AN EMPIRICAL STUDY ON THE RELATIONSHIP BETWEEN STOCK MARKET DEVELOPMENT AND ECONOMIC GROWTH IN NAMIBIA

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ABSTRACT

The "supply-leading" hypothesis argues that the development of the monetary system leads to economic growth by channelling public savings to investments (McKinnon, 1973; Shaw, 1973). Patrick (1966) suggests the "demand-following" hypothesis, which says that as an economy develops demand for financial services increase and leads to the development of financial institutions and their financial assets and liabilities. A third view is that there can be a bi-directional (feedback) relationship between Stock Market Development (SMD) and economic growth. By employing EVIEWS, this study tests these hypotheses in the case of Namibia for the period 1995Q4 to 2013Q3. The purpose of this study is to examine the long-run relationship between Stock Market Development (SMD) and economic growth and the direction thereof, by applying the Johansen co-integration analysis, Unit Root Tests, and Toda and Yamamoto (1995) Granger causality tests. The study employs three measures of SMD, namely; 1) Market Capitalization ratio; 2) Total Value of Shares Traded ratio; and 3) Stock Market Turnover ratio. The results from the co-integration test indicate a long-run relationship between economic growth proxied by Real Gross Domestic Product (RGDP) and stock market indicators bearing from SMD to economic growth. The finding supports the "supply-leading" hypothesis, which is incongruous with the findings of Sunde (2013) whose study supports the "demand-following" hypothesis.

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DEDICATION

I would like to dedicate this thesis to my father, Mr. Matayo Rushalika and my mother Mrs. Catherine Rushalika. I would also dedicate this thesis to my Uncle and Aunt, Mr. Kaviro Valentin Nsengi and Mrs. Julienne Nsengi. I will eternally be grateful to them.

DECLARATION

I, Rushalika Bahabwa, hereby declare that this study is a true reflection of my own research and that this work or thereof has not been submitted for a degree in any other institution of higher education. No part of this report may be reproduced, stored in any retrievable system or transmitted in any form, (e.g., by means of electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or the University of Namibia in that behalf.

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CHAPTER ONE

INTRODUCTION

1.1 Orientation of the Study

The impact of the financial sector on economic growth of a country has been researched and documented throughout the years. It is believed that adequate supply of efficiently operated financial institutions steps up economic growth, increase the effectiveness of resource allocation, and improve wealth allocation. However, due to disagreements amongst economists, researcher and analysts, there has been controversies in establishing the nature direction of a relationship that exists between SMD and economic growth. Kimani and Olweny (2011) describe this as a "hen and egg" dilemma. Most studies in this area aim on establishing the role of financial system development in economic growth but more often exclude the role of SMD on economic growth. The role of SMD in economic growth inevitably stimulates thoughts that require answers. Amongst many other benefits, stock market is a source of funding for new ventures based on their expected profitability; it channels more savings into investment and improves capital productivity by efficiently allocating resources (Abu-Sharia, 2005).

Stimulating economic growth and development requires long-term funding, far longer than the duration for which most savers are willing to commit their funds and this constitute a barrier to economic growth. When considering this problem, the capital

market is highly appreciated because it becomes an instrument of mobilizing and utilizing long-term funds for development. Adewale and Isenmila (2012) describe it as the long-term end of the financial system. According to Levine and Zervos (1998), capital markets boost economic growth by increasing domestic savings, increasing the quantity and quality of investment and provide additional investment class that may better meet risk preferences and liquidity needs of investors. The development of a stock market represents economic strength of a country. When there is a need to improve investments, savings and the general strength of an, stock market is an essential ingredient that should not be overlooked. Vector (2005) suggests that stock markets can boost economic growth by increasing liquidity of financial assets, making global and domestic risk diversification possible, by promoting wiser investment decisions, and having an influence on corporate governance. Adenuga (2010) who explains that stock markets affect economic activities through the creation of liquidity as well supports this view. The author opines that equity markets that are liquid minimizes risks involved in making long-term investments because they become attractive and allow investors to buy or quickly sell their assets whenever they need access to their savings or want to adjust their portfolios. Paudel (2005) also supports this argument. In young and growing economies, stock market improvement is important as it influences the performance of other financial institutions such as banks and firms that needs of financial muscles to remain competitive. It is for these reasons that most, existing debates on the subject generally place much emphasis on the intermediation roles and functions of the stock market and there has been no consensus whatsoever.

According to Ajit & Wang (2013), most studies carried out on the subject have been recognized mainly through cross-country growth regressions which have been constantly yielding conflicting results due to differences in institutional characteristics, market size and economic circumstances of each country involved in a study. Thus, there is no conclusive evidence that reflects a true picture of this relationship based on an individual country. The subject has produced many incompatible findings by various researchers. For example, Tan (1999) found that in China, the relationship between financial intermediation and economic growth is positive and significant, while the effect of SMD on economic growth is limited. Wang (2002) concludes that there is no obvious correlation between China's capital market development and economic growth. Puahe *et al*. (2007) investigated the relationship between stock markets and economic growth in twelve Asian countries, including China from 1980 to 2004 and found a bi-directional feedback relationship between stock markets and economic growth in China. On the same country, Ajit and Wang (2013) found a negative relationship between actual SMD and RGDP growth in China in the end, which they stated, was in support of the argument that in underdeveloped countries SMD has no positive contribution on economic growth. From these authors, it is obvious that the relationship between SMD and economic growth remains a subject of dispute amongst scholars. Differences in findings maybe because of period, the measures of stock market development used in the study or even data analysis tools and this is proof that there is no consensus on the subject.

Schumpeter (1912), who was amongst the first researchers to examine the relation between financial development and economic growth, suggested that a well-functioning financial system promotes economic growth by categorizing and choosing investments, which are likely to flourish and efficiently allocate resources to technological innovation. Since that, thought financial systems have considerably grown and have led to improved private financing through financial markets and establishment of stock markets all around the world. Innovative financial products have emerged, facilitating better risk management and allocation of capital. This brings an understanding that if financial development facilitates long-run economic development, expanding the stock markets in developing countries might help promote their long-run economic growth. However, the relationship between stock markets development has not been conclusively established by academics, researchers, and policy makers. Irrefutable evidence is not available, but studies in various countries come up with their own findings and conclusion based on country data. This study attempts to add to the existing literature on the subject by examining the case of Namibia.

