Africa

The time series analysis starts with South Africa because it has the largest stock market in the continent (Yartey, 2007). Commencing from the stationarity test as contained in Table 4.2.1.1, the study establishes that all the variables are I(0) and I(1), a requirement of ARDL, which becomes invalid once any of the variables is stationarity beyond the first difference. Therefore we delve into the bound test in Table 4.2.1.2. The bound tests indicate that at 5 percent significance level, the F-statistic falls between the lower and the upper bound, then the result appears inconclusive, with economic growth as the dependent variable. Fortunately, Kremers, Ericsson, and Dolado (1992) propose that an alternative way of establishing cointegration is by applying the ECM version of the ARDL model. Therefore, the paper proceeds to estimating the ARDL Model.

From the ARDL estimates, the long-run results are reported in the upper panel of Table 4.2.1.3, while the short run results are displayed in the lower panel of Table 4.2.1.3. The dependent variable is real per capita GDP growth. Following the work of Pesaran and Pesaran (1997), the study set the maximum order of lag set to four[39]. According to the long run estimates, turnover ratio positively contributes to the economic growth in South Africa. Besides, bank credit is positively related with economic growth. Though the estimates are not significant, however, turnover ratio

[39] However, deviating from Pesaran and Pesaran (1997), the study actually selected the optimal lag order as follows- 2, 4, 2, 1, because AIC and SBC selection are not serial correlation free and not homoscedastic.

appears to have a bigger positive coefficient in comparison to bank credit. Mortality rate enters the long run equation with a negative entry.

In the lower panel of Table 4.2.1.3, the short run estimates suggest that the turnover ratio has a first-order positive impact on economic growth, while the subsequent orders are negatively associated with economic growth. Conversely, the contemporaneous bank credit has a depressing outcome on economic growth. In fact, it is observed that for every 1 percent increase in bank credit, economic growth is expected to fall by 1.019 percent. Moreover, the mortality rate enters the regression with a positive sign contrary to theory. The ECM coefficient implies that 14.7 percent of disequilibrium in the previous period is corrected in the current period, thereby supporting the idea of existence of long run relationship among the variables, a result which remain inconclusive with the application of bound test. According to the adjusted R^2 the regressors explains about 25.9 percent of the variation in economic growth.

In Table 4.2.1.4, the Granger causality test results are reported[40]. The study observes that turnover ratio Granger causes economic growth in the both the short run and long run, while there is no feedback from economic growth. In support of

[40] We acknowledge the comments of Prof. Ron Smith, of the Department of Economics, Birkbeck College, London on the need to use VAR in investigating the Granger causality test.

evidence provided by Nzue (2006) study on Cote D'Ivoire for the period 1976-2002 and Odhiambo (2010) study on South Africa for the period 1971-2007, Akinlo and Akinlo (2009) study on South Africa, Antonios (2010) study on Germany for the period 1965-2007, there is unidirectional flow of causality from stock market to economic growth. Moreover, there is bidirectional causality between bank credit and economic growth, similar to the findings of Ndako (2010). Cumulatively, this is an evidence for supply leading hypothesis in South Africa. Akin to the results obtained for turnover ratio, there is a unidirectional causality from mortality rate to economic growth in South Africa.

Generally, the findings provided above shows that stock market has a weak positive impact on economic growth in the long run. On the other hand, the banking sector has a strong negative impact on economic growth in the short run and a weak positive impact on economic growth in the long run. Based on the bigger size of turnover ratio coefficient, stock market appears to be better than banking sector in South Africa. Therefore, the study concludes that market based system is more appropriate than bank based system in South Africa. This result is similar to the panel results in Table 4.1.8, which shows that banking sector is more inimical to economic growth than stock market. Bassanini et al. (2001) reach similar conclusion. Based on the Granger causality test, the study provides evidence for supply leading hypothesis, as it predominates over the demand-following hypothesis, because there is unidirectional causality from the stock market (while there is bidirectional from

banking sector) to economic growth. Moreover, there is a weak evidence for the positive contribution of human capital development on economic growth in South Africa. The diagnostics tests are contained in Table 4.2.1.5. The tests signify that the model does not suffer from serial correlation or heteroscedasticity. Besides, the model is well-specified and the errors are normally distributed. Though South Africa has the largest markets in Africa, it is not the first or the only stock market in Africa. Therefore, the study moves into the other markets.

4.2.2 Egypt

In Egypt is located the oldest and second largest stock market in Africa, in terms of stock market capitalisation. Therefore, the study proceeds to investigate the relationship between stock market and economic growth in Egypt. From the unit root tests, as displayed in Table 4.2.2.1, all the variables are at most stationary at the first difference[41]. Therefore, in Table 4.2.2.2 the study progress into the bound test. At 1 percent significant level, the F-statistic falls between the lower and the upper bound then the result seems inconclusive, with economic growth as the dependent variable. However, Kremers et al. (1992) propose that the application ECM version of the ARDL model is another means of detecting cointegration.

The ARDL estimates of Egypt are presented in Table 4.2.2.3. The dependent variable is real per capita GDP growth. In consonance with the work of Pesaran and

[41] Turnover ratio and mortality rate are stationary at first level with the use of PP- test

Pesaran (1997), the maximum lag is set at four[42]. The long-run results are reported in the upper panel of the Table 4.2.2.3, while the short run results are displayed in the lower panel of Table 4.2.2.3. From the long run estimation, it is observable that turnover ratio positively adds to economic growth in Egypt. The long-run estimate indicates that for every 1 percent increase in the turnover ratio, economic growth will increase by 0.512 percent, at 1 percent significance level. On the other hand, the findings signify that for every 1 percent increase in the bank credit, the economic growth will fall by around 0.819 percent, at 1 percent significance level. In other words, bank credit is negatively related to economic growth in Egypt. Mortality rate enters the equation with negative and significant sign. In terms of figures, for every 1 percent decrease in mortality rate, economic growth is expected to increase by 0.776 percent, a rate that is even larger than the turnover ratio contribution.

The short-run estimates suggest that the contemporaneous turnover ratio positively spurs economic growth in the short-run. As observed, an increase of 1 percent of the turnover ratio increases the economic growth by about 0.176 percent at 5 percent significance level. On the contrary, bank credit is shown to have a negative contribution to economic growth in Egypt. For instance, 1 percent increase in bank credit will decrease the economic growth by 0.288 percent, holding other factors constant. Mortality rate does not have the expected sign in the short-run. The error

[42] However, deviating from Pesaran and Pesaran (1997), the study actually selected the lag order as follows- 3, 4, 0, 4, because AIC and SBC selection are not serial correlation free and not homoscedastic.

correction term shows that about 40 percent of disequilibrium in the previous period year is corrected in the current period. The adjusted R^2 is relatively higher than the figure obtained for South Africa at 55.5 percent.

The Granger causality tests are reported in Table 4.2.2.4. In Egypt, there is a causality flowing from turnover ratio to economic growth in the long run, without any feedback from economic growth. Hence, in support of Christopolous and Tsionas (2004) and Akinlo and Akinlo (2009) study on Egypt, and Mun et al. (2008) on Malaysia with yearly data for the period 1977-2006, the results show that there is unidirectional flow of causality from stock market to economic growth. Moreover, there is bidirectional causality between bank credit and economic growth. Cumulatively, this implies that supply leading hypothesis exists in Egypt.

Summing up, the findings indicate that stock market is positively associated with economic growth in both the short run and in the long run. Conversely, the banking sector is negatively associated with the economic growth, especially in the long run. Stating it in another sense, the presence of stock market is better than banking sector in Egypt. Thus, we conclude that market based system is more appropriate than bank-based system in Egypt. These findings on Egypt are aligned to those obtain by Atje and Jovanovic (1993) Nieuwerburgh et al. (2006) Bassanini et al. (2001) and Azarmi et al. (2005) for the subsample period of pre-liberalisation in India. Based on the Granger causality test, the study provides evidence for supply

leading hypothesis, as it predominates over the demand-following hypothesis, because there is unidirectional causality from the stock market (while there is bidirectional from banking sector) to economic growth. Moreover, there is a strong evidence for the positive contribution of human capital development on economic growth in Egypt. From the diagnostics test reported in Table 4.2.2.5, there is no evidence for serial correlation or heteroscedasticity and the model is correctly specified.

4.2.3 Morocco

Before proceeding to the third largest stock market in Africa-Nigeria, the relationship between stock market and economic growth is investigated in Morocco and Tunisia, but starting with Morocco. This is because these two markets are located in the North Africa, like Egypt. Besides, Morocco has the second oldest stock market in Africa. Therefore the findings on Morocco are reported in the ensuing discussion. Starting with the unit root tests as displayed in Table 4.2.3.1, there is the evidence that all the variables are either I(0) or I(1). After meeting the condition that none of the variables attained stationarity beyond first difference, the study proceeds to Table 4.2.3.2, which contains the bound test. With economic growth as the dependent variable and at 5 percent significance level, the bound test indicates that the F-statistic falls between the lower and the upper bound, then, the result appears inconclusive. Coincidentally, Marashdeh and Shrestha (2010) argue that another way of

establishing cointegration is by applying the ECM version of the ARDL model. Hence, the study proceeds to estimating the ARDL model.

From the ARDL estimates, the long-run results are reported in the upper panel of Table 4.2.3.3, while the short run results are displayed in the second panel of 4.2.3.3. The dependent variable is real per capita GDP growth. Due to the problem of serial correlation and heteroscedasticity, the study increases the maximum lag to six[43]. Following the work of Pesaran and Pesaran (1997) the study utilizes AIC optimal lag selection. From the long run estimates, turnover ratio is negatively related with economic growth. Bank credit is also negatively related with economic growth, with turnover ratio having a less negative impact. Mortality rate appears to be a very significant factor with the coefficient indicating that for every 1 percent increase in mortality rate, economic growth is expected to increase by 1.385 percent, a figure which absorbs the negative tendencies of both the turnover ratio and bank credit.

The results of the short run are essentially similar to the long run results. For instance it is observed that in the short run, 1 percent increase in the contemporaneous turnover ratio will decrease economic growth by 0.129 percent, at 1 percent significance level. For contemporaneous bank credit, economic growth will decrease by 1.124 percent, for every 1 percent increase in bank credit. This symbolizes that

[43] We appreciate comments of Dr. Bahram Pesaran (the co-author of Microfit 4.0) on the need to increase the optimal lag length of the variables.

bank credit perform worse than stock market, even in the short run. The contemporaneous mortality rate enters the equation with the correct, albeit an insignificant sign. The ECM coefficient implies that the 69.5 percent of disequilibrium in the previous period is corrected in the current period, establishing the idea of long run relationship. According to the adjusted R^2 the regressors explains about 97.9 percent of the variation in economic growth.

From the Granger causality Table 4.2.3.4, it is obvious that turnover ratio Granger causes economic growth in the short run and long run, while there is a feedback from economic growth. Thus, this implies that there is bidirectional causality between stock market and economic growth, in support of the evidence provided by Shahbaz et al. (2008) on Pakistan for the period covering 1971 and 2006. There is also a unidirectional causality from the banking sector to economic growth in the long run.

Summing up, the findings indicate that stock market has a negative impact on economic growth. Nevertheless, considering the size of the coefficients, stock market (with a smaller negative coefficient) performs better than bank credit. This can be interpreted to mean that market based system is more appropriate than bank based system in Morocco. Based on the Granger causality test, the study provides evidence for supply leading hypothesis, as it predominates over the demand following hypothesis, because there is bidirectional causality from the stock market (while there

is unidirectional from banking sector) to economic growth in Morocco. Moreover, human capital appears to be a very important factor in economic growth especially in the long run. The diagnostics tests as contained in Table 4.2.3.5 indicate the lack of serial correlation and no heteroscedasticity. Besides, the model is correctly specified and the residuals are normally distributed. Having investigated two markets from North Africa-Egypt and Morocco- with different results, the study proceeds to the third market from the region.

4.2.4 Tunisia

The last and third North African stock market in our sample is that of Tunisia. Therefore, this section basically focuses on Tunisia. Commencing the analysis from the unit root tests, as displayed in Table 4.2.4.1, all the variables are at most stationary at first difference. Hence in Table 4.2.4.2 the study ventures into the bound test. At 1 percent significance level, the F-statistic falls between the lower and the upper bound, therefore evidence for cointegration seems inconclusive, with economic growth as the dependent variable. Coincidentally, Marashdeh (2005) argues that an alternative way of establishing cointegration is the application of ECM version of the ARDL model. Thus, the study turns to the ARDL Model.

The ARDL estimates of Tunisia are presented in Table 4.2.4.3. The dependent variable is real per capita GDP growth. As a result of the problem of serial correlation the study increases the maximum lag to six. In line with the work of Pesaran and

Pesaran (1997) the study utilizes AIC optimal lag selection. The long-run results are presented in the upper panel of Table 4.2.4.3, while short run estimates are reported in the lower panel. It is clear from the long run estimation that turnover ratio is negatively related to economic growth. For instance, the estimates indicate that 1 percent increase in turnover ratio will decrease economic growth by 0.264 percent. A similar increase will result into economic growth shrinking, as much as 4.573 percent in Tunisia. The coefficient of mortality rate indicate that economic will increase in economic growth by 2.644 percent, when mortality rate decreases by 1 percent.

The short run estimates are similar to long run estimates in the sense that for Tunisia, turnover ratio negatively contributes to growth in the short run. Equally, the bank credit has a generally stronger negative impact on economic growth. In numeric terms, 1 percent changes in contemporaneous turnover ratio and bank credit will have opposite effect on economic growth to the tune of 0.104 percent and 8.091 percent, respectively. Once again this is evidence that bank credit performs worse than turnover ratio in Tunisia. Mortality rate is insignificant in the short run. The error correction term indicates that more than 39.6 percent of disequilibrium in the previous period is corrected in the current period. In tune with the work of Marashdeh (2005), this means that long run relationship exists among the variables. The adjusted R^2 is about 74.9 percent, which implies that the short run model can explain 74.9 percent of the variation in economic growth.

From the Granger causality displayed in Table 4.2.4.4, it is obvious that turnover ratio Granger causes economic growth long run with feedback from economic growth in both the short run and in the long run. Thus, this implies bidirectional causality between stock market to economic growth in the long run, while unidirectional is present in the short run flowing from economic growth to stock market. For the bank credit, there is a long run bidirectional relationship with economic growth. However, in the short run, there is unidirectional causality flowing from bank credit to economic growth. This result indicates bidirectional causality between financial sector and economic growth. The causality on mortality rate shows that mortality rate Granger causes economic growth without any feedback from economic growth.

In summary, the results show that stock market is negatively related to economic growth in Tunisia, similar to the outcome of Nzue (2006). Nevertheless, in view of the coefficients magnitudes, stock market (with a smaller negative coefficient) performs better than bank credit. This can be interpreted to mean that market based system is more appropriate than bank based system in Tunisia. Based on the Granger causality test, the study provides evidence for bidirectional causality in Tunisia. In addition, human capital development turns out a significant factor in economic growth, a result similar to all the North African stock markets reviewed. The diagnostics tests in Table 4.2.4.5 outputs suggest that the estimates do not suffer from either heteroscedasticity or serial correlation. With the completion of the

investigation on stock markets in the North Africa, the study proceeds with stock markets in the West Africa- Nigeria, Cote D'Ivoire, and Ghana.

4.2.5 Nigeria

The stock market in Nigeria is the largest stock market in West Africa and the third largest in Africa, by stock market capitalisation. Therefore, the study commences with the stock market of Nigeria. Beginning with the unit root tests as displayed in Table 4.2.5.1, there is the evidence that all the variables are either I(0) or I(1). After meeting meet the condition that no variable attained stationarity above first difference, the study moves to Table 4.2.5.2, which contains the bound test. With economic growth as the dependent variable, the bound test indicates that the F-statistic falls between the lower and the upper bound, then, the result appears inconclusive, at 5 percent significance level. However, Marashdeh and Shrestha (2010) argue that another way of establishing cointegration is by applying the ECM version of the ARDL model.

The ARDL estimates of Nigeria stock market are shown in Table 4.2.5.3, with the long run estimates occupying the upper panel, while the short run estimates occupy the lower panel of Table 4.2.5.3. The dependent variable is real per capita GDP growth. As a result of the problem of serial correlation, the study increases the

maximum lag to five[44]. According to the long run estimates, turnover ratio negatively contributes to the economic growth. Bank credit has a negative impact on economic growth as well. However, the mortality rate enters the equation with the expected negative and significant sign.

For the short run estimates, turnover enters the equation with a positive but insignificant impact on economic growth. However, similar to the mortality rate, the contemporaneous bank credit has negative and insignificant relationship with economic growth. These findings are similar to the results obtain by Solarin (2010) study on Nigeria for the period covering 1981-2008. The error correction term indicates that more than 16.2 percent of disequilibrium in the previous year is corrected in the current year. Following the study of Marashdeh and Shrestha (2010), this indicates the existence of long run relationship among the variables. According to the adjusted R^2 the regressors explains about 71.8 percent of the variation in economic growth.

From the Granger causality in Table 4.2.5.4, the study notes turnover ratio Granger causes economic growth in both the short run and long run, while there is only a long run feedback economic growth. On the other hand, there is unidirectional

[44] The selected the lag order is as follows- 4 2, 2, 4, because AIC and SBC selection are not serial correlation free and not homoscedastic.

causality from bank credit and mortality rate to economic growth without any feedback from economic growth. Clearly, this implies that there is unidirectional causality between flowing from financial sector to economic growth.

Summing up, the results presented above provide evidence that stock market has a negative impact on economic growth. In contrary to the results of other countries, the study observes banking sector performs better than stock market (with a bigger negative coefficient in the long run). Thus, we provide evidence for bank-based system over market-based system in Nigeria. Considering the Granger causality test, the study provides evidence for supply leading hypothesis, as it predominates over the demand-following hypothesis, because there is long run bidirectional causality between stock market (while there is unidirectional from banking sector) and economic growth in Nigeria. Moreover, human capital appears to be a very important factor in economic growth, especially in the long run. From the diagnostics tests presented in Table 4.2.5.5, the model is free of heteroscedasticity, serial correlation and there is no specification error. Apart from Nigeria, there two West African stock markets in the sample.

4.2.6 Cote D'Ivoire

Excluding Nigeria, Cote D'Ivoire has the largest stock market in West Africa. As shown earlier, the market serves eight West African countries and is the first regional stock market in the World. Hence, the study focuses on the stock market in

this section. Commencing with the unit root tests, as displayed in Table 4.2.6.1, all the variables are I(0) and I(1), thus not attaining stationarity beyond first difference, a condition for the bound test. Therefore, in Table 4.2.6.2 the study progresses into the bound test. At 10 percent significance level, the F-statistic falls between the lower and the upper bound, therefore evidence for cointegration seems inconclusive, with economic growth as the dependent variable. However, Kremers et al. (1992) suggest that ECM version of the ARDL model can also provide evidence for cointegration.

The ARDL results of Cote D'Ivoire are presented in Table 4.2.6.3. The dependent variable is real per capita GDP growth. As a result of the problem of serial correlation the study increases the maximum lag to five. In line with Pesaran and Pesaran (1997) the study utilizes AIC optimal lag selection. The long-run results are presented in the upper panel of Table 4.2.6.3, while short run estimates are reported in the lower panel. Commencing from the long run results, the study notes that turnover ratio is negatively related to economic growth. Similarly, bank credit coefficient enters the equation with a negative and significant coefficient. Mortality rate turns out to be positive, contrary to theory.

In the short run, turnover ratio has a negative impact on the economic growth. Interpreting the estimates, for every 1 percent increase in the current turnover ratio, economic growth is expected to decrease by 0.283 percent. However, subsequent-order of turnover ratio shows positive signs, similar to the sign of bank credit. The

error correction term indicates that more than 20.3 percent of disequilibrium in the previous period is corrected in the current period. This is an evidence for long run relationship among the variables according to Kremers et al. (1992). The adjusted R^2 is about 44.4 percent, which implies that 44.4 percent variation in the economic growth is explained by the regressors.

From the Granger causality reported in Table 6.2.6.4, the findings prove that turnover ratio Granger causes economic growth in both the short run and in the long run, while with feedback from economic growth only in the long run. For the banking sector, there is long run unidirectional causality from bank credit to economic growth. Evidently, this is an evidence for supply leading hypothesis in Cote D'Ivoire. Findings hint bidirectional relationship between economic growth and mortality rate in the long run.

In summary, the results show that stock market negatively contributes to economic growth in Cote D'Ivoire, in support of Nzue (2006) who observe same result for the same country. However, further findings prove the depressing impact of banking development is bigger than the stock market in Cote D'Ivoire, especially in the long run (as the coefficient of bank credit is larger). Therefore, for Cote D'Ivoire, the study concludes that market based system is better than bank based system. The Granger causality tests indicate evidence for supply leading hypothesis. For the first time, human capital appears not to be an essential factor in economic growth.

However, we interpret this to mean that human capital is not given adequate attention in Cote D'Ivoire unlike the previous countries that have been investigated. The diagnostics tests as reported in Table 4.2.6.5 signify that the model is free from serial correlation, heteroscedasticity and there is no specification problem. Hence, having investigated Nigeria and Cote D'Ivoire, the study embarks on the assessment of the relationship between stock market and economic growth in last West African market in the sample.

4.2.7 Ghana

In this section, the study focuses on the relationship between stock market and economic growth in Ghana. The unit root test as presented in Table 4.2.7.1 indicate that the all the variables are I(0) and I(1), which means that the study can proceed to bound test of cointegration. In Table 4.2.7.2, with economic growth as the dependent variable, the bound test indicates that the F-statistic falls between the lower and the upper bound, then, the result appears inconclusive, at 1 percent significance level. However, Marashdeh and Shrestha (2010) opine that ECM version of the ARDL model is another means of detecting cointegration.

Hence, the ARDL estimates of Ghana stock market are displayed in Table 4.2.7.3, with the long run estimates in the upper panel, while the short run estimates are in the lower panel. The dependent variable is real per capita GDP growth. As a

result of serial correlation the study increases the maximum lag to six[45]. According to the long run estimates, turnover ratio negatively contributes to the economic growth. Similarly, bank credit has a positive impact on economic growth. However, the mortality rate enters the equation with significantly positive sign. In short run, estimates show that turnover ratio enters the equation with negative but insignificant sign. On the other hand, bank credit positively impact economic growth. From the estimate it is evident that economic growth increases by 0.345 percent for every 1 percent increase in bank credit, holding other factors constant. The significant error correction term indicates there is long run relationship as the term is significant with negative entry. In fact, it implies that 18.9 percent of disequilibrium in the previous period is corrected in the current period. The adjusted R^2 is about 0.814, which implies the regressors explain 81.4 percent variation in economic growth.

From the Granger causality displayed in Table 4.2.7.4, the study observes turnover ratio and economic growth Granger causes each other in the long run. However, there is no evidence for flow of causality in the short run. Therefore, this means that there is bidirectional causality between the stock market and economic growth only in the long run. Besides, results suggest that banking sector has bidirectional causality relationship with economic growth in the long run, but unidirectional causality from economic growth to banking sector in the short run.

[45] The selected the lag order is as follows- 6, 4, 1, 4 because AIC and SBC selections are not serial correlation free and not homoscedastic.

Generally, this means that demand following hypothesis exist in Ghana. Findings hint a unidirectional relationship flowing from mortality rate to economic growth.

Summarily, the foregoing outcomes indicate that stock market (with an insignificant sign in the long run) has a weak positive impact on economic growth. In other results, banking sector performed better than stock market in the short run and in the long run (considering the size of the coefficient in the long run). Therefore, in the case of Ghana, bank based system is better than market based system. Considering the causality test, there is evidence for demand following hypothesis. Similar to the result of Cote D'Ivoire, the study fails to find any evidence for positive contribution of human capital development.

As for the diagnostics test, in Table 4.2.7.5, the study observes that the estimation is free from serial correlation and there is no functional form problem. Generally, the study shows that in West Africa, stock markets do not really have significant positive contribution to economic growth. Nevertheless, stock market still performs better than bank credit. Moreover, human capital development is not as effective in improving economic growth, as that of North Africa. In the succeeding section, the study moves into stock markets in Southern Africa.

4.2.8 Botswana

After South Africa, Botswana has the largest stock market in Southern Africa in terms of market capitalization (Irving, 2005). Therefore, in this section, the study concentrates on Botswana. Based on the unit root tests as displayed in Table 4.2.8.1, there is the evidence that all the variables are either I(0) or I(1). After satisfying the condition that none of the variables attained stationarity above the first difference, the study moves to the Table 4.2.8.2, which contains the bound test. With economic growth as the dependent variable, the bound test indicates that the F-statistic falls between the lower and the upper bound, then, the result appears inconclusive, at 10 percent significance level. However, Marashdeh and Shrestha (2010) argue that another way of establishing cointegration is by applying the ECM version of the ARDL model.

Therefore, the study reports the ARDL estimates in Table 4.2.8.3 with long run estimates in the upper panel, while the short run estimates are in the lower panel. The dependent variable is real per capita GDP growth. Due to the problem of serial correlation, the study increases the maximum lag to six. In line with the work of Pesaran and Pesaran (1997) the study utilizes AIC optimal lag selection. Hence proceeding to long run estimates the findings suggest that turnover ratio has a positive impact on economic growth. The figures indicate that for every 1 percent rise in turnover ratio, economic growth falls by 1.296 percent. Conversely, bank credit does not significantly affect economic growth. Besides, mortality rate turns out with

an unexpected sign. Moving to the short run estimates, also dub as the ARDL-ECM results, findings suggest that turnover ratio is significantly and positively related to economic growth. For instance, when holding other factors constant in the short run, economic growth rises by 0.222 percent for every 1 percent rise in turnover ratio. It is noteworthy that the result is significant at 1 percent significant level. The bank credit is also positively and significantly related to economic growth. For instance, the estimates suggest that 1 percent rise in bank credit improves the economic growth by 4.032 percent, a figure greater than the estimate of turnover ratio. The highly significant error correction term suggests that more than 17.1 percent of disequilibrium in the previous period is corrected in the current period. Moreover, this implies the existence of long run relationship among the variables. The adjusted R^2 suggest that 78.4 percent of the variation in the economic growth is explained by the regressors.

