NEAR EAST UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
BANKING AND FINANCE PROGRAM

THE NEXUS BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN SOUTH AFRICA: EMPIRICAL EVIDENCE FROM GRANGER CAUSALITY AND ARDL BOUND TESTS

ZAYNAB MOHAMMED ALSUWEEE ASBEETAH

MASTER'S THESIS

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THESIS SUPERVISOR
ASSOC. PROF. DR. ALIYA ISIKSAL

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ACCEPTANCE/APPROVAL

We as the jury members certify that 'the nexus between stock market development and economic growth in South Africa: empirical evidence from Granger causality and ARDL bound tests' prepared by Zaynab Mohammed Alsuweee Asbeetah defended on ...../..../.... has been found satisfactory for the award of degree of Master

JURY MEMBERS

.....
Assoc. Prof. Dr. Aliya IŞIKSAL (Supervisor)
Near East University
Faculty Economics and Administrative Sciences
Department of Banking & Finance

.....
Assoc. Prof. Dr. Turgut TÜRSOY (Head of Jury)
Near East University
Faculty Economics and Administrative Sciences
Department of Banking & Finance

.....
Dr. Andisheh SALIMINEZHAD
Near East University
Faculty Economics and Administrative Sciences
Department of Economics

.....

Prof. Dr. Mustafa SAĞSAN
Director of Graduate School of Social Sciences

DECLARATION

I Zaynab Mohammed Alsuweee Asbeetah, hereby declare that this dissertation entitled ‘the nexus between stock market development and economic growth in South Africa: empirical evidence from Granger causality and ARDL bound tests’ has been prepared myself under the guidance and supervision of ‘Assoc. Prof. Dr. Aliya Isiksal’ in partial fulfilment of the Near East University, Graduate School of Social Sciences regulations and does not to the best of my knowledge breach any Law of Copyrights and has been tested for plagiarism and a copy of the result can be found in the Thesis.

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ABSTRACT

THE NEXUS BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN SOUTH AFRICA: EMPIRICAL EVIDENCE FROM GRANGER CAUSALITY AND ARDL BOUNDS TESTS

This study examines the dynamic relationship between stock market development and economic growth for South-Africa. The study relies on data spanning the period from 1975 and 2016, which was analysed using the Autoregressive-Distributed-Lag (ARDL) Bounds test. The ARDL model is used to estimate the coefficient in both the short and long run. Moreover, the Granger-causality test is applied to check the causality among the variables of interest. Very few studies have examined the dynamic contribution of stock market development on economic growth by using the ARDL and Granger causality tests for South Africa. The empirical results from the ARDL model for both the short- and long-run show that there is a positive and significant relationship traded stocks and economic growth. The study suggests that the short- and long-run causal drive of stock market development could enhance economic growth by channelling important resources raised via foreign investments. The study also suggests that policymakers in South Africa should consider developing policies that would attract and retain local investment in the country.

Keywords: ARDL, South Africa, development, GDP, Causality

ÖZ

GÜNEY AFRIKA'DA BORSA GELIŞIMI ILE EKONOMIK BÜYÜME ARASINDAKI ILIŞKI: NEDENSELLIK VE ARDL SINIR TESTLERINDEN ELDE EDILEN AMPIRIK KANITLAR

Güney Afrika'da mevcut borsa gelişimi ve ekonomik büyüme arasındaki ilişki: Granger nedensellik ve ARDL sınır testlerinden elde edilen deneysel bir bulgu Bu çalışma, Güney Afrika için olan borsa gelişimi ile ekonomik büyüme arasındaki dinamik ilişkiyi incelemektedir. Çalışma, Gecikmesi Dağıtılmış Otoregresif Sınır Testi (ARDL) ile analiz edilen 1975 ve 2016 yılları arasındaki verilere dayanmaktadır. ARDL modeli, kısa ve uzun vadede olan katsayısını tahmin etmek için kullanılmaktadır. Ayrıca, Granger nedensellik testi, çıkar değişkenleri arasındaki nedenselliği kontrol etmek için uygulanmaktadır. Çok az sayıda çalışma, Güney Afrika için ARDL ve Granger nedensellik testlerini kullanarak borsa gelişiminin ekonomik büyümeye dinamik katkısını incelemiştir. ARDL modelinin hem kısa hem de uzun vadedeki deneysel sonuçları, piyasa kapitalizasyonu, işlem gören hisse senetleri ve ekonomik büyüme arasında pozitif ve önemli bir etki olduğunu göstermektedir. Çalışma, sermaye piyasası gelişiminin çeşitli vekilleri arasındaki kısa ve uzun vadeli ilişkinin, yabancı yatırımlarla elde edilen önemli kaynakların yönlendirilmesi yoluyla ekonomik büyümeyi artırabileceğini göstermiştir. Çalışma ayrıca Güney Afrika'daki politikacıların ülkedeki yerel yatırımları çekecek ve tutacak politikalar geliştirmeyi düşünmeleri gerektiğinide öne sürmektedir.

Anahtar Kelimeler: ARDL, Güney Afrika, Geliştirme, GSYİH, Nedensellik

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ABBREVATIONS

GDP: Gross Domestic Product

TS: Traded Stocks

ARDL: Autoregressive Distributed Lag

OLS: Ordinary Least Squares

IDC: Industrial Development Corporation

JSE: Johannesburg Stock Exchange

D-W: Durbin Watson

PP: Philips-Perron

ADF: Augmented Dickey-Fuller

KPSS: Kwiatkowski-Phillips-Schmidt-Shin

MC: Market Capitalization

TS: Traded Stocks

SMD: Stock Market Development

CV: Critical Values

CHAPTER 1
INTRODUCTION

It is no longer contentious that there are links between financial markets and economic development, as economists since the time of Schumpeter in 1934 have proved theoretically and empirically that financial institutions are indispensable for facilitating technological innovation and economic growth (Beck et al., 2004; Azman-Saini and Smith, 2011; Aliero et al., 2013a; Anyanwu, 2014; Dimova and Adebowale, 2018). In this sense, unhindered financial intermediation between the surplus spending unit and the deficit spending unit through well-developed financial systems can channel resources to the most productive use, thus leading to the expansion of the economy (Zhang and Posso, 2017; Asogwa et al., 2018). In recognition of this, financial sector liberalisation swept emerging markets around the world, specifically since the early 1970s when there was a structural transition from a repressed towards a liberalised financial sector (Beck *et al*., 2004), which was driven by the realisation of the conceptualised benefits of financial sector deepening (Anyanwu, 2014).

There is an overwhelming body of literature supporting the critical role of financial markets in economic growth. At the macro-level, financial development is found to exert a strong positive influence on output, employment, economic-growth (Azman-Saini and Smith, 2011), and capital accumulation (Beck *et al*., 2010). Similarly, a number of studies on the microeconomic aspect have asserted that access to credit through microfinance institutions could enable poor and vulnerable households to strongly overcome liquidity constraints, making it possible to undertake

investments that can boost production, employment status, income and mental health (Okurut *et al*., 2005; Banerjee *et al*., 2015). Furthermore, increasing access to other formal financial services can stimulate savings and investments, smoothen consumption and empower women (Ibrahim et al. 2018). Thus, the financial sector has implications that connect micro-households with factors that determine long-term macroeconomic performance (Okurut *et al*., 2005). It is through this process that microfinance forms a bridge between microeconomic opportunities for individuals and the macroeconomic performance of the economy (Aliero *et al*., 2013b).

Financial development has become a key pillar of the policies established to promote inclusive development in the majority of countries around the world (Zhang and Posso, 2017). This emanates from the realisation that an inclusive financial system could be instrumental in the reduction of poverty and income inequality as well as a vehicle for promoting inclusive development (Banerjee *et al*., 2015). It is instructive to draw a conceptual demarcation between inclusive and exclusive finance. Inclusive finance occurs when individuals, regardless of their income level, have access to a wide range of the financial services needed to enhance their livelihoods (Ibrahim *et al*., 2018). Through inclusive financial systems, poor and vulnerable individuals are better disposed with an avenue to borrow and save, as well as invest in education, which allows them to build their assets and entrepreneurial ventures (Aliero *et al*., 2013b).

In contrast, financial exclusion refers to a process by which poor and disadvantaged social groups experience difficulties in accessing financial services (Wang and Guan, 2017; Ibrahim *et al*., 2018). A distinction thus needs to be drawn between those who are financially excluded due to barriers of access (for instance, lack of collateral or the ‘so-called’ hard-to-reach populations, including women and rural poor) and those who are excluded by choice (what is aptly referred to as self-exclusion). The latter situation may occur as a result of low financial literacy, which may lead individuals to perceive themselves as unsuitable, or due to their previous negative experience of financial services. These two extreme ends of the spectrum reflect the dichotomy between voluntary and involuntary financial inclusion. The

importance of financial inclusion can be drawn from the consequences of being financially excluded. Generally, financial exclusion can retard economic growth while also increasing poverty and inequality (Ibrahim *et al*., 2018).

While advanced economies have enhanced financial access and sustainable financial services like savings, credit, insurance and payment systems among others, in the majority of less advanced economies, the overwhelming proportion of adults still lack access to formal financial services, with only 34% of the adult population in Sub-Saharan Africa using formal banking services (Dimova and Adebowale, 2018). With a proportion of unbanked adults of 13%, this places South Africa as the country with the lowest rate of financial exclusion among the major African economies (Ibrahim *et al*., 2018).

The stock market is regarded to be one of the most important parts of a financial system, as it enables corporations to raise critical capital by issuing new stocks (Beck and Levine, 2004). Stock market stability is generally considered one of the key macroeconomic objectives because frequent volatility in key macroeconomic parameters has serious implications for the performance of an economy. Consequently, stability of the markets is highly important for sustained growth (Naceur and Ghazouani, 2007).

There is increased reliance on gross domestic product (GDP) as a crude measure of economic growth. The cost of all goods that are produced and supplied in the economy in a specific time-period can be observed, including individual consumption, paid-in construction expenses, private inventories and government procurements. An increase in GDP implies an increase in all the values of goods produced within the economy. Thus, this study aims to test and examine the correlation and causal relationship between stock market development and economic growth.

The motivation is to thoroughly explore the relationships using South Africa as a case study. South Africa as an emerging economy has a well-established, efficient and developed stock market, with a variety of instruments and sophisticated economic institutions, and it is the most industrialized economy in the whole of Africa. The stock market of South Africa was initially licensed in

the first-quarter of 1996, and by 2001, the South African stock market had become one of the most liquid capital markets in Africa.

It was reported in 2003 that the sum of the listed firms in South Africa had escalated to 500 firms, thus increasing the overall market capitalization to $182.6, with the regular value of monthly trading reaching $6399. Furthermore, in 2011, the Johannesburg Stock Exchange (JSE) had a market capitalization of $799.7 billion. During 2011, it emerged as one of the 17 largest stock exchanges in the world. Certainly, the Johannesburg Stock Exchange (JSE) is not only one of the largest but also one of the most efficient global stock exchanges. Additionally, in 1994, total per capita internal credit to the private sector expressed as a ratio of GDP was evaluated at 114%, while in 2011, it increased to 135% (Ndako, 2010).

While a vast proportion of the literature is unanimous and consistent regarding the benefits of financial development for individuals, households and the economy at large, one major area of contention is the ambiguity as to whether the poverty reduction effect of financial development can lead to a bi-directional causal effect. There are theoretical arguments that predict that the welfare enhancing drive of financial development will eventually trickle down to the poor and thus reduce income disparity (Beck *et al*., 2010; Anyanwu, 2014). While the existing macroeconomic literature has mainly focused on the role of financial development in economic growth, the themes of the microeconomic literature largely revolve around access to finance, income, poverty, welfare, and the comparative benefits of finance between males and females. However, studies on the finance-growth nexus in relation South Africa remain very limited. Against this background, this study explores the dynamic relationship between stock market development and economic growth, taking South Africa as a case study. To accomplish this objective, two traditional unit root tests in the form of the Augmented Dickey-Fuller (ADF) and the Philips-Perron (PP) unit root tests are employed in this thesis to check the stationarity and stability of the key time series variables. The Autoregressive distributed lag (ARDL) cointegration technique is applied while investigating the dynamic linkages concerning the variables in question in the long run. To analyse the direction

and the patterns of the causality among the key variables of interest, the multivariate VECM Granger causality test is employed.

1.1 Statement of the problem

Among all African countries, the South African stock market remains the largest, most advanced, most sophisticated and the most progressive. It has compared well with the stock markets of developed countries for many decades. South Africa has developed a well-established financial system and a competitive stock market, which has established the country in the top 20 financial markets in the world. The main question that this study aims to answer is whether economic growth can spur capital market development using the stock market development as a proxy. This question involves the determination of whether there is a causal relationship between financial development and economic growth?

1.2 Objective and significance of the thesis

The broad objective is to explore the relationship between financial sector development taking the stock market sub-sector (using indicators such as stocks traded and total value as a percentage of GDP) and economic growth. Moreover, the thesis aims to test the dynamic causal relationship between stock market development and growth.

The study fills a gap in the literature as it represents the first attempt to check the dynamic finance-growth relationship for South Africa by adopting both the ARDL approach and multivariate Granger causality tests.

1.3 Research Questions

The overall aim of the study is to systematically answer the following three broad questions:

Q1. Are there short-run and long-run relationships between the proxy of financial development and economic growth?

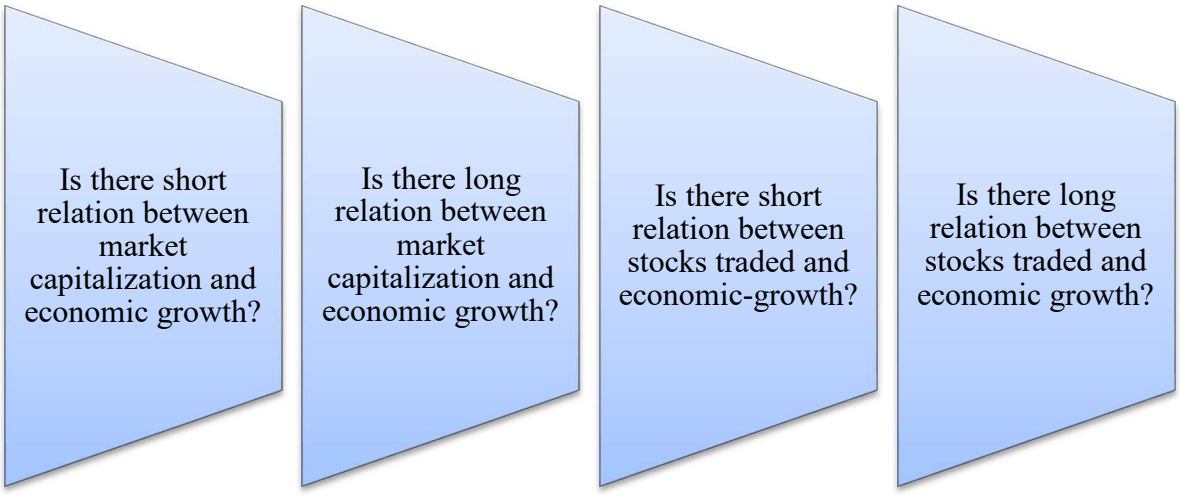

Figure 1: Questions model

Q2. Is there a causality running between the SMD indicators (such as market capitalization and traded stocks) and GDP?

Q3. Is there a reverse causality running between SMD and economic growth?

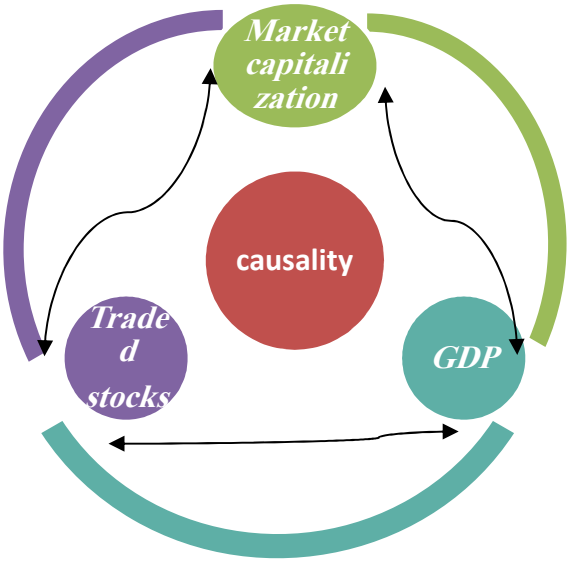

Figure 2: Variables of the study

1.4 Limitations and scope of the study

The scope of this thesis is limited to examining the influence of stock market development on South African economic growth. The time span is limited to 40 years spanning the period between 1975 and 2016.