1.2 Statement of the Problem

The relationship between financial sector development and economic growth has been a constant issue in the development literature. There is no consensus both theoretically and empirically on the nature of the relationship between these two variables. According to McKinnon (1973) and Shaw (1973), financial development is a necessary condition for economic growth. This view is termed as the "supply-leading" hypothesis.

The "supply-leading" hypothesis argues that the development of the financial system leads to economic growth by channelling public savings to investments. Another view by Patrick (1966) suggests that as an economy expands demand for financial services is generated leading to the growth of financial institutions and their financial assets and liabilities. This view is termed as the "demand-following" hypothesis. A study by Sunde (2013) on financial development and economic growth using data from Namibia supports this hypothesizes. He found a unidirectional relationship between financial systems development and economic growth in Namibia. The author explained that Namibia realized financial system development when there is economic growth and not the opposite. That means that there is no feedback relationship between financial system development and economic growth in Namibia.

A third view is that there can be a "bi-directional" (feedback) relationship between SMD and economic growth. This view suggests that a combination of "supply-leading" and "demand-following" hypotheses operates simultaneously depending upon the stage of development of an economy. The final view is the independent hypothesis, which

argues that SMD and economic growth are not causally related. El-Wassal (2005) examined the relationship between stock market growth and economic growth twelve emerging economies over a period of 12 years. The author collected monthly set of data to test Co-integration and Granger Causality of these two variables. Co-integration test's results revealed a long-run relationship between stock market liquidity and size and real activity, privatization, and stock returns in five countries of which Zimbabwe was part of while the Causality tests found a bi-directional relationship between stock market growth indicators and actual economic activity, privatization, and stock returns for most of the countries under study. The findings support the existence of feedback relationship between Stock markets and economic growth. Different empirical studies carried out by different researchers such as Adamopoulos (2010); Yıldırım, *et al* (2014); Zivengwa, *et al* (2011) and Ishioro, (2013) amongst other, found support for the dissimilar views of the relationship between financial system development and economic growth in diverse countries.

The relationship between stock market development and economic growth has not received sufficient attention in Namibia. The Namibian Stock Market is one of the fairly well established in Africa but whether it contributes to economic growth or is itself a result of economic growth is not clear. This relationship is not well, if at all, documented in Namibia. The need to shed more light on the finance-growth nexus paying attention to stock market measures of financial development has motivated this study. This study seeks to assess the degree and nature of the relationship between stock market development and economic growth in Namibia.

1.3. Objectives of the Study

The main objective of the study is to analyse the relationship between SMD and economic growth in Namibia for the period 1995Q4 to 2013Q3. The main objective divided into the following specific objectives:

- To examine whether there is a long-run relationship SMD and economic growth
- To examine whether there is a causal relationship between the two variables
- To determine the direction of the causality (if any)

1.4. Significance of the Study

Theory is in support of the idea that SMD stimulates economic growth by increasing the level and productivity of investments. They increase the savings rate and enhance the efficient allocation of savings. When more savings go to the corporate sector, it accelerates economic growth. In order for developing countries to achieve growth through SMD, traditional barriers to SMD namely, small size, low liquidity, lack of transparency, and inadequate infrastructures and institutions, should not be there. The efficiency of stock markets will improve if these bottlenecks are covered, which will then boost investor confidence in the country. A thorough understanding of the relationship between stock market and economic growth is critical to investors in such a way that it could help them foresee upcoming market movement in accordance to stock market activities. It also benefits both the Government and private sectors greatly as the empirical facts would serve as a valuable guidance and reminder for them to scrutinize the effectiveness of each policy they implement. The study is a helpful tool for

Namibian policymakers and other key players to launch appropriate mix of fiscal, legal, and regulatory reforms to develop local stock market.

1.5. Limitation of the Study

This study is limited to Namibia using data from 1995Q:4 to 2013Q:3. For international analysis or information, the researcher used and acknowledged journals, books and other academic materials to help understand the subject under study. With this in mind, this report is limited to data collected from available resources in Namibia mixed with an external opinion regarding the subject.

Following the introduction, the rest of thesis is as follows. Chapter two discusses the evolution of a stock market in Namibia covering from the development of the Namibian stock market up to various ways in which the Namibian stock market can be developed. Chapter three examines theoretical framework and related literature on the functioning of stock markets and economic growth. Chapter four describes the data used, source, econometric methodology and the model while empirical investigations and discussion of results are reported in part five while the thesis ends with conclusions and policy implications being covered in Chapter six.

CHAPTER TWO

THE EVOLUTION OF THE STOCK MARKET IN NAMIBIA

2.1. Introduction

The stock market is a place where trading of both medium and long-term securities. The market (stock market) is made of primary market for the issue of new securities and the secondary market where existing shares or securities traded. It is a complex institution imbued with intrinsic means through which long-term funds of the major sectors of the economy comprising households, firms, and Government are gathered, harnessed, and made available to different sectors of the economy (Nyong, 1997). The development of a stock market presents opportunities for greater fund's mobilization, improved efficiency in resource allocation and provision of relevant information for appraisal. The activities and trading in this market are managed by the Namibian Stock Exchange. This section will look at the development of the Namibian Stock Exchange over the years, its achievements, and challenges.

2.2. Development of Namibia Stock Exchange

The foundation of the first Namibian Stock Exchange was back in 1904 in Lüderitz due to the diamond rush. Few years later, the rush was over and by 1910, the exchange closed. When the country obtained its independence plans for a second Stock Exchange were in place. With the preparations to build an independent economy Government

gave full moral and legislative support, while funding came from 36 leading Namibian businesses representing the full cross section of interested parties in developing capital markets: each donated N$10.000 as start-up capital. In October 1992, the Namibian Stock Exchange (NSE) came into existence with one dual listed firm and one stockbroker as a vehicle for locally registered companies to raise capital through public flotation, for widening of share ownership amongst the Namibian public, and for outside investors to participate in Namibian enterprises. The aim of the exchange is to make investments in capital markets easier and provide a range of appropriate tradable instruments; create and maintain an effective regulated environment to facilitate the way issuers of securities and investors get together to transact safely and securely and to contribute to the development of a supportive investment climate and culture in Namibia. The NSE is the only licensed stock exchange in Namibia in terms of the Stock Exchanges Control Act (No.1 of 1985). Securities listed on the NSE consist of primarily dual listed South African companies and primary listed Namibian companies. It is a secondary trading of financial securities such as equities and bonds.