In Table 4.2.8.4, the computed Granger causality results are displayed. Firstly, the study notes that turnover ratio Granger causes economic growth in both short run and long run, with only long run feedback from economic growth. Hence, this means bidirectional causality between turnover ratio and economic growth. Besides, the bank credit Granger causes economic growth, in both short run and long run, without any feedback from economic growth. Clearly, this is an indication of supply leading hypothesis in Botswana.

In sum, our findings generally provide evidence for a positive contribution of stock market to economic growth in Botswana. Secondly, we confirm that stock market performs better than the banking sector in Mauritius, in line with Nieuwerburgh et al. (2006) who contends that stock market development is a better forecaster of economic growth than bank-based development in Belgium in the period between 1830 and 2000. Of note is that banking sector performs better than stock market in the short run. However, in the long run the trend reversed. Thus this is an indication that in Botswana, market-based system is more suitable than bank-based system especially in the long run. Considering the Granger causality test, the study provides evidence for supply leading hypothesis, as it predominates over the demand following hypothesis, because there is long run bidirectional causality from the stock market (while there is unidirectional from banking sector) to economic growth in Mauritius. Similar to the results of the West African countries, evidence for the positive contribution of human capital is not found. The diagnostics tests in Table 4.2.8.5 indicate the lack of serial correlation, function form problem and heteroscedasticity. Hence, having investigated Botswana, the study moves to a smaller market in Southern African region (Irving, 2005).

4.2.9 Mauritius

In the southern part of Africa, one of the leading stock market is located in Mauritius, which is third in terms of market capitalization after South Africa and Botswana. Therefore, in this section, the study focuses on Mauritius. Considering the

unit root tests, as reported in Table 4.2.9.1, all the variables are I(0) and I(1), thus attaining stationarity not beyond the first difference, a condition for a valid bound test. Therefore, in Table 4.2.9.2 the study progresses into the bound test. At 10 percent significance level, the F-statistic falls between the lower and the upper bound, therefore evidence for cointegration is inconclusive, with economic growth as the dependent variable. However, Kremers et al. (1992) propose that an alternative method of establishing cointegration is by applying the ECM version of the ARDL model.

The ARDL estimates are presented in Table 4.2.9.3 with the long run estimates in the upper panel and the short run estimates in the lower panel of Table 4.2.9.3. The dependent variable is real per capita GDP growth. Due to the problem of serial correlation, the study increases the maximum lag to six. In line with the work of Pesaran and Pesaran (1997) the study utilizes SBC optimal lag selection. In the long run estimate turnover ratio has a positive and significant impact on economic growth. The estimates show that 1 percent increase in turnover ratio will increase economic growth by 0.386 percent. On the other hand, bank credit is not only insignificant but also has a negative impact on economic growth. Mortality rate enters the equation with the expected sign, albeit with an insignificant entry. The error correction term indicates that more than 48.2 percent of disequilibrium in the previous period is corrected in the current period, thus suggesting the existence of long run relationship

among the variables. The adjusted R^2 implies that our short run model accounts for 60.8 percent of the variation of the economic growth.

From the Granger causality Table 4.2.9.4, it is apparent that there is unidirectional causality flowing from the turnover ratio and economic growth in both the short run and long run. The results are similar to the findings of Nzue (2006) on Cote D'Ivoire and Odhiambo (2010) on South Africa Christopolous and Tsionas (2004) and Mun et al. (2008). Moreover, unidirectional causality exists from bank credit to economic growth, with causality flowing from bank credit in the long run. Clearly this is an evidence for supply leading hypothesis. There is also unidirectional causality flowing from mortality rate to economic growth in the long run.

In summary, the results show that stock markets contribute positively to economic growth. On the other hand, the banking sector has a negative impact on economic growth. Thus this is an indication that market based is more appropriate than bank based system in Mauritius in line with Bassanini et al. (2001). Based on Granger causality test, this is a clear evidence for supply leading hypothesis. Human capital development is found to have a weak positive impact on economic growth. The diagnostics tests in Table 4.2.9.5 indicate the lack of serial correlation, functional form problem and heteroscedasticity. Hence, having investigated the relationship in stock market, bank and economic growth for Mauritius, the study proceeds with

Swaziland (the smallest stock market of the Southern African countries in the sample) (Irving, 2005).

4.2.10 Swaziland

In this section, the study reviews the time series evidence for Swaziland. Commencing with the unit root tests, as displayed in Table 4.2.10.1, all the variables are I(0) and I(1), thus attaining stationarity not beyond first difference, a prerequisite for conducting the bound test. Therefore, in Table 4.2.10.2 the study moves into the bound test. At 1 percent significance level, the F-statistic falls between the lower and the upper bound, therefore evidence for cointegration seems inconclusive, with economic growth as the dependent variable. However, Kremers et al. (1992) suggest that cointegration can be established with the aid of the ECM version of the ARDL model.

Hence we proceed to the ARDL estimates to find out the existence of long run relationship and consider the long and short run estimates. In Table 4.2.10.3 the ARDL estimates are reported with the long run estimates in the upper panel and the short run estimates in the lower panel. The dependent variable is real per capita GDP growth. As a result of the problem of serial correlation the study increase the maximum lag to six[46]. All the long run coefficients enter with insignificant entries,

[46] The selected the lag order is as follows- 5, 5, 5, 5 because AIC and SBC selections are not serial correlation free and not homoscedastic.

with the turnover ratio being positive while bank credit is negative. In short run, the results virtually remain same, however with the contemporaneous bank credit showing a positive entry. The error correction term indicates that more than 42.4 percent of disequilibrium in the previous period is corrected in the current period. The adjusted R^2 suggest the model explains about 41.0 percent of the variation in economic growth.

The study reports the Granger causality test in Table 4.2.10.4. The findings of the Granger causality reveal that turnover ratio Granger causes economic growth only in the long run, with short run and long run feedback from economic growth. Besides, the study observes a long run causality flowing from bank credit to economic growth, with long run feedback from economic growth to bank credit. This is evidence that demand following hypothesis predominates in Swaziland. Besides, we observe a unidirectional flow of causality from the mortality rate to economic growth.

In summary, the results show that stock market has a weak positive contribution on economic growth. However, the stock market performs better than the banking sector, as the coefficient of the latter is negative and insignificant in the long run. This is evidence in support of market based system as against the bank based system in Swaziland, in tune with evidences provided by Bassanini et al. (2001). The Granger causality indicates that demand following hypothesis predominates in the Swaziland. In regards to human capital development, the study fails to find evidence for its

positive contribution in Swaziland. The diagnostics tests reported in Table 4.2.10.5 reveals that the estimates are free from serial correlation and heteroscedasticity. In the next section, the study concentrates on the only East African stock market in the sample.

4.2.11 Kenya

Kenya has the biggest stock market in East Africa, a region with very limited development of stock markets. Hence in this section, the study investigates the interaction of the variables in Kenya. Starting with the unit root tests, as reported in Table 4.2.11.1, all the variables are shown to be either I(0) and I(1), thus attaining stationarity not beyond the first difference, a prerequisite of the bound test. Therefore, in Table 4.2.11.2 the study progresses into the bound test. At 10 percent significance level, the F-statistic falls between the lower and the upper bound meaning that the evidence for cointegration is inconclusive, with economic growth as the dependent variable. However, Marashdeh and Shrestha (2010) propose that an alternative method of establishing cointegration, which is the application of the ECM version of the ARDL model.

The study proceeds with the time series results of Kenya as contained in Table 4.2.11.3. The dependent variable is real per capita GDP growth. As a result of serial

correlation the study increase the maximum lag to five[47]. The long run estimates are shown in the upper panel section of Table 4.2.11.3, while the short run estimates are displayed in the lower panel. In the long run, turnover ratio is positively associated with economic growth in Kenya. Numerically, the long run coefficient signifies that economic growth will rise by 0.769 percent, when there is 1 percent increase in turnover ratio. On the other hand, bank credit has an insignificant negative contribution to the economic growth. Contrary to theory, the coefficient of mortality rate has a positive sign.

In the short run, the coefficients show that stock market has a positive and significant relationship with economic growth. In terms of figures, with every 1 percent increase in turnover ratio, economic growth increases by 0.386 percent, holding other factors constant. Conversely, the coefficient of the bank credit is negative. The contemporaneous mortality rate is negative but insignificant. Moving to the error correction term, the study observes that error correction term suggests that 19.7 percent of disequilibrium in the previous period is corrected in the following period. According to Marashdeh and Shrestha (2010), this is another indication of the existence of long run relationships among the variables. The adjusted R^2 indicates that 80.9 percent variation of economic growth is explained by the regressors.

[47] The selected the lag order is as follows- 4, 2, 4, 2, because AIC and SBC selections are not serial correlation free and not homoscedastic.

In Tables 4.2.11.4, we compute the Granger causality to check the flow of causality among the variables. Turnover ratio Granger causes economic growth in the long run, without any feedback from economic growth. Therefore there is a unidirectional causality flowing from stock market to economic growth. Bank credit Granger causes economic growth in long run, while there is feedback from economic growth in Kenya. Clearly, this is an evidence for supply leading hypothesis in Kenya.

In conclusion, our results support the evidence provided that stock market positively contributes to economic growth in Kenya. On the other hand, bank credit is negative and insignificant. Clearly, this is evidence that market-based system is more suitable than bank-based system in Kenya. These results are in line with findings of Bassanini et al. (2001) and Odedokun (1996b), who note a negative relationship between financial depth and economic growth. Based on the Granger causality test, the study provides evidence for supply leading hypothesis, as it predominates over the demand-following hypothesis, because there is unidirectional causality from the stock market (while there is bidirectional banking sector) to economic growth. Similar to the findings of the Southern Africa countries, the study notes that human capital development is not a significant factor in economic growth. The diagnostics tests as reported in Table 4.2.11.5 signify that the model is free from serial correlation, no heteroscedasticity and no functional form problem.

CHAPTER 5

SUMMARY AND CONCLUSION

5.1 Summary

In this study, we set out to investigate the relationship between stock market and economic growth in some selected African countries for the period covering 1990 to 2009. The countries in the sample include South Africa, Egypt, Morocco, Tunisia, Nigeria, Cote D'Ivoire, Ghana, Botswana, Mauritius, Swaziland and Kenya. These countries have been selected based on two criteria. The first yardstick is the size of the markets. In this case South Africa, Egypt, and Nigeria and Morocco are the largest stock markets in Africa in terms of market size. The second yardstick is the availability of data, which all the markets in the sample scaled through (however, data in Botswana and Ghana are available for period covering 1991-2009, while that of Swaziland are available for 1990-2008 period).

The main objective of the study is to determine the impact of stock market on economic growth in the selected African countries as a panel and at individual country level. However, the investigation of this objective itself does not lead to the acceptability or the rejection of stock market development, since it is not the only financial institution. Therefore, the study proceeds with a second objective, which is to determine whether a market-based system is more suitable than bank-based system in the selected Africa countries as a panel and at individual country level. Even the

determination of the second objective may not necessarily imply that priority be placed on development of financial institutions. Hence, the study embarks on the investigation of supply leading hypothesis existence in the selected African countries as a panel and at individual country level. The other objectives are to determine the existence of income convergence hypothesis in the selected countries and provide for business cycle in some of the estimates.

This study has numerous contributions and significance. For example, this paper contributes to empirical literature on the impact of stock markets in Africa. Hence, this may serve as a guide on policy makers on how to manage the development of stock market in their respective countries. Moreover, since the study concentrates on the biggest stock markets in Africa, these results may be useful for other emerging stock market in the continent. By extension, future works can build upon this study to consider other non-banking financial institutions. As the study also include banking sector, the research may guide the governments of these respective countries on how to allocate fund or stabilization policy between banks, stock markets and other financial institutions. In addition, it may inform policy decisions involving the adoption or otherwise of specific types of financial system in the selected countries and Africa at large. For both foreign and local investors, this study might also serve as a yardstick apart from the expected return from their investments. Unlike previous studies, this work principally adopt GMM-system approach, which has been argued to be robust in small sample size, in presence of weaker assumption

of heteroscedasticity and serial correlation Arrelano and Bover (1995) and Blundell and Bond (1998a).

Methodologically, the work is divided into two sections. The first section covers the panel study, which begins with pooled OLS, then random and fixed effect model before investigating the nexus with GMM-difference one-step variant and finally GMM-system one step variant. In accordance with the argument of Harris (1997) and Durham (2000) and Minier (2003), the study later removed South Africa from the sample and re-estimated with GMM-system one step variant. In line with the endogenous growth model, the adopted variables are stock market indicators (market capitalization, turnover ratio, and value of shares traded ratio), banking sector development indicator, population growth rate and mortality rate for human capital development. The other control variables include money supply, initial income, investment, foreign direct investment, interest rates and inflation rate and government consumption expenditure. To provide for business cycle the variables are averaged over a three year interval. In order to distinguish between the long run and short run relationship, and to check the degree of causality among major variables, the study utilises the recent introduced panel cointegration techniques, in which the study selected few variables, due to the sensitivity of the techniques to degree of freedom. The selected variables include turnover ratio (subject-matter and significance) because it appears to be the most significant of all the stock market indicators; bank credit because it is the best measure (relevance and theoretical foundation) of banking

development; mortality rate (relevance and theoretical foundation) because of its importance to endogenous growth model. Coincidentally, population growth rate is also conspicuously missing from the works of Beck and Levine (2004), Arestis et al. (2001) and Rousseau and Watchel (2000).

The second section of the methodology deals with time series analysis, which is basically on the ARDL estimates. Due to the short sample size of the annual data, the disaggregation procedures introduced by Gandolfo (1981) and Lisman and Sandee (1964) are utilised to disaggregate the data into quarterly series. The data are further smoothened in order to avoid problems associated with disaggregated techniques. The variables in the time series study are similar to the variables in the panel cointegration techniques.

The findings are generally interesting. Starting with the panel estimates, the pooled OLS reveals that stock market development (considering the market capitalisation because trade ratio and turnover ratio are generally insignificant, even at 10 percent significance level) has a negative impact on economic growth. However, banking sector shows bigger negative impact on economic growth. Therefore, the study concludes that stock market performs better than banking sector in the selected countries. These results are contrary to most previous studies; even those pertaining to Africa (see Akinlo and Akinlo 2009; Adjasi and Biekpe, 2006). For other variables, there is evidence for positive relationship between human capital

accumulation and economic growth with no evidence for convergence of income in our sampled countries. Government expenditure and money supply appear to have negative impact on economic growth. Foreign direct investment has a significant positive impact on economic growth. As a result of the problems associated with pooled OLS, the study proceeds to other methods.

One of these methods is the random effect model. The findings of random effect estimates indicate that stock market has positive impact (considering turnover ratio because market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level) on economic growth. This finding is assumed to depict the fact that it is the transaction on the stock markets that actually enhances economic growth and not mere listing of companies on the stock exchanges. The positive impact of turnover ratio on economic growth is similar to the findings of Beck and Levine (2004). On the other hand, banking development appears to have a negative impact even at higher level of banking development on economic growth. Therefore this implies that market based system is more suitable than bank based system in the selected countries. This result is not surprising because in Africa, banking services penetration is as low as 5 percent, access to banks in most countries is limited to the urban centres; and the fact that the ratio of M1 to M2 is the highest in the world means that cash is still the dominant financial instrument (Andrianaivo and Yartey, 2009). There are evidences for higher human capital accumulation; higher foreign direct investment; lower government expenditure, and lower population growth rate

for economic growth. Unlike the pooled OLS estimates, there is evidence for convergence of income hypothesis. Due to the fact that not all the estimates are consistent, the study proceeds with the fixed effect model.

In the fixed effect model, stock market development has positive impact (considering turnover ratio because market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level) on economic growth. This may connotes that it is the transaction on the stock markets that actually boosts economic growth and not mere listing of companies on the stock exchanges. The positive impact of turnover ratio on economic growth is in line with the findings of (Beck and Levine 2004). On the other hand, bank developments are positive but not generally significant. Therefore, we once again conclude that market based system is more appropriate than bank based system in the selected countries and by extension African stock markets. Other results indicate that foreign direct investment, low population growth rate, human capital accumulation and investment are essential in boosting economic growth. Moreover, there is evidence of convergence of income in our sample countries. The inference with the fixed effect estimator is potentially prone to nonnormality, heteroscedasticity, and serial correlation in idiosyncratic errors (Wooldridge, 2009:488). Therefore, the study proceeds to GMM estimates.

From the GMM-difference estimates, considering the coefficient of turnover ratio (as market capitalisation and trade ratio are generally insignificant, even at 10

percent significance level), it appears that stock market has a positive but weak impact on economic growth. Thus, it is transaction or liquidity on the stock markets that actually drive economic growth and not mere listing of companies. The positive impact of turnover ratio on economic growth is similar to the findings of (Beck and Levine 2004). The banking sectors turns out to be more insignificant, which conform to the arguments of (Andrianaivo and Yartey, 2009) who argue that bank penetration is low and Kenny and Moss (1998) opine that banks operations are mired in scandal, thus not actually boosting economic performance. Therefore, we conclude that market based system is more appropriate than bank based system for the selected countries in Africa. Important variables from the findings include foreign direct investment and money supply. While the former displays a positive role in boosting economic growth, the latter is negatively related to economic growth, which has been attributed to seignorage practiced by government in Africa. It is argued that GMM difference instruments are often weak which causes biases in small sample size (Arrelano and Bover, 1995). Therefore, further econometrics methods are needed that control for these problems.

The GMM-system estimates indicate that the coefficient of turnover ratio (as market capitalisation and trade ratio are generally insignificant, even at 10 percent significance level), thus stock market has a positive impact on economic growth. Once again, this supports the notion that it is actually transaction or liquidity on the stock markets that boost economic and not mere listing of companies. The positive

impact of turnover ratio on economic growth is similar to the findings of (Beck and Levine 2004). Conversely, the banking sector coefficient turns out to be negative. Hence, this is an indication that stock market performs better than banking sector in the selected countries. Therefore we conclude that market based system is more compatible with economic growth than the bank based system. This is not surprising as activities of banking sector in Africa are composed of debt, which is inimical to growth because it gives priority on the payback over the substance of the project. Moreover, banking activities in Africa are mired with corruption and scandal as argued by Kenny and Moss (1998) or low penetration as put forth by Andrianaivo and Yartey (2009). This could also be attributed to stringent collateral conditions imposed by banks, information asymmetry, and the huge public sector role in the banking industry, which persists in some African countries even after liberalisation (Misati and Nyamongo, 2011). Human capital appears as a determinant of economic growth. While government expenditure appears to negatively impact on economic growth, foreign direct investment has positive relationship on economic growth. Inflation rates and interest rates are significantly related to growth. The inclusion of large stock market may exaggerate the coefficient. Therefore, the study removes South Africa and re-estimates the model.

The findings without the inclusion of South Africa show that stock market (considering the trade ratio and turnover ratio, as market capitalisation is insignificant even at 10 percent significance level), without the inclusion of South Africa in the

sample boosts economic growth. Hence this support the impression that transaction or liquidity actually impacts on economic growth and not mere listing of companies. The positive impact of turnover ratio on economic growth is similar to the findings of (Beck and Levine 2004). On the other hand, the impact of banking sector appears to be weak as most of the coefficients are weak even at a relatively higher developed banking sector. Similar to the previous results, the study conclude that market based system is more suitable than bank based system. Foreign direct investment and government expenditure are important variables in determining economic growth.

Principally from the GMM-system results, it is observable that stock market liquidity is positively related to economic growth. This is corroborated with the findings of most of the other methods. Moreover, banking development is negatively associated with economic growth, based on the GMM-system findings and supported by most of the other methods. These findings demonstrate suitability of market based system over bank based system. Human capital development, government expenditure, foreign direct investment, inflation and interest rates are shown to be determinants of economic growth, according to the GMM-system that are substantially similar to estimates of other methods. The GMM-system approach suggests a weak evidence for convergence hypothesis. Generally, the aforementioned procedures do not differentiate between long run and short run conditions. Moreover, causality tests are not feasible with procedures. Therefore, the study moves to panel cointegration techniques.

Despite being different in terms of approach, the panel cointegration procedures provide similar findings. For example, stock market (in terms of turnover ratio) is positively associated with economic growth in both the long run and in the short run (though insignificant in the long run). However, the banking sector does not possess such impact on economic growth, as it enters the equation with a negative sign in the long run. Therefore, it is concluded that stock market performs better than banking sector. In other words, there is evidence for market based system over bank-based system in selected African countries. Based on the panel Granger causality test, the study provides evidence for supply leading hypothesis, without any evidence for demand following hypothesis because there is unidirectional causality from the stock market and banking sector to economic growth. Abu-Bader and Abu-Qarn (2008) provide similar evidence for supply leading hypothesis on a study of six MENA countries. Besides, the findings show that in the selected African countries, human capital development is germane for economic growth. These results are not significantly different from the previous panel results, above. However, the particular characteristics of each country may not make the findings to be applicable to all countries especially, when it comes to policy making. Moreover authors have argued for time series estimation[48]. Therefore, the study proceeds with time series estimation of each country.

[48] Such as Arestis and Demetriades (1997); Arestis et al. (2001)

In the times series findings, evidence abound for positive contribution of stock market on economic growth, market-based system, and supply leading hypothesis few exceptions. For human capital development, there are evidences mainly for the large countries in the continent. For example, the findings on South Africa, Egypt, Morocco, Botswana, Mauritius, Cote D'Ivoire, Tunisia, Swaziland and Kenya indicate market based system is better than bank-based system. This is even true despite the estimates of Morocco, Tunisia and Cote D'Ivoire showing a negative impact of stock market on economic growth. Generally, these findings on market based system are in line with the findings of Odedokun (1996b) Atje and Jovanovic (1993) Nieuwerburgh et al. (2006) Bassanini et al. (2001) and Azarmi et al. (2005). All the aforementioned countries display evidence for supply leading hypothesis in line with Odhiambo (2010) and Mun et al. (2008), but the exceptions are Cote D'Ivoire, Tunisia, which indicate bidirectional relationship and Swaziland which shows demand following hypothesis. The impact of human capital on economic growth is generally positive except for Cote D'Ivoire, Botswana, Swaziland and Kenya.

The evidences on Nigeria (with a negative impact of turnover ratio) and Ghana (with a positive impact of turnover ratio) indicate bank system performs better than market based system in the economy. This is however different from an earlier study in Nigeria by Solarin (2010). The difference may be due to different sample range as

the latter study covers 1981-2008. Supply leading and positive impact of human capital is found for Nigeria. On the other hand, there is evidence for demand following hypothesis in Ghana in and no evidence for human capital development.

5.2 Policy Recommendation

The findings indicate that stock market development proxy-turnover ratio is positively and significantly related to economic growth. Therefore in order to promote economic growth, these African countries should implement policies to improve stock market development especially in the area of liquidity and activity on the stock exchanges. Specifically, these include the introduction of second-tier markets (for countries without second tier markets) or improvement of second-tier stock markets, introduction of online trading; and reduction of settlement period; the opening of more branches across the each countries and stock market integration within African and also to the global market especially with the emerging countries. All these measures will boost the liquidity of stock market development and ultimately foster economic growth. For countries such as Nigeria and Ghana with less evidence of the contribution of stock market to economic growth, it is recommended that the entire system of trading in the stocks market be overhauled for a better performance of the exchanges.

Product-wise, there should be introduction of more instruments on the stock exchanges, especially in consonance with the yearnings of the people. Therefore the

operations of the stock market should be broadened to include more financial products, especially products with equity orientation. This includes Sukuk, which is profit and sharing based instruments, especially in the North and West African stock markets with a substantial Muslim population. In fact, Islamic bond (Sukuk) and unit trust can be specifically structured to mop-up idle funds from the Muslims who are desirous of investing in line with their religious injunctions (Al Faki, 2007). This has been successfully practiced in many other developing countries around the World such as Malaysia, Bahrain and Indonesia with similar percentage of Muslims in the North African countries.

Another spotlight on the issue of liquidity on the stock market is the transaction costs on the stock markets as transaction costs in African capital markets are said to be the highest in the world. Investors are charged various kinds of fees, stamp duty and other special charges by the regulatory bodies (CBN, 2007:52). In practice, increases in costs erode efficiency. Besides, this will toughens the operations of the markets. Therefore, it is recommended that there should be reduction in cost of transaction. To this end, the regulatory bodies must devise alternative means of generating income.

Another finding from this study is that banking system has a negative contribution on economic growth. This is not surprising as most loans are channelled to short terms ventures, which attracts higher returns but less impact on the overall

growth of the most countries. Moreover, banks have in the past witnessed several crises, which in turn have required tax payers money for bail out. In other cases, political elites are given priority over purposeful customers. Since the banking system cannot be totally eradicated, this study suggests that banking system should be overhauled in such a way that more equity-based products are introduced in the banking sectors. In other words, banks should be more equity-oriented rather than debt-oriented. In this direction, Islamic banking products such as Musharakah and Mudarabah that are equity-based should be promoted in the banking sector. Moreover, relevant authorities may roll out policies which stipulate that certain percentage of all loans granted by bank must be reserved for certain productive sectors such as manufacturing, agriculture, mining and electricity sectors. This will make bank credit more productive and ultimately lead to economic growth. To prevent various forms of bank crises and fragilities, preventive regulatory frameworks and legal provisions devoid of sectional political interest should be introduced, which are also capable of containing shocks to corporate balance sheets.