1.5 Hypotheses of the study

The hypotheses tested in this study are as follows:

First main hypothesis: There are both short-run and long-run relationships between SMD and GDP.

- H1: • *There is a short-run relationship between market capitalization* GDP
- H2: • *There is a short-run relationship between traded stocks* GDP
- H3: • *There is a long-run relationship between market capitalization and* GDP
- H4: • *There is a long-run relationship between traded stocks and* GDP

Second Main Hypothesis: Finance-Growth causality.

- H5: • *Market capitalization Granger causes GDP*
- H6: • *Stocks traded Granger causes GDP*

Third Main Hypothesis: Growth-Finance causality.

- H7: • *There is a short -run causality between market capitalization and GDP*
- H8: • *There is a short-run causality between stocks traded and GDP*

1.6 Thesis structure

The rest of the thesis is arranged as follows:

1. *Chapter two*: contains a review of previous studies, as well as a theoretical and empirical review of the key variables in question.
2. *Chapter three*: includes a presentation of the treated sample and data used. The chapter will further introduce econometric models accompanied by a description of their variables. Lastly, the methodology of the thesis will be explained.
3. *Chapter four:* the results generated by estimating the econometric models and methodology introduced in Chapter three will be presented.
4. *Chapter five*: consists of a summary of the thesis, along with policy implications, suggestions and recommendations.

CHAPTER 2
LITERATURE REVIEW

2.1 South African economy

During the period between 1976 and 2016, South Africa experienced many changes in its economic structure; in this regard, South Africa started to introduce trade liberalization, which in turn led to an increase in exports, particularly non-gold exports, as well as an increase in import volumes. However, the increase in exports and imports in the country served as a key factor in the reintegration into the international economy (Bhorat and Westhuizen, 2013).

In fact, there are many factors that have led to the increasing volume of exports in South Africa in recent decades. Bhorat and Westhuizen (2013) indicated that currency deprecation played a significant role in the increase in the volume of exports, which in turn has positively affected the competitiveness of South African exports.

Figure 3 shows that the volume of imports exceeded the volume of exports around 2005. However, although there was an overall increase in both exports and imports, in 2009, there was a significant drop in the relative (imports and exports), which may be attributed to the 2009 financial crisis, given that the South African economy was sensitive to global economic movements.

On the other hand, Bhorat and Westhuizen (2013) indicated that there is a positive relation between international trade and GDP in South Africa, which can be attributed to the increase in imports and exports that financed the country’s growth cycle.

However, the average 3.3% per annum economic growth rate accomplished between 1994 and 2012, is significantly higher than the 4% average annual growth rate achieved between 1980 and 1993 (Faulkner and Loewald, 2008).

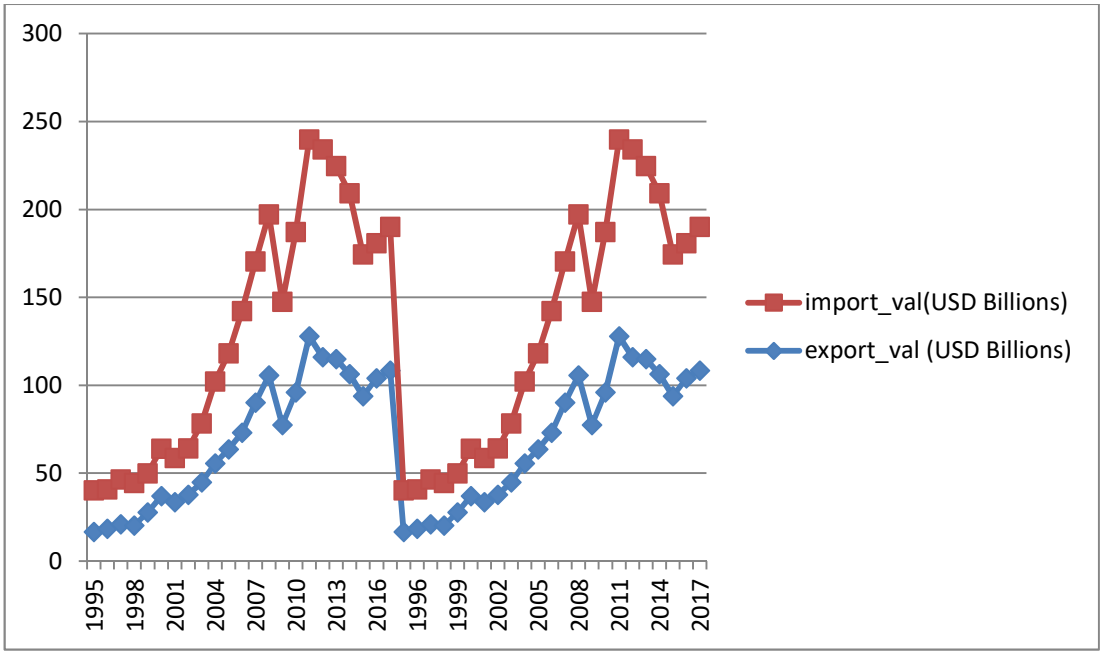

Figure 3: Trade including imports and exports in South Africa, Source: world bank

Levine and Zervos (1999) also stated that the stocks aid the investors in terms of any risk through assisting the corporation with the opportunity to hold asset portfolios. In this way, the diversification of risk also leads to the promotion of investment in higher-return projects and also leads to higher economic growth.

The stock market also stimulates economic growth through the normal supply of information concerning the corporations and the timeliness of the data that affect prices and the profits of shareholders, thus leading to enhancements in research and development, which further increases productivity and economic growth. However, Figures 4, 5 and 6 show that the per capita growth, traded stocks and the market capitalization of the listed corporation increased over the period spanning 1975 to 2016.

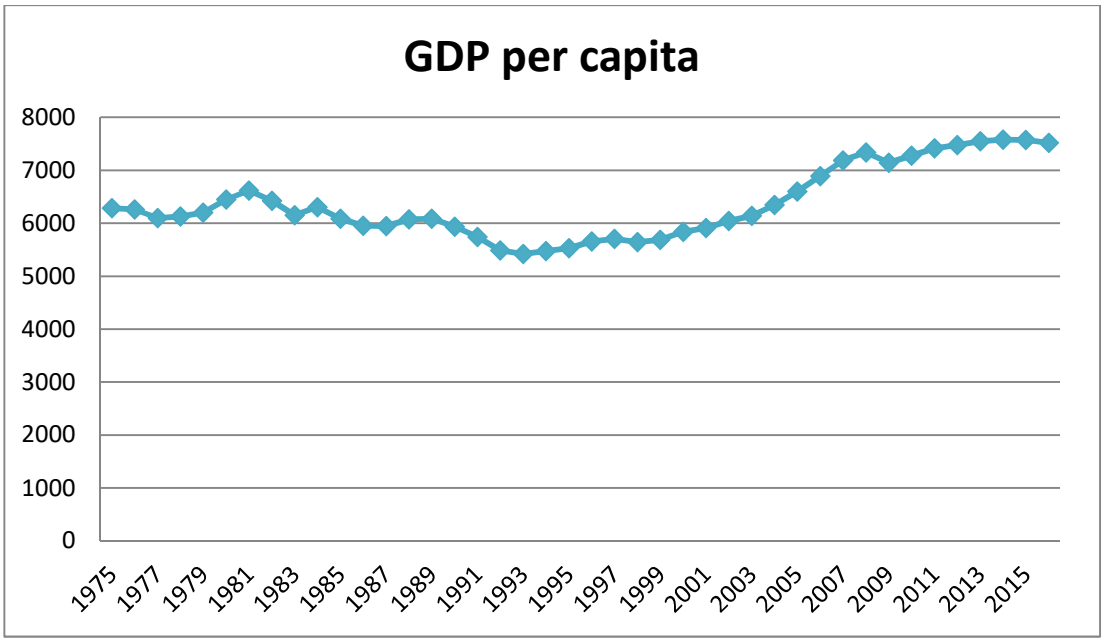

Figure 4: GDP per capita growth of South Africa. Source: World Bank.

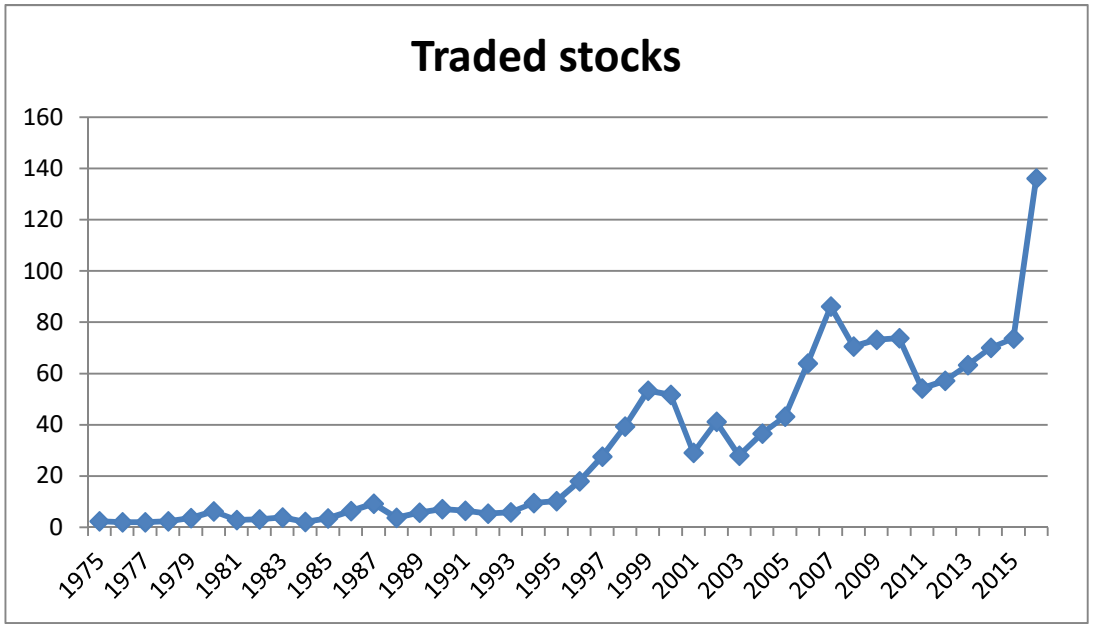

Figure 5: Traded stocks of South Africa. Source: World Bank

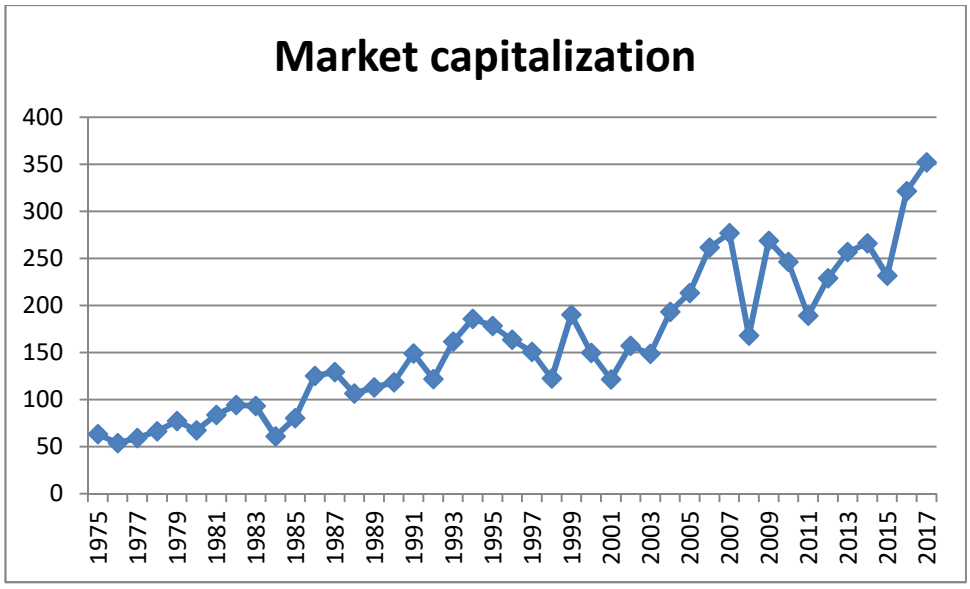

Figure 6: Market capitalization of the listed corporation (as a percent% of GDP) of South Africa. Source: World Bank

2.2. Stock markets and economic growth

2.2.1 Economic growth

Economic growth refers to an increase in the amount of goods and services that are produced in a given country. Economic growth in a given country is generally measured by using the gross domestic product, which is one of the most important, widely used and inclusive measures of national output. Regardless of who owns the resources, it takes the market value of all final goods and services that are produced in a given country during a specified period - generally one year. Economic growth can be measured by changes in the GDP; it measures the full economic output for the past year. GDP includes all goods and services that are produced in a specific period (Kuznets, 1955)

Morris (2004) identified that growth in the economy shows that the country is moving in the right direction, while a slowdown indicates that the country needs to evaluate the areas that are deficient. Denison (1962) argued that the growth of an economy can be observed by evaluating the GDP per capita or the real GDP. Economic growth implies an increase in living standards as well as the wealth of people living in the social order. People's wealth translates into an increase in their levels of consumption. Therefore, economic growth can be defined as having the aptitude and ability to produce goods and services. It is

argued that an increase in production capacity leads to a sustainable increase in income per person for a given country (Simon, 1986).

Based on the assessment above, economic growth can be defined as merely the increase in GDP that occurs annually within an economy, whether due to increases in aggregate demand and the supply of goods and services as can be observed in developed countries, or as a result of efforts associated with organized long-term restructuring and of the development of economic, technological and social structures. Economies around the world are divided into three specific categories: underdeveloped, developing, and developed countries. Hence, economists have to ask what factors cause the differences in various countries. Kaldor (1961) identified several advantages of economic growth. Firstly, economic-growth enables consumers to achieve higher levels of income. Secondly, economic growth helps to increase the employment rate and thus leads to a decline in the level of unemployment. Next, it helps governments to decrease borrowing by creating higher tax revenues, which in turn facilitates the improvement of public services such as education and infrastructure. Besides, economic growth can also help to protect the environment by making more funds available for focusing on environmental issues.

The most efficient path through which financial development can impact households robustly is identified as micro-credit. This is an innovative model developed to help marginalized poor households in remote areas through sustainable deepening to enable the rural poor to access modified financial services, who are generally excluded from the traditional banking system (Aliero et al, 2013a). The delivery of micro-credit is usually group based, which stems from using groups of households as an alternative option to the traditional collateral requirement as a micro-loan conditionality. This unique feature of collateral-free micro-loans distinguishes rural formal credit from the traditional credit offered in the conventional banking arrangement (Ibrahim et al. 2018). The idea behind this modelled banking system is to enable groups of individuals to form unions, such as cooperatives or societies, which would largely offset the risks associated with borrowers who lack credit history and collateral (Aliero et al. 2013b). Another form of group-based financing is the

self-help group (SHG) mechanism of pooling resources together and this revolves around the contributing members. In this sense, micro-credit delivery is somewhat appealing because it presents a new strategy for deepening livelihood diversity, which could substantially serve as a pathway to reduce poverty (Aliero et al. 2013a). Contrastingly, risks are not spread throughout a group in the individual lending model, rather the burden is placed entirely on the individual borrower (Ibrahim et al. 2018).

The micro-credit delivery model assumes that obstacles to livelihood diversity can be reduced through the provision of credit services to the vulnerable poor at an affordable rate. This is hypothesized to particularly serve as a pathway out of poverty because it could lead to increased well-being, equity and sustainability. Otherwise, society may experience a set of constraints that could spur civil strife and surge relative deprivation. There are different categories of vulnerable households primarily targeted by micro-credit institutions. Micro-credit institutions are mainly targeting clients in the middle pyramid. Households in this group are entrepreneurs and the self-employed poor with a minimum average income of $730 per annum.

The bottom of the pyramid indicates that more than four billion people earn up to $730 per year (Aliero et al. 2013a) whom are excluded from micro-credit services because they exhibit a high risk of credit repayment ((Ibrahim et al. 2018). This group of poor people includes the ultra-poor or destitute and poor labourers where the expectation of running sustainable livelihood diversification strategies is unrealistic (Aliero et al. 2013b).

Bagehot (1873) briefly discussed this issue in a vague sense. On the other hand, Robinson (1952) discussed that a relationship exists between financial development and economic growth, where the relationship flows in such a way that economic growth boosts financial development. The growth in the economy drives the need for financial tools and institutions, hence leading to their accrual. The school of financial repression was popular until the start of the 1990s. This school explains how the growth of the economy is affected by the development of financial systems. The founders of this school were Shaw and McKinnon (1973), who argued that the implementation of certain policies

such as the necessity to have high reserve ratios restricts the development of financial institutions. In turn, this affects the growth of the economy.