2.3. Namibia Stock Exchange Performance

According to preliminary report for 1998, more than one billion Namibia dollars’ worth of shares were traded on the NSE in that year to 31 December, 1998, setting a new record high for the young market. The value of equity trading in 1998 was N$1,035.3 million, up by nearly 15% compared to 1997's figure of 901.3 million. The volume of shares traded was up even more, with 107 million shares traded for a total increase of

60% over the previous year's 67 million shares traded. There was growth in value traded despite market turmoil in Namibia and worldwide that saw many share prices fall and brought the Namibian share price indices back to levels seen in 1996 and even 1994. The NSE Local Index fell a massive 45% and closed the year at 106, down from 164 on 31 December 1997, and the NSE Overall Index fell 12% to end at 176 compared to 226 at the end of December 1997. The NSE has experienced growth since 2003, with the Overall Index increasing from 259 at the end of March 2003, to peak at 1034 on 11 October 2007. Trading on the NSE during 2008 was volatile, with four months in the second half of the year exceeding N$ 1.2 billion each. The total trades were N$ 9.132 billion, compared to the N$ 10.892 billion in 2007. Even though the volume of trades increased by 20% compared to 2007, an increase in volume does not necessarily result in increased profits, as the NSE’s fees are value-based, unlike the JSE where volumes drive the fees. In 2013 the Local Index increased by 21.3% on turnover of N$ 352 million after a 23.7% increase in 2012 all in an illiquid market.

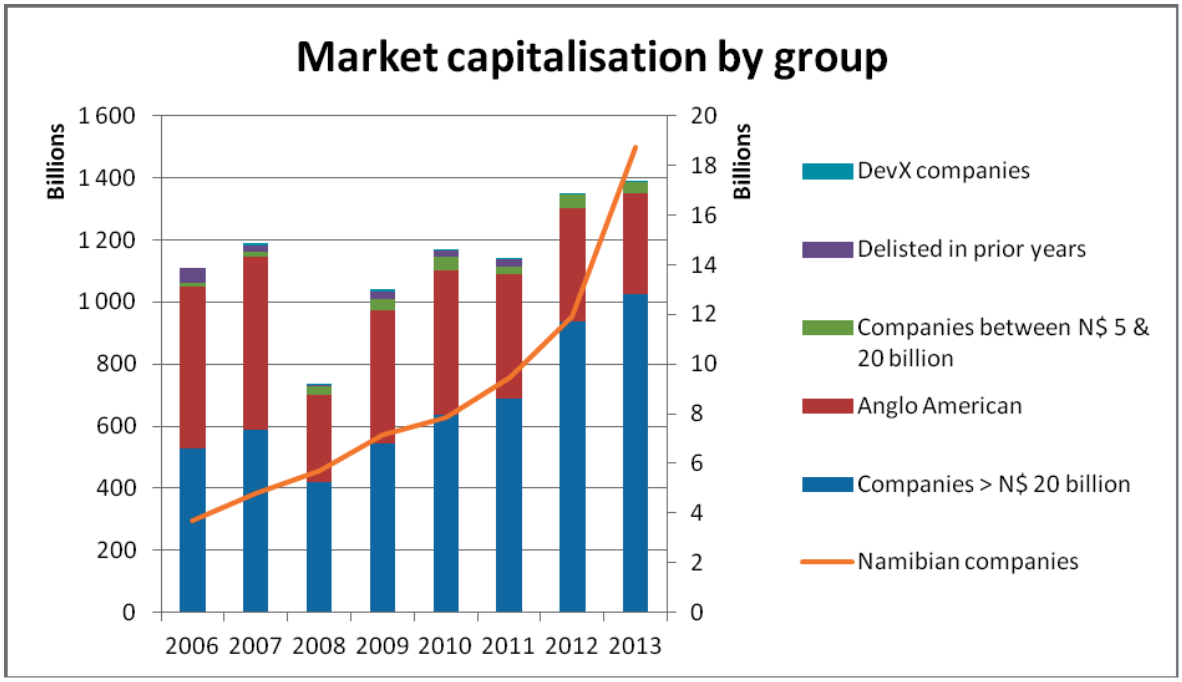
While the Overall index increased by 1.32% against the JSE All Share index increased by 17.85%. At 31 December 2013, the total market capitalization was N$ 1.407 trillion or US$ 134 billion. This result re-confirmed the position of the NSE as the second largest exchange by total market capitalization in Africa, after the JSE. The total of Government debt securities at the end of 2013 stood at N$ 18.83 billion up from N$ 9.982 billion at the end of 2010 plus N$ 5.4 billion internationally and N$ 850 million listed on the JSE according to NSE Annual Reports (2003; 2007; 2008; 2012; 2013).

Overall, there has been a steady increase in performance of the stock exchange and it has been encouraging that the institution is heading in the right direction.

2.4. Growth and Namibia Stock Exchange Capitalization

Since its launch in 1992, the market capitalization of shares listed on the NSE has grown significantly. Over 70 companies have listed on the Main Board and the Development Capital Board (DevX), but attrition through takeovers, transfers to other exchanges and two liquidations reduced the number to 34 in 2013.

Table 1: Stock Exchange Capitalization



Source: *Namibia Stock Exchange Annual Report 2013*

Table 2: Primary listed on the stock exchanges in

Australian - ASX	4
London - LSE	2
London - AIM	0
South Africa - JSE	15
Namibia - NSX	8
Toronto - TSX	5
Total	**34**

According to Namibia's Vision 2030 as cited in the Namibia Financial Sector Strategy for 2011-2022, the Namibian economy is to grow on average by 6.2 percent. The financial sector will to play an important role for the achievement of the projected growth, with financial intermediation expected to expand on average by 6.3 percent over the next 10 years. As the economy grows, there will be increased demand for finance from companies that are expanding. This demand for financing will be met not only by banks, but also increasingly by the capital market as well as venture capital and private equity. Thus, the need for SMD as it will play a key role for the growth throughout the economy.

2.5. Factors Affecting the Performance of the Namibia Stock Exchange

After much considerations and reading, the following points where identified as a problem facing the NSE.