Stemming from the findings on dominance of supply leading hypothesis, the study recommends that financial development must be accorded priority in the pursuit of economic growth and not otherwise. This is because the focus on financial development will naturally generate improved economic growth. In doing this there are several ways by which policy makers can improve financial development. These include creating conducive environment, reviewing financial system regulation and

tax policies. If these measures are put in place then financial system is to improve economic fortunes of the real sector by proving that requires form of liquidity and thus improving efficiency of operations and increasing resources for capital accumulation. For a better impact on economic growth, however, policy initiatives should give special attention to stock market development as against the banking system, because the stock market is better in promoting economic growth.

As evident from the study, human capital development is germane to the development of economic process, of which stock market and the financial system are part of the process. To this end, human resources available in the stock market must be upgraded to the international best practices level. This can be done at two levels. At the stock exchange level, policies such as periodic training, improving remuneration benefits, and instilling professionalism of the workforce should be instituted. At the government level, efforts should be made towards setting labour standards including recruitment standards, improvement of health and education facilities, mandatory basic education; support on the job training programmes. All these measures will surely provide accurate human capital for stock market and economic growth at large.

A very distinctive element of human capital development is the need to foster the use of information technology in the economy, especially in the stock market operations. One of the differences between stock market development in Africa (with

the exception of South Africa in this case) and other emerging markets is the availability of advanced information technology accessories in the other emerging stock markets. The utilisation of advanced information technology in the area of trading and settlement on the stock exchanges confer several advantages. This will decrease cost of transaction, fasten the settlement periods, improve transparency in the market and attract investment from all sectors.

Stemming from the fact that government expenditure is largely inimical to economic growth, which is not surprising as most government expenditure in Africa is meant to satisfy the urge of vested interest of political and business elite, in the face of institutional weakness. The study recommends that government should decrease its involvement in economy, especially by restricting its economic involvement in financial systems. Besides, the government should concern itself with developing the institutional environment, the quality of institutions, which include the judicial system and regulatory infrastructure, law and order. Several provisions such as credit regulation, tax incentives, contractual enforcement and property right must be instituted. All these steps must be capable of tackling retrogressive tendencies in the stock markets such as market manipulation and insider trading. However, the perimeter of regulatory arrangements must be compatible across jurisdictions, institutions, and activities.

Liquidity and active participation of the investors reinforce each other. As investment is largely insignificant, this is evidence that stock market actually promote growth through increase in investment, according to Atje and Jovanovic (1993) and Goldsmith (1969). On the other hand, foreign direct investment is largely positive and significant, implying that foreign direct investment affects economic growth through other channels other than stock market (Mohtadi and Sumit, 2004). In sum, local investors must be given privilege in policy formulations on attracting active participation in the market. Therefore, policies that encourage activity participation, especially the local investors will improve liquidity and will in turn promote the foreign investors. These include policies such as tax holidays, relaxation of withholding tax, capital gain tax and instilling high level of transparency, enough to attract investors. Instilling transparency may take many forms including periodic reviewing the reports of listed companies and sanctioning of erring firms.

5.3 Limitation of the Study

Despite the modest effort of the study to investigate the impact of stock market development, the study is not without some limitations. Firstly, the study does not cover the entire stock markets in Africa. Currently there are 22 stock exchanges in the continent, whereas the study deals with 11 countries. Thus, the results may not be universally true for all the stock markets in Africa. Therefore, with the availability of data in the future, the other stock markets may be included. The sample size is of 20

year-duration. Hence, empirical results and conclusions drawn especially from the causality tests should be considered as suggestive rather than absolute.

The issue of integration of stock markets in the continent has been left untouched. It is an obvious truth that proper stock market development in the continent make not be appreciated without inculcating the extent of stock market integration among African markets and with the global markets. The channel through which stock market affects economic growth has been largely ignored in the study. Therefore further studies are needed in this direction as investigating the channel will not only be informative but also serve as a policy tool for relevant regulatory authorities. Moreover, the study of macroeconomic and institutional determinants of stock market development is another area which further studies are necessary. The development of other financial institutions such as insurance, pension companies unit trusts mutual funds have not been examined, which further research, may take up.

References

Abdul Rahman, A. Mohd Sidek, Z and Tafri, F. (2009). Macroeconomic determinants of Malaysian stock market. *African Journal of Business Management,* 3(3), 95-106.

Abu-Bader, S. and Abu-Qarn, A. (2008). Financial development and economic growth: Empirical evidence from six MENA countries. *Review of Development Economics,* 12(4), 803–817, 2008.

Adam, M. and Tweneboah, G (2008b). Do macroeconomic variables play any role in the stock market movement in Ghana? *MPRA Paper* No. 9368

Adam, M. and Tweneboah, G. (2008a). Foreign direct investment and stock market development: Ghana's evidence. *MPRA Paper* No. 11985

Adebiyi, M. (2005). Capital market performance and the Nigerian economic growth, in Fakiyesi O and Akano O (eds), *Issues in Money, Finance and Economic Management in Nigeria*, Lagos, University of Lagos Press.

Adjasi, C. and Biekpe, N. (2006). Stock market development and economic growth: the case of selected African countries. *African Development Review,* 18(1) 144-161.

Agyare, T. (2007). Corporate governance and market development-fund manager investing in Africa's perspective. *Paper presented at the ASEA conference,* Accra on 27-29 October, 2007.

Akinlo, A. and Akinlo, O. (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. *Journal of Economics and Business*, 61, 162-171.

Al-Faki, M. (2007). Securities market: The challenges of bond and derivatives in Nigeria. *Paper presented at the 16th Annual Conference of the Research and Statistics Offices,* Kaduna on 12-16 November, 2007.

Allen, F. (1993). Stock markets and resource allocation, in Mayer C. and Vives X. (eds), *Capital Markets and Financial Intermediation.* Cambridge: Cambridge University Press.

Andrianaivo, M. and Yartey, C. (2009). Understanding the growth of African financial markets. *IMF Working Paper 09/182.* Washington D.C.: International Monetary Fund.

Antonios, A. (2010). Stock market and economic growth: An empirical analysis for Germany. *Business and Economics Journal,* 2010.

Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte-carlo evidence and an application to employment equations. *Review of Economic Studies,* 58, 277-297.

Arellano, M. and Bover, O. (1995). Another look at the instrumental-variable estimation of error components models. *Journal of Econometrics*, 68, 29-52.

Arestis, P. and Demetriades, P. (1997). Financial development and economic growth: assessing the evidence. *Economic Journal*, 107, 783-799.

Arestis, P. Demetriades, P. and Luintel, K. (2001). Financial development and economic growth: The role of stock markets. *Journal of Money, Credit, and Banking,* 33, 16-41.

ASEA (2008, 2009). Yearbooks of the Africa securities exchange association for the years 2008 and 2009, respectively.

Asterious D and Hall. S, (2007). *Applied econometrics: A modern approach using Eviews and Microfit*, Revised Edition. New York, Palgrave Macmillian.

Atje, R. and Jovanovic, B. (1993). Stock markets and development. *European Economic Review*, 37, 632-640.

Ayadi, F. Adegbite, E. and Ayadi, S. (2008). Structural adjustment, financial sector development and economic prosperity in Nigeria. *International Research Journal of Finance and Economics.* 15

Azarmi, T. Lazar, D. and Jeyapaul, J. (2005). Is the Indian stock market a casino? *Journal of Business & Economics Research*, 3(4), 63-72.

Azman-Saini, W. Habibullah, M. Law, S. and Dayang-Afizzah, A. (2006). Stock prices, exchange rates and causality in Malaysia: A *MPRA Paper* No. 656

Baharumshah, A. and Lau, E. (2007). Regime changes and the sustainability of fiscal imbalance in East Asian countries. *Economic Modelling*, 24, 878-894.

Baharumshah, A. Lau, E. and Khalid, A. (2006). Testing twin deficits hypothesis using VARs and variance decomposition. *Journal of the Asia Pacific economy*, 11(3), 331-354.

Bank Negara Malaysia, (2008) Annual Report, Kuala Lumpur, available under: http://www.bnm.gov.my/ [JANUARY 2010]

Barro R (1991) Economic Growth in a Cross Section of Countries. *The Quarterly Journal of Economics*, 106(2), 407-443.

Basher, S. and Sadorsky, P. (2006). Oil price risk and emerging stock markets. *Global Finance Journal*, 17, 224-251.

Bassanini, A. Scarpetta, S. and Hemmings, P. (2001). Economic Growth: The role of policies and institutions: Panel data evidence from OECD countries, *OECD Economic Department Working Paper* No. 283

Baum, C. Schaffer, M. and Stillman, S. (2003). Instrumental variables and GMM: Estimation and testing. *Stata Journal*, 3, 1-31.

Beck, T. and Demirgüç-Kunt, A. (2009). Financial institutions and markets across countries and over time: Data and analysis. *World Bank Policy Research Working Paper* No. 4943

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

Beck, T. Demirguc-Kunt, A. Laeven, A. and Levine, R. (2008). Finance, firm size, and growth. *Journal of Money, Credit and Banking*, 40, 1381-1405.

Beck, T. Loayza, N. and Levine, R. (2000). Finance and the sources of growth. *Journal of Financial Economics*, 58, 261-300.

Bencivenga, V. Smith, B. and Starr, R. (1996). Equity Markets, Transaction Costs and Capital Equity Markets, Transaction Costs and Capital Accumulation: An illustration. *The World Bank Economic Review*, 10(2), 241-265.

Benimadhu, S. (2010). President's Letter. *ASEA* Yearbook (2009), 13.

Bernanke, B. and Kuttner, K. (2005). What explains the stock market's reaction to Federal Reserve Policy?. *Journal of Finance.* 60, 1221-1257.

Bernard, A. and Durlauf, S. (1996). Interpreting tests of the convergence hypothesis. *Journal of Econometrics*, 71, 161-173.

Berthélemy, J. and Varoudakis, A. (1996). Economic growth, convergence clubs and the role of financial development. *Oxford Economic Papers*, 48, 300-328.

Berthélemy, J. Varoudakis, A. (1997). Financial development and growth convergence: A Panel Data Approach, in Hausmann, R. Reisen H. (eds.), *Promoting Savings in Latin America,* Paris, IDB/OECD.

Billmeier, A. and Massa, I. (2009). What drives stock market development in emerging markets—institutions, remittances, or natural resources? *Emerging Markets Review*, 10, 23-35.

Blackburn, K. Bose, N. and Capasso, S. (2005). Financial development, financing choice and economic growth. *Review of Development Economics*, 9, 135-49.

Blundell, R. and Bond, S. (1998a). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87, 115-143.

Blundell, R. and Bond, S. (1998b). GMM estimation with persistent panel data: An application to production functions. *The Institute of Fiscal Studies Working Paper Series*, No. W99/4

Bolbol, A. Fatheldin, A. and Mohammed, M. (2005). Financial development, structure, and economic growth: The case of Egypt, 1974–2002. *Research in International Business and Finance*, 19, 171-194.

Bolton, P. and Frexias, X. (2000). Equity, bonds and bank debt: capital structure and financial market equilibrium under asymmetric information. *Journal of Political Economy*, 108, 324-351.

Boot, J. Feibes, W. and Lisman, J. (1967). Further methods of derivation of quarterly figures from annual data. *Journal of the Royal Statistical Society. Series C (Applied Statistic*), 16(1), 65-76.

Boubakari, A. and Jin, D. (2010). The role of stock market development in economic growth: Evidence from some Euronext countries. *International Journal of Financial Research*, 1(1), 14-20.

Bowerman, B. and O'Connell, R. (1979). *Time Series and Forecasting: An Applied Approach.* New York, Duxbury Press.

Boyd, J. and Smith, B. (1996). The co-evolution of the real and financial sectors in the growth process. *World Bank Economic Review*, 10, 371-396.

Boyd, J. Chang, C. Smith B (1998) Moral hazard under commercial and universal banking. *Journal of Money, Credit and Banking*, 30, 426-468.

Brasoveanu. L, Dragota, V. Catarama, D. and Semenescu, A. (2008). Correlations between capital market development and economic growth: The case of Romania. *Journal of Applied Quantitative Methods,* 3(1), 64-75.

Brown, R. Durbin, J. and Evans, J. (1975). Techniques for testing the constancy of regression relations over time. *Journal of the Royal Statistical Society*, 37, 149-163.

Bruno, M. and Easterly W. (1998). Inflation crises and long-run growth. *Journal of Monetary Economics*, 41, 3-26.

CBN (2007). Capital market dynamics in Nigeria: Structure, transaction cost and efficiency 1980-2006. A Research Paper by Research and Statistics department Central bank of Nigeria. 1-110

Capasso, S. (2003). Stock Market development and economic growth: A matter of information problems, *CGBCR, University of* Manchester Discussion Paper series, No. 32.

Capasso, S. (2006). Stock Market Development and Economic Growth *UNI-WIDER Research Paper* No. 2006/102

Caporale, G. Howells, P. and Soliman, A. (2005). Endogenous growth models and stock market development: Evidence from four countries. *Review of Development Economics*, 9(2), 166-176.

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

Cheung, Y. and Ng, L. (1998). International evidence on the stock market and aggregate economic activity. *Journal of Empirical Finance*, 5, 281–296.

Cho, Y. (1986). Inefficiencies from *financial liberalization* in the absence of well-functioning equity markets. *Journal of Money, Credit and Banking*, 18, 191-199.

Choi, I. (2001). Unit root tests for panel data. *Journal of International Money and Finance*, 20, 249-272.

Chow, G. (1960). Tests of equality between sets of coefficients in two linear regressions. *Econometrica* 28, (3), 591–605.

Christopoulos, D. and Tsionas E (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics, 73*, 55-74.

Claessens S, Klingebiel D, and Schmukler, S. (2006). Stock market development and internationalization: Do economic fundamentals spur both similarly? *Journal of Empirical Finance* 13, 316-350.

Cooray, A. (2010). Do stock markets lead to economic growth? *Journal of Policy Modeling*, 32, 448-460.

Darrat, A. (1988). On fiscal policy and the stock market. *Journal of Money, Credit and Banking*, 20, 353-363.

Darrat A. (1999). Are financial deepening and economic growth causally related? Another look at the evidence. *International Economic Journal* 13,(3), 19-35

Das, M. and Mohapatra, S. (2003). Income inequality: the aftermath of stock market liberalization in emerging markets, *Journal of Empirical Finance,* 10(1-2), 217-248.

De Gregorio, J. and Guidotti, P. (1995). Financial development and economic growth. *World Development*, 23, 433-448.

Deb, S. and Mukherjee, J. (2008). Does stock market development cause economic growth? A time series analysis for Indian economy *International Research Journal of Finance and Economics,* 21, 142-149.

Deidda, L. and Fattouh, B. (2002). Non-linearity between finance and growth. *Economics Letters*, 74, 339-345.

Demetriades, P. and Hussein, K. (1996). Does financial development cause economic growth. *Journal of Development Economics,* 51, 387-411.

Demirgüç-Kunt, A. and Maksimovic, V. (1996). Stock market development and financing choices of firms. *World Bank Economic Review*, 10(2), 341-369.

Dermirguc-Kunt, A. and Levine, R. (1996a). Stock markets, corporate finance and economic growth: An overview. *The World Bank Economic Review*, 10(2), 223-239.

Dermirguc-Kunt, A and Levine R (1996b). Stock markets and financial intermediaries: Stylized facts. *The World Bank Economic Review*, 10(2), 291-321.

Diamandis, P. (2009). International stock market linkages: Evidence from Latin America *Global Finance Journal*, 20, 13-30.

Diamond, D. and Dybvig, P. (1983). Bank runs, insurance and liquidity, *Journal of Political Economy*, 85, 191-206.

Durham, J. (2000). Econometrics of the effects of stock market development on growth and private investment in lower income countries. *QEH Working Paper* No. 53

Easterly, W. (1996). When is stabilization expansionary? *Economic Policy*, 7, 67-107.

Ehrlich, I. and Lui, F. (1999). Bureaucratic corruption and endogenous economic growth. *The Journal of Political Economy*, 107(6), S270-S293.

Emenuga**,** C. (1997). Development of stock markets in sub-Saharan Africa. *African Development Review*, 9, 156-185.

Engle, R. and Granger, C. (1987). Cointegration and error correction: representation, estimation and testing. *Econometrica*, 55, 251-276.

Fatas, A. (2001). The Effects of Business Cycles on Growth. *Paper Presented at the 5th Annual conference of the Central Bank of Chile*, on November 29-30, 2001.

Feijoo, S. Caro, A. and Quintana, D. (2003). Methods for quarterly disaggregation without indicators; a comparative study using simulation. *Computational Statistics & Data Analysis*, 43, 63-78.

Fielding, D. (2003). Counting the Cost of the Intifada: Consumption, Saving and Political Instability. *Public Choice*, 116, 3-4, 297-312.

Fielding, D. and Shortland, A. (2005). How does political violence affect confidence in a local currency? Evidence from Egypt. *Journal of International Development*, 17, 841-866.

Filer, K. Hanousek, J and Nauro, F. (1999). Do stock markets promote growth?. *The Center for Economic Research and Graduate Education (CERGE) Working Paper 267*, Prague: Charles University

Fink, G. and Haiss, P. (1999). Central European financial markets from an EU perspective: Theoretical aspects and statistical analyses, Wirtschaftsuniversität Wien-Forschungsinstitut für Europafragen *Working Paper* 34

Fry, M. (1978). Money and capital or financial deepening in economic development? *Journal of Money, Credit, and Banking*, 10, 464-475.

Gandolfo, G. (1981). *Qualitative Analysis and Econometric Estimation of Continuous Time Dynamic Models*. Amsterdam: North-Holland.

Garcia, F. and Liu, L. (1999). Macroeconomic determinants of stock market development, *Journal of Applied Economics*, 2(1), 29-59.

Goh, S. and Wong, K. (2010). Malaysia's outward FDI: The effects of host market size and home government. *Policy Discussion paper* 33/10

Goldsmith, R. (1969). *Financial Structure and Development*. New Haven and London: Yale University Press.

Goldstein, M. and Khan, M. (1976). Large versus small price changes and the demand for imports. *IMF Staff Papers* 23, pp 200-225.

Granger, C. (1988). Some recent developments in a concept of causality. *Journal of Econometrics*, 39, 199-211.

Greasley, D. and Oxley, L. (1997). Time-series based tests of the convergence hypothesis: Some positive results. *Economics Letters*, 56, 143-147.

Greenwood, J. and Smith, B. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control*, 21, 141-181.

Gross (2001) Financial Intermediation: A contributing factor to economic growth and employment. *International Labour Office Mimeo*

Guiso, L. Sapienza, P. and Zingales, L. (2002). Does local financial development matter? *CEPR Discussion Paper* 3307

Gujarati, D. (2003). *Basic Econometrics*. *Fourth edition*. McGraw Hill Publishing Company

Gurvey, J. and Shaw, E. (1955). Financial aspect of economic development. *American Economic Review*, 45, 515-538

Haber, S. (2008). The finance-growth nexus: Theory, evidence, and implications for Africa. *Paper Presented at the African Finance for 21st Century High-Level Seminar,* Tunis on March 4-5, 2008.

Hansen, L. (1982). Large sample properties of generalized method of moments estimators. *Econometrica,* 50(3), 1029-1054.

Harris, R. (1997). Stock markets and development: Re-assessment. *European Economic Review,* 41, 139-146.

He, L. (2006). Variations in effects of monetary policy on stock market returns in the past four decades. *Review of Financial Economics*, 15, 331-349.

Hearn, B. and Piesse, J. (2010). Barriers to the development of small stock markets: A case study of Swaziland and Mozambique. *Journal of International Development*, 22, 1018-1037.

Hek, P. (1999). On endogenous growth under uncertainty. *International Economic Review,* 40(3), 727-744.

Hurlin, C. and Venet, B. (2004). Financial development and growth: A re-examination using a panel Granger causality test. Unpublished Manuscript.

Ibrahim, M. (2000). Co-integration and granger causality tests of stock price and exchange rate interactions in Malaysia. *ASEAN Economic Bullentine*, 17, 36-47.

Ilmolelian, P. (2005). The Determinants of the Harare stock exchange (HSE) market capitalization. *MPRA Paper,* No. 1418

IMF (2000). The World Economic Outlook (WEO). *Database International Monetary Fund,* September 2000 Edition

Irving, J. (2005). Regional integration of stock exchanges in Eastern and Southern Africa: Progress and prospects. *IMF Working Paper* 05/122. Washington D.C.: International Monetary Fund

Japelli, T. and Pagano, M. (1994). Saving, growth, and liquidity constraints. *Quarterly Journal of Economics,* 109, 83-109.

Jarque, C. and Bera, A. (1980). Efficient tests for normality, homoscedasticity and serial independence of regression residuals. *Economics Letters,* 6, 255-259.

Jefferis, K. and Smith, G. (2005). The changing efficiency of African stock markets. *South African Journal of Economics,* 73, 54-67.

Jones, C. (1995). Time series tests of endogenous growth models. *The Quarterly Journal of Economics*, 110(2), 495-525.

Jung, W. (1986). Financial development and economic growth: international evidence. *Economic Development and Cultural Change*, 34, 333-346.

Kaiser (2008) HIV/AIDS Policy Fact sheet, at http://www.kff.org/hivaids/upload/7365-065.pdf

Kao, C. (1999). "Spurious regression and residual-based tests for cointegration in panel data. *Journal of Econometrics*, 90, 1-44.

Keller, K. and Panu, P. (2005). Growth in OECD countries and elsewhere: How much do education and R&D explain? *Economics Bulletin,*15(16), 1-11.

Kelly, R. and Mavrotas, G. (2003). Savings and financial sector development: Panel cointegration evidence from Africa. *UNU Wider Discussion Paper* No. 2003/12

Kenny, C. and Moss, T. (1998). Stock markets in Africa: Emerging lions or white elephants? *World Development* 26(5), 829-843.

Keynes, J. (1936). *The General Theory of Employment Interest, and Money.* London, Macmillan.

Khan, A. (2000). The finance growth nexus. *Business Review Jan/ Feb Federal Reserve Bank of Philadephia,* 3-14.

Khan, M. and Senhadji, A. (2001). Threshold effects in the relationship between inflation and growth. *IMF Working Paper* 00/110. Washington DC: International Monetary Fund.

Kholodilin, K. Montagnoli, A. Napolitano, O. and Siliverstovs, B. (2009). Assessing the impact of the ECB's monetary policy on the stock markets: A sectoral view. *Economics Letters,* 10, 211-213.

King, R. and Levine, R. (1993a). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717-37.

King, R. and Levine, R. (1993b). Finance, entrepreneurship and growth: theory and evidence. *Journal of Monetary Economics*, 32, 513-542.

Koga, M. (2006). The decline of Japan's saving rate and demographic effects. *The Japanese Economic Review,* 57(2), 312-321.

Korajczyk, R. (1996). A measure of stock market integration for developed and emerging markets. *The World Bank Economic Review,* 10 (2) 267-289.

Koubi, V. (2008). On the determinants of financial development and stock returns. *Journal of Money, Investment and Banking,* 1, 69-76.

Kremers, J. Ericsson. N, and Dolado, J. (1992). The power of cointegration tests. *Oxford Bulletin of Economics and Statistics*, 54, 325-343.

Kwanashie, M. (1999). Concept and dimension of globalization. Paper *Presented at the Nigeria Economic Society (NES) Seminar*, Lagos, on February 11, 1999.

Lau, E. Baharumshah, A.and Haw, C. (2006). Current account: mean-reverting or random walk behavior? *Japan and the World Economy,* 18, 90-107.

Lawton. R, (1998). How should additive Holt–Winters estimates be corrected? *International Journal of Forecasting*, 14, 393-403.

Levin, A. Lin, C. and James-Chu, C. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108, 1-2.

Levine, R. (1991). Stock markets, growth, and tax policy. *The Journal of Finance,* 46, 1445-1465.

Levine, R. (2002). Bank-based or market-based financial systems: Which is better. *Journal of Financial Intermediation*, 11, 398-428.

Levine, R. and Zervos, S. (1996) Stock Markets development and long–run growth *The World Bank Economic Review Vol 10 No 2 Pp 323-339*

Levine, R. and Zervos, S. (1998). Stock markets, banks and economic growth. *American Economic Review*, 88, 537-57.

Levine, R. Loayza, N. and Beck, T. (2000). Financial intermediation and growth: Causality and causes. *Journal of Monetary Economics,* 46, 31-77.

Lisman, J. and Sandee, J. (1964). Derivation of quarterly figures from annual data. *Applied Statistics,* 13, 87-90.

Lucas R. E (1988) “On the mechanics of development” *Journal of Monetary Economics*, 22, 3-42.

Luintel, K. and Khan, M. (1999). A quantitative reassessment of the finance-growth nexus: Evidence from a multivariate VAR. *Journal of Development Economics*, 60, 381-405.

Luintel, K. Khan, M. Arestis, P. and Theodoridis, K. (2008). Financial structure and economic growth. *Journal of Development Economics*, 86, 181-200.

Machin, S. and Stewart, M. (1996). Trade unions and financial performance. *Oxford Economic Papers, New Series*, 48, 213-241.