There are three main economic-growth theories, namely New Keynesian, Neoclassical and the McKinnon approach (Figure 7: Growth Theories)

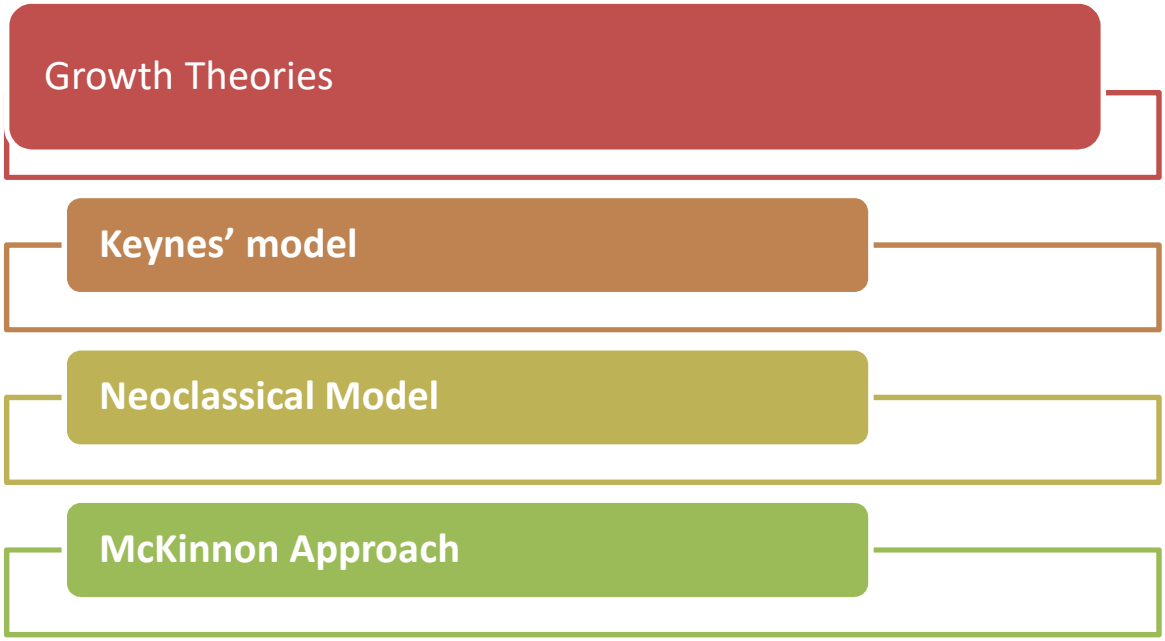

Figure 7: Growth Theories

2.2.1.1 Keynes' Model

This economic theory introduced a revolutionary school of thought to the macroeconomic debates. In his book entitled "The General Theory of employment, interest and money", John Maynard Keynes suggested that there are controversial relationships among the key macroeconomic variables. He advocated for active and direct government interventions in the economic affairs of the country as the best way of enhancing economic growth. This economic intervention through both contractionary and expansionary economic policies was aimed at encouraging investments and increasing production capacity in the economy (Keynes, 1937).

The traditional Keynesian theory is based on an attempt to attain a point of equilibrium between the aggregate supply and the aggregate demand. These two key variables jointly determine the level of inflation and growth. The theory suggests that the supply curve appears to be sloping straight upward and not a straight vertical line (Dornbusch and Fischer, 2001).

The implication was that any change in aggregate demand has an effect on both the prices of products and output. If the supply curve is vertical, it implies that any change in aggregate demand only has an effect on the prices, but has zero effect on the output (Dornbusch and Fischer, 2001). This position implies that several other factors come into play when determining the inflation rate in the short term apart from the aggregate demand. Inflation is equally influenced by other factors like the monetary policy, labour force and the cost of other factors of production.

The first model is called a Keynes' model, which is based on the principle that people or investors have some reasons to hold money: the first reason is that the people and the investors are holding money to cover their transactions. The second reason is precautionary, and the third reason is their trade speculative motive (Pradhan et al., 2016).

Keynes (1936) indicated that liquidity preferences would increase interest rates above the equilibrium level at full employment and income would decrease until the savings and investments equilibrium was maintained. Keynes also stated that, at this point, the best policy that could be followed to decrease the real interest rate would be to apply financial repression (Fry, 1989).

However, In Keynes' approach, the investment is specified and determined only by using the actual (i.e. real) interest-rate channel; thus, if the real interest rate increases, it will lead to a decrease in investment opportunities. Furthermore, this will result in a decline of savings at different stages of full employment. Restoring equilibrium will lead to a decrease in the total gross of output (Christopoulos and Tsionas, 2004).

2.2.1.2 Neoclassical model

The second approach is called the neoclassical model. According to the Neo-Classical growth theory, financial markets are only able to raise the saving rate, thus per capita national income can be increased. However, this increment will not be permanent. Although the increase in saving rate leads the level of GDP (per capita) to rise, however the does not grow in the long run. Therefore, the neoclassical growth approach does not explain sustainable growth. In contrast,

endogenous growth models such as Rebelo (1990) allow long-lasting per capita income growth rate via increments in aggregate savings as well as technological progress.

The Neoclassical theory, as championed by Tobin (1965) and Mundell (1963), convincingly explained how inflation in an economy relates to the growth of output without consideration for the excesses in the demand for products. Mundell (1963) particularly suggested that an increase in inflation or a mere expectation of its increase leads to an immediate decrease in the level of people's wealth. He attributed this decrease in people's wealth to the balancing off on the people's rate of return on real money (Schultz, 1990). In response, people resort to saving in assets and increasing the price levels of their assets and products. Consequently, this lowers the interest rates. An increase in savings translates into the accumulation of capital and increases the rate of capital growth. Tobin developed Mundell's (1963) assertions by suggesting that inflation causes people to transform their money into assets that can generate more interest. Thus, inflation results in positive economic growth.

The two economists "Tobin and Mundell" made the assumption that investment is a substitute for the balance of real money. This assumption leads to the conclusion that an increase in inflation and a decrease in real money balance returns will force people to substitute their real money with interest-generating assets. Since such assets constitute capital, this switching results in an accumulation of capital, which consequently leads to economic-growth. Therefore, there is a direct linear correlation between inflation and real economic growth (King and Rebelo, 1989)

Stockman (1981) presented a contradictory approach that leads to total disagreement with the conclusions of Mundell and Tobin. In Stockman's opinion, the two variables complement each other in a way that leads to an inverse relationship between the two key variables in question. He argued that a decrease in the purchasing power of money balances leads to a decrease in purchases of both capital and consumer goods. Consequently, inflation leads to a decrease in output at a steady level. Therefore, Stockman concluded that inflation has an inverse effect on economic growth.

2.2.1.3 McKinnon approach

The third approach was proposed by McKinnon (1973). This approach concentrates on different sides of the influences on rising interest rates. McKinnon (1973) criticized both the assumptions of Keynes' and the neoclassical approaches, while arguing that capital markets are competitive with a single interest rate that regulates and sets the markets.

McKinnon focused on the linkage between investment and deposit rates. However, his approach is based on how the finance is improved or increased. In McKinnon's outside money approach, finance is raised internally (Zaman et al, 2012).

McKinnon stated that fragmentation in the factor markets provides the initial motivation for the pressure of government interventions, which in turn causes incredibly complex distortions in commodity prices. Thus, with an explicit policy aimed at improving the operation of factor markets, government interventions in commodity markets may be prevented, which means that carefully considered liberalization in all sectors can move forward. Since fragmentation in the capital market causes the misuse of other factors of production, labour and land, capital market liberalization is the key overall issue (McKinnon,2010).

At this point, McKinnon characterized the fragmented state of the capital market as the state in which the processes of saving and investment are not specialized, and each entrepreneur provides labour, makes technical decisions, consumes, saves, and invests by himself. Thus, his utility maximizing level depends on his endowment, his own productive or investment opportunity, and his market opportunities for external lending or borrowing over time. When these components are badly correlated, existing capital is misallocated, and so a fragmented capital market occurs (Jung,1986).

McKinnon suggested that the banking system is the intermediary, and emphasized the role of efficient bank lending in the enlargement process of the real size of the monetary system, as well as in alleviating financial repression, which he defined as the poor performance of organized bank lending that is related to regulated interest ceilings and collateral requirements. Since usury ceilings on the interest rates charged on bank loans by public intervention do

not cover the administrative costs and potential default risks inherent in small-scale lending, the ability and willingness of commercial banks to serve small-scale borrowers are restricted. Furthermore, the available finance flows to completely safe borrowers whose reputation is known or whose collateral is relatively riskless, and the result of this process is further inequality in the distribution of income (Pagano, 1993).

To overcome financial repression and its negative effects, McKinnon suggested loans at high real interest rates, but in larger quantities and for longer terms. However, in an economy with high and unstable inflation, such as underdeveloped economies, this strategy may be nearly impossible. The reason for this is that the real interest rates are likely to be depressed to negative levels by this inflation. At this stage, serious deflation may occur, which will increase the demand for money by controlling the money supply and raising nominal interest rates. Such a deflationary policy encourages people to acquire cash balances and to reduce their demand for commodities, thus increasing competitiveness and the real size of the banking system (Fry,1980).

McKinnon (1973) opined that the liberalization of stock markets allows for financial deepening, which is a reflection of the increased use of financial intermediation by savers and borrowers.

2.2.2 Stock market development and economic growth

Conceptually, stock market development refers to the interplay of factors and policy initiatives in an economy so as to influence a change in financial intermediation and the performance of stock markets. Various reasons have been suggested regarding the core importance of stock market development (Adjasi, 2007)

For instance, Demirguc and Levine (1996) posited that financial development is critical for the availability and accessibility of funds in an economy. They further argued that a sound financial system results in the efficient allocation of capital and significant moves towards risk diversification. Consequently, the level of stock market development is synonymous with the ability to mobilize savings and allocate funds towards projects with a significant capacity to

generate high returns. It is inevitable that financial systems are an important element of an economy.

This asserting is supported by growing concerns around the world in regard to the increasing complications that are being experienced in the financial sector. A particular notable event was the stock market crash that wreaked havoc towards the end of 2015. Levine (1993) contended that emphasis should be placed on the importance of stock market development, arguing that the resultant outcome towards economic growth is significantly positive and substantial. There are numerous indicators that can be used to evaluate the level of financial improvement.

These pointers include soundness, access, and size of the financial system. Financial development indicators also extend to corporate activities and the performance of banks, financial institutions, and bond markets. Thus, it can be deduced that the availability of financial services moves in a parallel direction with the level of stock market development.

Benefits attributed to stock development are not limited to high returns for less risk, but also aid in eliminating market frictions that are posed by information asymmetry. This is essential because information asymmetry tends to hinder the level of financial development (Antzoulatos, 2008)

Levine (1991) stated that stock markets help the investors to avoid risk by providing corporations the opportunity to reduce risk through holding portfolios of assets. In this way, the diversification of risk also leads to the promotion and enhancement of investments with higher-return projects and also leads to higher economic growth rates. Furthermore, the existence of various equity ownership contributes to strengthening political stability, which in turn further enhances growth.

Stock markets stimulate economic growth as a result of the constant provision of information concerning the corporations and timeliness of the data that affect the prices of stock and profits of shareholders, thus leading to enhancements

in research and development, which further increases productivity and economic growth (Levine, 1991).

However, the financial system has five important functions in the economy. Firstly, it facilitates the exchange of goods and services. This is the most basic function of financial systems that allows the economy to grow and it must include a type of exchange platform. The way in which the financial sector affects the economy is through facilitating a shift in the type of technology systems have the ability to either increase or decrease economic growth via regulating the innovations in a certain country. Financial markets can reduce shocks and turn investments into specialized and productive initiatives. In this way, technology advances and the economy is able to reap its benefits by growing (Levine,1991).

Furthermore, the financial sector has the ability to increase or decrease the amount of money that is available for investments. The economy is driven by the number of investments that are critical for promoting economic growth. Financial systems are able to ensure that it is possible to conduct transactions in an economy. The existence of platforms that facilitate the receipt and payment of transactions ensures that information and transaction issues can be managed. Consequently, the financial sector enables growth, innovation and specialization in addition to services and goods. By increasing innovations in the financial sector, the information and transaction issues are greatly reduced (Levine, 1993).

The second role of financial institutions is linked to two types of risks: the risk of liquidity and individual risk. The first type of risk is based on the fact that most investments that are profitable need to hold capital in the long term. Most people are not willing to lose control of their savings for extended periods. Financial institutions allow people to avoid shocks that impact liquidity, which means their savings are projected to be more productive.

The second type of risk is linked to the uncertainty associated with projects. It is not possible to predict whether a project will ultimately be beneficial. The existence of such risks creates the need for the financial sector, as people can change their capital worth directly or indirectly. The aforementioned risks are

also related to countries, regions, industries, firms and projects. Financial institutions help to reduce risks by offering services for diversification. Through this, they inspire people to save more while increasing the resource allocation abilities (Levine ,1991).

Thirdly, financial systems have the ability to decrease moral risks. Financial institutions and particularly banks have the ability to ensure that loans are given to the right people and their usage is maximised. The screening systems in most financial institutions are rigorous and by making sure that the system is not compromised, capital is protected. The level to which creditors and stakeholders can efficiently influence and monitor how institutions use their capital and make managers maximize the value of a firm significantly affects the utilization, allocation, and decisions that govern how savings are made. Financial institutions have to ensure that they implement effective corporate governance mechanisms. Corporate governance is essential as it elevates a company's efficiency in regard to the utilisation and allocation of resources. Additionally, it increases a saver’s willingness to fund innovation and production ventures. However, some people oppose this argument, and large believe that corporate governance can be strengthened through a number of engaging mechanisms including competition in the market, insolvency threats, corporate control in the market, activism that is shown by investors in an institution (pension funds and banks) and creditors (holders of bank bonds) (Levine, 1991).

Fourthly, the allocation of funds as well as the provision of information related to probable investments. This role of financial systems is connected to their ability to obtain information regarding which projects are available at the time and which are feasible. It gives financial institutions the ability to invest in projects that are profitable and whose risk can be greatly reduced. People that save money at an individual level cannot easily process and acquire information on conditions in the market, managers and firms, as the costs are high. Thus, it is not possible to discern which investment will provide them an acceptable return on their capital. Financial institutions are able to reduce the cost of information through capitalising on economies of scale as well as specialization. More information also helps to identify which technologies are

more efficient for production and the investors who have the highest likelihood of successfully initiating new processes of production and packaging goods. Stock markets also play a significant role in generating information about various companies (Levine,1993).

Fifthly, mobilizing people to save as a way of acquiring capital from a number of savers so as to obtain capital for investment is relatively difficult. Information and transaction issues have to be overcome during the savings process. The presence of financial systems in a country helps to increase the willingness of savers to put their surplus cash into financial institutions. The existence of an insurance structure at the government level helps to facilitate this particular function of the financial systems. Financial systems that have the ability to encourage people to save promote economic development in the country in the financial sector, taking advantage of the economies of scale and augmenting savings. By implementing projects that are indivisible, financial systems that are able to obtain savings from large numbers of people are able to diversify as they are can venture into projects that are risky (Khan et al., 2000).

Many extant empirical and theoretical studies have examined the causal relationship between financial system development and economic growth. In the theoretical area, economists try to determine whether the impacts of the financial development are economically large and they also investigate whether the financial sector fosters and supports economic growth. One of the first economists to discuss how the financial system in a country can affect economic growth was Schumpeter (1911), who identified that the financial system affects growth because it determines which resources are released to firms so as to enable productivity and push for innovation. Due to this, financial institutions play an essential role in the development of the economy by facilitating the development of innovations.

Gurley and Shaw (1955) argued that developing countries are less efficient than developed countries and the amount of total savings is not sufficient in such countries. Thus, they depend on capital inflow for economic growth. Many

less developed countries try to repress the financial sector by decreasing the interest rate regulations.

Calderon and Liu (2002) offered an opposing view regarding the effects of financial development on real economic growth and stated that the contribution of the financial markets to the occasional relationship in developing countries is stronger than in advanced economies, where the less developed countries have a wide area in the financial deepening and economic-growth relationship. In contrast, this relation is negatively affected in developed countries. The economic and financial improvement can be positive and significant in the middle-income countries, while the high- and low-income countries are not robustly related.