Dual listings – the role of stock market in mobilizing funds for use in Namibia is still constantly in doubt. Companies with dual listing can raise funds from NSE to develop their operations outside of Namibia. Most of the funds generated at NSE do not

circulate in the local economy but used abroad for development of other economies. The NSE is just a channel through which funds flow to other countries.

Limited supply of shares – investors by share but do not sell and this affect liquidity on the exchange. Most trading of shares listed on the NSE, other exchanges normally take place on other exchanges, and this has a negative effect on local exchange. However, limited number of local Namibia firms that are on the exchange may also cause this problem. Not many Namibian owned companies are active on the stock exchange. According to Levine and Zervos (1996) and Ajageer, (2012), liquidity influence growth by easing investment in large, long-term projects as it allows investors to have access to their savings during the investment period through buying and selling of their stocks in a company at any time they wish to do so. When there is no high liquidity in a market, investors will be reluctant in injecting funds in investment projects that involve long-run capital commitment. If this happens, it leads to a drop in the level of investments in domestic economy, which in turn affects long-run economic growth. Empirically, Ogunmuyiwa (2010) shows that investor's sentiment and stock market liquidity Granger cause economic growth. Wachtel and Rousseau (2000) postulate that high level of liquidity is important in growing markets because it boosts confidence of both individual and portfolio investors in the values of information and risk diversification associated with trading on an organized exchange. It allows surplus resources to shift from short to long-term capital market and into venture capital. This eventually encourages growth in the number of firms and shares available to investors leading to economic growth.

2.6. Structure of the Namibian Stock Market

The following bodies and regulations govern the NSE:

1. The Stock Exchange Association is the custodians of the license to operate the stock exchange. This body comprises 37 associate members representing the 37 corporate bodies in commerce who sponsored the establishment of the NSE.

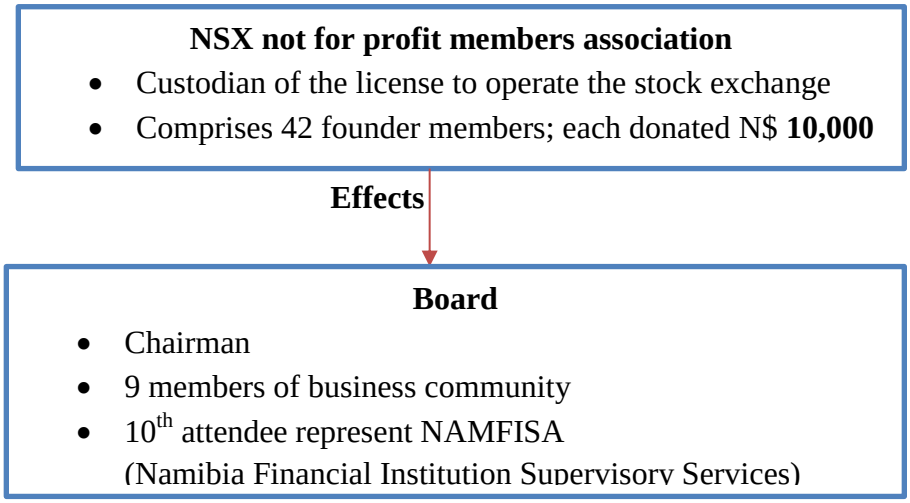
2. The Executive Committee, representing the interests of all the stakeholders in the NSE

3. Various Subcommittees are appointed from time to time as need arises. The Listings Committee meets regularly.

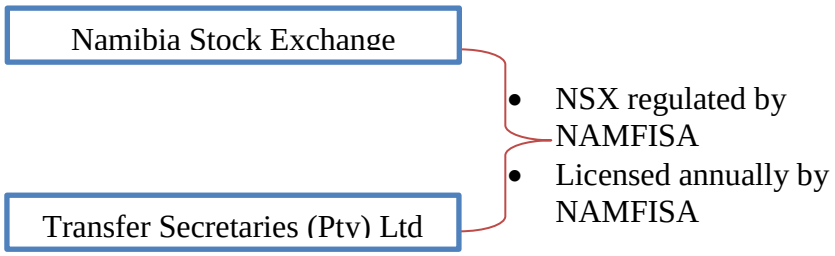
4. The Stock Exchanges Control Act (1985, amended 1992), by which the NSE is regulated. The Act is overseen by the registrar of the Stock Exchange who is the permanent Secretary at the Ministry of Finance and assisted by the Department of Financial Institutions Supervision

Table 3: Structure of Namibia Stock Exchange

Organizational Level



Operational Level



Source: ***nsx.com.na***

Listing Requirements

a. Share equity amounting to N$1 million.

b. Minimum of 1,000,000 shares in issue.

c. Profitable trading record for three years

d. Current audited profit of at least N$500,000 annual before taxation and interest.

e. Minimum of 20% of the shares should owned by the public.

f. Minimum of 150 shareholders in the company.

g. Companies should provide audited reports for the previous three years.

h. Companies should have an acceptable record of business practice and management integrity.

Source: *Namibia Stock Exchange (2014)*

2.7. Development of Stock Brokers

The Namibia stock exchange has currently four registered stockbrokers:

IJG

In 1996, IJG started its operations to capitalize on opportunities in the Namibian corporate finance and stock broking field opened up by the rapid growth of the NSE. IJG has since grown into one of Namibia's leading financial services companies offering stock broking, private equity, money market, advisory, and research services to its clients. In 2009, IJG was the leading Namibian stockbroker in the Old Mutual Namibia / NSE Executive Opinion survey. IJG is the only existing stockbroker in Namibia that is a founder member of the NSE. The Namibian Financial Institutions Regulatory Authority (NAMFISA) regulates the NSE. IJG has a 30% BEE shareholding and is a signatory to the industry's Financial Services Charter of 2009. IJG has assisted in listing twenty out of the last 22 companies and five (5) of the last six (6) Domestic Medium Term Note Programs (DMTNP") on the NSE and has helped to raise over N$2.0 billion on the NSE through bond and equity issues since 1999 for its clients. As a result, IJG is currently the sponsor to approximately 50% of all the companies listed on the NSE.

Namibia equity brokers

Wilfred Moroff founded Namibia Equity Brokers in 2003 through a management buy-out of Nedcor Securities. Namibia Equity Brokers carried out a BEE transaction in July 2004, which saw Sidney Martin and Frank Fredericks taking 50% stake in the company. They provide products such as Daily Call Deposits, Treasury Bills, Government Stock, Fixed Deposits, Preference Shares, and Debentures.