Maddala, G. S. and S. Wu (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61, 631-52.

Mahony, D. (2007). African capital markets follow the emerging world. *Paper presented at the ASEA conference*, Accra on 27-29 October, 2007.

Malik, A. (2010). Oil prices and economic activity in Pakistan. *South Asia Economic Journal*, 11(2) 223-244.

Mankiw, G. Romer, D. Weil, D. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, 107, 407-437.

Marashdeh, H. (2005). Stock market integration in the MENA Region: An application of the ARDL bounds testing *approach University of Wollongong Economics Working Paper Series*, 2005.

Marashdeh, H. and Shrestha, M. (2010). Stock market integration in the GCC countries *International Research Journal of Finance and Economics*, 37, 102-114.

Martin, R. and Sunley, P. (1998). Slow convergence? The new endogenous growth theory and regional. *Economic Geography*, 74(3), 201-227.

Massa, I. (2009). Stock markets in Africa: Bidding for growth amid global turmoil. *Overseas Development Institute* No. 134

McKinnon, R. (1973). *Money and Capital in Economic Development.* Washington DC, Brookings Institution.

Mihalca, G. (2007). The relation between financial development and economic growth in Romania *Paper presented at the 2nd Central European Conference in Regional Science,* Bratislava on 10-13 October, 2007.

Miller, J. & Ratti, R. (2009). Crude oil and stock markets: stability, instability, and bubbles. *Energy Economics*, 31, 559-568.

Minier, J. (2003). Are small stock markets different? *Journal of Monetary Economics*, 50, 1593-1602.

Misati, R. and Nyamongo, E. (2011). Financial development and private investment in Sub-Saharan Africa. *Journal of Economics and Business,* 63, 139-151.

Mishkin, F. (2007). The economics of money, banking, and financial markets *Eight Edition.* Boston, Pearson International Limited.

Mohd Nasir, M. Hwa, K. and Mohammad, H. (2008). An initial study on the forecast model for unemployment rate. *Journal of the department of statistics, Malaysia*, 1, 27- 43.

Mohsin, K. and Senhadji, A. (2001). Threshold effects in the relationship between inflation and growth. *IMF Staff Papers*, 48(1), 1-21.

Mohtadi, H. and Sumit, A. (2004). Financial markets and financing choices of firms: Evidence from developing countries. *Global Finance Journal,* 15(1), 57-70.

Mun, H. Siong, E. and Thing, T. (2008). Stock market and economic growth in Malaysia: Causality test. *Asian Social Science*, 4(4), 86-92.

Muslumov, A. and Gursory, C. (2000). Stock market and economic development: A causality test. *Douglos University Journal,* 2, 124-132.

Naceur, S. and Ghazouani, S. (2007). Stock markets, banks, and economic growth: Empirical evidence from the MENA Region. *Research in International Business and Finance*, 2, 297-315.

Nagaraj, R. (1996) India's capital market growth trends, explanations and evidence. *Economic and Political Weekly*, 31, 2553-2563.

Ndako, U. (2010). Stock markets, banks and economic growth: Time series evidence from South Africa. *The African Finance Journal,* 12(2), 72-92.

Nieuwerburgh, S. Buelens, F. and Cuyvers, L. (2006). Stock market development and economic growth in Belgium. *Explorations in Economic History*, 43, 13-38.

Nigeria Stock Exchange (NSE) Annual Report Various Issues

Novales, A. Fernandez, E. and Ruiz, J. (2009). *Economic growth: theory and numerical solution methods*. Berlin: Springer.

Nzue, F. F. (2006). Stock market development and economic growth: evidence from Cote D'Ivoire. *African Development Review,* 18(1), 123-143.

Obiyatullah B (2007). Growth and development of the Malaysian capital market. Unpublished Manuscripts

Obstfeld, M. (1994). Risk-taking, global diversification, and growth. *American Economic Review,* 85, 1310-1329.

Odedokun, M. (1996a). Alternative econometric approaches for analyzing the role of the financial sector in economic growth: time-series evidence from LDCs. *Journal of Development Economics,* 50(1), 119-146.

Odedokun, M. (1996b). Financial Indicators and economic efficiency in developing countries, in Hermes, N. and Lensink, R. (eds), *Financial Development and Economic Growth,* London, Routledge.

Odhiambo, N. (2010). Stock market development and economic growth in South Africa: An ARDL-bounds testing approach. *Paper presented at the Proceedings of Business and Social Science Research Conference,* USA on 20 June, 2010.

Ogun, T. (2010). Infrastructure and Poverty Reduction: Implications for Urban Development in Nigeria. *UNU-WIDER Working Paper* No. 2010/43

Ologunde, A. Elumilade, D. and Asaolu, T. (2006). Stock market capitalization and interest rate in Nigeria: A time series analysis. *International Research Journal of Finance and Economics,* 4, 154-167.

Osinubi, T. (2004). Does stock market promote economic growth in Nigeria? *The ICFAI Journal of Applied Finance,* 10(3), 17-35.

Pace, G. and Trimbath, S. (2002). Bond market development in select Asian countries. *Milken Institute Working Paper* 2003-02

Parabijit, S. (2007) Capital accumulation in less developed countries: does stock market Matter? Paper *Presented at the 4th International Conference on Developments in Economic Theory and Policy*, Bilbao on 5-6, July, 2007.

Patrick, H. (1966). Financial and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(1), 174-189.

Pedroni, P. (1999). Critical values for cointegration tests in heterogeneous panels with multiple regressors. *Oxford Bulletin of Economics and Statistics*, 61, 653-670.

Pedroni, P. (2004). Panel Cointegration, asymptotic and finite sample properties of pooled time series tests with an application to the PPP Hypothesis. *Econometric Theory*, 20, 597-625.

Pesaran, H. and Pesaran, B. (1997). *Microfit 4.0.* Oxford, Oxford University Press.

Pesaran, M. and Shin, Y. (1999), An autoregressive distributed lag modelling approach to cointegration analysis. in Strom, S. (ed), *Paper presented at Econometrics and Economics Theory in the 20th Century*. The Ragnar Frisch Centennial Symposium, Cambridge University Press, Cambridge.

Pesaran, M. Shin, Y. and Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289-326.

Poon, Wai-Ching, (2009). Is monetary condition index an important indicator for Malaysia? Available at SSRN: http://ssrn.com/abstract=1606403

Pyo, S. and Choi, Y. (2009). A fast handover scheme using exponential smoothing method. *IJCSNS International Journal of Computer Science and Network Security*, 9(2), 61-64.

Ram, R. (2007). IQ and economic growth: Further augmentation of Mankiw–Romer–Weil model. *Economics Letters*, 94, 7-11.

Ramlogan, C. (2004). The transmission mechanism of monetary policy: Evidence from the Caribbean *Journal of Economic Studies*, 31(5), 435-447.

Ramsey, J. (1969). Tests for specification errors in classical linear least squares regression analysis. *Journal of the Royal Statistical Society*, 31(2), 350-371.

Rano, A. (2009). Stock prices and exchange rate interactions in Nigeria: an intra-global financial crisis maiden. *MPRA Paper* No. 11985

Ratanapakorn, O. and Sharma, S. (2002). Interrelationships among regional stock indices *Review of Financial Economics* Vol. 11 pp. 91-108

Rigobon, R. and Sack, B. (2004). The impact of monetary policy on asset prices. *Journal of Monetary Economics* 51, 1553-1575.

Robinson, J. (1952). The generalization of the general theory. in *The Rate of Interest, and Other Essays.* London: Macmillan.

Romer, P. (1986). Increasing returns and long-run growth. *The Journal of Political Economy*, 94 (5), 1002-1037.

Romer, P. (1990). Endogenous technological change. *The Journal of Political Economy*, 98(5), 71-102.

Rousseau P. and Xiao S (2007) Banks, stock markets, and China's ‘great leap forward *Emerging Markets Review,* 8, 206-217.

Rousseau, P. and Sylla, R. (2001). Financial systems, economic growth, and stabilisation. *NBER Working Paper* No. 8323.

Rousseau, P. and Wachtel P (2002). Inflation threshold and the finance-growth nexus. *Journal of International Money and Finance*, 21, 727-793.

Rousseau, P. and Wachtel, P. (2005). Economic growth and financial depth. Is the relationship extinct already? *UNI-WIDER Discussion Paper* No. 2005/10

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

Saint-Paul, G. (1992). Fiscal policy in an endogenous growth model. *The Quarterly Journal of Economics*, 107(4), 1243-1259.

Santos, S. and Cardoso, F. (2001). The Chow-Lin method using dynamic models. *Economic modeling*, 18, 269-280.

Schumpeter, J. (1911:1961). *The Theory of Economic Development*, New York: Oxford University Press.

Segerstrom, S. (1998). Endogenous growth without scale effects. *The American Economic Review* 88, 1290-1310.

Shahbaz, M. Ahmed, N. and Ali, L. (2008). Stock market development and economic growth: ARDL-Causality in Pakistan. *International Research Journal of Finance and Economics*, 14, 182-195.

Shaw, E. (1973). *Financial Deepening in Economic Development*, New York: Oxford University Press.

Singh A, Singh A and Weisse B. (2000). Information technology, venture capital and the stock market, *University of Cambridge Accounting and Finance Discussion Papers*, No. 00-AF47

Singh, A. (1997). Financial Liberalization, stock markets and economic development. *The Economic Journal*, 107, 771-782.

Singh, A. and Weisse, B. (1998). Emerging stock markets, portfolio capital flows and long-term economic growth: Micro and macroeconomic perspectives *World Development*, 26(4), 607-622.

Smith, G. (2008). Liquidity and the informational efficiency of African stock markets *South African Journal of Economics*, 76, 161-175.

Solarin, S. (2010). Stock markets, banking sector and economic growth: The case of Nigeria. *Paper presented at the 4th International Borneo Business Conference (IBBC),* Miri 13-14 December, 2010.

Solarin, S. and Dahalan J (2010a). Macroeconomic determinants of stock market developments in Nigeria. *Paper presented at the 4th International Borneo Business Conference (IBBC),* Miri 13-14 December, 2010.

Solarin, S. and Dahalan, J. (2010b). Stock market integration: Evidence from selected countries in Africa. *Paper presented at the 4th International Borneo Business Conference (IBBC),* Miri 13-14 December, 2010.

Solow, R. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70, 65-94.

Stiglitz, J. (1985). Credit markets and the control of capital. *Journal of Money, Credit and Banking,* 17(2), 133-152.

Sumit, A. (2002). Stock market development and economic growth: Preliminary evidence from African countries. *Journal of Sustainable Development in Africa*, 3(1) 48-56.

Surya, B. and Suman, N. (2006). Stock market and economic development: A causality test. *Journal of Nepalese Business Studies*, 3(1), 36-44.

Tadesse, S. (2002). Financial architecture and economic performance: International evidence, *Journal of Financial Intermediation*, 11, 429-454.

Tang, C. (2008). A re-examination of the relationship between electricity consumption and economic growth in Malaysia. *Energy Policy*, 36, 3077-3085.

The website of Casablanca Stock Exchange-www.casablanca-bourse.com

The website of Egyptian Stock Exchange-www.egyptse.com

The website of Johannesburg Stock Echange-www.jse.co.za

Thorbecke, W. (1997). On stock market returns and monetary policy. *The Journal of Finance*, 52, 635-654.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking*, 1, 15-29.

Toda, H. and Yamamoto, T. (1995). Statistical inferences in vector autoregressions with possibly integrated processes. *Journal of Econometrics*, 66, 225-250.

Todaro, M. and Smith, S. (2003). *Economic Development Fourth Indian Reprint*. Singapore. Pearson International Limited.

Udegbunam R (2002). Openness, stock market development, and industrial growth in Nigeria. *The Pakistan Development Review*, 41(1), 69-92.

Valdes, B. (1999). *Economic Growth: Theory, Empirics and Policy*. Northampton: Edward Elgar Publishing.

Verbeek, M. (2004). *A Guide to Modern Econometrics Second Edition*. West Sussex, John Wiley Sussex.

Wooldrigde, J. (2001) Application of generalized methods of moments estimation *Journal of Economic Perspective* 15, 87-100.

Wooldrigde, J. (2009). *Introductory Econometrics: A Modern Approach, Fourth Edition.* Austrialia, South-Western College Publishing.

World Bank. (2010). Various data available at http://data.worldbank.org/topic

Wurgler, J. (2000). Financial markets and the allocation of capital. *Journal of Financial Economics*, 58, 187-214.

Yartey, C. (2007). Well-developed Financial intermediary sector promotes stock market development: Evidence from Africa. *Journal of Emerging Market Finance*, 6, 269-289.

Yartey, C. (2008). The determinants of stock market development in emerging economies: Is South Africa different. *IMF Working Paper* 08/38. Washington DC: International Monetary Fund.

Yartey, C. and Adjasi, K. (2007). Stock market development in sub-Saharan Africa: Critical issues and challenges. *IMF Working Paper* 07/209 Washington DC: International Monetary Fund.

Appendices

Table 2.1
Market institutional and infrastructural development indicators, as at 2009.

Country	Settlement Cycle	Settlement System	Trading System	Individual	Foreign (% of value traded)	Listed Companies	Trading Companies	Regulator	Online Trading	Indices
Botswana	T+4	2008	Manual	7.6[a]	39.5[b]	31	N/A	Yes	No	2
Cote D'Ivoire	T+ 3	1998	1998	N/A	N/A	38	38	Yes	N/A	2
Egypt	T+ 2	2003[c]	2008	63	19	306	289	Yes	N/A	4
Ghana	T+ 3	2009	2009	N/A	N/A	35	33	Yes	Yes	1
Kenya	T+5	2004	2006	70.8	55.8	55	50	Yes	N/A	2
Mauritius	T+ 3	1997[d]	2001	N/A	24	89	89	Yes	Yes	5
Morocco	T+ 3	2002	2008	N/A	N/A	76	77	Yes	Yes	2
Nigeria	T+ 3	1999	2004	98	53	213	208	Yes	Yes	2
South Africa	T+ 3	1988[e]	2007[f]	N/A	17.4	410	390	Yes	Yes	2
Swaziland[g]	T+5	Manual	Manual	N/A	N/A	5	N/A	Yes	N/A	1[h]
Tunisia	T+ 3	1996	2001	87	12	52	52	Yes	Yes	1

[a]This is the sum of foreign companies 37.8% and foreign individual 1.7%. The BSE launched 3 free float indices in January 2010 comprising the Domestic Companies Free Float Index (DCFFI), Local Asset Status Free Float Index (LASFFI) and Domestic Financial Services Free Float Index (DFSFFI).[b]This include foreign individual 1.7% and local individual 5.9%. From http://www.bse.co.bw/docs/BSE_Annual_Report_2009.pdf.
[c]From the website http://www.mcsd.com.eg/mcdr/english/Showpage.aspx?pageid=8 [d]Based on the commencement of operations by Central depository and Settlement. [e] This is for equities. We chose this because it predates those of derivatives, whose system was implemented in 2009 and 2010. [f] This is for equities. We chose this because it predates those of derivatives, whose system was implemented in 2009 and 2010. [h] The Statistics are from Irving (2005). [g] From the website http://www.ssx.org.sz/

Table 2.2

Trend of African stock market indicators, 1990-2009

Country	1990-1999				2000-2009			
	Market Capitalisation (% of GDP)	Trade ratio (% of GDP)	Turnover ratio	No. of companies (Per 10,000 population)	Market capitalisation (% of GDP)	Trade ratio (% of GDP)	Turnover ratio (%)	No. of companies (Per 10,000 population)
Botswana	8.95	0.71	7.33	7.58	35.16	0.97	2.86	9.68
Cote D'Ivoire	7.21	0.20	2.31	1.99	27.75	0.50	1.66	2.07
Egypt	13.99	3.11	14.26	11.87	61.60	21.86	26.32	10.49
Ghana	13.73	0.62	2.64	1.01	16.51	0.50	2.92	1.25
Kenya	14.62	0.47	3.19	2.09	27.75	2.34	6.83	1.49
Mauritius	27.08	1.55	4.49	27.46	59.96	2.69	7.75	37.98
Morocco	17.27	2.66	13.17	2.17	63.55	10.14	22.13	2.15
Nigeria	7.31	0.18	2.09	1.58	19.24	2.87	12.37	1.49
South Africa	142.95	19.99	13.13	17.17	216.93	114.05	46.49	9.89
Swaziland	14.85	0.05	0.34	4.50	7.76	0.11	1.30	5.11
Tunisia	11.20	1.23	8.67	2.98	12.81	1.69	12.72	4.77
Africa	25.38	2.80	6.51	7.31	49.91	14.34	13.03	7.85
SSA*	13.62	1.08	5.85	6.32	33.21	4.37	9.68	7.65
Malaysia	184.71	99.69	51.55	25.11	151.57	46.99	47.17	37.35
Mexico		11.57	36.90	2.18	32.23	9.82	29.83	1.44

Source Beck, T. and Demirgüç-Kunt, A. (2009); official web sites of stock exchanges and author's calculations

* Average without South Africa.

South Africa

Table 3.1.1
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.620	1.075	0.122	0.27	-0.232
Turnover ratio	1.000	0.210	460.164	2.528	63.328	1.925
Bank credit	1.000	0.000	1444	4.479	78.419	1.270
Mortality rate	0.890	0.040	8.605	0.346	7.139	-0.047

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Egypt

Table 3.1.2
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.000	1.353	0.137	1.179	0.032
Turnover ratio	1.000	0.590	963.200	3.658	26.085	-2.053
Bank credit	0.480	0.270	168.708	1.531	41.619	-0.897
Mortality rate	0.520	0.000	3.305	0.214	5.237	-0.052

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Morocco

Table 3.1.3

Exponential smoothing result-Double method (one parameter)

Variable	α	SSE	RMSE	Mean	Trend
Growth	0.999	32.470	0.672	1.084	-0.104
Turnover ratio	0.999	739.717	3.205	50.104	3.823
Bank credit	0.999	128.416	1.335	76.772	0.276
Mortality rate	0.872	1.570	0.148	1.845	-0.018

α is the smoothing parameter, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha \leq 1$, with values near to zero being superior.

Tunisia

Table 3.1.4

Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.000	4.592	0.252	0.751	0.012
Turnover ratio	1.000	0.550	259.250	1.898	12.925	0.05
Bank credit	0.580	0.000	263.824	1.914	63.578	0.084
Mortality rate	0.270	0.110	2.036	0.168	4.524	-0.035

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Nigeria

Table 3.1.5

Exponential smoothing result-Double method (one parameter)

Variable	α	SSE	RMSE	Mean	Trend
Growth	0.806	4.793	0.258	0.711	-0.122
Turnover ratio	0.762	63.969	0.943	23.934	-1.106
Bank credit	0.708	170.880	1.541	36.623	0.987
Mortality rate	0.164	2.030	0.168	4.519	-0.038

α is the smoothing parameter, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha \leq 1$, with values near to zero being superior.

Cote D'Ivoire

Table 3.1.6

Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.630	2.687	0.193	0.097	0.065
Turnover ratio	1.000	0.610	17.592	0.494	1.168	-0.116
Bank credit	1.000	0.070	78.783	1.046	15.466	0.040
Mortality rate	0.020	0.140	18.091	0.501	22.109	-0.054

α is the permanent component coefficient (intercept) β trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Ghana

Table 3.1.7
Exponential smoothing result-Double method (one parameter)

Variable	α	SSE	RMSE	Mean	Trend
Growth	0.999	0.411	0.076	1.038	-0.340
Turnover ratio	0.999	17.121	0.488	4.304	-1.123
Bank credit	0.920	10.774	0.387	14.416	-0.466
Mortality rate	0.546	0.337	0.068	18.728	-0.031

α is the smoothing parameter, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha \leq 1$, with values near to zero being superior.

Mauritius

Table 3.1.8
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.000	5.919	0.287	0.933	0.025
Turnover ratio	1.000	0.380	78.819	1.046	14.221	1.461
Bank credit	0.820	0.000	473.036	2.563	88.395	0.665
Mortality rate	0.300	1.000	1.220	0.130	4.009	-0.022

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Botswana

Table 3.1.9
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.000	6.427	0.299	-0.034	-0.005
Turnover ratio	1.000	0.150	32.820	0.675	1.912	-0.014
Bank credit	0.555	0.600	34.327	0.690	21.760	0.301
Mortality rate	0.160	1.000	17.218	0.489	22.079	-0.255

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Swaziland

Table 3.1.10
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	β	SSE	RMSE	Mean	Trend
Growth	1.000	0.590	5.657	0.280	0.082	-0.101
Turnover ratio	1.000	0.560	80.532	1.058	1.226	-0.228
Bank credit	0.900	0.120	46.796	0.806	24.116	0.190
Mortality rate	0.230	1.000	34.063	0.688	27.497	-0.008

α is the permanent component coefficient (intercept) β is the trend, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha, \beta < 1$, with values near to zero being superior.

Kenya

Table 3.1.11
Exponential smoothing result- Holt-Winters (two parameters)

Variable	α	SSE	RMSE	Mean	Trend
Growth	0.999	2.064	0.169	-0.315	0.149
Turnover ratio	0.999	15.966	0.471	7.755	-0.337
Bank credit	0.999	25.519	0.640	29.991	-0.402
Mortality rate	0.948	0.204	0.053	18.8825	-0.100

α is the smoothing parameter, SSE is the Sum of Squared Residuals and RMSE is the Root Mean Squared Error. The smoothened values have been calculated based on EViews default settings. The degree of smoothing ordinarily requires $0 < \alpha \leq 1$, with values near to zero being superior.

Table 4.1.1

Descriptive analysis: 1990-2009

Correlation	Market capitalisation	Trade ratio	Turnover ratio	Bank credit	Mortality rate	Growth
Mean	38.030	8.679	9.854	33.559	54.293	1.823
Median	17.090	0.934	5.193	25.076	64.000	1.858
Maximum	338.205	259.156	70.483	87.586	112.000	10.577
Minimum	0.444	0.001	0.010	3.448	7.200	-7.994
Std. Dev.	55.584	28.358	12.581	21.557	30.933	2.900
Skewness	2.797	5.802	2.275	0.610	0.030	-0.259
Kurtosis	11.562	42.490	8.239	2.0812	1.503	3.608
Jarque-Bera	945.725	15317.570	435.299	21.100	20.292	5.767
Probability	0.000	0.000	0.000	0.000	0.000	0.056
Observations	217	217	217	217	217	217

The figures are in dollars

Table 4.1.2

Spearman rank-order and correlation analysis: 1990-2009

Correlation	Market capitalisation	Trade ratio	Turnover ratio	Bank credit	Mortality rate	Growth
Market capitalisation	1.000					
Trade ratio	0.804*** (0.000)	1.000				
Turnover ratio	0.516*** (0.000)	0.874*** (0.000)	1.000			
Bank credit	0.539*** (0.000)	0.663*** (0.000)	0.631*** (0.000)	1.000		
Mortality rate	-0.400*** (0.000)	-0.620*** (0.000)	-0.638*** (0.000)	-0.670*** (0.000)	1.000	
Growth	0.087 (0.203)	0.175*** (0.001)	0.219*** (0.001)	0.140** (0.04)	-0.262 (0.000)	1.000

* The null hypothesis is no correlation among the variables * With the exception of growth, all the variables are in their logarithmic form. *The probability values are reported in the parenthesis

Table 4.1.3

Stock markets, control variables and growth, pooled OLS

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	14.251*	16.070*	21.718**	4.705	-2.577	-127.453***	22.930***	-7.338	16.913*	13.544*	15.469*	20.644**
	(7.548)	(8.091)	(8.360)	(5.735)	(32.196)	(36.011)	(5.241)	(20.671)	(9.360)	(7.635)	(8.226)	(8.403)
Initial income	0.336	0.218	0.108	1.111***	0.328	0.182	-0.270	0.352	0.412	0.302	0.184	0.091
	(0.292)	(0.301)	(0.283)	(0.321)	(0.382)	(0.315)	(0.393)	(0.340)	(0.382)	(0.299)	(0.296)	(0.268)
Market capitalisation	-0.450**			-0.584**			-0.412**			-0.445*		
	(0.216)			(0.241)			(0.179)			(0.230)		
Trade ratio		-0.032			-0.061			-0.087			-0.011	
		(0.164)			(0.174)			(0.175)			(0.174)	
Turnover ratio			0.324			0.380*			0.179			0.341
			(0.258)			(0.212)			(0.258)			(0.258)
Bank credit	-0.827	-1.06*	-1.191**	-0.363	-0.919	-1.033*	-0.371	-0.937	-1.045*			
	(0.525)	(0.564)	(0.562)	(0.466)	(0.641)	(0.570)	(0.615)	(0.571)	(0.624)			
Mortality rate	-1.504***	-1.489**	-1.011*	-1.295***	-1.544***	-0.891**	-2.386**	-1.514***	-1.191***	-1.497**	-1.483**	-1.041*
	(0.516)	(0.564)	(0.511)	(0.367)	(0.505)	(0.431)	(0.577)	(0.468)	(0.424)	(0.590)	(0.570)	(0.536)
Population	-3.251	-3.866	-7.115**	-1.649	-3.266	-6.530*	-2.538	-2.489	-5.397	-3.464	-0.424	-7.354**
	(2.838)	(3.028)	(3.303)	(2.141)	(2.989)	(3.295)	(1.949	(2.920)	(3.266)	(2.822)	(3.013)	(3.279)
Inflation[a]					3.477							
					(5.635)							
Government				-0.485***								
				(0.126)								
Foreign Investment[a]						31.713***						
						(7.377)						
Interest[a]								4.173				
								(2.894)				
Investment									-0.165			
									(0.118)			
Money supply							-1.446*					
							(0.766)					
Higher bank credit										-0.121	-0.164	-0.190*
										(0.099)	(0.107)	(0.104)
Adjusted R	0.294	0.267	0.282	0.364	0.264	0.344	0.332	0.208	0.287	0.29	0.262	0.28
F (P-value)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

The standard errors reported in the parentheses are heteroscedasticity and autocorrelation consistent (HAC). The control variables have been added based on their significance.