Arcand et al. (2015) suggested that investors always strive to sell their assets and dispose them off before prices in the market continue to go down. This is very detrimental to an economy as it leads to a lack of confidence, which may cause the weakening of the economy to continue. Therefore, the price bubble will ultimately burst, leading to finance turmoil and economic crisis. Arcand et al. (2015) researched the impact of financial systems on real growth by using different data and methodology and found that a small or a medium sized financial system will contribute to the growth of the economy and obtains a high return by providing credit. In addition, economic growth may be negatively affected when the financial depth reaches 80% - 100% of GDP.

This effect is likely to make the allocation of resources go down. If a person has no credit, then they will not be eligible to obtain a loan. Cecchetti and Kharroubi (2012) emphasized that large finance is not good for economies due to the fact that financial systems negatively affect the economy.

Rajan and Zingales (1998) stated that reducing the external finance from firms and easing the establishment of productive firms lead to long-run growth. They also suggested that inadequate financing methods lead to foreign companies being preferred over domestic firms. They also suggested that the sophisticated financial markets and banking systems have a greater ability to provide credits that are needed from industrial sectors.

Graff (2001) referred to four groups of possibilities when discussing this relationship. He first cited that there is no relationship between economic growth and financial development. Graff (2001) reinforced his proposal by stating that advancements are pushed by historical processes. The second possibility is that the economic growth causes developments in the financial sector by creating shifts in the market as well as having effects on financial institutions. The third possibility is that the causal relation flows from financial development to economic growth. The final possibility put forward by Graff (2001) is that financial development could have a negative effect on economic growth. This last possibility is suggested because there are some financial systems that are not stable.

Beginning with Goldsmith's (1969) work, scholars have attempted discover the direction of the causality between financial improvement and economic growth since when the direction of this relationship is known, it is possible to apply correct policies to advance economic development. However, despite the fact that numerous observational investigations have been conducted thus far, the direction of the causality remains uncertain.

In the accompanying part, theoretical examinations researching the conceivable direction of the causality between financial improvement and economic growth will be inspected. This causality is categorised into two theories, as argued by Patrick (1969). They are "supply-leading theory" and "demand following theory". Subsequently, numerous studies have extended this view by investigating the various relationships between finance and growth with the advancement of new techniques of analysis. In these outcomes, while several investigations have discovered bidirectional relations, others have suggested that there is no connection between financial development and economic growth as four distinct perspectives.

Finally, several studies exploring the conceivable connection between economic growth and development have discovered a bi-directional connection between them (Blackburn and Hung, 1998: Greenwood and Jovanovic, 1990; Demetriads and Hussein, 1996). Development of the money related markets is a costly procedure. In other words, the ability to maximise profits among savers

and investors through money related organizations and instruments requires significant funds. While wealthier nations have sufficient assets to meet the spending requirements, poor nations do not possess the fundamental resources to allocate to money-related markets. For this situation, Greenwood and Smith (1997) expressed that in poor nations, advancement in the monetary markets occurs after financial development. Afterwards, the creation of money-related frameworks advances the monetary development process.

From one perspective, money-related administrations improve the capital gathering and distribute it to the most effective return ventures. Then again, savers may win the most elevated return and broaden their risk, as money related administrations gather and examine data for potential undertakings instead of shareholders. At the point when the general salary level expands as a result of the promotion of monetary extension, budgetary administrations achieve their development level. For this situation, competition among budgetary specialist co-ops raises the effectiveness of the money related administrations. In this manner, supporters of the bi-directional connection express that both the budgetary framework and financial development cause each other.

Thus far, the conceivable causal connection between finance and development has been examined in terms of four distinct perspectives. The reasons clarifying this uniqueness emerge from contrasts in regard to the structure, administration, effectiveness, and profundity of nations' money-related frameworks. Accordingly, it is important to clarify this relationship by examining the reasons why a causality exists and the channels through which finance influences economic growth. In this regard, the following hypotheses are developed:

2.2.2.1 Supply leading hypothesis

The first hypothesis is the supply-leading, which is based on the assertion that financial development causes economic growth,. In other words, there is a positive impact on economic growth through the supply channel of financial services provided by financial intermediary corporations.

In this hypothesis, financial services include the lower cost of investment information and advice and alternatives, which provide a preferable allocation of resources by savers and the people or investors who would have other opportunities from which to select and invest in more profitable alternatives or projects, which will support and enhance economic growth (Peia and Roszbach, 2015).

Many scholars in the field of economics advocate for the supply-leading theory by expressing the fact that financial development prompts economic growth. This speculation has been upheld by numerous free-market thinkers (for example, see McKinnon, 1980: Fry, 1978: Gupta,1984: Levine et al., 2000). As indicated by this view, it can be determined that deliberate constitution of the monetary organizations and markets raises the supply of budgetary administrations and therefore advances financial development (Calderon and Liu, 2002).

The budgetary foundations may cultivate financial development which is attributable to two essential channels. One of these channels expands the effectiveness of capital accumulation implying that the minimal profitability of the capital increases. The other channel influences saving rates subsequently investments in the economy are affected (Al-Yousif, 2002). In other words, money-related improvement expands the saving rates and the proficiency of the ventures, which subsequently facilitates monetary development.

Patrick (1966) expanded this view by concentrating on the commitment of the budgetary framework to innovative ventures. Concerning his view, the budgetary framework helps to exchange sources from traditional segments to innovative areas; along these lines, businesspeople are spurred to embrace increasingly creative and risky investments as they can discover reserves effectively. In accordance with this view, King and Levine (1993a) additionally stated as per their endogenous development hypothesis that an improved monetary framework can trigger advancement and efficiency, and subsequently advances financial development. Rajan and Zingales (1998) furthered this conjecture by examining nations' growth processes. They

proposed that financial growth may prompt a decrease in the costs of outside finance for firms, and in this way, it significantly affects monetary exercises. Their studies demonstrated that nations that have created financial frameworks likewise have further developed modern areas as these types of ventures require vast capital infusions.

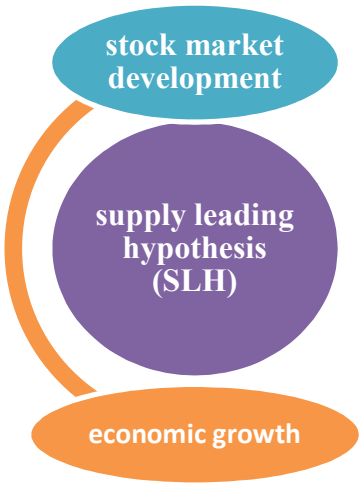

Figure 8: Hypothesis of Supply leading (SLH)

2.2.2.2 Demand following hypothesis

The second hypothesis is known as the demand following hypothesis (DFH), A large number of economic analysts have supported the supply-leading theory and expressed that financial advancement prompts economic development. This speculation is bolstered by numerous conspicuous market analysts, such as McKinnon (1980), and Levine, Loayza and Beck (2000). As indicated by this view, it could be determined that purposeful constitution of the money-related foundations and markets raises the supply of monetary administrations and, hence advances financial development (Calderon and Liu, 2002).

The money-related foundations may cultivate monetary development through two essential channels. One of these channels expands the effectiveness of raising capital, implying that the peripheral efficiency of the capital increases. The other channel influences saving rates which impacts investments in the economy (Al-Yousif, 2002). In other words, monetary advancement expands the saving rates and the proficiency of the ventures, which consequently leads to advanced financial development.

Patrick (1966) extended this view by concentrating on the commitment of the budgetary framework to innovative ventures. In regard to this view, the money-related framework helps to exchange sources from traditional segments to innovative ventures; in this way, businesspeople are propelled to embrace increasingly creative and risky investments as they can discover reserves effectively. In accordance with this view, King and Levine (1993a) likewise stated, as indicated by their endogenous development hypothesis, that enhanced money-related frameworks may initiate advancement and profitability, and thus advance financial development. Rajan and Zingales (1998) likewise add to this thought by examining the nations' growth processes. They proposed that money-related improvements may prompt a decrease in the costs of outside finance for firms, and in this way, it significantly affects monetary exercises. Their examination demonstrated that nations that have created money related frameworks similarly have further developed technology divisions as these types of ventures require immense capital pressures.

Levine (2005) argued that this economic growth (GDP) leads to acceleration of stock market development through the rising demand for financial securities and instruments, which expedite improvement and development of the financial system. Levine (2005) confirmed this hypothesis based on his conclusion that increasing the number of projects need more financial resources.

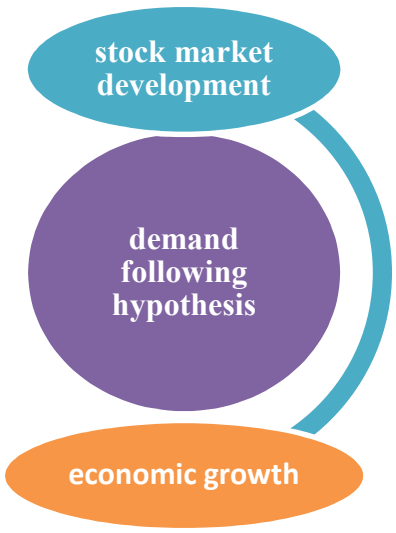

Figure 9: Demand following hypothesis

2.2.2.3 Feedback hypothesis

The third hypothesis is called the Feedback hypothesis (FH), which indicates that the linkage between stock market development and economic-growth is represented as reciprocation (Hristopoulos and Tsionas, 2004; Odhiambo, 2009).

It shows that when a country is still at a depressed level in terms of growth rates the stock-markets are underdeveloped, but once growth starts to occur, the stock market is improved, causing it to surge. Therefore, growth supports and enhances stock market development. This hypothesis argues for the existence of a causality from SMD to GDP. In the summary of SLH is based on SMD causes economic growth to rise.

The second one is called the 'demand-following-hypothesis', which is based on the postulation that there is a causality running from economic-growth to stock development. The third one is based on the assumption that there is a 'bidirectional causality (see Beck and Levine 2004; Odhiambo, 2009).

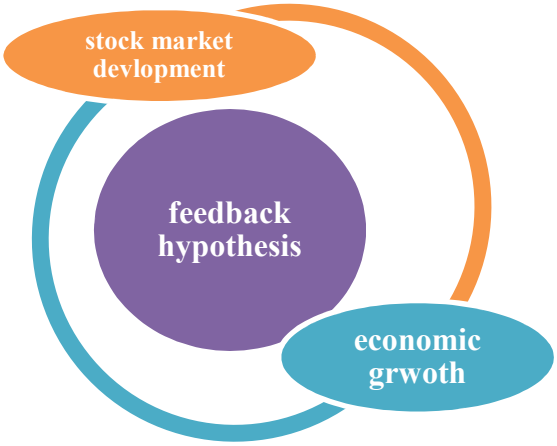

Figure 10: Feedback hypothesis (FH)

2.2.2.4 Neutrality hypothesis

Finally, several economists have contended that the financial framework does not impact economic growth, while on the other hand they express that the money related market is not a basis for financial development. They reflect this distrust in the monetary framework by disregarding it in their financial improvement models (Chandavarkar, 1992). Additionally, early development models centre around factor collection, human capital and physical capital as

motors of development. However, these sources show unavoidable losses and in the long run, the financial development depending on these elements would stop. In this situation, long-run financial development can be supported by exogenous technological development. Nevertheless, the conventional neoclassical perspective on development additionally proposes that finance is not significant for financial development (Allen and Oura, 2004). This model for the most part centres on the technological development brought about by factor aggregation, and later advancement which advances further innovative improvement. Nevertheless, developing nations that have limited capability to raise capital must expand these resources to encourage growth, where financial development may play a role.

2.3 Empirical evidences

Odedokun (1996) examined the impact of financial development on economic growth using longitudinal data from 71 less developed countries for the period 1960-1980. The data was analysed via panel ordinary least squares and the study found that financial development increases economic development at a rate of approximately 85%. Another key finding revealed that the significant impact of financial development on growth is relatively more robust for less developed countries than those that are developing.

Arestis and Demetriades (1997) used time-series analysis and Johansen cointegration tests to examine the United States and Germany. They observed that development in the banking sector affects economic growth, while there was no strong evidence of such an effect for the United States; however, GDP contributes significantly to both the banking sub-sector and the stock market sub-sector.

Levine and Zervos (1996) used a VAR model to explain the linkage between the development of the stock market in Japan and its GDP. Their outcomes indicated the presence of a linkage between the stock market development and several economic variables, namely inflation rate, industrial production, and interest rates. Therefore, an increase in GDP led to increased development of the financial market in Japan, which was measured using the capital market.

Rousseau and Wachtel (2000) studied the dynamic impact of stock market development on economic growth by employing annual data of 47 countries for the period spanning from 1980 until 1995 and used the panel VAR technique to overcome econometric problems. They contended that stock markets can provide the necessary capital and information for large investment projects by encouraging international portfolio diversification and flows to increase economic performance. The results of their study are consistent with the channels observed above. In addition, the study emphasized the importance of liquidity in market improvement and per capita income.

Gupta (1984) investigated the effect of SMD on economic growth for 14 Latin American countries and Asian countries by using the Granger causality test. The findings of the study confirmed that financial deepening robustly led to economic growth.

Kemal et al. (2007) conducted an interesting study on the dynamic nexus between financial development and real economic growth for 19 advanced economies (also called high income countries). The panel data span from 1974 until 2001. It is noteworthy that the authors used four distinct indices and indicators of financial development, which included: nominal currency plus demand and real interest bearing liabilities of banking sector and other financial linkages divided by real national income; oft-used private sector credit expressed as a ratio to real GDP; the indicators of capital market performance including the stock market capitalization, which was expressed as a ratio to real GDP. Similar to extant studies, real per capital GDP was used as a proxy of economic growth. To eliminate the potential bias emanating from endogeneity, the authors incorporated some sets of control variables often used in the literature related to the stock development discourse. Different estimators ranging from panel OLS, GMM, fixed and random effect were used and the results indicated a significant positive correlation among the variables in question. The findings are consistent with the supply following hypothesis literature. Similarly, Caporale et al. (2009) examined the finance-growth nexus for 10 new EU members. The results showed that stock market development led to economic growth without any feedback.

Calderon and Liu (2003) used the Granger causality test for 109 economically advanced and economically backward countries with a data set spanning a period of 43 years. They used the traditional indicators of financial development, such as the ratio of M2 to GDP and credit to the private-sector as provided by formal financial intermediaries expressed as the ratio to real GDP. For control measures, they also used certain variables such as average human capital, per capita income level, government size and parallel exchange rate. They concluded that the development of finance generally leads to the growth of the domestic economy, and there is a two-way Granger causality on the finance-growth nexus.

Leitao (2010) tested the relationship between SMD and economic growth in 27 European Union Countries and BRIC (Brazil, India, Russia,and China) countries. The study used a panel data approach and the data covered the period 1980-2006. The results of the study showed that financial development indicators contribute positively and significantly to economic growth. Although this study was robust, it failed to identify country-specific peculiarities.

Anwar and Sun (2011) examined the interrelationship between economic growth and capital market development proxied by stock market capitalization for Malaysia. The study convincingly demonstrated that stock market development has an exponential effect on real growth rate for Malaysia, specifically between 1970 and 2007.

Huiran and Wang (2013) used a panel data to examine the relationship between stock development and economic growth in 89 selected countries for the period 1970 and 2009. The results showed a significant and positive effect of financial development on real economic growth.

Mhadhbi (2014) used the GMM model to test the dynamic effect of capital market development on real economic growth in 110 selected countries over the period from 1973-2012. The obtained results showed that the variables that positively and significant influence economic growth in the selected countries are those that reflects the level of availability of the banking system.

Van Nieuwerburgh et al. (2006) used a proxy of real GDP to measure economic growth and five different indexes to measure the stock market development over the time period from 1830 to 2000. The results showed that SMD had a long-run relation with the growth of the economy in Belgium.

Gurley and Shaw (1955), convincingly demonstrated that financial sector development has the potential to boost and enhance GDP rates by promoting physical capital accumulation. Another study was presented by Mauro (2000), who found that the stock market is a stable predetermining factor of GDP and suggested that sustainability of the stock market is an important factor for achieving market stability and enhancing economic growth.

Creane et al. (2003) showed that an efficient financial market increases savings and supports investments by identifying potentially profitable ventures and good business opportunities, installing discipline that can adequately control the performance of managers. Osei (2005) used the multivariate VAR model and found that development of the stock market caused an increase in the GDP in Ghana in the period from 1991 to 2003. Similar results were found by Guha and Mukherjee (2008). Choong et al. (2009) used the ARDL bounds test model and examined the relation between financial development and GDP for the period of 1970 to 2002. The results showed that financial development led to increase in real GDP.