Simonis Storm Securities (SSS)

Simonis Storm Securities is a well-established Namibian financial services firm, one of the leading independent stock broking firms in Namibia. The company started in 1996 under the name, Fleming Martin Securities (Namibia). After various mergers and acquisitions, Simonis Storm Securities (Pty) Limited (SSS), a wholly owned subsidiary of Lexus Securities (Pty) Ltd, was established and is currently 100% Namibian owned. The company has grown in stature and managed to secure agency agreements with companies who are leaders in the financial industry regionally as well as internationally.

PSG Asset Management

The component companies which came together to form PSG Asset Management were essentially PSG Fund Management, PSG FutureWealth and the Unit Trust business of the three Asset Management Boutiques of PSG Absolute Investments, PSG Alphen Asset Management and PSG Tanzanite. While there was a formal and informal agreement for cooperation between these companies, they also competed to a degree in some spaces which obviously led to duplication within the greater PSG Group. These

companies have been operating for a long time and have developed into respected players in their own fields of expertise. The investment team is made up of a group of highly qualified, very experienced individuals who have garnered significant awards for themselves over the years and whose combined capabilities are sure to hold themselves in even higher stead. PSG Asset Management is an established, recognized, and respected investment management company with more than 48bn under administration and R17bn under management in a simple but comprehensive range of local and international funds. Their suite of funds spans the risk spectrum from Money Market to Equity in a focused range and includes income oriented, balanced (Reg28) and flexible funds. They also manage offshore funds within the same investment team that is responsible for the enviable ten-year investment record of accomplishment of the local funds, and have done so with success since 2006. The investment team boasts more than 150 years in experience and several of the team members have worked together for many years. PSG Asset Management has a distinct bottom-up approach to investments, with an emphasis on managing absolute risk.

2.8. Promoting Stock Market Development in Namibia

From history and available material, the Namibian stock market is small, illiquid, with infrastructural bottlenecks. Despite these problems, the stock market has helped in the financing of the growth of companies but there is little evidence of broader economic benefits. How to make the stock market more beneficial to Namibia is the real question. A number of propositions have been suggested to help develop stock markets in Africa.

These range from the need to increase automation, which Namibia has adopted and used as reference for other stock markets in Africa, demutualization of exchanges, regional integration of exchanges, promotion of institutional investors, regulatory and supervisory improvements, involvement of foreigner investors, and educational programs. Most of these propositions involve substantial benefits as well as cost outlays (Adjasi *et al*., 2007). This section will examine these possible ways in detail.

a. Automation

Namibia stock exchange has adopted this model and it uses the trading system of the Johannesburg stock exchange. Automation is particularly important if a stock exchange aim at integration. Without automation the much-touted benefits of regional stock market integration is likely to be lost.

b. Demutualization

According to Azzam (2010), demutualization began as early as 1993 when the Stockholm Stock Exchange became the first exchange to demutualize. Since then many other stock exchanges have adopted stock market demutualization. Adjasi and Yartey, (2007) explains that demutualization involves a change in the legal status, structure and control of an exchange from a non-profit, protected interest one to a profit oriented and shifts the interest of the stock exchange from satisfying financial intermediaries to the satisfaction of market participants (Morsy, 2007). Azzam (2010) opined that demutualization increases an exchange's financial performance, size, and liquidity, while lowering its debt and concluded that stock exchange change from mutual to

demutualized exchange is value enhancing for the exchange and its shareholders. However, the main concern over this strategy is that it may cause exchanges to reduce consistency of their governing oversight in order to gain market share. Listing of securities issued by an exchange or its affiliate on its own market creates new potential conflicts of interest. Conflicts regarding "self-listings" raise concerns as to an exchange's ability to, independently and effectively, enforce its own or the Commission's rules against itself or an affiliated entity, and thus comply with its statutory obligations. The possibility that for-profit exchanges may fail and go out of business can create serious problems if listed companies suddenly find it difficult to raise capital and investors face reduced liquidity for their holdings (Akhtar, (2002) & Azzam, (2010)).

c. Promotion of Institutional Investors

The participation of institutional investors in African exchanges should strongly be encouraged. Institutional investors such as pension funds, life insurers and mutual funds that operates in retirement savings system, are at the forefront when it comes to the promotion of effective market practices and financial novelty in modern financial system. They are a source of long-term capital with investment portfolios built around the two main asset classes (bonds and equities) and an investment horizon tied to the often long-term nature of their liabilities. Institutional investors also reduce reliance on the banking system, acting as shock absorbers at times of financial distress. The growth of these institutions has also contributed to the development of capital markets, providing financing to companies and governments and helping to develop mechanisms

for corporate control and risk management. However, beside their important role, there are concerns relating to institutional investors. Such concerns include the fact that investment holding periods are declining and that allocation to less liquid, long-term assets such as infrastructure and venture capital are generally very low and considered less important by allocations to hedge funds and other high frequency traders. Generally, institutional investors can act as a countervailing force to commercial and investment banks as well as other market intermediaries, forcing them to be more competitive and efficient. NSE stands to gain from high involvement of institutional investors on the stock exchange.

d. Regulatory and Supervisory Improvements

Regulation and supervision of the financial system play a great role in determining both its stability and the extent of services provided. Regulation and supervision protects investors from the potentially opportunistic behaviour of insiders. Investor protection helps solve agency problems and information asymmetry arising from inside information. As Adjasi and Yartey (2007) explained, regulatory framework involves a set of rules imposed by the authorities on the actions of participants in financial markets. Supervision is the manner in which the authorities verify and enforce compliance with the requirements of the regulatory framework. The benefits from stock market activity are many and include capital acquirement, savings, and investment growth amongst others. It is for this reason that most African governments are implementing domestic financial policies to draw foreign portfolio for enhanced investment through stock markets (Biekpe & Adjasi, 2006).