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is based on the result of the descriptive analysis, which shows non –normality of the stock market variable

*, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.4

Stock markets, control variables and growth, random effect model

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	24.203** (9.492)	23.559** (9.716)	24.591** (9.504)	16.390* (9.202)	34.432* (19.161)	-72.135 (57.088)	33.952*** (9.902)	8.916 (19.924)	24.908** (10.086)	23.835** (9.511)	23.156** (9.672)	24.027** (9.411)
Initial income	-0.333 (0.555)	-0.379 (0.607)	-0.317 (0.592)	0.597 (0.569)	-0.102 (0.377)	-0.237 (0.576)	-0.778 (0.558)	-0.298 (0.618)	-0.369 (0.694)	-0.344 (0.565)	-0.363 (0.615)	-0.305 (0.595)
Market capitalisation	0.054 (0.278)			-0.158 (0.264)			-0.014 (0.262)			0.066 (0.282)		
Trade ratio		0.237 (0.167)			0.100 (0.141)			0.203 (0.173)			0.257 (0.172)	
Turnover ratio			0.475* (0.253)			0.430* (0.250)			0.487* (0.273)			0.491* (0.256)
Bank credit	-0.314 (0.665)	-0.446 (0.649)	-0.622 (0.652)	-0.224 (0.613)	-0.983* (0.576)	-0.688 (0.642)	0.058 (0.679)	-0.402 (0.652)	0.6811 (0.663)			
Mortality rate	-1.061* (0.610)	-0.891 (0.655)	-0.756 (0.650)	-0.937* (0.523)	-1.028** (0.483)	-0.856 (0.638)	-1.688** (0.649)	-0.881 (0.657)	-0.750 (0.672)	-1.095* (0.640)	-0.953 (0.675)	-0.822 (0.666)
Population	-7.828** (3.479)	-7.366** (3.359)	-8.470** (3.311)	-6.778** (3.382)	-8.601** (3.287)	-7.233** (3.347)	-8.653** (3.344)	-6.964** (3.400)	-8.508** (3.408)	-7.780** (3.487)	-7.350** (3.359)	-0.859** (3.312)
Inflation[a]					-1.729 (3.607)							
Government				-0.473** (0.218)								
Foreign Investment[a]						20.401* (11.880)						
Interest[a]								2.808 (3.332)				
Investment									0.022 (0.210)			
Money supply							-1.310* (0.746)					
Higher bank credit										-0.052 (0.110)	-0.086 (0.109)	-0.111 (0.108)
Breusch-Pagan test	0.118	0.039**	0.058*	0.825	0.017**	0.269	0.508	0.116	0.132	0.098*	0.029**	0.046**
Hausman Test	0.087*	0.082*	0.146	0.014***	0.000***	0.038**	0.035**	0.122	0.100	0.113	0.129	0.189

The standard errors reported in the parentheses are heteroskedasticity and autocorrelation consistent (HAC). The control variables have been added based on their significance.

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the stock market variable

*, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.5

Stock markets, control variables and growth, fixed effect model

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	48.770** (21.125)	50.834** (19.484)	52.057** (17.954)	53.896** (20.741)	54.394** (24.768)	-81.562* (48.052)	47.488** (22.412)	67.761*** (22.084)	48.770*** (18.203)	48.539** (22.408)	49.309** (20.918)	51.097** * (19.005)
Initial income	-5.735*** (1.930)	-5.277*** (1.697)	-5.289*** (1.660)	-5.769*** (1.842)	-5.184*** (1.572)	-7.152*** (1.395)	-5.667*** (2.032)	-5.389*** (1.561)	-5.162 (1.655)	-5.675*** (2.050)	-5.135*** (1.875)	-5.161*** (1.774)
Market capitalisation	0.054 (0.339)			0.090 (0.331)			0.098 (0.345)			0.066 (0.334)		
Trade ratio		0.328 (0.241)			0.313 (0.260)			0.396 (0.281)			0.295 (0.258)	
Turnover ratio			0.461* (0.249)			0.503** (0.239)			0.613** (0.274)			0.455* (0.256)
Bank credit	0.714 (0.635)	0.864* (0.500)	0.658 (0.582)	0.673 (0.640)	0.816* (0.484)	0.977* (0.522)	0.498 (0.734)	0.967** (0.482)	0.559 (0.592)			
Mortality rate	-1.600** (0.662)	-1.433** (0.679)	-1.532* (0.800)	-1.70** (0.691)	-1.464** (0.656)	-1.661** (0.648)	-1.644** (0.628)	-1.571 (0.581)	-1.336 (0.803)	-1.474** (0.674)	-1.313* (0.705)	-1.425* (0.813)
Population	-2.115 (4.770)	-4.969 (5.429)	-5.471 (5.639)	-3.715 (4.909)	-4.941 (5.453)	-7.008 (5.519)	-2.473 (5.023)	-6.171 (5.249)	-5.060 (5.864)	-1.888 (4.894)	-4.185 (5.528)	-5.066 (5.679)
Inflation[a]					-0.850 (3.089)							
Government				-0.603 (0.596)								
Foreign Investment[a]						32.274*** (11.407)						
Interest[a]								-2.889 (4.142)				
Investment									0.433** (0.194)			
Money supply							0.826 (0.896)					
Higher bank credit										0.106 (0.122)	0.111 (0.106)	0.088 (0.117)
Adjusted R^2	0.468	0.48	0.486	0.467	0.471	0.527	0.463	0.475	0.493	0.467	0.477	0.484
F (P-value)	0.003***	0.001***	0.001***	0.003***	0.001***	0.001***	0.013**	0.002***	0.001***	0.003***	0.001***	0.001***
Wald (time)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

The standard errors reported in the parentheses are heteroskedasticity and autocorrelation consistent (HAC). The control variables have been added based on their significance.

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.6

Stock markets, control variables and growth, GMM-difference estimator

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	35.781*	32.236*	29.536*	25.518	14.996	-105.691**	59.614**	15.640	27.580*	36.618	31.763	28.803
	(20.75	(19.10)	(17.53)	(15.69)	(37.90)	(48.33)	(28.16)	(27.13)	(16.49)	(23.20)	(20.99)	(19.09)
Initial income	-0.974	-0.703	-0.346	-0.250	-0.295	-0.819	-2.588	-0.588	-0.218	-1.028	-0.704	-0.360
	(1.316)	(1.159)	(1.057)	(0.997)	(0.834)	(1.058)	(2.307)	(1.027)	(0.910)	(1.398)	(1.220)	(1.095)
Market capitalisation	-0.289			-0.401			-0.159			-0.299		
	(0.289)			(0.276)			(0.338)			(0.2902)		
Trade ratio		0.048			-0.001			0.008			0.053	
		(0.166)			(0.1761)			(0.175)			(0.172)	
Turnover ratio			0.359			0.471**			0.284			0.370
			(0.249)			(0.223)			(0.320)			(0.249)
Bank credit	0.104	-0.376	-0.816	0.120	-0.530	-0.270	1.269	-0.313	-0.707			
	(1.212)	(1.091)	(0.997)	(0.820)	(0.810)	(1.157)	(1.852)	(1.007)	(0.780)			
Mortality rate	-0.931	-0.963	-0.737	-0.956*	-1.175**	-0.330	-2.651***	-0.997	-0.816	-0.865	-0.961	-0.755
	(0.717)	(0.692)	(0.633)	(0.505)	(0.584)	(0.511)	(0.654)	(0.663)	(0.587)	(0.824)	(0.752)	(0.677)
Population	-12.264	-10.847	10.647	-9.242	-7.973	-14.147**	-13.014	-9.709	-9.993	-12.617	-10.895	-10.816
	(8.500)	(7.836)	(7.284)	(5.545)	(5.895)	(6.446)	(8.847)	(7.058)	(6.536)	(8.992)	(8.131)	(7.484)
Inflation[a]					2.097							
					(5.630)							
Government				-0.247								
				(0.237)								
Foreign Investment[a]						30.767***						
						(9.575)						
Interest[a]								2.889				
								(2.840)				
Investment									-0.092			
									(0.156)			
Money supply							-3.018**					
							(1.173)					
Higher bank credit										0.033	-0.058	-0.129
										(0.213)	(0.191)	(0.171)
Wald (joint)	0.002***	0.001***	0.000***	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.002***	0.001**	0.000***
Wald (dummy)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (time)	0.000***	0.000***	0.000***	0.000***	0.005***	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***
Sargan test[b]	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
AR(1) test	0.050*	0.058*	0.105	0.055*	0.054**	0.064*	0.034**	0.034**	0.045**	0.053**	0.066*	0.119
AR(2) test	0.053*	0.102	0.483	0.542	0.321	0.319	0.152	0.284	0.554	0.050**	0.110	0.405

The control variables have been added based on their significance. [a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors [b] The standard errors reported in the parentheses are robust standard errors [c] The null hypothesis is that the instruments used are not correlated with the residuals.[d] The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation , *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.7(a)

Stock markets, control variables and growth, GMM-system estimator

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	20.620**	41.053*	41.347**	1.813	10.173	14.259	-101.773**	-86.590*	-82.671*	-224.402***	42.576**	-147.094**
	(10.10)	(23.22)	(17.63)	(7.885)	(17.49)	(21.48)	(47.97)	(50.88)	(46.31)	(70.08)	* (13.19)	(55.16)
Initial income	-0.294	-0.542	-0.245	1.058***	0.863	0.869	0.379	0.352	0.387	-0.424	-0.452	-0.309
	(0.499)	(0.608)	(0.480)	(0.38)	(0.600)	(0.709)	(0.235)	(0.404)	(0.349)	(0.444)	(0.366)	(0.289)
Market capitalisation	0.435			0.089			0.110			0.427		
	(0.369)			(0.274)			(0.315)			(0.311)		
Trade ratio		0.461			0.167			0.218			0.270	
		(0.330)			(0.248)			(0.243)			(0.192)	
Turnover ratio			1.011**			0.562			0.563			0.652**
			(0.440)			(0.525)			(0.456)			(0.322)
Bank credit	-0.970	-1.919**	-2.437***	-1.034	-1.093	-1.483	-0.762	-1.416**	-1.565*	0.035	-0.295	-0.902
	(1.065)	(0.953)	(0.878)	(0.827)	(0.927)	(1.109)	(0.579)	(0.608)	(0.783)	(1.124)	(1.124)	(1.086)
Mortality rate	-1.162*	-1.167	-0.930	-1.428***	-1.224**	-1.009*	-1.730***	-1.767***	-1.486**	-0.587	-0.572	-0.497
	(0.588)	(0.736)	(0.726)	(0.425)	(0.473)	(0.596)	(0.329)	(0.469)	(0.585)	(0.558)	(0.521)	(0.445)
Population	-5.578	-12.722	-14.280*	0.624	-2.939	-5.239**	-1.867	-4.978	-7.098	-3.969	-7.307	-9.556**
	(4.524)	(0.943)	(7.745)	(3.106)	(6.522)	(8.614)	(3.004)	(5.987)	(6.663)	(4.336)	(5.047)	(3.773)
Inflation[a]							23.805**	22.519**	22.242**			
							(10.50)	(10.12)	(8.265)			
Government				-0.517**	-0.555**	-0.469*						
				(0.202)	(0.228)	(0.268)						
Foreign Investment[a]										51.386***	42.576**	37.512***
										(15.65)	* (13.19)	(11.19)
Interest[a]												
Investment												
Money supply												
Higher bank credit												
Wald (joint)	0.020**	0.030***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (dummy)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (time)	0.000***	0.000***	0.000***	0.000***	0.000**	0.000***	0.000***	0.002**	0.000***	0.000***	0.001***	0.000***
Sargan test	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
AR(1) test	0.084*	0.106	0.102	0.077*	0.068*	0.063	0.063*	0.071*	0.075	0.089*	0.098*	0.108
AR(2) test	0.015***	0.060*	0.639	0.84	0.388	0.805	0.285	0.323	0.528	0.122**	0.204	0.603

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors [b] The standard errors reported in the parentheses are robust standard errors [c] The null hypothesis is that the instruments used are not correlated with the residuals.[d] The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation , *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.7(b)

Stock markets, control variables and growth, GMM-system estimator (continuation)

Regressors	13	14	15	16	17	18	19	20	21	22	23	24
Constant	21.569	42.586*	45.810***	-35.113	-25.878	-28.680	13.221	21.182	26.768	17.335	38.916	39.092**
	(14.63)	(24.29)	(19.30)	(28.74)	(29.26)	(32.27)	(9.690)	(18.38)	(19.54)	(11.39)	(23.40)	(18.48)
Initial income	-4.077	-0.814	-0.583	0.026	-0.180	-0.104	0.352	0.272	0.273	-0.175	-0.545	-0.210
	(0.694)	(0.754)	(0.617)	(0.324)	(0.423)	(0.384)	(0.388)	(0.544)	(0.633)	(0.474)	(0.603)	(0.492)
Market capitalisation	0.260			0.124			0.276			0.463		
	(0.332)			(0.322)			(0.337)			(0.390)		
Trade ratio		0.426			0.281			0.219			0.485	
		(0.288)			(0.243)			(0.259)			(0.341)	
Turnover ratio			0.999**			0.699			0.677			1.081**
			(0.382)			(0.430)			(0.533)			(0.440)
Bank credit	-1.184	-1.849**	-2.358***	-0.657	-1.191	-1.473	-1.100	-1.528*	-1.983**			
	(0.861)	(0.788)	(0.622)	(0.904)	(0.871)	(1.106)	(0.742)	(0.797)	(0.838)			
Mortality rate	-2.544**	-2.538***	-2.141**	-1.258***	-1.189**	-0.909	-1.437***	-1.482***	-1.178*	-1.247**	-1.170	-0.987
	(0.992)	(0.912)	(0.921)	(0.450)	(0.519)	(0.549)	(0.388)	(0.469)	(0.675)	(0.576)	(0.756)	(0.743)
Population	-0.324	-7.480	10.732	-1.393	-5.973	-8.303	-2.941	-5.494	-8.682	-4.892	-13.145	-15.006**
	(3.577)	(8.182)	(7.276)	(2.021)	(5.491)	(6.229)	(4.097)	(7.021)	(8.140)	(4.748)	(9.551)	(8.079)
Inflation[a]												
Government												
Foreign Investment[a]												
Interest[a]				9.723	10.451*	11.696**						
				(6.088)	(5.881)	(5.270)						
Investment							-0.251**	-0.239*	-0.163			
							(0.106)	(0.120)	(0.166)			
Money supply	-1.566	-1.835	-1.717									
	(1.492)	(1.434)	(1.295)									
Higher bank credit										-0.162	-0.286*	-0.388***
										(0.139)	(0.150)	(0.129)
Wald (joint)	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.046**	0.078*	0.000***
Wald (dummy)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (time)	0.000***	0.002***	0.000***	0.000***	0.000***	0.000***	0.001***	0.000***	0.000***	0.000***	0.001***	0.000***
Sargan test[b]	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
AR(1) test	0.096*	0.170	0.209	0.062*	0.067*	0.067*	0.089*	0.103	0.112	0.093*	0.115	0.118
AR(2) test	0.785	0.839	0.720	0.584	0.404	0.893	0.215	0.310	0.774	0.022**	0.038**	0.57

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors [b] The standard errors reported in the parentheses are robust standard errors [c] The null hypothesis is that the instruments used are not correlated with the residuals.[d] The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation , *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.8(a)

Stock markets, control variables and growth, GMM-system estimator (without South Africa)

Regressors	1	2	3	4	5	6	7	8	9	10	11	12
Constant	20.232	59.621*	58.054***	6.271	33.568	31.184	-108.778**	-52.741	-48.270	-244.951***	-171.972**	-87.671
	(12.30)	(34.02)	(14.65)	(9.133)	(33.39)	(20.59)	(45.36)	(55.02)	(41.16)	(71.73)	(83.78)	(62.75)
Initial income	-0.245	-1.341	-0.886 *	0.955 **	0.045	0.050	0.387	-0.430	-0.238	-0.550	-1.066	-0.754**
	(0.562)	(0.976)	(0.443)	(0.382)	(1.094)	(0.644)	(0.244)	(0.705)	(0.332)	(0.571)	(0.739)	(0.323)
Market capitalisation	0.349			0.149			-0.040			0.650		
	(0.432)			(0.401)			(0.317)			(0.467)		
Trade ratio		1.034*			0.682			0.603			0.719	
		(0.585)			(0.549)			(0.483)			(0.446)	
Turnover ratio			1.694***			1.395***			1.212**			1.304***
			(0.347)			(0.517)			(0.4881)			(0.379)
Bank credit	-0.884	-0.436	-1.400	-0.743	-0.460	-1.099	-0.941	-0.709	-1.105	0.484	0.377	-0.702
	(1.353)	(1.156)	(0.925)	(1.046)	(0.793)	(0.887)	(0.680)	(0.647)	(0.674)	(1.467)	(1.253)	(1.081)
Mortality rate	-1.297	0.738	0.664	-1.260*	0.116	0.426	-2.042***	-0.632	-0.247	-0.219	0.659	0.549
	(0.849)	(1.302)	(0.626)	(0.653)	(1.098)	(0.593)	(0.401)	(0.889)	(0.678)	(0.908)	(0.880)	(0.464)
Population									-			
	-5.078	-24.392	-25.07***	-1.741	-14.698	-17.908**	-2.656	-15.209	17.597**	-5.867	-17.212	-19.122***
	(5.751)	(15.16)	(5.822)	(4.312)	(14.40)	(8.386)	(3.731)	(11.95)	(6.996)	(6.119)	(11.91)	(4.931)
Inflation[a]							26.156**	19.716**	19.036**			
							(10.25)	(9.083)	* (6.905)			
Government				-0.569***	-0.484**	-0.318						
				(0.198)	(0.219)	(0.221)						
Foreign Investment[a]										56.274***	46.000***	28.449**
										(15.99)	(15.00)	(11.68)
Interest[a]												
Investment												
Money supply												
Higher bank credit												
Wald (joint)	0.026**	0.005***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (dummy)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (time)	0.000***	0.000***	0.000***	0.000***	0.001***	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***
Sargan test	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
AR(1) test	0.088*	0.096*	0.090*	0.090*	0.135	0.133	0.053*	0.052*	0.053*	0.101	0.126*	0.095*
AR(2) test	0.017**	0.194	0.919	0.864	0.558	0.782	0.262	0.223	0.735	0.189	0.362	0.952

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors [b] The standard errors reported in the parentheses are robust standard errors [c] The null hypothesis is that the instruments used are not correlated with the residuals.[d] The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation , *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.8(b)

Stock markets, control variables and growth, GMM-system estimator (without South Africa, continuation)

Regressors	13	14	15	16	17	18	19	20	21	22	23	24
Constant	40.661*	69.508*	66.903***	-39.421	9.458	3.868	17.304	47.920	55.701**	18.595	58.624*	55.725***
	(20.85)	(36.80)	(21.26)	(28.88)	(0.802)	(26.20)	(12.20)	(35.31)	(20.33)	(14.25)	(33.96)	(15.56)
Initial income	-0.850	-1.660	-1.283	0.226	-0.959	-0.569*	0.299	-0.705	-0.742	-0.319	-1.336	-0.813*
	(0.930)	(1.123)	(0.786)	(0.357)	(0.861)	(0.289)	(0.461)	(1.057)	(0.610)	(0.591)	(0.961)	(0.445)
Market capitalisation	-0.193			-0.100			0.275			0.266		
	(0.439)			(0.283)			(0.438)			(0.460)		
Trade ratio		0.733			0.942*			0.757			1.065*	
		(0.570)			(0.549)			(0.610)			(0.582)	
Turnover ratio			1.527***			1.507***			1.721***			1.706***
			(0.414)			(0.390)			(0.598)			(0.353)
Bank credit	-2.295***	-1.761**	-2.072***	-1.212	-0.375	-1.078	-1.007	-0.728	-1.408*			
	(0.621)	(0.701)	(0.684)	(0.921)	(0.640)	(0.932)	(0.977)	(0.700)	(0.821)			
Mortality rate	-4.340**	-2.165	-1.370	-1.824***	0.566	0.527	-1.450**	0.013	0.686	-1.403*	0.959	0.596
	(1.289)	(1.539)	(1.472)	(0.436)	(1.075)	(0.489)	(0.654)	(1.180)	(0.763)	(0.816)	(1.281)	(0.670)
Population	-1.217	-17.999	-20.531***	0.275	-19.947	-19.930***	-4.597	-18.902	-24.402**	-4.397	-24.842	-25.079***
	(4.538)	(15.06)	(6.986)	(3.180)	(13.84)	(5.978)	(5.514)	(15.43)	* (8.287)	(6.300)	(15.05)	(6.242)
Inflation[a]												
Government												
Foreign Investment[a]												
Interest[a]				10.651*	8.400*	8.922**						
				(6.181)	(4.872)	(26.20)						
Investment							-0.279***	-0.193	-0.023			
							(0.104)	(0.131)	(0.163)			
Money supply	-2.597	-2.110	-1.890									
	(1.749)	(1.600)	(1.484)									
Higher bank credit										-0.142	-0.025	-0.221
										(1.829)	(0.178)	(0.144)
Wald (joint)	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (dummy)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Wald (time)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.001***	0.001***	0.000***	0.000***	0.000***	0.000***
Sargan test[b]	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999
AR(1) test	0.079*	0.114	0.144	0.064*	0.089*	0.102	0.098*	0.109	0.100	0.098*	0.094*	0.090*
AR(2) test	0.672	0.489	0.592	0.927	0.533	0.446	0.339	0.313	0.881	0.027**	0.203	0.953

[a] In the regression, this variable is included as log (1+ variable), all other variables are entered as log (variable), with the exception of the dependent variable. This is partially based on the result of the descriptive analysis, which shows non –normality of the errors [b] The standard errors reported in the parentheses are robust standard errors [c] The null hypothesis is that the instruments used are not correlated with the residuals.[d] The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation , *, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.9

Panel unit root tests

Variables	Levels			First differences		
	LLU	ADF-F	PP-F	LLU	ADF-F	PP-F
Growth	-1.597*	35.853**	41.396***	-12.126***	103.373***	105.938***
Turnover ratio	2.0581	13.5	13.856	-10.589***	95.099***	103.585***
Bank credit	6.275	3.598	6.259	-4.652***	46.622***	47.077***
Human capital	-2.289**	68.973***	84.082***	-3.959***	52.363***	57.274***

* The lag selections are based on SIC with Newey-West bandwidth selection using Bartlett kernel
*The maximum lags are automatically selected by EVIEWS
*The alternative hypothesis in LLU is no unit, but no unit roots in some cross section for ADF-F, and PP-F tests.
*, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.1.10

Panel cointegration tests

Kao	-2.892***			
	Panel Statistic (Within dimension)			
	Panel v-	Panel rho	Panel PP	Panel ADF
Pedroni	-1.547	2.834***	-1.653	-0.744
	Group Statistic (Between dimension)			
	Group rho-Statistic	Group PP-Statistic	Group ADF-Statistic	
	3.744***	-10.369***	-5.217***	

*For both tests, the lag selections are based on SIC with Newey-West bandwidth selection using Bartlett kernel *** indicates the rejection of the null hypothesis of no cointegration at 1 percent level of significance. Automatic maximum lag selection by SIC for Kao test is 1, while it is 0 for Pedroni test. We assume that there is no deterministic trend for the two tests.
The null hypothesis is that there is no cointegration.

Table 4.1.11
Panel ECM

Variables	Long run estimates
Constant	66.693***
	(16.876)
Turnover ratio	0.092
	(1.050)
Bank credit	-7.690**
	(2.565)
Mortality rate	-9.668**
	(2.544)
Variables	Short run estimates
Constant	-0.074
	(0.403)
D(Growth, 2)	-0.199
	(0.243)
D(Growth, 3)	-0.013
	(0.168)
D(Turnover ratio, 0)	-0.088
	(0.415)
D(Turnover ratio, 1)	0.839**
	(0.468)
D(Turnover ratio, 2)	1.570***
	(0.547)
D(Bank credit, 0)	-1.504
	(2.358)
D(Bank credit, 1)	-1.882
	(1.778)
D(Bank credit, 2)	2.535*
	(1.639)
D(Mortality rate, 0)	12.941**
	(5.760)
D(Mortality rate, 1)	0.120
	(4.376)
D(Mortality rate, 2)	1.251
	(3.709)
ECT (1)	-0.738***
	(0.103)
Adjusted R^2	0.489

With the exception of growth all the variables are in natural logarithmic form. *The figure in the parenthesis are standard errors

*, **, *** Imply 10%, 5%, and 1% level of significance, respectively.

Table 4.1.12

Panel Granger causality test

Variables	D(Growth)	D(Turnover ratio)	D(Bank credit)	D(Mortality rate)	ECT_{t-1}
D(Growth)	-	11.132**	2.550	11.209**	-3.672***
D(Turnover ratio)	4.627	-	5.873	2.517	0.034
D(Bank credit)	1.893	1.302	-	0.106	0.007
D(Mortality rate)	2.869	3.569	1.954	-	0.001

* All variables except for the lagged error term ECT_{t-1} are in first differences.