Arestis et al. (2005) used the heterogeneous panel data model and examined the relation between financial development and GDP for India, South Africa South Korea, the Philippines, Taiwan, and Greece, for the period from 1990 until 2001. The results showed that financial development causes growth in India, South Africa, South Korea, the Philippines, Taiwan, and Greece.

Odhiambo (2014) utilized the ARDL bounds test estimator to investigate the short-run and long-run dynamic between financial development and GDP in India for the period of 1971-2007. The results showed that real economic growth was induced by financial development.

Osualaet al. (2013) employed ARDL and tested the relationship between economic growth and financial development in Nigeria from 1980-2012. The

results showed that the country's financial development led to an increase in its economic growth.

Bayar et al. (2014) used the ARDL bounds test while examining the relation between economic growth and financial development for Turkey for the period between 1971 and 2007. The results showed that the increase in Turkey's economic growth was driven by financial development. To reveal the pathways through which financial development support economic growth in Turkey, Ibrahim et al. (2017) employed complex econometric techniques than can robustly identify causalities in the presence of a structural break. The study found that the energy sector served as an important pathway that promoted financial development in Turkey.

Beck and Levine (2004) employed Johansen co-integration and tested the growth-finance nexus for 40 selected countries over the period from 1985 to 1998. The results revealed evidence of a two-way causality between real economic growth and financial development. This finding shows the tendency of financial repression to harm growth. Kar and Pentecost (2000) and Peia and Roszbach (2013) also enhanced the time series literature by suggesting that stock market development supports economic growth.

Shan and Morris (2002) applied Johansen cointegration and used data from 20 OECD countries over the period from 1985-1998. The results showed that capital market development (CMD) Granger caused real growth in 20 OECD countries. However, most of these studies revealed evidence supporting the supply-led hypothesis. It is important to note that the direction of the causal relation between finance and growth is highly sensitive to the proxy used to measure the key variable in question, particularly financial sector development. Atje and Jovanovic (1993) found a positive relation between stock market development and economic growth for 40 countries over the period 1980-1988.

In contrast, Xu (2000) used VAR and Ben Naceur and Ghazaouani (2007) used GMM, and they suggested that there is no significant association between stock market development and economic growth for a study on eleven southern and eastern Mediterranean countries.

In African countries, particularly South Africa, the dynamic contribution of capital market development on certain macroeconomic variables has not been adequately and scientifically addressed. One of the empirical studies focusing on the South African case that analysed the macroeconomic effect of stock development on economic growth is Frankel (2007). In his study, he investigated the factors that were determinants of the real value of the South African rand for 1984 and 2007. The study applied the OLS model and the results revealed that high interest rates raised international demand for the rand and led to appreciation of the exchange rate.

A comprehensive study dealing with the finance-growth nexus for South Africa can be found in the work of Kularatne (2002). The author employed time series data covering the period during which the country embarked on structural reforms in terms of both banking and the capital market (1985 and 1992). To eliminate bias associated with the use of a single indicator of financial development, a multivariable index of financial development was constructed using several indicators of banking and capital market (including ratio of private credit, market capitalisation, all shares index, among others). To determine the direction of the growth-finance nexus, two different multivariate models in the form of Johansen and Juselius cointegration as well as an oft-used Vector Error Correction Mechanism (VECM) were adopted. The key finding indicated a linear relationship between economic growth and the constructed index of financial development. Furthermore, the Granger-VECM test revealed a bidirectional causality between financial development and economic growth.

Hsing (2016) tested the relationship between the South African exchange rate based on demand and supply analysis over the period ranging from 1983 until 2014. The results showed a strong positive association between the ZAR/USD exchange rate and South African government bond yields, US GDP, the US stock market, and the South African real GDP.

Moreover, Fourie et al. (2016) examined the connection between exchange rate volatility and certain macroeconomic variables, the principal of which is real economic growth in South Africa. The results showed that the exchange rate factor has positive and significant impacts on economic growth.

Maepa (2016) studied the effect of exchange rate volatility on South African foreign investment over the period 1970-2014. The study applied the Vector Autoregressive model (VAR). The results revealed a long-run causal effect of exchange rate on the rate of investments in South Africa. However, an adverse connection between exchange rate volatility and investments was found in the long-run relationship between capital market development and economic growth.

It is imperative to review and examine extant studies conducted in respect of Africa's leading economy. Similar to South Africa, as the second-best African economy, the research on Nigeria dealing with the growth-finance nexus can be broadly classified into two groups: microeconomic and macroeconomic standpoints. From the macroeconomic perspective, Aliero et al. (2013) examined the theory as to whether financial development can boost employment and serve as a pathway out of poverty. This primarily involves determining the short-run and long-run dynamic relationship between financial development and unemployment in Nigeria for the period between 1980 and 2011. The study applied the ARDL bounds testing approach to cointegration. The study found that in spite of the positive impact of financial sector development on economic growth, there is minimal evidence to support the contribution of finance on the rate of unemployment. However, when financial development was decomposed into urban and rural sector financial development, a striking finding revealed the tendencies of rural credit allocation in rural areas (rural financial development) to reduce unemployment in both the short and long run. In this way, the study argued that monetary authorities should strengthen and deepen rural financial service delivery, which could reduce the rising levels of youth unemployment. To this end, Aliero and Ibrahim (2013) emphasized the need to reduce the challenges of youth unemployment through financial development. This was aligned with the realization of the fact that an efficient financial market can respond to the needs of the private sector, which in turn can apply dramatic changes to the level of unemployment. As such, financial development can enable access to funding which can enable

poor households to transform their production system (Aliero and Ibrahim, 2013).

On the other hand, Gani and Ibrahim (2015) undertook a comprehensive study aimed at unravelling the impact of capital market sector development on Nigeria's economic growth for the period from 1980 until 2013. The time series for the said period was analysed via a multivariate framework including the traditional Johansen and Juselius cointegration as well as VECM. The study found that a long-run relation existed between economic growth and some indicators of capital market development such as security mobilization, market capitalization and interest rate. Interestingly, the feedback hypothesis was discovered as the Granger causality test showed a bi-directional causal relation between security mobilization and economic growth, while evidence of the independence hypothesis existed in the short run. Thus, it was concluded that enhancing financial sector development would facilitate economic growth in the long run in that the capital market serves as an engine driving the growth process.

To unveil the dynamic linkages between financial openness, trade openness and economic growth, Ibrahim and Nuruddeen (2016) employed extensive annual time series data covering the period from 1980 to 2012 for Nigeria. The analysis used Johansen cointegration, VECM and Granger causality to reveal the long run-relation among the variables in question. While the results contradicted the plethora of literature by discovering a negative relationship between financial openness and economic growth, this called for caution against exposing the financial sector to the external shocks due to its sensitivity to international financial turmoil. As for the causal relation, evidence of the supply following hypothesis was found for Nigeria.

An interesting study that introduced the element of inequality in the finance-growth literature was conducted by Nuruddeen and Ibrahim (2014). The paper used annual secondary time series data analysed using the ARDL bounds test for cointegration and symmetric causality. The results indicated strong

tendencies for financial sector development to facilitate the reduction of poverty and income inequality among the populace.

Adjasi and Biekpe (2006) examined the influence of the SMD on the country's economic growth and 13 other African countries by employing dynamic panel data. The outcomes indicated a positive connection between stock market development and the GDP. Enisan and Olufisayo (2009) analysed the relationship between the development of the stock market and economic growth in South Africa and six other African countries using the ARDL approach. The outcomes of the study indicated that stock market development had a significant and positive long-run effect on GDP over the period of 1980-2004.

Ndako (2010) used the multivariate vector autoregressive (VAR), and found a unidirectional causality running from economic growth to capital market development in South Africa over the period from 1980 to 2005. It was suggested that the SMD contains some useful information that helps to predict economic growth rates.

Ahmed et al. (2010) used panel data analysis for South Africa and 14 other African countries for the time frame between 1976 and 2005. The results revealed a positive connection between the stock market development indicator and GDP in 15 countries.

Masoud and Hardaker (2012) analysed the connection between South Africa's economic growth and 41 emerging markets and their stock market development for a 120-year period using a panel data model. The results indicated that stock market development measured by market capitalization and total value traded were found to play a substantial role in the economic growth in these emerging markets.

Ngarea et al. (2014) used fixed and random effects panel models to test the linkage between stock market development and economic growth rates in South Africa and 35 other countries for the period from 1980 to 2010, and

showed that stock market development has a positive effect on economic growth. They also suggested that countries should prioritize policies aimed at fostering financial market deepening.

Table 1: Summary of empirical literature review

Authors	Country	Period	Model	Results
Arestis and Demetriades (1997)	USA, Germany,	1970-1990	Johansen co-integration	(SMD → EG) in Germany
Odedokun (1996)	71 developed countries	1960-1980	OLS	(SMD + EG)
Rousseau and Wachtel (2000)	47 countries	1980-1995	VAR-model	(EG + SMD)
Atje & Jovanovic (1993)	40 countries	1980-1988	Time series	(EG + SMD)
Gupta (1984)	50 Asian and Latin American countries		Granger causality	(SMD + EG)
Kar and Pentecost (2000)	Turkey	1963-1995	VAR-model	(SMD → EG)
Calderón and Liu (2003)	22 advanced and 87 emerging countries	1960-1994	Granger causality	(SMD → EG)
Kemal et al. (2007)	19 high-income countries	1974-2001	Panel data	(SMD + EG)

Caporale et al (2009)	10 new EU members	1994-2007	Granger causality	(SMD → EG)
Calderon and Liu (2003)	109 countries	1960 to 1994	Granger causality	(SMD -EG)
Huiran and Wang (2013)	89 selected countries	1970-2009	Panel dynamic model	(SMD + EG)
Anwar and Sun (2011)	Malaysia	1970 – 2007	Time series	(SMD + EG)
Mhadhbi (2014)	110 selected countries	1973-2012	GMM	(SMD + EG)
Beck and Levine (2002)	40 selected countries	1985-1998	GMM Model	(SMD + EG)
Shan, Morris (2002)	20 OECD countries	1985-1998	Yamamoto causality	(SMD → EG)
Arestis et al. (2005)	India, South Africa South Korea, the Philippines, Taiwan, and Greece	1990-2001	Heterogeneous panel	(SMD → EG)
Choong et al. (2005)	Malaysia	1970-2002	ARDL	(SMD → EG)
Deb and Mukherjee (2008)	India	1996-2007	Granger causality	(SMD → EG)

Odhiambo (2013)	South Africa	1971-2007	ARDL	(SMD → EG)
Bayar et al. (2014)	Turkey	1999-2013	Johansen co-integration	(SMD → EG)
Osuala et al. (2013)	Nigeria	1980-2012	ARDL	(SMD → EG)
Enisan and Olufisayo (2009)	South Africa and 6 other countries	1980-2004	ARDL	(SMD → EG)
Ndako (2010)	South Africa	1980-2005	VAR	(SMD → EG)
Ngarea et al. (2014)	South Africa and 35 other countries	1980-2010	Fixed effect model	(SMD → EG)
Ahmed (2010)	South Africa	1976-2005	Panel data	(SMD → EG

Masoud and Hardaker (2012)	South Africa and other countries,	1980-2010	Panel Data	(SMD → EG)
Ngarea et al. (2014)	South Africa and 35 other countries,	1980-2010	Fixed effect model	(SMD → EG)
Kularatne (2002)	South Africa	1985-1992	VECM	(SMD → EG)
Xu (2000)	41 countries	1960-1993	VAR model	(SMD # EG)
Ben Naceur and Ghazaouani (2007)	11 countries	1979-2003	GMM model	(SMD #EG)

Where EG denotes economic growth, SMD is stock market development

CHAPTER 3
DATA AND METHODOLOGY

In the previous chapter, we reviewed the theories and literature that has examined the relationship between stock market development and economic growth. Specifically, we focused on demonstrating the explained and explanatory variables.

In this chapter, we emphasize the econometric model to study the correlation and the relationship between SMD and GDP, where the data used and methodology adopted will be illustrated.

3.1 Research design

One of the major and significant initial steps of any research study is the research design (Annavaram, Patel and Davidson, 2001). The research design allows the researcher to ensure that the data is meaningful and leads to credible results. The present study is designed to examine the potential impact of stock market development on South Africa's economic growth.

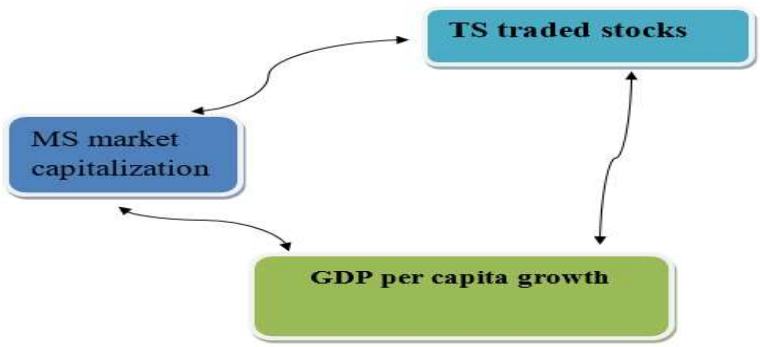

Figure 11: Variables of the study

3.2 Variables definition and source of data

Table 2: Summary of variables' definition and sources

Variables	Definition	Source
MC	Market-capitalization (MC) of listed firms as % of GDP	World Bank-website
TS	Traded stocks: which is presented as a (%) of the change in total value-of traded-stocks firms that divided by (GDP)	World Bank-website
GDP	GDP per capita growth of the state, which is derived and estimated from the World Bank data: it is defined and measured as annual (%) growth rate of GDP gross-domestic-product (per capita), which is based on purchasing-power parity (PPP).	World Bank website

3.3 The Econometrics model

The aim of this work is to analyse the relationship between economic growth and stock market development in South Africa by using ARDL and Granger causality tests. The research employs annual time series data for South Africa covering 1976 until 2016. The series was converted to natural log for ease of interpretation. The estimated ARDL(p,q) models are represented as follow:

$$LGDP_t = \alpha_0 + \sum_{j=0}^{q} \beta_j L^j LTS_t + \sum_{i=1}^{p} \gamma_i L^i LGDP_t + \epsilon_t \qquad Eq(1)$$

$$LGDP_t = \alpha_0 + \sum_{j=0}^{q} \beta_j L^j LMC_t + \sum_{i=1}^{p} \gamma_i L^i LGDP_t + \epsilon_t \qquad Eq(2)$$

$-LGDP_t$ is per capita growth, which is measured as the annual percentage (%) growth rate of GDP per capita.

- LTS_t is traded stocks: Percentage (%) change in total of traded-stocks values divided by GDP.
-LMC_t is the market capitalization of listed firms as % of GDP (stock-price X the number of stock outstanding).
- ϵ_t *is an error term*

3.4 Unit root test and cointegration

The unit root test aims to address the stationarity of the variables. Stationarity is one of the preliminary tests that ought to be performed before developing any econometric model. Variables are stationary if their variance (how spread they are from the mean), and auto-covariance remain fixed (i.e., constant) over a period of time.

If a series is not stationary in the regression analysis, the hypothesis tests cannot be undertaken correctly where the assumption of asymptotical distribution is not valid and t-statistic is not following the t-distribution; consequently, the hypothesis tests are incorrect. A unit root causes a spurious problem whereby in the regression analysis, although two variables may be totally unrelated, if we regress one on the other, we gain a high R-squared and the outcome will be misleading (Gujarati, 2009).

To perform the stationarity test, this thesis uses the ADF, KPSS and PP unit root test procedures. The traditional unit criteria in the form of ADF and PP unit root tests hypothesises that H0: the series has a unit root or is not stationary H1: the series data has no unit root or is stationary, whereas the KPSS assumes that the series is trend stationary, meaning that KPSS is one of the first unit root test that sets the null hypothesis of series is trend stationary (Aliero and Ibrahim, 2012).

In this study, the bounds testing model based on the estimation of ARDL methodology is used to examine the short and long-run association between all the variable of this study. The main advantage of the bounds methodology to cointegration analysis compared to other models is that the long-run and short-run dynamics of the chosen model can be assessed separately.

ARDL models have been shown to provide reliable and dependable results for testing long-run relationships. This model is preferred because of its many advantages; in regard to the first advantage, Pesaran et al. (2001) indicated that the model can be used for time series data irrespective of whether the variables are fixed or stationary at first difference (1), or the variables are stationary at the levels I (0), or the variables are stationary in both.

However, if such a stationary permutation exists in the series, then the variables of this study are cointegrated. Thus, the advantage of cointegration analysis is that it is a direct test of economic theories of long-run relationships. However, cointegrating relationships might exist between variables in the mix between I(0) and I(1).