e. Involvement of Foreigner Investors

Private capitals flows—Foreign Direct Investment, remittances and portfolio investment are important for SMD and Namibia need to do more to attract capital flows especially portfolio flows. Sustained economic growth, quality public institutions and infrastructure, trade liberalization, and efficient capital markets are important for attracting capital flows (Adjasi & Yartey 2007; Asiedu, 2006). In Tanzania, Ziorklui (2001) found that regional integration and globalization of the Tanzania capital market would be beneficial in terms of attracting foreign capital, efficiency of utilization of capital and corporate governance. Foreign participation would also encourage domestic in the capital markets. The problem with portfolio capital is that they are normally targeted at large and growing markets. Attracting portfolio capital flows into stock markets goes hand in hand with opening up markets for foreign investor participation. Apart from the injection of fresh capital, opening up markets to foreign participants help to increase trading and liquidity of markets. Increasingly African markets are opening up to foreign participation with little or no ceilings on foreign ownership of shares. A few markets still have some foreign participation restrictions. For instance, foreign ownership of shares cannot exceed 40% in stock markets in Kenya and Zimbabwe and 74% in the Ghana. In Namibia, foreign nationals can only own a maximum of 55% shareholding in banking institutions. This is partly to satisfy key objectives of the Namibian Financial Sector Strategy which seeks to increase local participation in the financial services sector by the year 2020. According to the Financial Sector Strategy,

there is low participation by Namibians in ownership, control, and management of local financial institutions. The importance of foreign investment and attractive economic policies is support by Adekanye, Oluwatosin and Yusuf (2013); Odia and Donwa (2010) on Nigeria. The researchers explained that capital market has the potential to boost growth but it has not contributed significantly to the economic growth of Nigeria due to low capitalization, low absorptive capitalization, illiquidity, and misappropriation of funds amongst others. In the study, they suggested that Government should restore confidence to the market through regulatory authorities. They should portray transparency, fair trading, and improve dealing in the market capitalization by encouraging more foreign investors to participate in the market and also to increase investments instruments such as derivatives, convertibles, swap and option in the market.

f. Educational Programs

Increasing public knowledge about the functioning of the stock market could promote the development of the stock market in Namibia. Educating the public about the role of the stock market can help increase the investor based and improve the liquidity of the stock market. Many people in Namibia do not know about the Namibian stock exchange and how its functions. Education about stock markets must be at the firm, institutional (including academic institutions) and individual levels. At the firm level, it is important to allay the fears of firms by educating them strongly and regularly on the benefits of listing. Firms in Namibia have an array of reasons why they would not list on stock

markets. Apart from the lack of knowledge about how stock markets work, there are other reasons such as high listing requirements and fear of losing control over family investments. Yartey (2005) conducted a study on stock exchange in Ghana and found that 33 percent of firms gauged were reluctant to list on the stock exchange due to fear of losing control of their companies. At the individual level, Namibian markets could tap into potentially large amounts of financial wealth that exists outside of the financial system, by pursuing vigorous and consistent educational campaigns about stock markets at various levels of society. Such educational drives are already in existence in a number of stock markets in Africa. In South Africa, the JSE/Liberty Life Investment Challenge, which introduces the youth to dynamic games in economics and finance and its application to investing and trading on the JSE, has been running for three decades now. NSE has been involved in schools but at minimal. Academics from institutions of higher learning have less information on the happenings of the exchange.

Summary

The question of whether financial market development promotes growth has gained considerable attention in academic and policy discussions. It is evident that, although the figures may look good from the establishment of the NSE up to now, there are loopholes for example, liquidity problem, less number of listed local firms et cetera, that have been hampering its progress. It is thus imperative that all issues that are not well address to be solved in order to improve the performance of the NSE.

CHAPTER THREE

LITERATURE REVIEW

3.0. Introduction

Most available literature emphasizes on the role of financial intermediation in the process of economic growth and capital accumulation. Many researchers have examined the channels through which banks and other financial intermediaries may help to boost, for example, the rate of saving or productivity of capital and, in turn, growth. However, the role of stock market in economic growth is now attracting wide interest amongst researchers as they seek to identify the contribution of stock market to economic growth. Studies explain that over the past two decades, liquidity in stock market has been a vehicle for long-run growth in emerging economies. There is ample consensus that without a liquid stock market, savers would be hesitant to tie up their investments for long periods of time, which could lead to many profitable long-term investments to have no funding.

There is theoretical evidence to suggest that greater stock market liquidity boosts or at least, leads to economic growth. Some theories suggest that large, liquid and internationally integrated stock markets boost economic growth. Alternative theories, however, suggest that well-developed stock markets are relatively unimportant for aggregate economic activity. Furthermore, empirical evidence connecting SMD

indicators to development has been inconclusive even though the equilibrium in available evidence is in favour of a positive relationship between SMD indicators and economic growth. It is against this background that this section seeks to examine what theories and empirical studies say about the relationship between SMD and economic growth.

3.1. Theoretical Review

The ever growing importance of stock markets in economies has led to many studies being conducted investigating the existence of a link between SMD and economic growth. Theory around the subject suggests that SMD is an important ingredient of economic growth in both the short and long run. A well-established and managed stock market creates investment opportunities in a country by financing economic activities that ultimately leads to economic growth. Financial market is the “brain" of the whole economic system of a country and the focal of decision-making. If the system fail, the performance of the entire economic system may be impaired (Stiglitz, 1994). Stock market facilitates efficient distribution of capital, mobilizes domestic savings, and helps with diversification of risks. This also allows the firms to have permanent access to capital raised through equity issues (Levine & Zervos, 1998; Mishkin, 2001; Caporale, Howells & Soliman, 2004). Pagano (1993) postulates that financial system affect economic growth by acting on the saving rate, on the fraction of saving channelled to investment, or on the social marginal productivity of investment. Stock markets provide vital information that improves the effectiveness of financial intermediation generally.

For traded companies, the stock market improves the flow of information from management to owners and quickly produces a market evaluation of company developments (Rousseau & Wachtel, 2000). Sunde (2013) conducted block exogeneity Wald tests and found that financial development does not Granger cause economic growth in Namibia, while economic growth Granger causes financial development. He attributed these finding to the low level of financial system development in Namibia and concluded that, in the Namibian context, growth precedes financial development. The arguments for the positive relationship between economic growth and SMD have been supported by a number of studies, such as Atje and Jovanovich (1993), Levine and Zervos (1993, 1998), Rousseau and Wachtel (2000) and Beck and Levine (2004). Paudel (2005) acknowledged that stock markets, due to their liquidity, enable firms to attain much needed capital quickly, hence facilitating capital allocation, investment, and growth.