*, **, *** indicate the rejection of the null hypothesis of no causality 10%, 5%, and 1% level of significance, respectively.

South Africa

Table 4.21.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-2.256	-3.569**	-2.298	-4.391**	-	-6.391***
Turnover ratio	-2.288	-1.189	-1.713	3.517**	-2.831	-6.616***
Bank credit	-4.484***	-1.542	-3.677**	-	-4.411***	-
Mortality rate	-2.167	-0.854	-0.838	-3.787**	-2.608	-8.085***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.1.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	3.526**	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	1.565	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	25.693***	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	1.928	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.1.3
ARDL results

Variables	Long run estimates
Constant	2.148
	(6.534)
Turnover ratio	0.167
	(0.314)
Bank credit	0.059
	(1.443)
Mortality rate	-1.059
	(1.232)
Variables	**Short run estimates**
Constant	0.316
	(0.940)
D(Growth, 1)	0.215*
	(0.122)
D(Turnover ratio, 0)	0.129
	(0.266)
D(Turnover ratio,1)	-0.296
	(0.252)
D(Turnover ratio, 2)	-0.132
	(0.205)
D(Turnover ratio, 3)	-0.223
	(0.208)
D(Bank credit, 0)	-1.019**
	(0.415)
D(Bank credit, 1)	0.278
	(0.312)
D(Mortality rate, 0)	0.258
	(0.655)
ECT (1)	-0.147***
	(0.050)
Adjusted R^2	0.259

*The lag selection is hand-picked at 2,4,2,1. With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.1.4
Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	7.840**	3.963	1.234	-1.701*
ΔTurnover ratio	5.30	-	9.387**	4.800	-
ΔBank credit	5.395	2.991	-	1.436	-5.952***
ΔMortality rate	4.039	24.854***	4.185	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT.

Table 4.2.1.5
Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 4.118 [0.390]	F (4, 51) = 0.822 [0.517]
Functional Form	CHSQ(1) = 1.959 [0.162]	F(1, 54) = 1.602 [0.211]
Normality	CHSQ(2) = 1.143 [0.565]	N/A
Heteroscedasticity	CHSQ(1) = 2.281 [0.131]	F(1, 66) = 2.291 [0.135]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Egypt

Table 4.2.2.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	2.193	-1.605	-2.193	-5.152***	-5.521***	-5.783***
Turnover ratio	- 2.528	-3.572**	-3.129	-5.487***	-	-9.798***
Bank credit	-1.937	0.794	0.890	-2.385	-2.385	-5.982***
Mortality rate	-3.757**	-2.052	-2.167	-	-2.123	-8.347***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because the study is dealing with quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.2.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	4.439***	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	2.476	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	4.292**	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	1.396	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.2.3

ARDL results

Variables	Long run estimates
Constant	3.887***
	(1.254)
Turnover ratio	0.512***
	(0.071)
Bank credit	-0.819***
	(0.177)
Mortality rate	-0.776***
	(0.370)
Variables	**Short run estimates**
Constant	1.368***
	(0.451)
D(Growth, 1)	0.291**
	(0.112)
D(Growth, 2)	0.258**
	(0.119)
D(Turnover ratio, 0)	0.176***
	(0.031)
D(Turnover ratio, 1)	-0.060
	(0.036)
D(Turnover ratio, 2)	-0.102***
	(0.038)
D(Turnover ratio, 3)	-0.073**
	(0.033)
D(Bank credit, 0)	-0.288***
	(0.069)
D(Mortality rate, 0)	1.845**
	(0.834)
D(Mortality rate, 1)	-0.541
	(0.872)
D(Mortality rate, 2)	-0.564
	(0.851)
D(Mortality rate, 3)	1.480*
	(0.797)
ECT (1)	-0.352***
	(0.060)
Adjusted R^2	0.555

*The lag selection is hand-picked at 3,4,0,4 With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.2.4
Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	6.863	5.789	4.090	-2.392**
ΔTurnover ratio	6.725	-	13.685***	4.523	-
ΔBank credit	27.183***	35.224*	-	26.999***	-2.300**
ΔMortality rate	20.769***	6.649	19.819***	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.2.5
Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4)= 6.149 [0.188]	F (4, 49) = 1.218 [0.315]
Functional Form	CHSQ(1) = 0.126 [0.722]	F(1, 52) = 0.097 [0.757]
Normality	CHSQ(2) = 51.610 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 0.908 [0.341]	F(1, 66) = 0.893 [0.348]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Morocco

Table 4.2.3.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-4.892***	-4.452***	-2.281	-	-	-3.375*
Turnover ratio	-2.802	-3.110*	-3.943**	-4.770***	-	-
Bank credit	-1.806	-2.501	-3.177*	-4.950***	-2.394	-
Mortality rate	-4.055**	-3.084*	-2.944	-	-	-8.891***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, he study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.3.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	3.367**	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	5.035***	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	1.891	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	1.872	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.3.3
ARDL results

Variables	Long run estimates
Constant	3.173**
	(1.386)
Turnover ratio	-0.011
	(0.060)
Bank credit	-0.258
	(0.286)
Mortality rate	-1.385***
	(0.307)
Variables	**Short run estimates**
Constant	2.205**
	(0.980)
D(Growth, 1)	1.343***
	(0.077)
D(Growth, 2)	-0.014
	(0.132)
D(Growth, 3)	0.364***
	(0.123)
D(Growth, 4)	-0.200*
	(0.107)
D(Growth, 5)	0.617***
	(0.079)
D(Turnover ratio, 0)	-0.129***
	(0.047)
D(Turnover ratio, 1)	-0.114**
	(0.045)
D(Turnover ratio, 2)	-0.172***
	(0.045)
D(Turnover ratio, 3)	0.032
	(0.045)
D(Turnover ratio, 4)	0.126**
	(0.047)
D(Turnover ratio, 5)	-0.054
	(0.043)
D(Bank credit, 0)	-1.214*
	(0.699)
D(Mortality rate, 0)	1.222
	(1.863)
D(Mortality rate, 1)	-0.428
	(3.270)
D(Mortality rate, 2)	-0.744
	(3.703)
D(Mortality rate, 3)	6.072**
	(2.991)
D(Mortality rate, 4)	-7.429***
	(1.711)
D(Mortality rate, 5)	3.656***
	(0.786)
ECT (1)	-0.695***
	(0.061)
Adjusted R^2	0.979

*The lag selection is based on Akaike Information Criterion (AIC)
With the exception of Growth, all the variables are in natural logarithmic form.
*The figures in the parenthesis are standard errors The numeric-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.3.4
Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	161.430***	14.079**	19.624***	-2.986***
ΔTurnover ratio	22.965***	-	16.006**	22.407***	-2.891***
Δ Bank credit	6.171	11.254*	-	2.501	-
ΔMortality rate	6.905	135.223***	16.615**	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.3.5
Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4)= 7.235 [0.124]	F (4, 39) = 1.200 [0.326]
Functional Form	CHSQ(1) = 0.193 [0.165]	F(1, 42) = 1.262 [0.268]
Normality	CHSQ(2) = 0.065 [0.968]	N/A
Heteroscedasticity	CHSQ(1) = 0.002 [0.964]	F(1, 64) = 0.002 [0.965]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Tunisia

Table 4.2.4.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-2.466	-4.931***	-3.333*	-5.376***	-	-
Turnover ratio	-2.565	-3.556**	-2.992	-5.119***	-	-7.766***
Bank credit	-1.617	-1.601	-1.756	-4.154***	-2.035	-8.070
Mortality rate	-2.438	-0.796	-0.702	-4.215***	-1.720	-8.016***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.4.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	4.675***	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	3.423**	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	3.428**	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	6.061***	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.4.3
ARDL results

Variables	Long run estimates
Constant	24.679***
	(6.182)
Turnover ratio	-0.264**
	(0.115)
Bank credit	-4.573***
	(2.578)
Mortality rate	-2.644***
	(0.422)
Variables	**Short run estimates**
Constant	9.778***
	(2.819)
D(Growth, 1)	0.534***
	(0.095)
D(Growth, 2)	0.235***
	(0.084)
D(Growth, 3)	0.286***
	(0.085)
D(Growth, 4)	-0.435***
	(0.087)
D(Growth, 5)	0.290***
	(0.094)
D(Turnover ratio, 0)	-0.104**
	(0.052)
D(Bank credit, 0)	-8.091***
	(2.702)
D(Bank credit, 1)	5.039
	(3.026)
D(Bank credit, 2)	2.566
	(2.896)
D(Bank credit, 3)	1.864
	(2.828)
D(Bank credit, 4)	-4.380*
	(2.298)
D(Mortality rate, 0)	7.438
	(6.072)
D(Mortality rate, 1)	-6.045
	(8.011)
D(Mortality rate, 2)	-4.828
	(7.643)
D(Mortality rate, 3)	-5.367
	(7.643)
D(Mortality rate, 4)	22.528***
	(7.460)
D(Mortality rate, 5)	-18.093***
	(5.975)
ECT (1)	-0.396***
	(0.081)
Adjusted R^2	0.749

*The lag selection is based on Akaike Information Criterion (AIC)
With the exception of Growth, all the variables are in natural logarithmic form.
*The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

.

Table 4.2.4.4
Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	10.324	11.856*	24.786***	-5.767***
ΔTurnover ratio	22.089***	-	65.932***	44.153***	-2.437**
ΔBank credit	5.469	5.633	-	94.624***	-2.542**
ΔMortality rate	1.247	11.339*	1.836	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.4.5
Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 10.568 [0.032]	F(4, 41) = 1.954 [0.120]
Functional Form	CHSQ(1) = 0.158 [0.691]	F(1, 44) = 0.106 [0.747]
Normality	CHSQ(2) = 21.441 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 0.625 [0.429]	F(1, 64) = 0.612 [0.437]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Nigeria

Table 4.2.5.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-3.496**	-3.181**	-2.861	-	-	-5.886***
Turnover ratio	-2.395	-2.412	-3.318*	-3.784**	-5.388***	-
Bank credit	-1.501	-1.728	-2.043	-4.591***	-2.945*	-6.609***
Mortality rate	-0.474	-1.192	-1.744	-4.391***	-4.363***	-3.161

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.5.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	3.587**	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	5.364***	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	0.868	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	2.443	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.5.3

ARDL results

Variables	Long run Estimates
Constant	14.371**
	(6.181)
Turnover ratio	-0.703
	(0.509)
Bank credit	-0.553
	(0.676)
Mortality rate	-6.561**
	(2.915)
Variables	**Short run Estimates**
Constant	2.327**
	(0.948)
D(Growth, 1)	1.141***
	(0.114)
D(Growth, 2)	-0.722***
	(0.149)
D(Growth, 3)	0.282**
	(0.109)
D(Turnover ratio, 0)	0.154
	(0.187)
D(Turnover ratio, 1)	0.094
	(0.187)
D(Bank credit, 0)	-0.345
	(0.323)
D(Bank credit, 1)	0.355
	(0.359)
D(Mortality rate, 0)	-4.816
	(7.183)
D(Mortality rate, 1)	0.703
	(11.477)
D(Mortality rate, 2)	5.360
	(11.330)
D(Mortality rate, 3)	-7.387
	(6.571)
ECT (1)	-0.162***
	(0.047)
Adjusted R^2	0.718

*The lag selection is hand-picked at 4 2, 2, 4. With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors. *The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.5.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	31.602***	3.606	2.910	-3.676***
ΔTurnover ratio	7.220	-	5.694	4.315	-0.120**
Δ Bank credit	2.774	34.779***	-	2.678	-
ΔMortality rate	18.729***	76.268***	5.831	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.5.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 8.185 [0.085]	F(4, 47) = 1.635 [0.181]
Functional Form	CHSQ(1) = 1.420 [0.233]	F(1, 50) = 1.082 [0.303]
Normality	CHSQ(2) = 29.278 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 0.484 [0.487]	F(1, 65) = 0.473 [0.494]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Cote D'Ivoire

Table 4.2.6.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-1.839	-1.642	-2.158	-3.753***	-5.313***	- 6.301***
Turnover ratio	- 2.995	-4.137***	- 3.020	- 4.396***	-	-7.030***
Bank credit	-1.632	0.765	-1.286	- 4.976***	-4.016***	- 7.941***
Mortality rate	-22.375***	-1.450	-2.440	-	-0.562	- 10.547***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth.The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, he study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.6.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	2.949*	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	3.215**	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	3.223**	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	4.547***	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.6.3
ARDL results

Variables	Long run estimates
Constant	-16.054 (13.901)
Turnover ratio	-0.802 (0.495)
Bank credit	-6.871*** (1.908)
Mortality rate	19.055*** (6.202)
Variables	**Short run estimates**
Constant	-3.266 (2.914)
D(Growth, 1)	0.255** (0.107)
D(Growth, 2)	0.090 (0.112)
D(Growth, 3)	0.269** (0.112)
D(Growth, 4)	-0.357*** (0.119)
D(Turnover ratio, 0)	-0.283** (0.107)
D(Turnover ratio, 1)	0.145 (0.092)
D(Turnover ratio, 2)	0.077 (0.093)
D(Turnover ratio, 3)	0.124 (0.094)
D(Turnover ratio, 4)	-0.273*** (0.095)
D(Bank credit, 0)	0.334 (0.723)
D(Mortality rate, 0)	540.131*** (147.253)
D(Mortality rate, 1)	515.534*** (153.6104)
D(Mortality rate, 2)	530.807 (136.526)
D(Mortality rate, 3)	471.481 (139.778)
ECT (-1)	-0.203*** (0.055)
Adjusted R^2	0.444

*The lag selection is based on Akaike Information Criterion (AIC)
With the exception of Growth, all the variables are in natural logarithmic form.
*The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.6.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	12.227*	7.789	19.948***	-3.537***
ΔTurnover ratio	4.956	-	8.365	6.364	-2.822***
ΔBank credit	5.699	3.966	-	122.069***	-1.402
ΔMortality rate	-	-	2.096	-	-1.634

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.6.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4)= 6.572 [0.160]	F (4, 44)= 1.196 [0.326]
Functional Form	CHSQ(1) = 2.647 [0.104]	F(1, 47)= 1.934 [0.171]
Normality	CHSQ(2) = 87.033 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 0.042 [0.838]	F(1, 65) = 0.000 [0.841]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Ghana

Table 4.2.7.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-2.482	-2.528	-1.855	-4.135***	-2.983*	-2.780
Turnover ratio	-3.740**	-3.871***	-3.967**	-	-	-
Bank credit	-1.342	-2.024	-3.310*	-3.475*	-3.591**	-
Mortality rate	-0.588	-0.948	-1.716	-1.384	-4.456***	-8.863***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth.The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.7.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	4.619***	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	4.004**	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	2.802*	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	5.682***	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.7.3
ARDL results

Variables	Long run Estimates
Constant	-23.771***
	(8.360)
Turnover ratio	0.007
	(0.062)
Bank credit	0.136
	(0.211)
Mortality rate	8.272***
	(3.015)
Variables	**Short run Estimates**
Constant	-4.499**
	(1.762)
D(Growth, 1)	1.503***
	(0.178)
D(Growth, 2)	-1.099***
	(0.272)
D(Growth, 3)	0.603**
	(0.291)
D(Growth, 4)	-0.453*
	(0.234)
D(Growth, 5)	0.229
	(0.174)
D(Turnover ratio, 0)	-0.004
	(0.009)
D(Turnover ratio, 1)	0.007
	(0.011)
D(Turnover ratio, 2)	-0.003
	(0.010)
D(Turnover ratio, 3)	0.008
	(0.009)
D(Bank credit, 0)	0.345*
	(0.202)
D(Mortality rate, 0)	0.401
	(15.169)
D(Mortality rate, 1)	-0.944
	(21.504)
D(Mortality rate, 2)	1.526
	(21.542)
D(Mortality rate, 3)	-2.125
	(13.565)
ECT (1)	-0.189**
	(0.087)
Adjusted R^2	0.814

*The lag selection is hand-picked at 6, 4, 1, 4. With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.7.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	3.813	4.770	3.365	-1.960*
ΔTurnover ratio	1.499	-	24.647***	17.222***	-3.561***
ΔBank credit	15.999***	8.629**	-	13.328**	-1.767*
ΔMortality rate	1.650	8.543**	2.725	-	-1.834*

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.7.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 8.059 [0.089]	F (4, 43) = 1.495 [0.220]
Functional Form	CHSQ(1) = 2.122 [0.145]	F(1, 46) = 1.528 [0.223]
Normality	CHSQ(2) = 74.727 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 7.292 [0.007]	F(1, 64) = 7.949 [0.006]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Botswana

Table 4.2.8.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-1.555	-3.205**	-2.837	-3.937**	-	-5.881***
Turnover ratio	-3.273*	-1.339	-3.234*	-	-5.836***	-
Bank credit	-4.440***	-0.945	-1.631	-	-1.806	-4.734***
Mortality rate	-2.661	0.370	-0.238	-5.180***	-0.727	-4.595***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.8.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	2.807*	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	3.176*	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	2.590	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	2.797*	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.8.3
ARDL results

Variables	Long run estimates
Constant	-11.717* (6.399)
Turnover ratio	1.296* (0.715)
Bank credit	1.347 (1.300)
Mortality rate	2.439** (1.049)
Variables	**Short run estimates**
Constant	-2.003** (0.750)
D(Growth, 1)	0.348*** (0.118)
D(Growth, 2)	0.044 (0.072)
D(Growth, 3)	0.122 (0.074)
D(Growth, 4)	-0.655*** (0.075)
D(Growth, 5)	0.286*** (0.101)
D(Turnover ratio, 0)	0.222*** (0.075)
D(Bank credit,0)	4.032*** (0.757)
D(Bank credit,1)	-1.374** (0.548)
D(Bank credit,2)	0.467 (0.560)
D(Bank credit,3)	0.355 (0.560)
D(Bank credit,4)	-3.067*** (0.800)
D(Mortality rate, 0)	0.417** (0.188)
ECT(1)	-0.171** (0.072)
Adjusted R^2	0.784

*The lag selection is based on Akaike Information Criterion (AIC)
With the exception of Growth, all the variables are in natural logarithmic form.
*The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.8.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	12.202*	20.379***	17.057***	-3.362***
ΔTurnover ratio	6.331	-	25.664***	9.102	-2.767***
ΔBank credit	3.172	9.385	-	81.330***	-
ΔMortality rate	10.643	22.495***	29.383***	-	-2.729***

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.8.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4)= 4.892 [0.299]	F (4, 47)= 0.941 [0.449]
Functional Form	CHSQ(1) = 0.456 [0.499]	F(1, 50)= 0.348 [0.558]
Normality	CHSQ(2)= 9.321 [0.009]	N/A
Heteroscedasticity	CHSQ(1) =0.000 [0.998]	F(1, 64) = 0.000 [0.998]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Mauritius

Table 4.2.9.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-2.441	-5.645***	-3.505**	-4.776***	-	-
Turnover ratio	-2.934	-4.128***	-2.823	-4.849***	-	-6.698***
Bank credit	-6.1664***	-2.253	-3.111	-	-2.305	-8.343***
Mortality rate	11.583***	-3.238*	-1.775	-	-	-4.774***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, the study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.9.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	2.835*	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	2.368	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	2.064	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	1.539	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.9.3
ARDL results

Variables	Long run Estimates
Constant	-2.200 (2.426)
Turnover ratio	0.386** (0.164)
Bank credit	-0.418 (0.402)
Mortality rate	-0.170 (0.686)
Variables	**Short run Estimates**
Constant	1.061 (1.273)
D(Growth, 1)	0.702*** (0.139)
D(Growth, 2)	0.291** (0.114)
D(Growth, 3)	0.377*** (0.114)
D(Growth, 4)	-0.538*** (0.103)
D(Growth, 5)	0.343*** (0.120)
D(Turnover ratio, 0)	0.186* (0.099)
D(Bank credit, 0)	-0.202 (0.216)
D(Mortality rate, 0)	-0.082 (0.336)
ECT (1)	-0.482*** (0.125)
Adjusted R^2	0.608

*The lag selection is based on Schwarz Bayesian Criterion (SBC)
With the exception of Growth, all the variables are in natural logarithmic form.
*The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.9.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	14.922***	4.915	1.158	-2.619**
ΔTurnover ratio	25.681***	-	8.551*	4.295	-
ΔBank credit	0.668	2.059	-	12.561**	-
ΔMortality rate	4.568	9.347*	25.831***	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.9.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4)= 5.841 [0.211]	F (4, 52)= 1.262 [0.297]
Functional Form	CHSQ(1) = 0.036 [0.850]	F(1, 55)= 0.030 [0.864]
Normality	CHSQ(2) = 21.500 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 0.425 [0.514]	F(1, 65) = 0.415 [0.522]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Swaziland

Table 4.2.10.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-3.143	-5.973***	-3.582**	-4.911**	-	-
Turnover ratio	-2.451	-2.644	-2.501	-4.356***	-4.777***	-6.765***
Bank credit	-0.920	-0.535	-1.026	-3.673**	-2.458	-7.214***
Mortality rate	-8.224***	1.105	-1.931	-	-1.347	-5.544***

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, he study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.10.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	4.647***	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	4.226**	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	3.266**	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	0.464	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.10.3
ARDL results

Variables	Long run Estimates
Constant	0.770
	(3.519)
Turnover ratio	0.013
	(0.150)
Bank credit	-0.611
	(0.691)
Mortality rate	0.435
	(1.084)
Variables	Short run Estimates
Constant	0.326
	(1.454)
D(Growth, 1)	0.459***
	(0.144)
D(Growth, 2)	0.277*
	(0.153)
D(Growth, 3)	0.313**
	(0.146)
D(Growth, 4)	-0.342**
	(0.169)
D(Turnover ratio, 0)	0.066
	(0.059)
D(Turnover ratio, 1)	0.012
	(0.065)
D(Turnover ratio, 2)	0.040
	(0.056)
D(Turnover ratio, 3)	0.048
	(0.053)
D(Turnover ratio, 4)	-0.075
	(0.053)
D(Bank credit, 0)	2.703
	(1.956)
D(Bank credit, 1)	-3.049
	(1.872)
D(Bank credit, 2)	-0.499
	(1.868)
D(Bank credit, 3)	0.131
	(1.929)
D(Bank credit, 4)	2.725
	(1.896)
D(Mortality rate, 0)	-8.734
	(7.985)
D(Mortality rate,1)	14.359
	(8.997)
D(Mortality rate, 2)	-5.752
	(7.888)
D(Mortality rate, 3)	1.334
	(7.764)
D(Mortality rate, 4)	-3.079
	(6.455)
ECT (1)	-0.424***
	(0.149)
Adjusted R^2	0.410

*The lag selection is hand-picked at 5,5,5,5. With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.10.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	4.616	7.795	3.872	-6.716***
ΔTurnover ratio	26.147**	-	19.854***	26.458***	-3.829***
ΔBank credit	8.129	7.707	-	14.677**	-1.765*
ΔMortality rate	5.228	5.203	7.962	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.10.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 10.995 [0.027]	F(4, 39) = 1.914 [0.127]
Functional Form	CHSQ(1) = 11.211 [0.001]	F(1, 42) = 8.440 [0.006]
Normality	CHSQ(2) = 184.344 [0.000]	N/A
Heteroscedasticity	CHSQ(1) = 2.414 [0.120]	F(1, 65) = 2.429 [0.124]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses. The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

Kenya

Table 4.2.11.1
Unit root tests

Variables	Levels			First differences		
	ADF	DF-GLS	PP	ADF	DF-GLS	PP
Growth	-2.690	-2.687*	-2.557	-4.257***	-3.704**	-5.034***
Turnover ratio	-2.537	-2.521	-2.915	-4.734***	1.833	-7.001***
Bank credit	3.426*	-3.458**	-3.450*	-	-	-
Mortality rate	0.004	0.980	0.004	-3.105	-3.986***	-3.069

The lag selection of the ADF is based on AIC with a maximum lag of 4, because we are dealing with a quarterly data. For the PP test is estimated based on Bartlett kernel with Newey-West bandwidth. The maximum lags are automatically selected by EViews in the case of PP test. To have a different specification, he study chose the lag for DF-GLS based on SIC with a maximum lag of 3. Generally, the null hypothesis is that of no stationarity. *, **, *** Imply stationarity at 10%, 5%, and 1% level of significance, respectively.

Table 4.2.11.2
Bound test results

Dependent Variable	F-Statistics	10%(0)	10%(1)	5% I(0)	5%(1)	1%(0)	1%(1)
Growth	3.037*	2.711	3.800	3.219	4.378	4.385	5.615
Turnover ratio	2.534	2.711	3.800	3.219	4.378	4.385	5.615
Bank credit	9.162***	2.711	3.800	3.219	4.378	4.385	5.615
Mortality rate	1.484	2.711	3.800	3.219	4.378	4.385	5.615

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no cointegration. Critical values are from Pesaran and Pesaran (1997).