This is a feature of the ARDL testing model that permits more flexibility than the cointegrated VAR approaches, which do not allow for different lags for different variables. It also follows that the choice of lag order for the ARDL model is vital for long-run studies and analysis.

The selection of lag orders should be based on diagnostic tests for residual serial correlation, the functional form misspecification and heteroscedasticity; several information measures are available for this purpose, such as the Akaike-Information-Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). According to Pesaran et al. (2001) the ARDL test produces steady, consistent and efficient estimates of long-run coefficients under asymptotic normality. This outcome stands for repressors that are both in I(0), I(1) or a mixture of (I(0) and I(1).

Comparing Pesaran and Shin (1999) with Johansen's traditional cointegration approach, Pesaran demonstrated that the small data of the bounds testing approach are better than the Johansen approach test, in which a large sample size is normally required for the results to be valid. This is another reason in addition to the inclusion of a possibly stationary variable and the better options to control for cross-sectional dependencies.

The ARDL bounds testing model is established from the overall test of significance of the lag of all the series in their level form. The study thus tests the significance of the F-statistic. From Equation (1.2), this study tests the hypothesis of the existence of no equilibrium relationship among the variables against the (H1) alternative hypothesis of the current long-run equilibrium relationship between the variables.

$$H0: \phi_0 = \phi_1 = \phi_2 = \phi_3 = \phi_4$$

$$H1: \phi_0 = \phi_1 \# \phi_2 \# \phi_3 \# \phi_4$$

The study uses the critical-values (CV) obtained by Pesaran et al. (2001); then, it compares the estimated F-statistics value to the lower and upper bounds. The lower bound values are generated based on the assumption that all the variables are integrated of order zero; I(0), while the upper bound is founded on the assumption that all variables are integrated of order one; I(1).

The null hypothesis is rejected if the F-statistics value falls above the upper bound; this indicates the existence of a long-run equilibrium relationship among the variables. If, the $F - statistic$ falls below the lower bound, then the study fails to reject the hypothesis of no cointegration, thus indicating that there is no long-run relationship among the variables.

If the calculated F-statistics exceeds the upper bound of the CV, then the variables are integrated. However, if the calculated F-statistics falls between the lower bound and upper bound levels, the decision is inconclusive. Because the ARDL model has shown the short-run and long-run effect of the independent variables on the dependent variables, the study can estimate the long-run coefficients after a long-run correlation has been determined among the variables. The ARDL approach equation is as follows:

$$\Delta LogGDP_t = \beta_0 + \sum_{i=1}^{n} y_2 \Delta LogTS_{t-j} + \sigma_1 logGDP_{t-1} + \sigma_3 logST_{t-1} + e_{1t\ldots Eq} \quad (3)$$

$$\Delta LogGDP_t = \beta_0 + \sum_{i=1}^{n} y_2 \Delta LogMC_{t-j} + \sigma_1 logGDP_{t-1} + \sigma_3 logMC_{t-1} + e_{1t\ldots Eq} \quad (4)$$

The dynamics coefficients of the short run from the model may be conveyed by investigating the error correction model linked with the long-run estimates. Thus, from Equations (1 and 2), the short-run regression model may be expressed once the existence of co-integration is validated, in order to capture the speed of adjustment of the dependent variable.

The ECM is estimated using the following equation:

$$\Delta LogGDP_t = = \beta_0 \ + \sum_{i=1}^{n} y_2 \Delta LogTS_{t-j} + \omega ECT_{t-1} \ + e_{1t} \quad \text{eq (5)}$$

$$\Delta LogGDP_t = = \beta_0 \ + \sum_{i=1}^{n} y_2 \Delta LogMC_{t-j} + \omega ECT_{t-1} \ + e_{1t} \quad \text{eq (6)}$$

ECT_{t-1} stands for the only one period lagged error correction-term. The *ECT* is assumed to be significant with a negative (-) sign. ECT shows the speed of adjustment for the short- and long-term levels of the dependent variable.

The order of lags on the first-differenced variables in Equations (4) – (6) is achieved from the unrestricted equations by using the (A.I.C) and (S.B.C). In order to confirm the results, this study uses various diagnostic tests such as the LM test for Autocorrelation. Autocorrelation is a numerical portrayal of the level of comparability between a specific time series and a lagged adaptation of itself over progressive time intervals.

It is equivalent to determining the connection between two diverse time series; however, a specific time series is actually utilized twice: once in its unique frame and once lagged by at least one time period. The study will utilize the LM test to ascertain whether there is an autocorrelation. Autocorrelation, also defined as a sequential relationship, is the connection of a signal with a lagged copy of itself as a segment of lag. It is the closeness between perceptions as an element of the time lag between them.

Heteroskedasticity: This test is applied to verify whether the error term, μ, in the regression model has a common or constant variance. The heteroskedasticity test (with no cross terms) will be adopted. We will test for

Breusch-Pagan (BPG), Arch and also White heteroskedasticity, where H0: homoscedasticity H1: heteroskedasticity.

The existence of heteroskedasticity is a significant concern in the utilization of relapse examination, including the examination of difference, as it can negate factual trial of essentialness that acknowledge that the demonstrating errors are uncorrelated and uniform—in this manner, their fluctuations do not move with the effects being shown.

Since heteroskedasticity concerns desires for the second snapshot of the errors; its essence is noted as misspecification of the second request. In this way, heteroskedasticity is the nonappearance of homoscedasticity. Finally, the study uses the Ramsey RESET Test to check the stability of the results. Furthermore, the stability of the models is verified through the (CUSUM and CUSUM-squared) to check the stability of the results of the study.

3.5 Granger Causality test

This study uses the Granger-causality test to examine the causal relationship between the variables of the study. Causality is commonly interpreted within the context of Granger-Causality (Granger, 1969), which shows whether a variable (X) causes (Y), and (Y) causes (X). The Granger causality allows for the addition of an error-correction term (ECT) to obtain the short-run deviations of the series according to their long-run equilibrium path (Odhiambo, 2009). The ECM equation is as follows:

$$\Delta Log\ GDP_t = \beta_0 + \sum_{i.=1}^{p} \Upsilon_1 \Delta LogGDP_{t-1} + \sum_{i.=1}^{q} \Upsilon_3 \Delta LogTS_{t-1} + \Upsilon_1\ ECT_{t-1} + e_{1t} \quad Eq(7)$$

$$\Delta Log\ TS_t = \beta_0 + \sum_{i.=1}^{p} \Upsilon_1 \Delta LogTSD_{t-1} + \sum_{i.=1}^{q} \Upsilon_2 \Delta LogGDP_{t-1} + \Upsilon_1\ ECT_{t-1} + e_{1t} \quad Eq(8)$$

$$Log\ GDP_t = \beta_0 + \sum_{i.=1}^{p} \Upsilon_1 \Delta LogGDP_{t-1} + \sum_{i.=1}^{q} \Upsilon_2 \Delta LogMC_{t-1} + \Upsilon_1\ ECT_{t-1} + \varepsilon_{1t} \quad Eq(9)$$

$$\Delta Log\ MC_t = \beta_0 + \sum_{i.=1}^{p} \Upsilon_1 \Delta LogMC_{t-1} + \sum_{i.=1}^{q} \Upsilon_2 \Delta LogGDP_{t-1} + + \Upsilon_1\ ECT_{t-1} + \varepsilon_{1t} \quad Eq(5)$$

CHAPTER 4
EMPIRICAL RESULTS

4.1 Descriptive statistics

The basic results of the descriptive statistics (such as mean, median and maximum and Standard deviation) of the key variables are examined in this section. Table 3 shows the descriptive statistics of the study variables. In addition, Figures 12 and 13 show the time series plots of the variables of the study.

Table 3 Descriptive statistics of the study variables

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
$LogGDP_t$	8.752742	8.723636	8.933605	8.598513	0.103380
$logMC$	4.933903	5.006777	5.773464	3.985720	0.090062
$LogTS$	2.702877	2.610691	4.913155	0.708038	0.044386

4.2 Unit root test results

Analysis of the variables' order of integration in a time series is very significant for having an inner variation among the variables of this study. To confirm the order of the integration among the variables, this study uses the ADF, KPSS and PP techniques and tests. By employing these tests, the study aims to check that the model and series are stationary. However, if the series is not stationary at level, the first difference is required until the variables become stationary

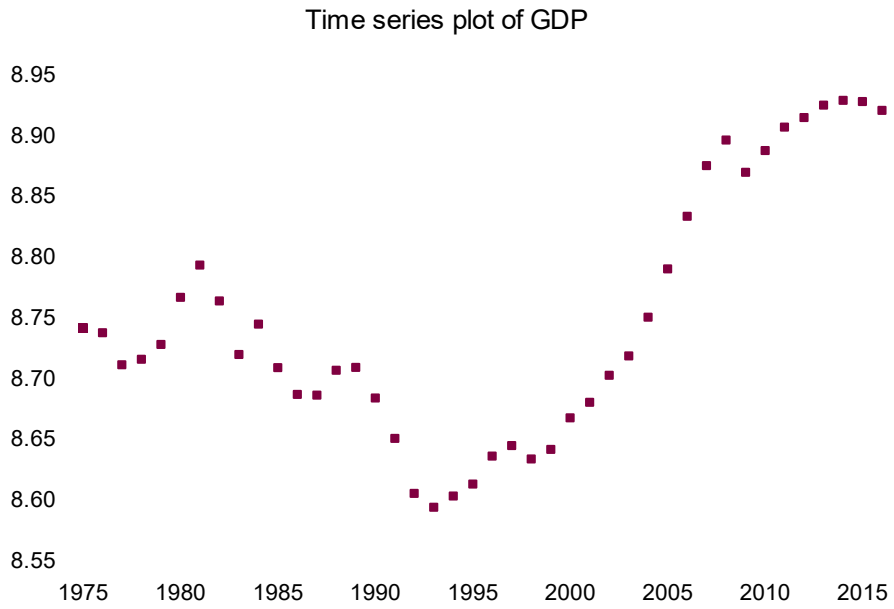

Figure 12: Time series plot of GDP

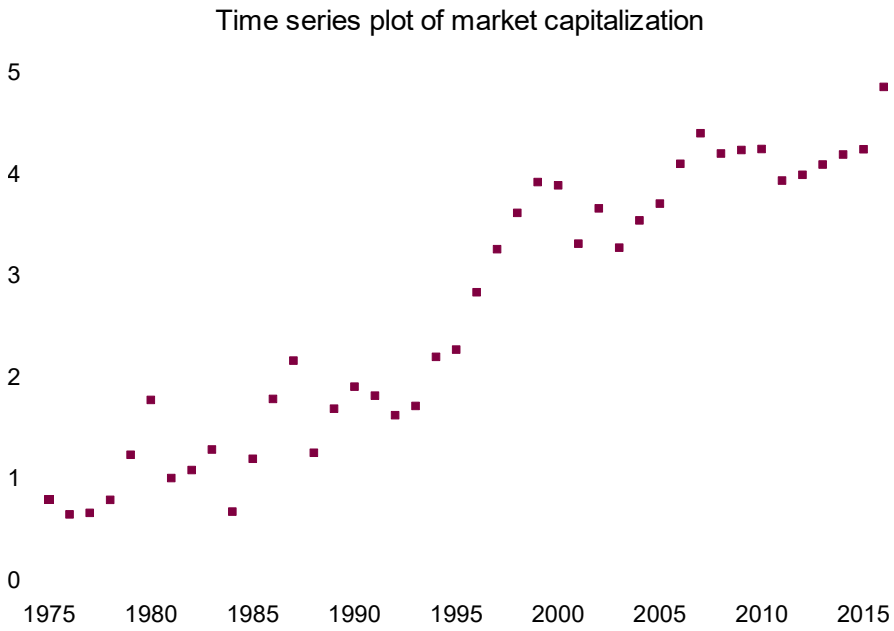

Figure 13: Time series plot of market capitalization

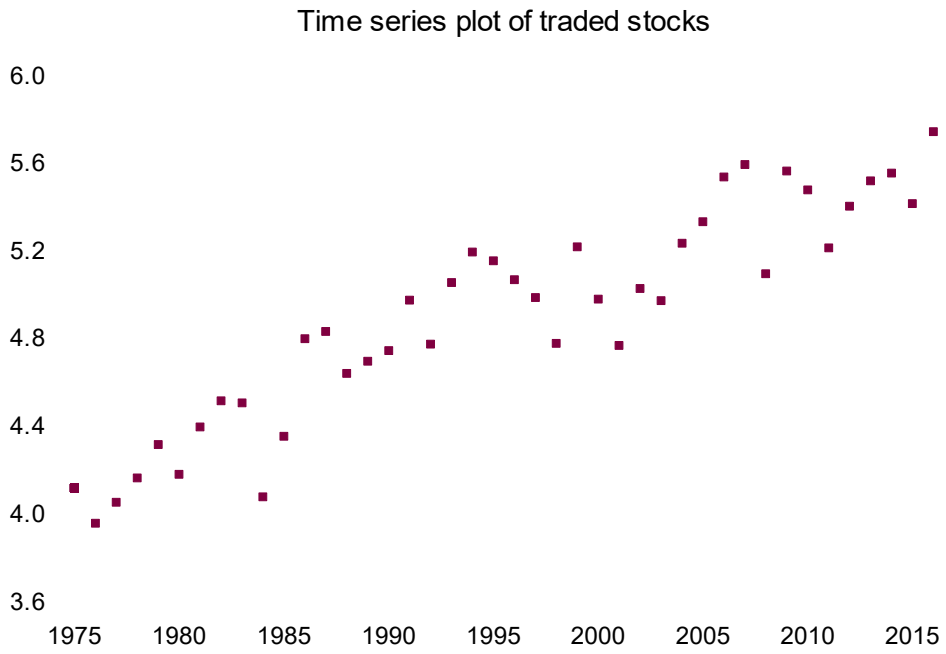

Figure 14: Time series plot of traded stocks

Table 4. ADF unit root test results

ADF unit root tests				
	Con	**CV**	**Trend & Con**	**Critical-value**
$\mathrm{LogGDP_t}$	-0.661	-2.937	-1.475	-3.527
LogMC	-0.638	-2.937	-3.106	-3.527
LogTS	-0.603	-2.937	-1.101	-3.527
$\Delta\mathrm{LogGDP_t}$	-3.819**	-2.937	-3.979**	-3.527
ΔlogMC	-4.307**	-2.937	-4.227**	-3.527
ΔLogTS	-7.534**	-2.937	-7.460**	-3.527

* and ** denote significance levels at 5% and 1%, respectively.

Table 5. PP unit root tests results

PP unit root tests				
	Con	**CV 5%**	**Trend & Con**	**CV 5%**
$LogGDP_t$	-0.215	-2.935	*-2.913*	-4.859
$logMC$	-0.373	-2.935	-2.921	-4.859
$LogTS$	-1.010	-2.935	-2.491**	-4.859
$\Delta LogGDP_t$	-2.999**	-2.935	*-5.941***	-4.859
$\Delta logMC$	-3.109**	-2.935	-6.401**	-4.859
$\Delta LogTS$	-3.571**	-2.935	-4.210**	-4.859

* and ** denote significance levels at 5% and 1%, respectively.

Table 6. Kwiatkowski-Phillips-Schmidt-Shin unit root tests results

KPSS unit root tests				
	Con	**CV 5%**	**Trend & Con**	**CV 5%**
$LogGDP_t$	-0.399	-0.463	*-0.119*	-0.146
$logMC$	-0.373	-0.463	-0.099	-0.146
$LogTS$	-0.290	-0.463	-0.071	-0.146
$\Delta LogGDP_t$	-0.651**	-0.463	*-0.281***	-0.146
$\Delta logMC$	-0.751**	-0.463	-0.310**	-0.146
$\Delta LogTS$	-0.591**	-0.463	-0.399** .210	-0.146

* and ** denote significance levels at 5% and 1%, respectively.

The findings of the ADF test at level and first difference are shown in Table 4. The outcomes indicate that all variables of this study are non-stationary at level. This is because the ADF test procedures statistics were less than the CV at 5%. However, the results report that all the variables are stationary at the first difference

The results obtained from the analysis of the PP test at level and first difference are further stated in Table 5. The outcomes indicate that all variables of this

study are non-stationary at level. This is because the Phillips Perron unit root test statistics were less than the CV. However, the Phillips-Perron unit root test statistics were higher than the CV. This means that the series are stationary at the first difference.