According to Athanasios and Antonios (2012) stock market contributes to the mobilization of domestic savings by enhancing the set of financial instruments available to savers to diversify their portfolios providing an important source of investment capital at relatively low cost. Although the relationship between SMD and economic growth has been extensively researched on, the link between these two variables provided ambiguous result on a major strand of finance-growth hypothesis (Schumpeter, 1932; McKinnon, 1973) with an insight into how financial intermediation facilitates economic growth.

Some economists are of the opinion that financial development is a needed in order to achieve high rates of economic growth (McKinnon, 1973; Shaw, 1973). According to El-Wassal (2005), financial system development can increase economic growth by helping savers to pool funds, to have access to a variety of instruments that can create investment opportunities. This view is termed as the "Supply-leading" hypotheses. A lot of literature and findings under this subject leans towards the "supply-leading" theory of economic growth. Stammer (1972), in his comments, postulate that this view has been highly considered by policy makers. Underdeveloped countries have opted for the establishment and development of financial system by broadening the range of financial facilities and hoping that these facilities will improve the rate of public savings and thereafter facilitate a more efficient distribution of funds for investments and economic growth. Stock markets work as the channel through which the public savings flow to industries and business enterprises. Mobilization of such resources for investment is certainly a necessary condition for economic take off, but quality of their allocation to various investment projects is an important factor for economic growth. This is precisely what an efficient stock market does to the economy (Berthelemy & Varoudaks, 1996).

Financial institutions afford risk management services, allows asset diversification, mobilize savings from atomized individuals for investment in the most productive ventures (Adenutsi, 2011). These positives of a well-developed financial system translate into economy-wide benefits. When all the above is achieved it leads to economic growth because there are productive and profitable investments financed at

lower cost and less risk. According to Levine (1997), the costs of acquiring information and making transactions create incentives for the emergence of financial markets and institutions. This hypothesis was suggested by Schumpeter in early 1900s (Schumpeter, 1912) and was later elaborated on by other researchers such as Shaw (1973), Mackinnon (1973). Financial development is a tool that enhances economic growth through various mediums:

(1) Efficient allocation of capital as the proportion of financial saving in total wealth rises,

(2) Mobilization of savings by providing attractive instruments and saving vehicles,

(3) Provision of vehicles for trading, pooling and diversifying risk,

(4) Lowering of cost of gathering and processing information and thereby improve the allocation of resources and;

(5) Increase specialization in production, development of entrepreneurship, and adoption of new technology.

In brief, it is suggests that a well-functioning financial sector will assist in the mobilization of limited resources from the surplus units to the deficit units thereby promoting efficient allocation of resources and thus lead other economic sectors in their growth process (Olufisayo, 2009).

Baier *et al* (2003) examined the connection between the creation of stock exchanges and economic growth. They found that economic growth increases relative to the rest of the world after a stock exchange opens. Evidence obtained indicated that increased growth

of productivity is the primary way that a stock exchange increases the growth rate of output, rather than an increase in the growth rate of physical capital. They also ascertained that financial deepening is rapid before the creation of a stock exchange and slower subsequently. This study encourages stock market creation and development as a contributor to economic growth. Although plausible, the "supply-leading" view is only one possible explanation. There is another strong link from economic growth to capital market, signifying that financial development follows economic growth.

Patrick (1966) came up with "'demand-following" hypotheses of this causal relationship. This hypothesis supports that idea that economic growth leads to financial system development. Stammer (1972) supported this view by suggesting that as the economy grows it generates additional and new demand for financial institutions and related services that brings about a supply response in the growth of the financial system. Patrick (1966) argued that financial intermediation helps the transfer of resources from the slow-growing sectors to the fast-growing sectors of the economy. Thus, the "supply- leading" hypothesis postulates that financial system development leads to economic growth in a country, while the "demand-following" hypothesis instigates a reverse causality relationship bearing from real economic growth to financial development (Adamopoulos & Vazakidis, 2011).

A third view is combination of the "supply-leading" and "demand-following" hypotheses. This suggestion implies that both hypotheses are mutually applicable. In his comment, Stammer (1972) stated that in real practice, there is likely to be an

interaction of "supply-leading" and "demand-following" hypotheses and that means there is a feedback relationship between financial development and economic growth. Augustine and Chikeleze (2007) termed it as "reciprocal" relationship where economic growth makes the development of financial intermediation gainful, and the establishment of an efficient financial system permits financial system in economic growth.

According to Greenwood and Smith (1997), this sort of causality pattern is possible in the long run. Patrick (1966) argued that the direction of causality changes over the course of development. During the early stages of development, financial has an impact on growth through the creation of financial institutions and the supply of financial assets. This is the same with the "supply-leading" hypotheses. However, in advanced stages of development, financial sector expansion plays a "demand-following" role. Meaning growth creates demand for financial institutions and other services leading to financial system development. Regmi (2012) consent that given that stock market is a medium for economic growth it has to be integrated into economic system of a country while designing economic policies. The author postulate that meaningful efforts are required of Government to ensure there is competent and well-established stock market because the more efficient the market is, the more it will attract investors. Well-developed, smoothly operating financial markets play an important role in contributing to the health and efficiency of an economy. Researchers over the years have found a strong positive relationship between financial market development and economic growth. Financial markets help to, efficiently, direct the flow of savings and investment

in the economy in ways that facilitate the accumulation of capital and the production of goods and services. The combination of well-developed financial markets and institutions, as well as a diverse array of financial products and instruments, suits the needs of borrowers and lenders and therefore the overall economy. In addition, efficient financial markets and institutions tend to lower search and transactions costs in the economy. Individuals, businesses, and governments in need of funds can easily discover which financial institutions or which financial markets may provide funding and what the cost will be for the borrower. This allows investors to compare the cost of financing to their expected return on investment, thus making the investment choice that best suits their needs.

3.1.1. Stock Markets and Economic Growth: The Macro Channel

Stock markets have been identified as channels through which companies can raise capital at lower cost of financing to an extend where large companies around the world sees it as cost effective means of raising funds and a way of minimizing credit risks which they would otherwise be exposed to when taking on bank financing. Caporale *et al.* (2004) opined that stock markets play a key role in allocating capital to the corporate sector, which has a real effect on the economy. They concluded that because debt financing is likely to be unavailable in many countries, particularly in developing countries, where bank loans might be limited to a selected group of companies and individual investors. Stock markets can play a pivotal role by being a channel through which firms can finance productive investments and therefore boost economic growth.