Table 4.2.11.3
ARDL results

Variables	Long run Estimates
Constant	-2.541
	(7.968)
Turnover ratio	0.769***
	(0.261)
Bank credit	-2.603
	(1.981)
Mortality rate	3.335
	(3.738)
Variables	**Short run Estimates**
Constant	-0.501
	(1.562)
D(Growth, 1)	1.317***
	(0.119)
D(Growth, 2)	-0.836***
	(0.154)
D(Growth, 3)	0.325***
	(0.115)
D(Turnover ratio, 0)	0.386**
	(0.148)
D(Turnover ratio, 1)	-0.311**
	(0.146)
D(Bank credit, 0)	-0.889
	(0.764)
D(Bank credit, 1)	0.658
	(1.160)
D(Bank credit, 2)	0.078
	(1.043)
D(Bank credit, 3)	0.481
	(0.723)
D(Mortality rate, 0)	-1.164
	(6.252)
D(Mortality rate, 1)	0.937
	(6.228)
ECT (1)	-0.197***
	(0.056)
Adjusted R^2	0.809

*The lag selection is hand-picked at 4,2,4,2. With the exception of Growth, all the variables are in natural logarithmic form. *The figures in the parenthesis are standard errors. The numerics-0, 1, 2, 3 indicate the extent of lag. * *, **, *** Imply 10%, 5%, and 1% level of significance, respectively. The estimation period is 1991-2008

Table 4.2.11.4

Granger causality results

Variable	ΔGrowth	ΔTurnover ratio	ΔBank credit	ΔMortality rate	ECT(-1)
ΔGrowth	-	4.472	6.372	3.409	-4.100**
ΔTurnover ratio	7.675	-	7.293	10.607**	-
ΔBank credit	5.158	5.556	-	1.806	-2.525**
ΔMortality rate	10.011**	19.672***	2.713	-	-

*, **, *** Imply 10%, 5%, and 1% level of significance respectively. *, **, *** Imply 10%, 5%, and 1% level of significance respectively. The null hypothesis is no Granger causality. The chi-square statistics are reported for the variables, while the t-statistic is reported for the ECT

Table 4.2.11.5

Diagnostic test results

Test Statistics	LM test	F-test
Serial Correlation	CHSQ(4) = 9.163 [0.057]	F (4, 47) = 1.862 [0.133]
Functional Form	CHSQ(1) = 0.063 [0.802]	F(1, 50) = 0.047 [0.829]
Normality	CHSQ(2) = 2.429 [0.297]	N/A
Heteroscedasticity	CHSQ(1) = 0.227 [0.634]	F(1, 65) = 0.221 [0.640]

The Lagrange multiplier tests are distributed as Chi-squared variates with degrees of freedom in parentheses The first figures in the parenthesis for the F-test are the degrees freedom. The null hypothesis of the two tests is no serial correlation, normality, correct functional form and homoscedasticity respectively.

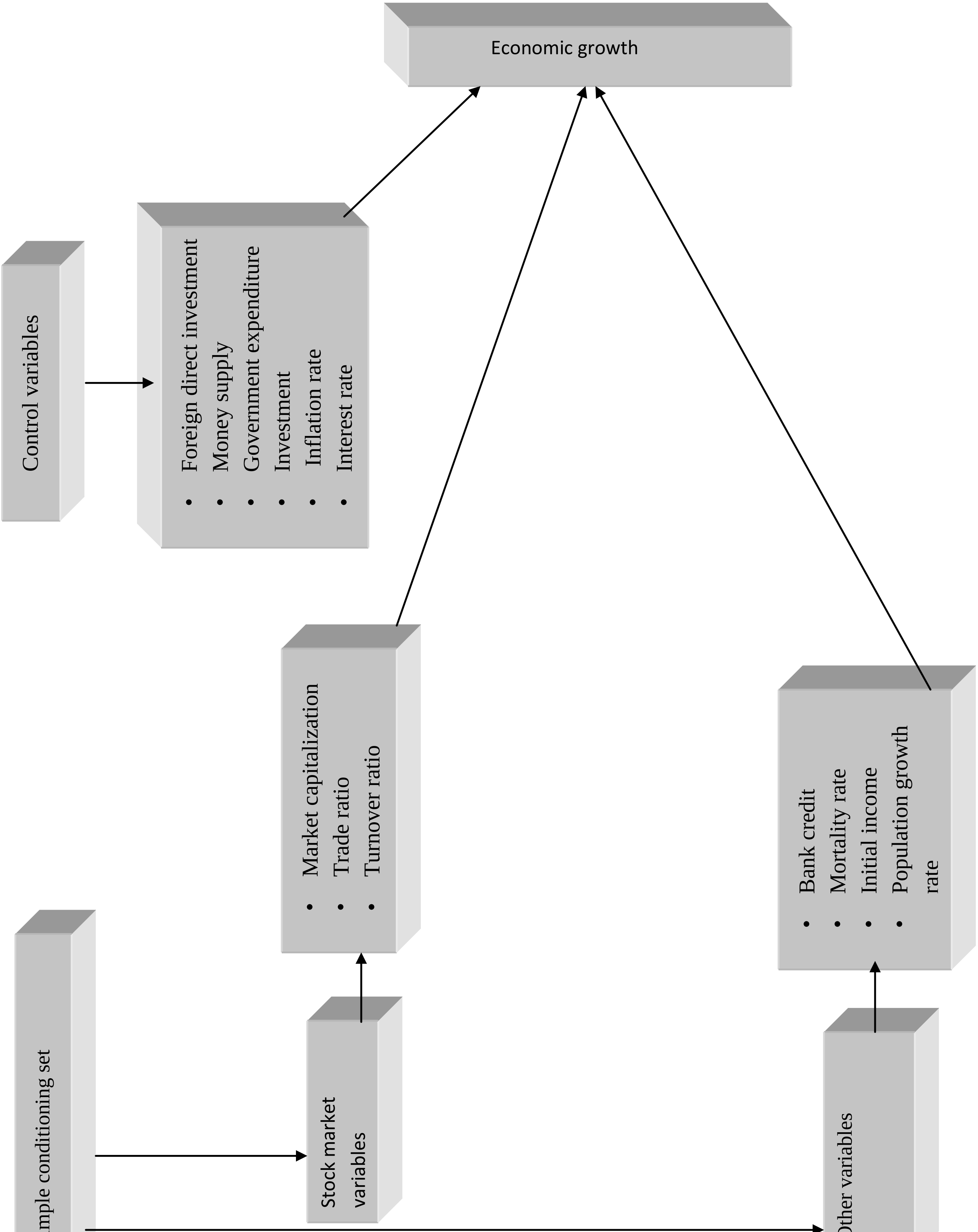


Figure 2.1 Theoretical Framework

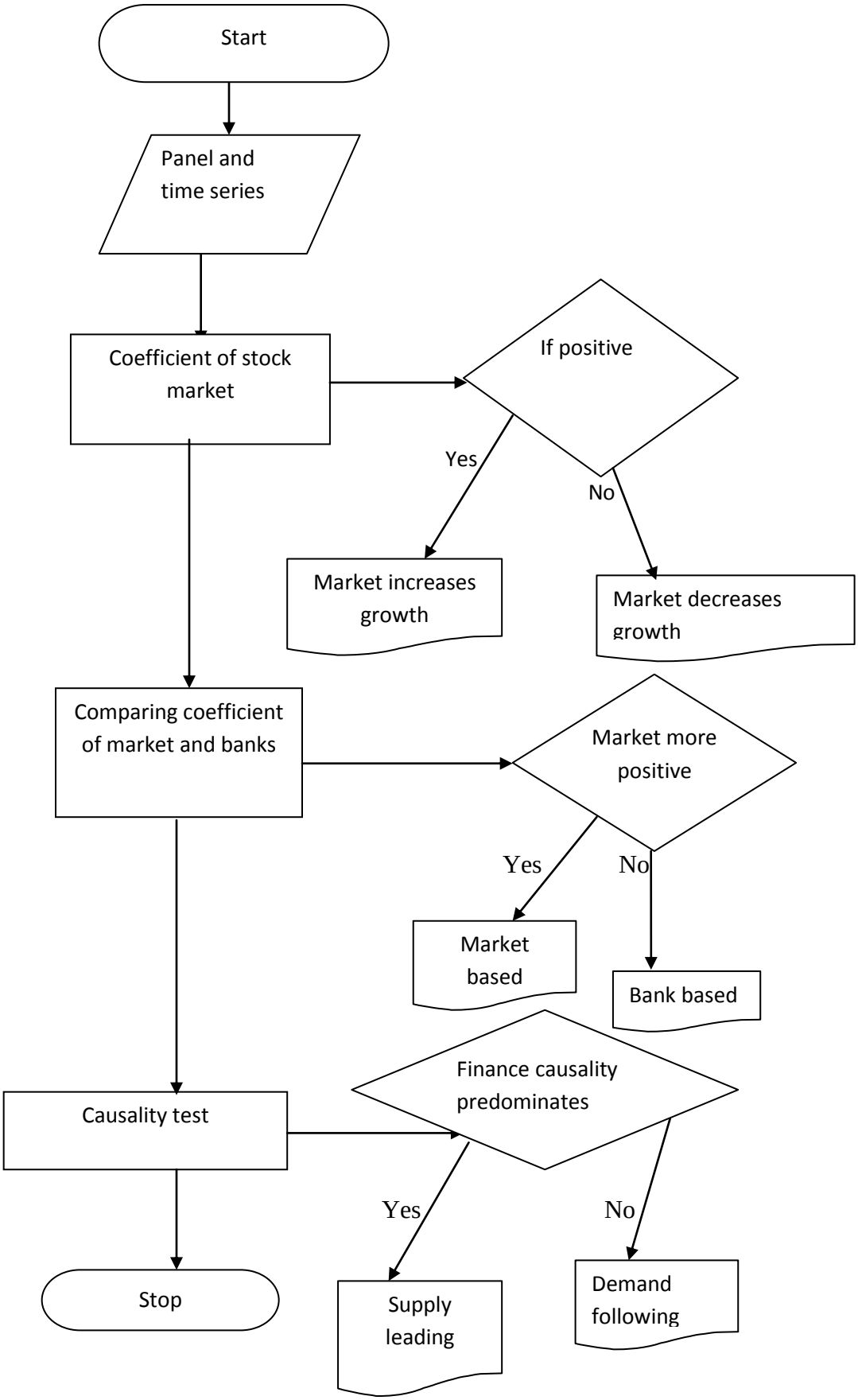


Figure 2.2 Flow chart of the Analysis

South Africa

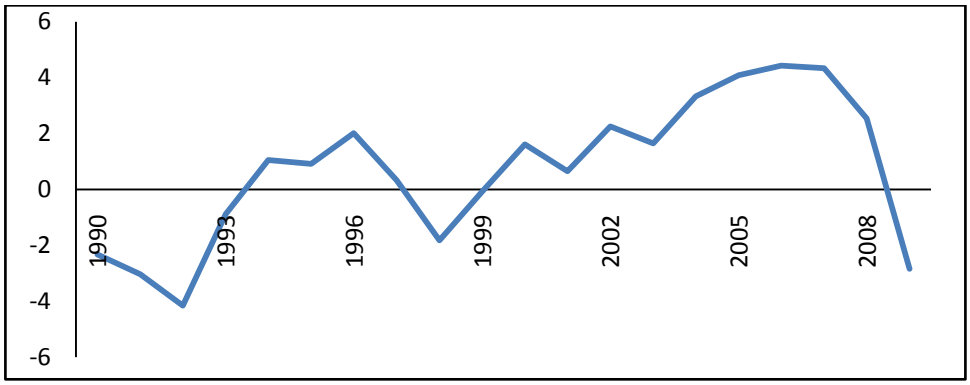


Figure 3.1.1
Economic growth

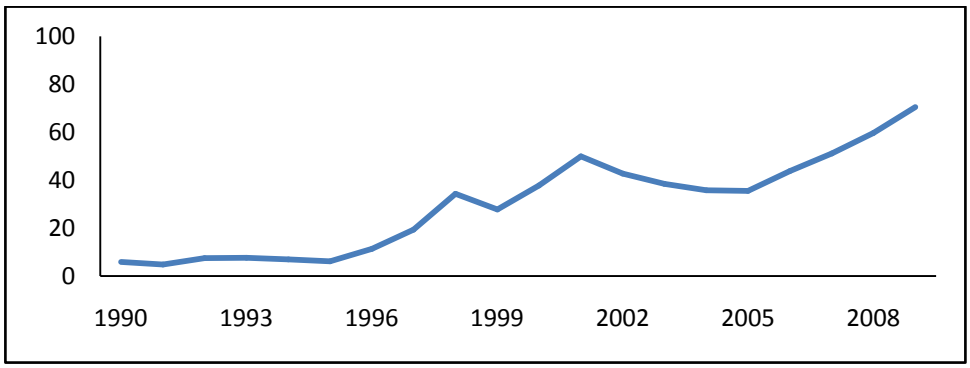


Figure 3.1.2
Turnover ratio

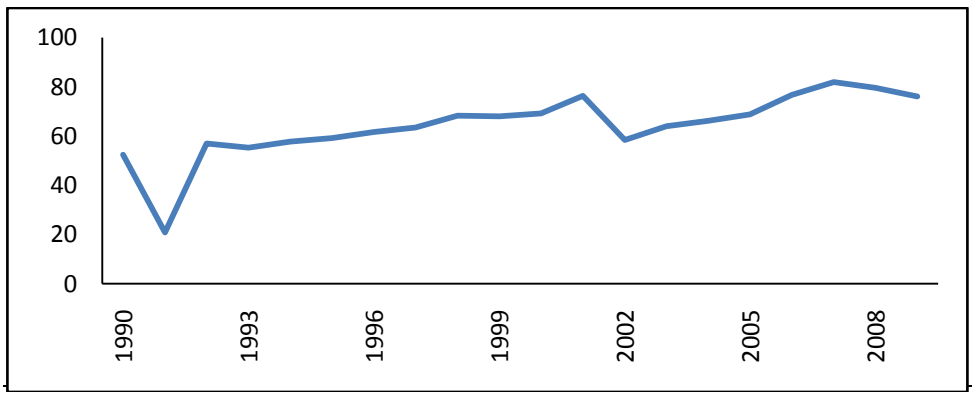


Figure. 3.1.3
Bank credit

Egypt

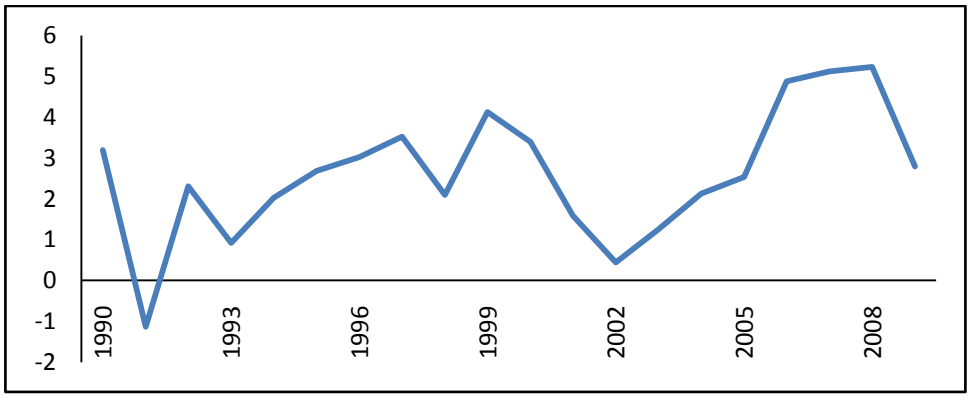


Figure 3.2.1
Economic growth

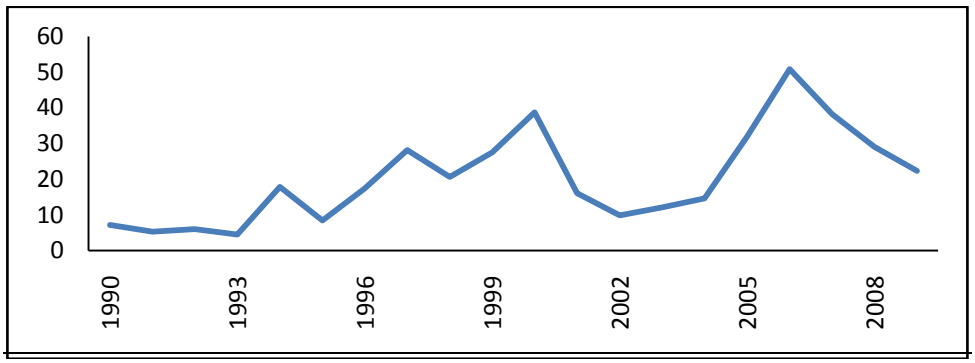


Figure 3.2.2
Turnover ratio

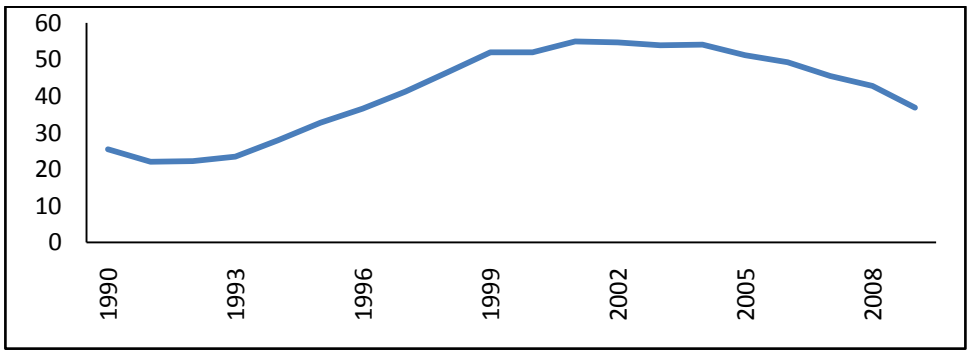


Figure 3.2.3
Bank credit

Morocco

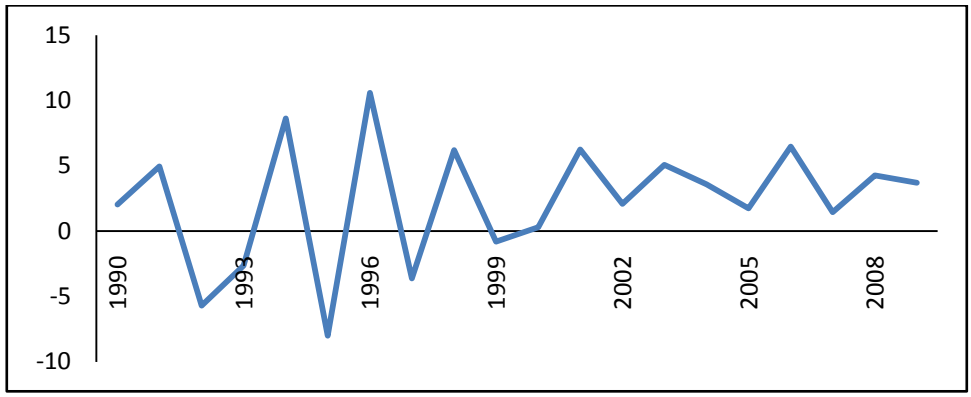


Figure 3.3.1
Economic growth

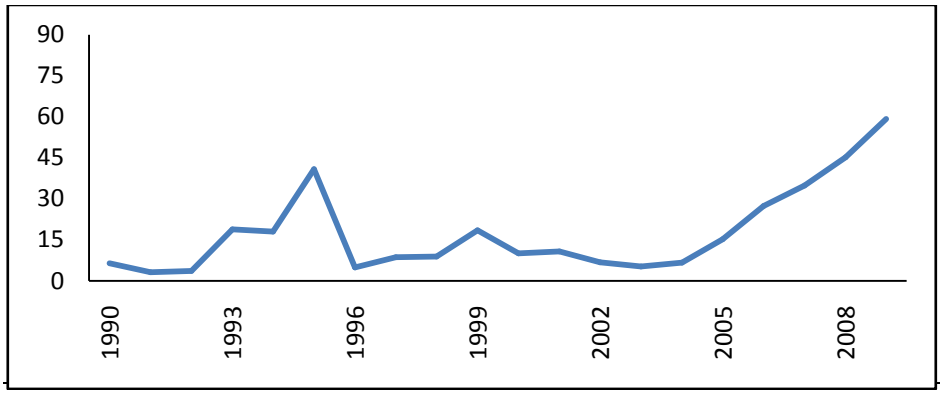


Figure 3.3.2
Turnover ratio

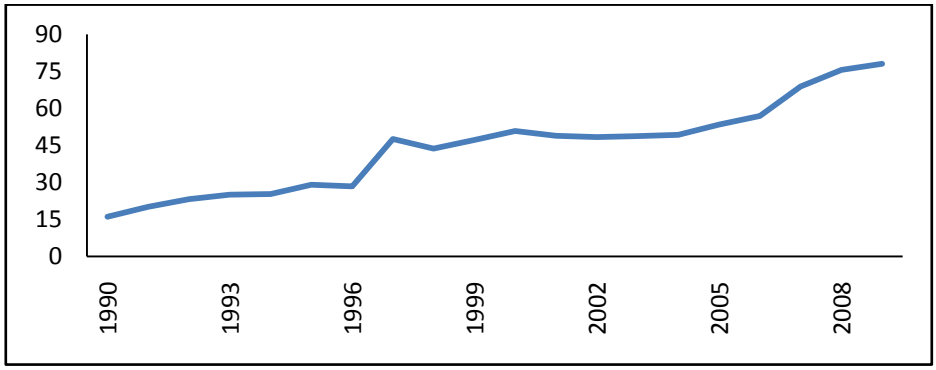


Figure 3.3.3
Bank credit

Tunisia

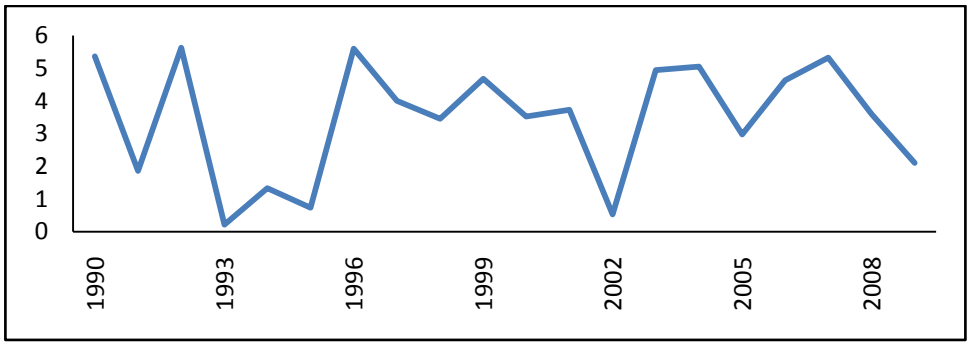
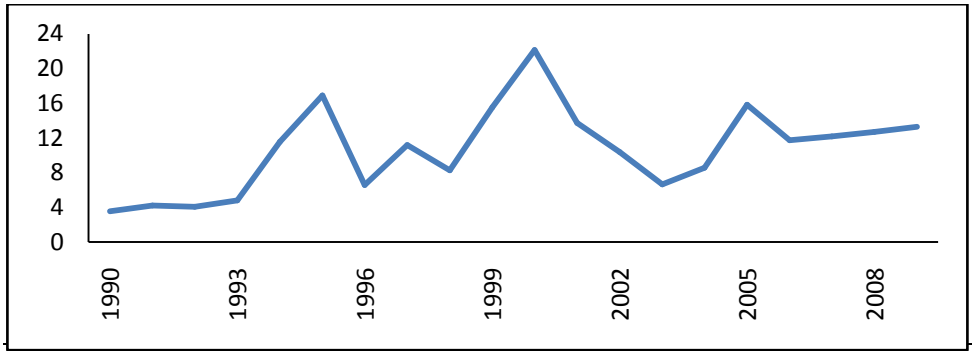