The KPSS test findings are detailed in Table 6, where the outcomes demonstrate that the Kwiatkowski-Phillips-Schmidt-Shin test statistic is higher than the CV. and thereby not within stationary levels; thus, it shows that it was not integrated of order 0 or I (0). After employing the first difference, the outcomes revealed that variables of this study are stationary at first difference, which shows the cohesiveness of all the variables in order [I(1)].

4.3 ARDL bound testing results

This section aims to examine the long-run cointegration between stock market development and South African economic growth. The (H0) implies that there is no cointegration among the variables. In contrast, the alternative hypothesis (H1) states that there is cointegration among the variables.

The bounds testing approach for cointegration includes evaluation of the critical-values and F-statistics results. To confirm that there is cointegration among the variables, this study considers the CV of 5% as the level of statistical significance, which is favourable with Pesaran et al. (2001).

The findings of the bounds testing approach are shown in Table 7. The results show that $the\ F$-statistic values is greater than the upper bound of the CV, indicating that all the variables of this study are cointegrated. The study findings reveal the presence of a long-run cointegration among the variables. Thus, it can lead us to conclude that market-based financial development and economic growth move together in the long run. These outcomes are consistent with empirical research conducted by Pradhan et al. (2015) and Enisan and Olufisayo (2009).

Table 7ARDL bounds test co-integration result

ARDL bounds test co-integration result			
Model I	Lag	F-statistic	Decision
GDP, ST	(3,2)	4.229**	Co-integration exists
Bounds CV Bounds			
		I(0)	I(1)
Sign if.	10%	3.02	3.51
	5%	3.62	4.16
	1%	4.94	5.58
Model II			
GDP , MC	(3,1)	4.9**	Co-integration exists
Bounds CV Bounds			
		I(0)	I(1)
Sign if.	10%	2.63	3.35
	5%	3.1	3.87
	2.50%	3.55	4.38

*,** and ** denote significance levels of 10%, 5% and 1%, respectively.

4.4 Short and long-run coefficient estimation results

The outcome of the ARDL bound testing technique has shown that there is a long-run cointegration among the proxies of stock market development (such as market capitalization and traded stocks) and economic growth. The next step is to examine the short-long run coefficient by means of the following ARDL testing model (GDP, MC, TS) and other models specified in the previous chapter.

The ARDL short and long-run model outcomes are detailed in Tables 8, 9 ,10 and 11. This study uses three proxies, namely GDP per capita growth of the country in order to measure the economic growth, and market capitalization and stock traded value in order to measure stock market development.

The ECT shows the speed of adjustment towards the long-run equilibrium, with only one period of shock in the models of the study. The results show that the ECT is negative and statistically significant. This means that the ECT for each of the indicated models is negative and significant at the 5% level of significance. This means that any prior period shock in model 1, 2 and 3 is to be corrected in the long-run equilibrium with speeds of 39%, 35% and 29%, respectively.

The study outcomes from Models 1, and 3 indicate a positive influence of market capitalization on economic growth. The coefficient of market capitalization clarified the predictable behaviour and role towards economic growth, which is positive and significant at the 10% level of significance (Tables 8 and 10). Therefore, a 1% increase in market capitalization causes increases in economic growth of around 0.09% and 0.12% respectively.

While the proxy of stock traded from Models 1 and 2 indicates that stock traded and market capitalization have a positive influence on South Africa's economic growth, the coefficient of stock traded also elucidated the likely behaviour and role concerning South Africa's economic growth, which is positive and statistically significant at the 1% level of significance (see Table 5). Therefore, a 1% increase in stocks traded will increase South Africa's economic growth by 0.07% and 0.25%, respectively.

Furthermore, the results from the long-run from Models 1 and 3 in the long-run estimation indicate that market capitalization has a positive effect on South Africa's economic growth; the coefficient of market capitalization expounded on the probable behaviour towards South Africa's economic growth, which is positive and statistically significant at the 1 and 5% levels of significance, respectively (see Tables 8 and 9). Therefore, a 1% increase in market capitalization percent will cause economic growth to increase by around 0.12% and 0.32%, respectively. The result is consistent with the theory and many empirical studies including those by Enisan and Olufisayo (2009), Ndako (2010), and Ngarea et al. (2014).

While the proxy of stock traded from Models 1 and 2 in the long run-estimation display a positive influence of stock traded on South Africa's economic growth,

the coefficient of stock traded also expounded on the probable behaviour towards South Africa's economic growth, which is positive and significant at the 1% significance level (See Tables 8 and 9). Therefore, a 1% increase in stocks traded will cause economic growth to increase by around 0.08% and 0.90%, respectively. The result is consistent with the theory and many empirical studies such as Enisan and Olufisayo (2009), who used the ARDL model and found a positive relation between stock market development and economic growth in South Africa and 6 countries over the period from 1980 to 2004.

However, the results from both the short and long run show that market capitalization and traded stocks led to an increase South Africa's economic growth over the period from 1975 to 2016. The study outcomes revealed that stock market development had a positive influence on economic growth, in addition to the fact that stock market development plays a vital role in economic growth.

Moreover, stock market development facilitates capital accumulation by allowing domestic and foreign investors to enter the stock market by capitalizing on financial securities and assets such as bonds and stocks. Thus, a well-established stock market development serves as a fundamental component of macroeconomic development, which draws domestic and foreign investors into the economy for long-term ventures, playing a key role in industrialization (Pradhan et al. 2015).

The long-run causal relation results to be determined regarding ECTt−1, must be negative significant. The results from Tables 8, 9 and 10 show that in Equation 2 of all three models, ECTt−1 is negative and significant.

The results indicate the presence of a long-run causal relationship between stock market development (market capitalization and stock traded) and economic growth. Therefore, it shows that in the long run, development of the stock market (when using MC and TS as proxies) can lead to economic growth. Empirical studies support this finding, such as Ngarea et al. (2014), who used a fixed effect model and found a positive relation between stock market

development and economic growth for South Africa and 35 other countries for the period from 1980 to 2010.

Table 8. ARDL short run result (Model **I**)

Coefficients of ARDL Models			
Model GDP, TS			
Variable	**Coefficient**	**t-Statistic**	**P-value**
$\Delta LogGDP_{t-1}$	0.31885*	1.91445	0.0681
$\Delta LogGDP_{t-2}$	-0.0954	-0.5393	0.5949
$\Delta LogGDP_{t-3}$	0.25183	1.60595	0.1219
$\Delta \mathrm{LogTS}_t$	0.04677***	3.1995	0.004
$\Delta \mathrm{LogTS}_{t-1}$	-0.001**	-3.57	0.005
$\Delta \mathrm{LogTS}_{t-2}$	0.00173	0.09995	0.9212
ECTt−1	-0.0806***	-3.2450	0.0036
R2	.974	-5.4441	
Normality	1.881(0.390)		
Serial correlation (LM)	0.2849(0.7548)		
Heteroscedasticity	1.0804(0.4172)		
Ramsey	1.053(0.2997)		

*,** and *** denote significantly level at the 10%,5% and 1% levels respectively.

Table 9. ARDL long run result (Model **I**)

Coefficients of ARDL Models			
Model GDP, TS			
Variable	**Coefficient**	**t-Statistic**	**P-value**
LogTS_t	0.37867**	2.1616	0.041
R-squared	0.93		
Adjusted R-squared	0.85		
Durbin-Watson	1.91		

*,** and *** denote significantly level at the 10%,5% and 1% levels respectively.

Table10. ARDL short -run result (Model **II**)

Coefficients of ARDL Models			
Model GDP, MC			
Variable	**Coefficient**	**t-Statistic**	**P-value**
$\Delta LogGDP_{t-1}$	0.221***	5.1285	0.001
$\Delta LogGDP_{t-2}$	0.981***	4.0155	0.000
$\Delta LogGDP_{t-3}$	0.009*	6.1080	0.0617
$\Delta \mathrm{LogMC}_t$	0.679955**	3.691767	0.019
$\Delta \mathrm{LogMC}_{t-1}$	-0.001***	-3.57	0.005
ECTt−1	-0.29611***	-5.9561	0.000
R2	.98		
Normality	2.230(0.132)		
Serial correlation (LM)	0.301(0.1021)		
Heteroscedasticity	1.666(0.2231)		
Ramsey	0.1233(0.3084)		

*,** and *** denote significance at the 10%, 5% and 1% levels, respectively.

Table11. ARDL long-run result (Model II)

Coefficients of ARDL Models			
Model GDP, MC			
Variable	**Coefficient**	**t-Statistic**	**P-value**
$logMC$	0.121018***	2.86982	0.000
R-squared	0.98		
Adjusted R-squared	0.90		
Durbin-Watson	2.23		

*,** and *** denote significance at the 10%, 5% and 1% levels, respectively

4.5 Granger Causality results

Considering the short run results, the study shows that a bidirectional causal relation exists between stock traded $\Delta logTS$ and economic growth $\Delta logGDP$,

as well as there is a bidirectional causal relation between economic growth $\Delta logGDP$and market capitalization $\Delta logMC$.

Table 12. Granger causality results

Granger causality tests under the block exogeneity approach (short-run)		
model I	$\Delta logGDP$	$\Delta logTS$
$\Delta logGDP$	-	2.7423*
$\Delta logTS$	4.7415**	-
Granger causality tests under the block exogeneity approach (short-run)		
model II	$\Delta logGDP$	$\Delta logMC$
$\Delta logGDP$	-	7.742877***
$\Delta logMC$	4.140632*	-

*,** and *** denote significantly level at the 10%,5% and 1% levels respectively.

However, the results from the causality tests in both short and long run confirmed the ARDL model results that stock traded volume led to an increase in South Africa's economic growth over the period from 1975 to 2016 same results obtain between market capitalization and GDP. More details in regard to the hypothesis outcomes are shown in Table 11.

Table 13 Summary of hypotheses results

	Hypothesis	**The Results**
H1	• There is short-run relation between market capitalization and economic growth.	Accepted
H2	• There is short-run relation between traded stocks and economic growth.	Accepted
H3	• There is long-run relation between market capitalization and economic growth	Accepted
H4	• There is long-run relation between traded stocks and economic growth.	Accepted
H5	• Market capitalization Granger causes economic growth.	Accepted
H6	• Stocks traded Granger causes economic growth.	Accepted

H7	• There is short-run causality between market capitalization and economic growth.	Accepted
H8	• There is short-run causality between stocks traded and economic growth.	Accepted

4.6 Model Robustness tests results

The J.B normality test results confirm that the models are normally distributed. Furthermore, the BPG and the ARCH results express and confirm that the model is homoscedastic. In addition, the LM test shows that there is no autocorrelation in the study results. The Ramsey RESET Test results show that there is stability in the study results. The following Figures 15 to 18 depict a family of Plots of Cumulative Sum of Recursive Residuals and Plots of Cumulative Sum of Squares of Recursive Residuals. The CV bounds at 5 percent significance level are represented by the straight lines. The two figures further confirm that the models are stable as the entire CUSUM test lines lie between the bounds of the straight lines

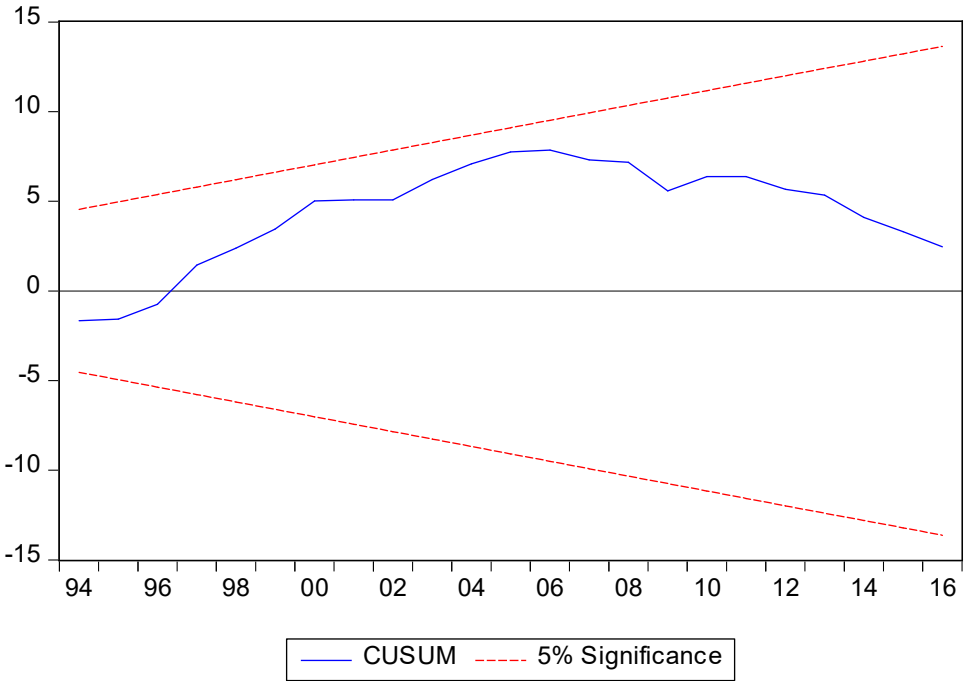

Figure 15: Plot of CUSUM test for model 1(GDP and TS)

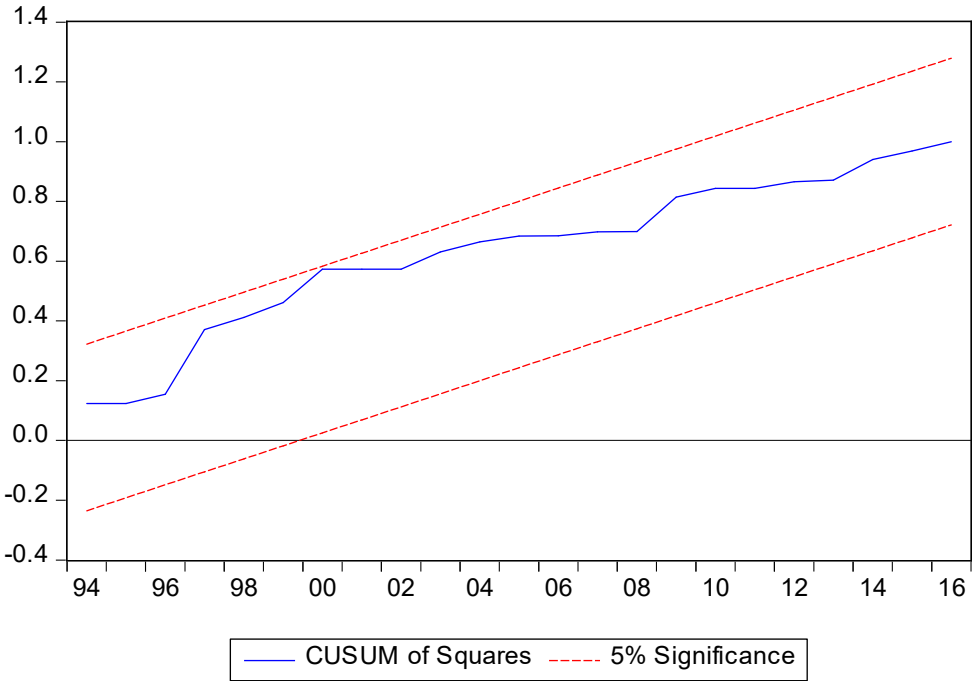

Figure 16: Plot of CUSUM Squares test for model 1(GDP and TS)

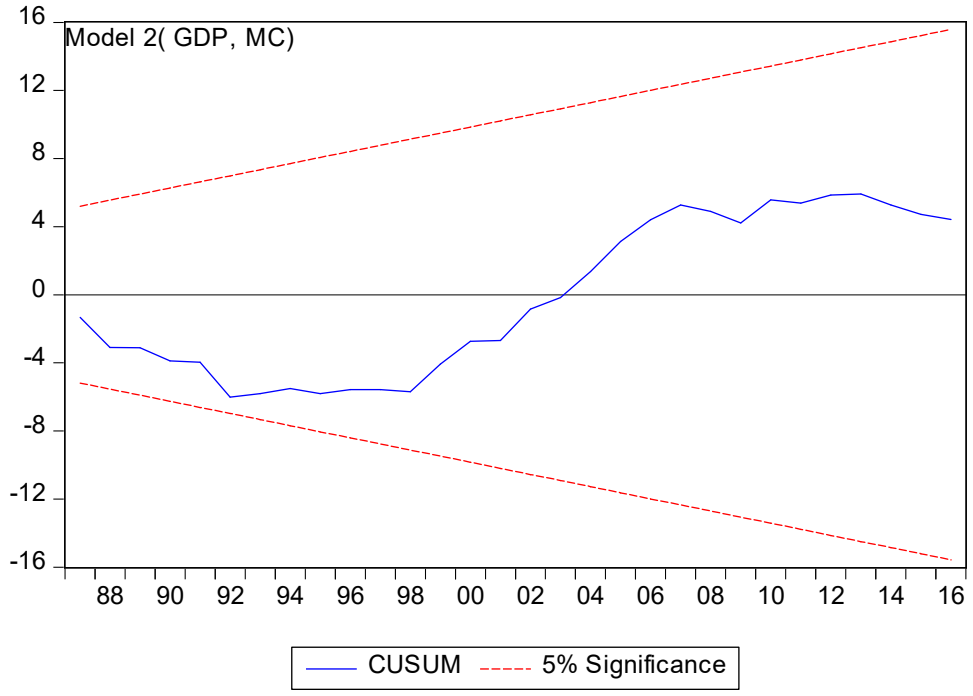

Figure 17: Plot of CUSUM test for Model 2(GDP, MC)

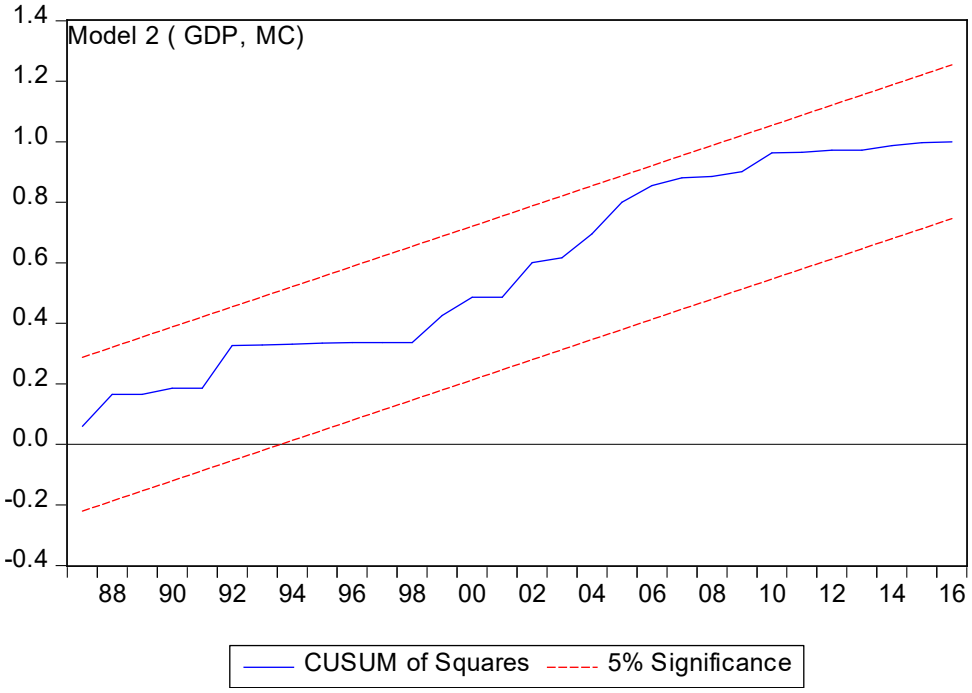

Figure 18: Plot of CUSUM Squares test for Model 1(GDP, MC)

CHAPTER 5
CONCLUSION

5.1 Summary of the thesis

The key objective of this study is to answer the research questions and to confirm the presence of a significant and positive relation between stock market development (namely market capitalization and traded stock) and South Africa's economic growth, which is measured by GDP over the period spanning from 1975 to 2016. The study uses the ADF, PP; KPSS statistic unit root tests to check the stationarity among the variables of this study. The study uses the ARDL bounds test to check for cointegration among the variables. To estimate the coefficient in the short and long run, the study employs the Autoregressive-Distributed Lag models. The Granger causality test is applied to test the causality direction among the variables.

Even though several studies have been conducted on this subject, most previous empirical studies have focused on the causal relationship between stock market development and economic growth. Very few empirical studies have investigated the effect of market capitalization and stocks traded on economic growth in the context of South Africa by using the ARDL model and the Granger causality test

In addition, the empirical results of this study show that the ECT was negative and statistically significant. Thus, this means that the ECT of each individual model is negative and significant at the 5% level. The empirical results from the ARDL model in short and long run show a positive relationship between traded stocks and economic-growth. Furthermore, the outcomes show that

there is a bidirectional causal relationship between stock traded and economic growth.

5.2 Implications and Recommendations

The South African financial sector stands as the largest, most developed, and most refined in Africa, and it compares well with financial systems in the developed world. In comparison to the majority of past studies, the current study uses the ARDL bounds and Granger causality to examine the linkage between stock market development and South Africa's economic growth.

Based on the results of the Granger causality tests conducted, it is evident that stock market development causes economic growth in South Africa. The results obtained are in line with the supply-leading hypothesis (Laeven et al., 2015).

Theoretically, the results of this thesis are consistent with the supply-leading hypothesis (SLH), which implies that financial development causes economic growth and plays an important role in any economy. In this hypothesis, financial services include lower cost of investment information and advice and alternatives, which provide a preferable allocation of resources by savers and the people or investors who would have other opportunities to choose from and invest in more profitable alternatives or projects, which will support and enhance the South Africa’s economic growth. Furthermore, the results are consistent with the feedback hypothesis, FH, which argues that the linkage between the development of the stock market and South Africa's economic growth is represented as a reciprocation.

Stock market development plays a critical role in any market. However, stock market development may lead to an increase in South Africa's economic growth by technological growth and improvements, which can attributed to more developed projects and plans that can be undertaken in the expansion of the financial framework.

The study suggests that the short and long-run relationship between stock market development and South Africa's economic growth could be affected by the channelling of resources raised on foreign investments in South Africa and the increase in international trade and GDP in recent years. The study also suggests that policy makers in South Africa should consider developing policies that would enhance and increase the investment in Africa in order to improve the stability of the market and should provide a tax reduction on interest charged on individual and corporation loans to fund the acquisition of stock, which could lead to financial market improvements.

5.3 Further studies

Further studies should be conducted on the relationship between stock market development, gold productions and economic growth in regard to the South African economy.

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APPENDICES

Appendix A: unit root test

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.818832	0.0057
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GL,2)
Method: Least Squares
Date: 02/06/19 Time: 21:36
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GL(-1))	-0.556288	0.145670	-3.818832	0.0005
C	0.002506	0.003528	0.710294	0.4819

R-squared	0.277340	Mean dependent var	-8.93E-05
Adjusted R-squared	0.258322	S.D. dependent var	0.025425
S.E. of regression	0.021897	Akaike info criterion	-4.756268
Sum squared resid	0.018219	Schwarz criterion	-4.671824
Log likelihood	97.12535	Hannan-Quinn criter.	-4.725735
F-statistic	14.58348	Durbin-Watson stat	1.870332
Prob(F-statistic)	0.000481		

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.475379	0.8215
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 02/06/19 Time: 21:40
Sample (adjusted): 1977 2016
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.060834	0.041232	-1.475379	0.1488
D(GDP(-1))	0.416768	0.153443	2.716115	0.0101
C	0.521252	0.356629	1.461607	0.1525
@TREND("1975")	0.000632	0.000366	1.727535	0.0926

R-squared	0.266443	Mean dependent var	0.004576
Adjusted R-squared	0.205313	S.D. dependent var	0.024109
S.E. of regression	0.021492	Akaike info criterion	-4.747654
Sum squared resid	0.016628	Schwarz criterion	-4.578766
Log likelihood	98.95308	Hannan-Quinn criter.	-4.686590
F-statistic	4.358641	Durbin-Watson stat	1.870923
Prob(F-statistic)	0.010192		

Null Hypothesis: TS has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.638666	0.8506
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TS)
Method: Least Squares
Date: 02/06/19 Time: 21:42
Sample (adjusted): 1976 2016
Included observations: 41 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TS(-1)	-0.028555	0.044710	-0.638666	0.5268
C	0.174681	0.131894	1.324404	0.1931

R-squared	0.010351	Mean dependent var	0.099040
Adjusted R-squared	-0.015025	S.D. dependent var	0.368894
S.E. of regression	0.371655	Akaike info criterion	0.905847
Sum squared resid	5.386957	Schwarz criterion	0.989436
Log likelihood	-16.56986	Hannan-Quinn criter.	0.936285
F-statistic	0.407894	Durbin-Watson stat	2.169109
Prob(F-statistic)	0.526773		

Null Hypothesis: TS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.106883	0.1183
Test critical values:	1% level	-4.198503	
	5% level	-3.523623	
	10% level	-3.192902	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TSL,2)
Method: Least Squares
Date: 02/06/19 Time: 21:44
Sample (adjusted): 1982 2016
Included observations: 35 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(TS(-1))	-2.276948	0.528544	-4.307963	0.0002
D(TS(-1),2)	1.060504	0.456116	2.325075	0.0275
D(TS(-2),2)	0.905893	0.394022	2.299095	0.0292
D(TS(-3),2)	0.832663	0.324401	2.566773	0.0159
D(TS(-4),2)	0.700293	0.244423	2.865085	0.0078
D(TS(-5),2)	0.320130	0.161548	1.981636	0.0574
C	0.224923	0.074327	3.026124	0.0053

R-squared	0.681225	Mean dependent var	0.039454
Adjusted R-squared	0.612917	S.D. dependent var	0.545206
S.E. of regression	0.339205	Akaike info criterion	0.852435
Sum squared resid	3.221689	Schwarz criterion	1.163505
Log likelihood	-7.917611	Hannan-Quinn criter.	0.959816
F-statistic	9.972729	Durbin-Watson stat	2.011495
Prob(F-statistic)	0.000007		

Null Hypothesis: D(TS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 5 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.227330	0.0104
Test critical values:	1% level	-4.243644	
	5% level	-3.544284	
	10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: ST has a unit root
Exogenous: Constant
Lag Length: 9 (Automatic - based on AIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.603302	0.9876
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ST)

Method: Least Squares
Date: 02/06/19 Time: 21:45
Sample (adjusted): 1985 2016
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ST(-1)	0.078155	0.129545	0.603302	0.5528
D(ST(-1))	-0.624816	0.226363	-2.760234	0.0117
D(ST(-2))	-0.719241	0.251247	-2.862689	0.0093
D(ST(-3))	-0.375894	0.275283	-1.365485	0.1865
D(ST(-4))	-0.456562	0.253622	-1.800169	0.0862
D(ST(-5))	-0.472978	0.259575	-1.822129	0.0827
D(ST(-6))	-0.712546	0.255741	-2.786208	0.0111
D(ST(-7))	-0.358979	0.277354	-1.294300	0.2096
D(ST(-8))	-0.397763	0.246686	-1.612426	0.1218
D(ST(-9))	-0.684596	0.288403	-2.373749	0.0272
C	19.56480	20.57812	0.950757	0.3525

R-squared	0.580482	Mean dependent var	8.153087
Adjusted R-squared	0.380712	S.D. dependent var	42.80166
S.E. of regression	33.68271	Akaike info criterion	10.13813
Sum squared resid	23825.03	Schwarz criterion	10.64198
Log likelihood	-151.2101	Hannan-Quinn criter.	10.30514
F-statistic	2.905745	Durbin-Watson stat	1.967334
Prob(F-statistic)	0.018925		

Null Hypothesis: D(SL) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.534495	0.0000
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(SL) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on AIC, maxlag=1)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.460531	0.0000
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SL,2)
Method: Least Squares
Date: 02/06/19 Time: 21:48
Sample (adjusted): 1978 2016
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SL(-1))	-1.873453	0.251115	-7.460531	0.0000
D(SL(-1),2)	0.425141	0.155399	2.735799	0.0097
C	0.104731	0.074185	1.411750	0.1669
@TREND("1975")	-0.001313	0.002952	-0.444860	0.6592

R-squared	0.710828	Mean dependent var	0.005977
Adjusted R-squared	0.686042	S.D. dependent var	0.368486
S.E. of regression	0.206470	Akaike info criterion	-0.220410
Sum squared resid	1.492042	Schwarz criterion	-0.049789
Log likelihood	8.298004	Hannan-Quinn criter.	-0.159193
F-statistic	28.67840	Durbin-Watson stat	2.137232
Prob(F-statistic)	0.000000		

Appendix B: Bound test

ARDL Bounds Test
Date: 06/16/19 Time: 10:59
Sample: 1982 2016
Included observations: 35
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.2293047815 71651	1

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	3.02	3.51
5%	3.62	4.16
2.5%	4.18	4.79
1%	4.94	5.58

Appendix C: ARDL tests

ARDL Cointegrating And Long Run Form
Original dep. variable: GDPL
Selected Model: ARDL(4, 6)
Date: 06/16/19 Time: 10:58
Sample: 1975 2016
Included observations: 35

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPL(-1))	0.318853	0.166551	1.914450	0.0681
D(GDPL(-2))	-0.095395	0.176891	-0.539284	0.5949
D(GDPL(-3))	0.251832	0.156812	1.605948	0.1219
DLOG(ST(-1))	0.046770	0.014618	3.199495	0.0040
DLOG(ST(-2))	-0.000969	0.017004	-0.057015	0.9550
DLOG(ST(-3))	0.001731	0.017314	0.099951	0.9212
DLOG(ST(-4))	-0.046637	0.016929	-2.754911	0.0113
DLOG(ST(-5))	-0.035966	0.017012	-2.114154	0.0456
DLOG(ST(-6))	-0.033160	0.016325	-2.031252	0.0539
CointEq(-1)	-0.080624	0.024845	-3.245049	0.0036

Cointeq = GDPL - (0.3787*LOG(ST(-1)) + 6.9027)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(ST)	0.378679	0.175182	2.161633	0.0413
C	6.902685	0.859705	8.029129	0.0000

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.080408	Prob. F(11,23)	0.4172
Obs*R-squared	11.92384	Prob. Chi-Square(11)	0.3694
Scaled explained SS	9.823258	Prob. Chi-Square(11)	0.5464

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/16/19 Time: 11:03
Sample: 1982 2016
Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000786	0.007381	-0.106500	0.9161
GDPL(-1)	-0.006985	0.004308	-1.621347	0.1186
GDPL(-2)	0.004678	0.007208	0.648977	0.5228
GDPL(-3)	0.008153	0.007107	1.147175	0.2631
GDPL(-4)	-0.005636	0.004139	-1.361560	0.1865
LOG(ST(-1))	8.77E-05	0.000396	0.221346	0.8268
LOG(ST(-2))	-2.74E-06	0.000457	-0.005999	0.9953
LOG(ST(-3))	0.000218	0.000470	0.464030	0.6470
LOG(ST(-4))	-0.000587	0.000461	-1.271914	0.2161
LOG(ST(-5))	0.000273	0.000433	0.630776	0.5344
LOG(ST(-6))	-0.000111	0.000454	-0.243868	0.8095
LOG(ST(-7))	-4.83E-05	0.000422	-0.114508	0.9098

R-squared	0.340681	Mean dependent var	0.000221
Adjusted R-squared	0.025355	S.D. dependent var	0.000439
S.E. of regression	0.000433	Akaike info criterion	-12.38506
Sum squared resid	4.32E-06	Schwarz criterion	-11.85180
Log likelihood	228.7386	Hannan-Quinn criter.	-12.20098
F-statistic	1.080408	Durbin-Watson stat	2.824945
Prob(F-statistic)	0.417206		

VEC Granger Causality/Block Exogeneity Wald Tests
Date: 06/23/19 Time: 18:19
Sample: 1975 2016
Included observations: 37

Dependent variable: D(GDPL)

Excluded	Chi-sq	df	Prob.
D(LOG(ST)	4.741577	1	0.0294
All	4.741577	1	0.0294

Dependent variable: D(LOG(ST)

Excluded	Chi-sq	df	Prob.
D(GDPL)	2.742351	1	0.0977
All	2.742351	1	0.0977

PLAGIARISM REPORT

The Nexus between Stock Market Developmentand Economic Growth in South Africa: Empirical evidence from Granger Causality and ARDL Bound test.

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ETHICS COMMITTEE REPORT

YAKIN DOĞU ÜNİVERSİTESİ

BİLİMSEL ARAŞTIRMALAR ETİK KURULU

08.04.2019

Dear Zaynab Mohammed Alsuweee Asbeetah

Your project **"The Nexus Between Development of Stock Market and Economic Growth in South Africa: empirical evidence from Granger Causality and ARDL Bound test."** has been evaluated. Since only secondary data will be used the project it does not need to go through the ethics committee. You can start your research on the condition that you will use only secondary data.

Assoc. Prof. Dr. Direnç Kanol

Rapporteur of the Scientific Research Ethics Committee

Direnç Kanol