Figure 3.4.1
Economic growth



-Figure 3.4.2
Turnover ratio

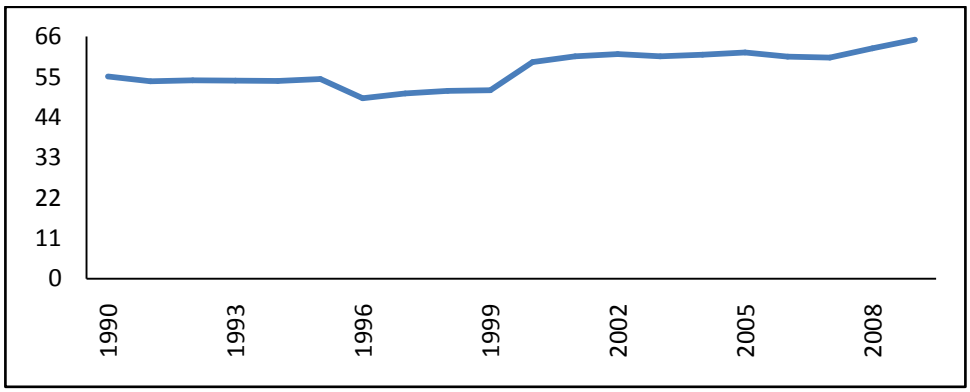


Figure 3.4.3
Bank credit

Nigeria

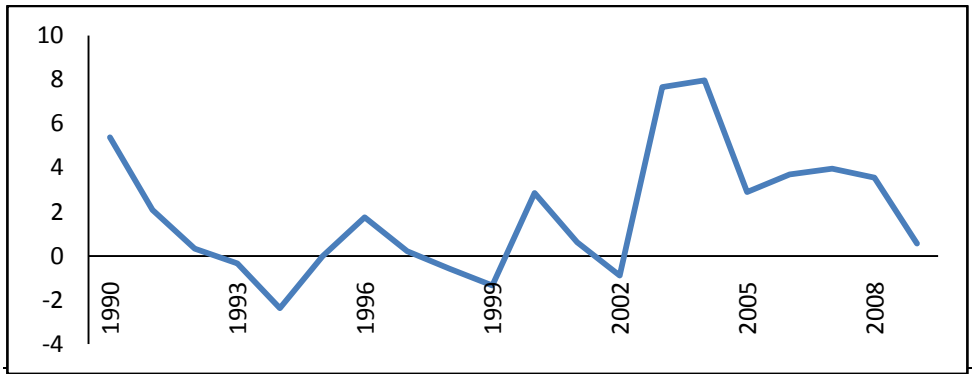


Figure 3.5.1
Economic growth

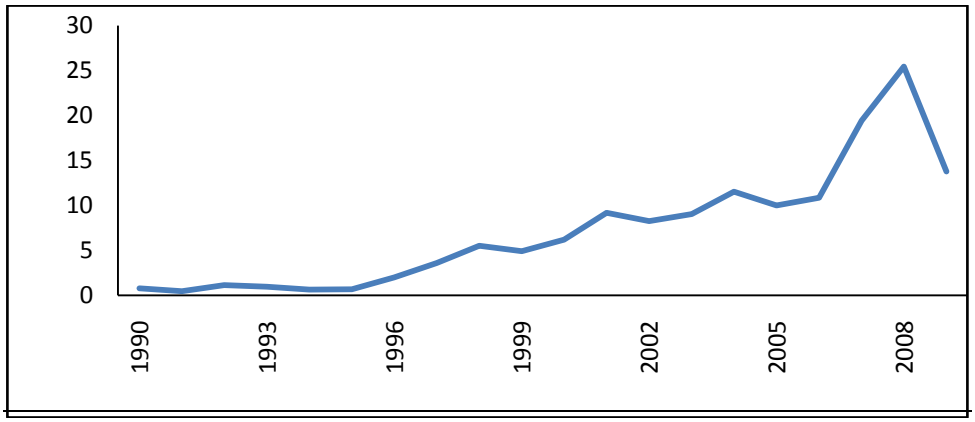


Figure 3.5.2
Turnover ratio

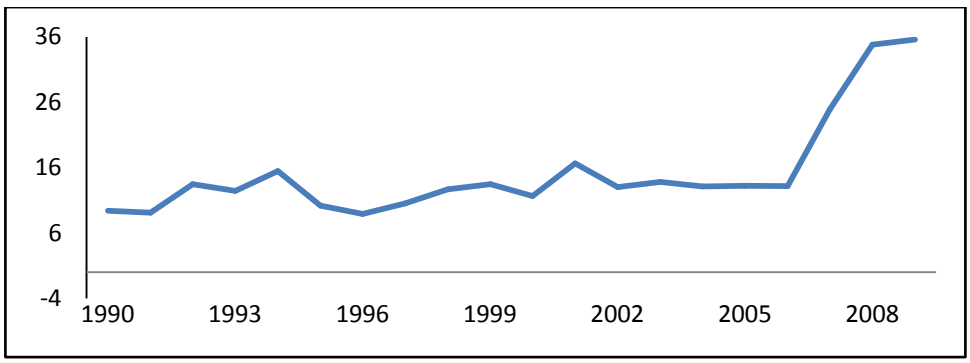


Figure 3.5.3
Bank credit

Cote D'Ivoire

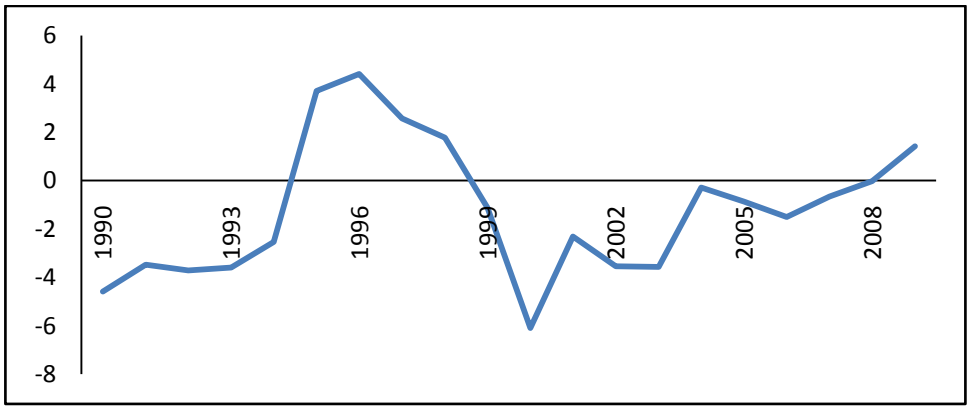


Figure 3.6.1
Economic growth

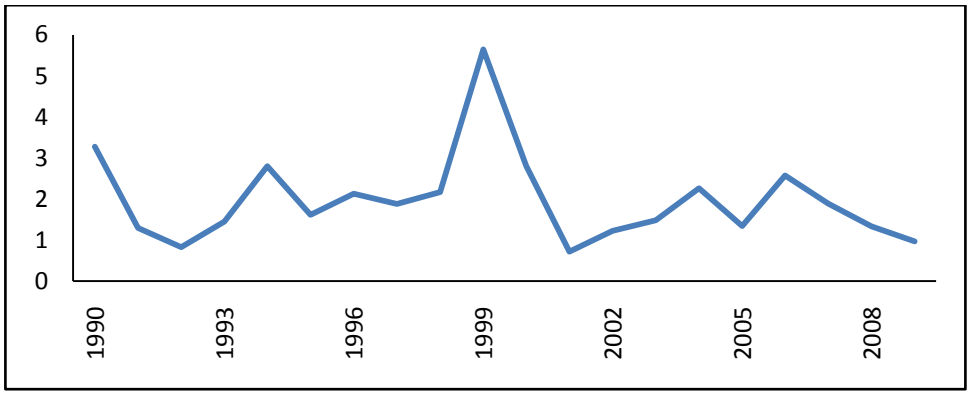


Figure 3.6.2
Turnover ratio

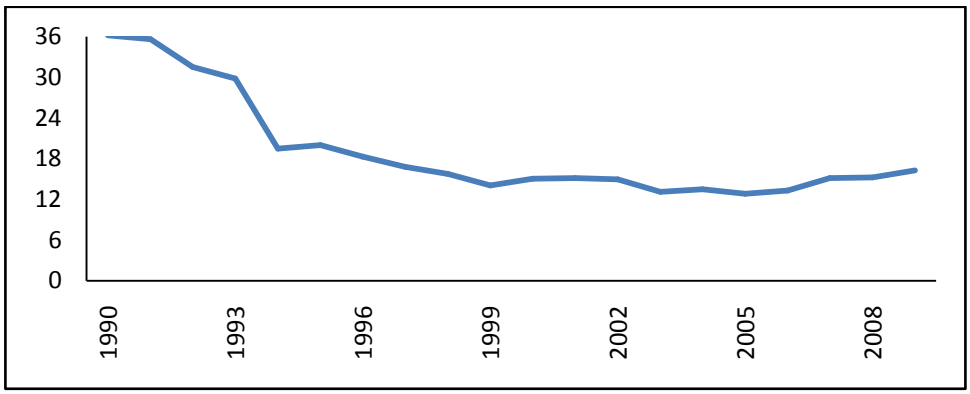


Figure 3.6.3
Bank credit

Ghana

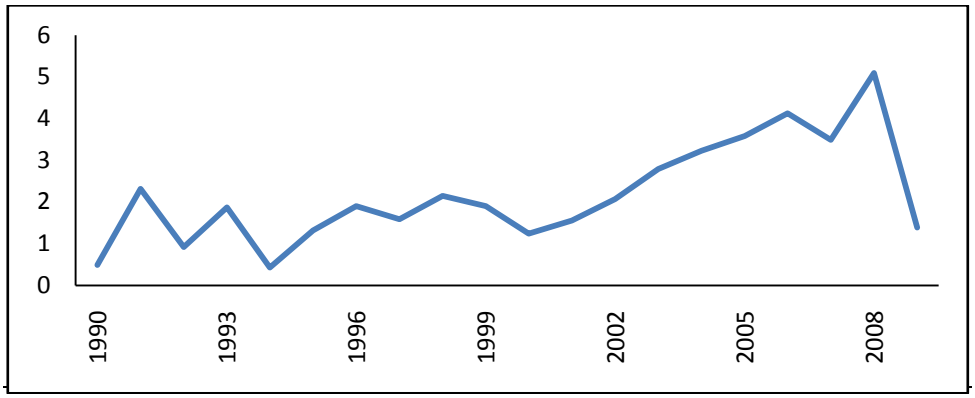


Figure 3.7.1
Economic growth

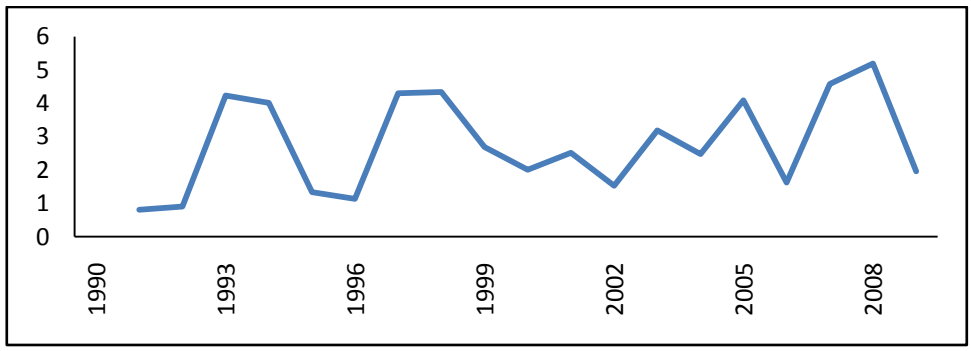


Figure 3.7.2
Turnover ratio

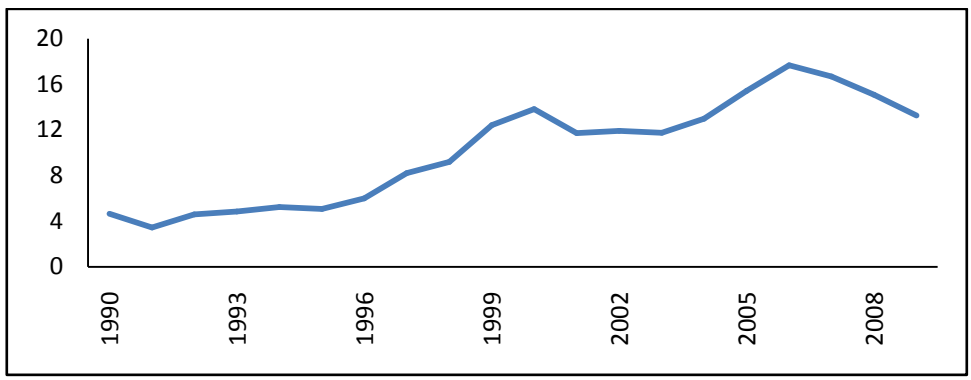


Figure 3.7.3
Bank credit

Botswana

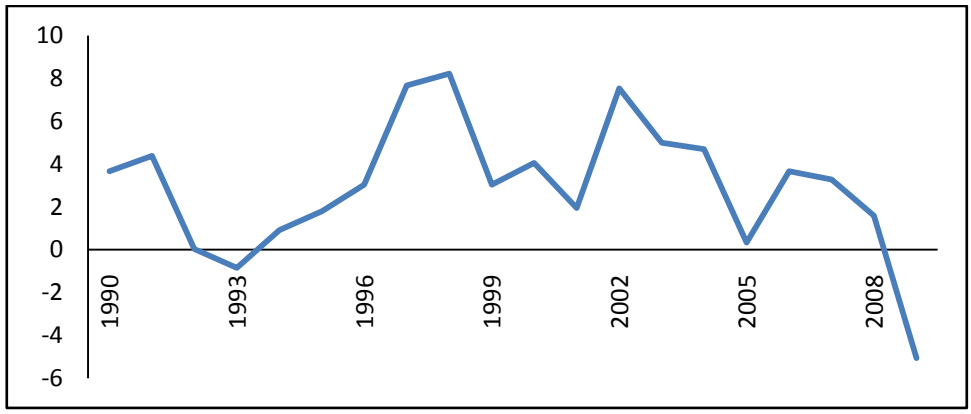


Figure 3.8.1
Economic growth

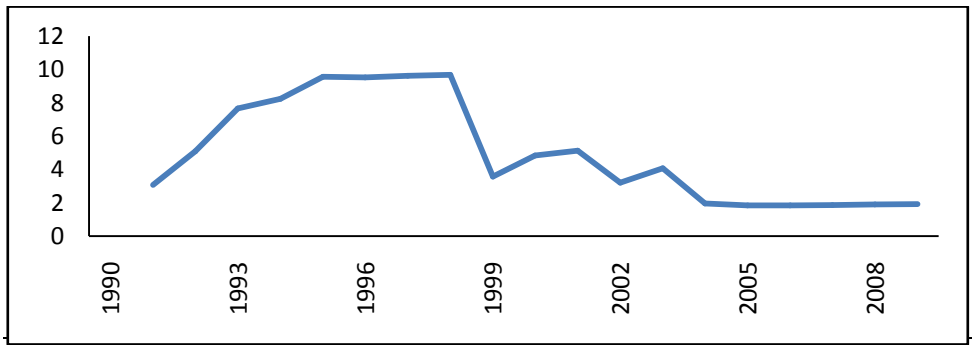


Figure 3.8.2
Turnover ratio

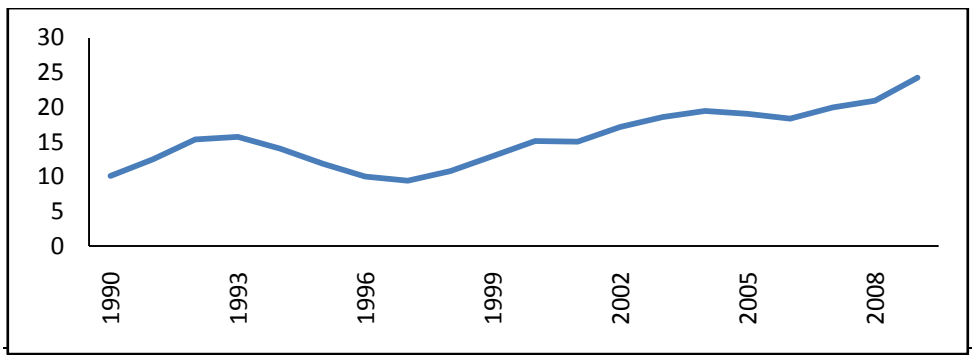


Figure 3.8.3
Bank credit

Mauritius

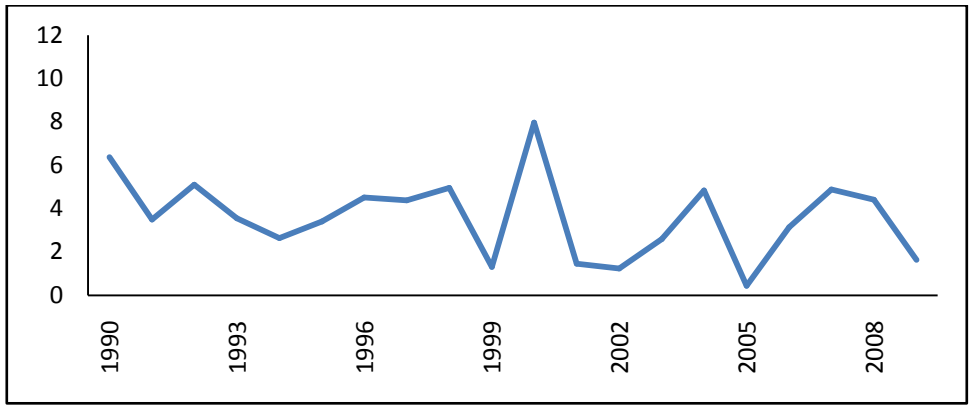


Figure 3.9.1
Economic growth

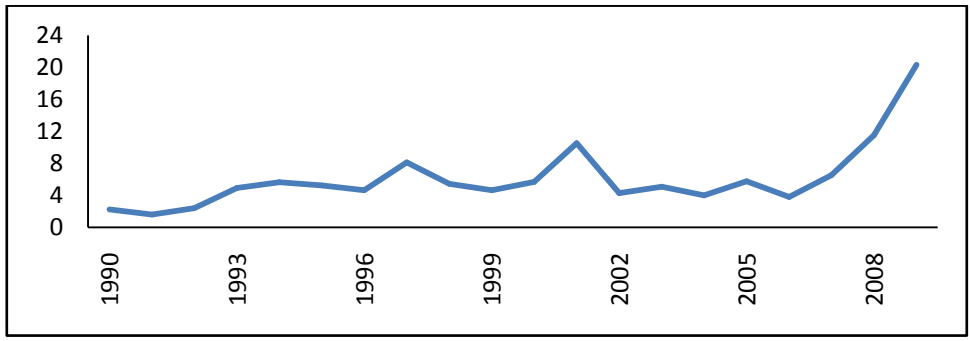


Figure 3.9.2
Turnover ratio

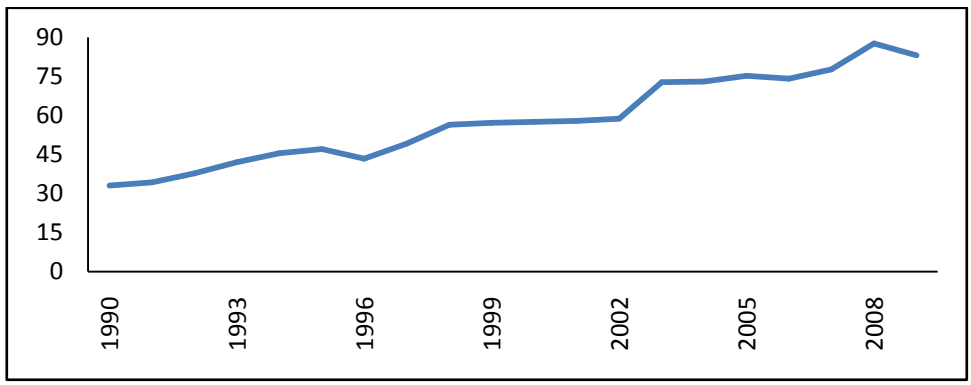


Figure 3.9.3
Bank credit

Swaziland

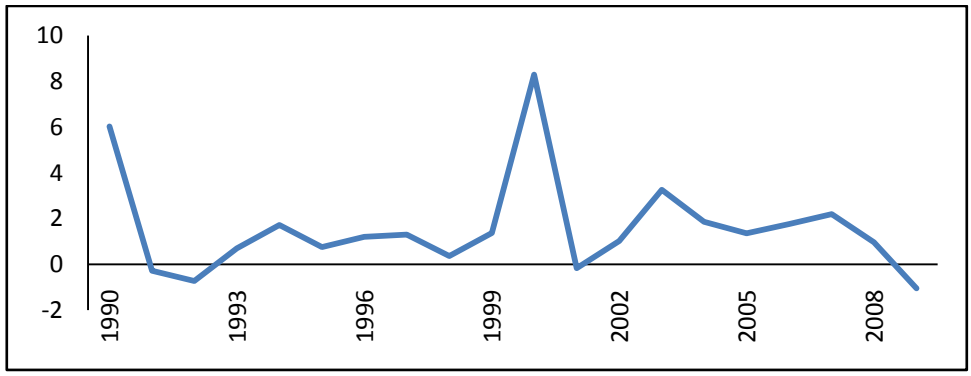


Figure 3.10.1
Economic growth

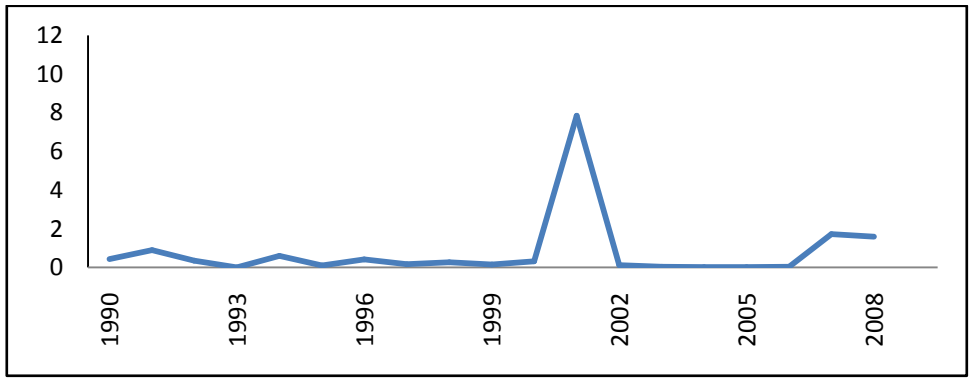


Figure 3.10.2
Turnover ratio

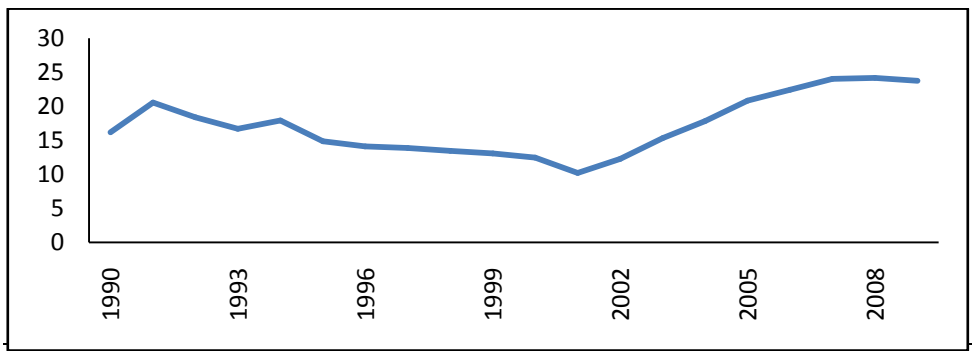


Figure 3.10.3
Bank credit

Kenya

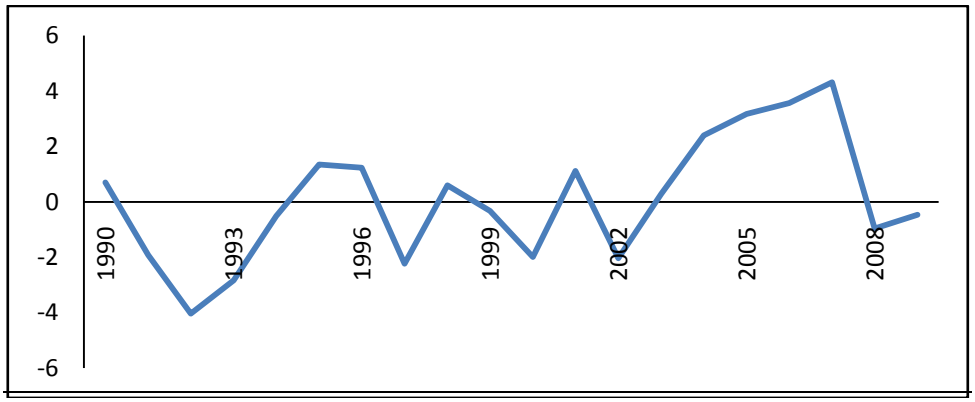


Fig. 3.11.1
Economic growth

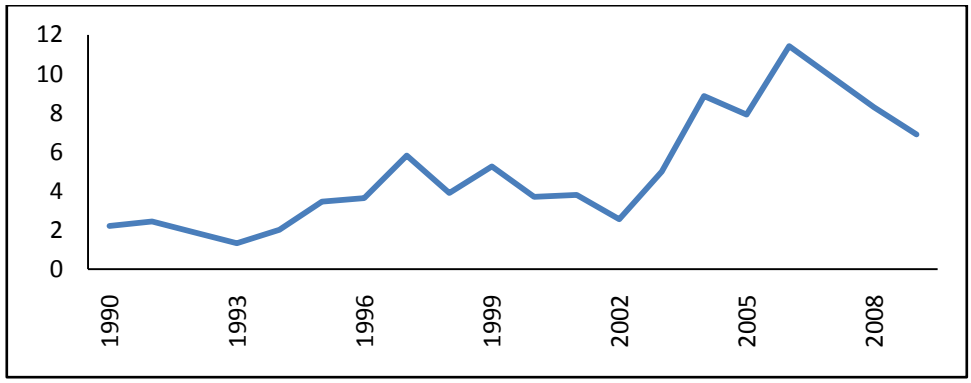


Figure 3.11.2
Turnover ratio

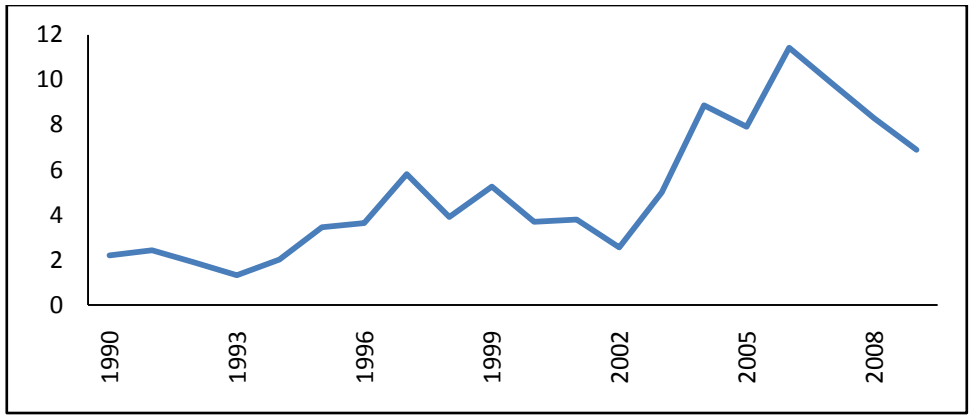


Figure 3.11.3
Bank credit