Adjasi and Yartey, (2007) stated that efficient stock markets reduce the costs of information because the information is made available by the market and reflected in stock prices. Stock markets are efficient if prices reflect all available information. When information is readily available at a lowest possible cost, it improves the acquisition of information regarding investment opportunities and thus improves the allocation resource for profitable ventures because investors are able to make informed decisions about investments. This leads to better allocation of funds amongst corporations and a higher rate of economic growth. The ability to profit from information motivates investors to research and keep an eye on firms. Better information about firms will improve resource allocation and stimulate economic growth, (Levine & Servos, 1996).

Kimani and Olweny (2011) opined that the existence of a well-functioning stock market notably helps to reduce the "principal-agent" and "information asymmetry" problems. Linking financial institutions with asymmetric information and agency costs offers financial system a more important function in accomplishing an efficient and effective capital allocation. When financial institutions accrue special knowledge in evaluating and monitoring investment projects, it gives them comparative advantage in evaluating risks and designing financial contracts (Thiel, 2001). Improved information about firms allows resource to be allocated to most promising firms which leads to faster economic growth but when the cost of information is high it keeps capital from flowing to its highest value use. Furthermore, investors are naturally reluctant to invest in activities

about which there is little reliable information as informational asymmetries and transaction costs may hamper liquidity and increase liquidity risk.

Another way stock markets may affect economic activities as mentioned above is through their liquidity. Authors such as Kimani and Olweny (2011), Levine, and Zervos (1998) have written extensively on the contribution of stock market liquidity to economic growth. Liquidity risk comes by worries related to converting assets into means of exchange. Although some analysts view stock markets in developing countries as “casinos” that produce little positive impact on economic growth, modern substantiation put forward supports the idea that stock markets can give a big boost to economic development (Levine & Servos, 1996). Liquid capital markets are markets where it is relatively inexpensive to trade financial instruments and where there is little uncertainty about the timing and settlement of those trades (Levine, 1997).The stock market affords investors with ways to liquidate their investments in securities at any desired time. The advantage thereof is that more people entrusts their financial resources into investment projects as a substitute of holding the money unused and as a result enhance the growth of the economy.

According to Corporal *et al.* (2004), well-developed stock market allows individuals with share ownership to have a reasonably liquid way of sharing risk when they invest in promising long-term projects. They allow those investors hit by liquidity shock to sell their shares to other investors who do not suffer from liquidity shocks. When there is high level of liquidity on a stock market, it reduces downside risk as well as the cost of

making investments in long-term projects that do not yield any return for a long period. Consequently, a more liquid stock market facilitate long-term investments in more profitable projects, thus improving efficiency in allocation of capital and enhancing prospects for long-term growth.

Levine and Zervos (1998) measured liquidity in the following two ways:

Turnover rate- Turnover measures the volume of domestic equities traded on domestic exchanges relative to the size of the market. High turnover serves as an indicator of low transactions costs. Importantly, a large stock market is not necessarily a liquid market because a large but inactive market may have large capitalization but small turnover rate. Second measure is the ***Value Traded ratio***, which measures trading volume as a share of national output and positively reflects liquidity on an economy-wide basis. While value traded ratio captures trading relative to the size of the economy, the turnover ratio measures trading relative to the size of the stock market. Thus, a small but liquid market may have high turnover but small value traded. Other theorists, however, have a more pessimistic opinion about the importance of stock markets liquidity. Liquid markets may induce a short-term perspective amongst investors that encourages firms to take actions, such as selling off assets, that raises profits temporarily at the expense of long-term growth. This view is supported by Arestis, Demetriades and Luintel, (2001). Zervos and Levine (1998) stated in opposition of the idea. They found no support for the contentions that stock market liquidity, international capital market integration, or stock return volatility reduces private saving rates or hinder long-run

growth but instead support that stock market liquidity has an effect on current and future rates of economic growth, capital accumulation, and productivity growth.

According to Levine and Servos (1996) and Pagano, (1993), a well-functioning and liquid stock market allows investors to diversify away unsystematic risk through internationally integrated stock markets. International risk sharing through internationally integrated stock markets improves the allocation of resources and accelerates the process of economic growth that leads to an increase in marginal productivity of capital. The ability to provide risk diversification services can have an effect on long-run economic growth by changing resource allocation and savings rates. Thus, the option to diversify a portfolio allows individual investors to undertake riskier and more specialized investment projects because the risk exposure towards domestic economic shocks reduces as a result (Thiel, 2001).

Levine and Servos (1996) and Palamalai and Prakasam (2014) explain SMD may also influence corporate control. Efficient stock markets make it easier to tie manager compensation to stock performance. This helps to align the interests of both managers and owners and improves corporate governance. Having a wide and varied scope of owners tend to improve companies’ management standards and efficiency in order to satisfy the demands of these shareholders and adhere to the more stringent rules for public corporations imposed by public stock exchanges and the Government. Thus, listed public companies have better management records than privately held companies. In a broader spectrum, corporate governance is a vital ingredient of economic growth

and particularly the role of financial factors. When providers of capital are able to monitor firms and how they make use of funds, they influence the operations of the firm and affect both savings and allocation decisions. When shareholders and creditors effectively monitor firms and induce managers to maximize firm value, it leads to efficient allocation of resources that makes savers more willing to finance production and innovation. Thus, the effectiveness of corporate governance mechanisms has a direct impact on a firm’s performance with potentially large ramifications on national growth rates (Levine, 2005).

In support of those mentioned by other authors, Rousseau and Wachtel (2000) further identified at least four more reasons why a stock market is an important financial institution even when equity issuance is a relatively minor source of funds. First, an equity market provides investors and entrepreneurs with a potential exit mechanism. They noted that venture capital investments will be more attractive when there is a possibility of exit allowing investors to gain from successful projects when the company makes an initial public offering. The option to exit through a liquid market mechanism makes venture capital investments more attractive. It might as well increase entrepreneurial activity and the impact of the market is beyond firms involved. Both foreign direct investment and portfolio investments are very important when it comes to raising capital for emerging market and transition economies and at the same time, it facilitates international portfolio diversification. Economies with organized and liquid markets attract more investment portfolio than those that are not.

Third reason mentioned by Rousseau and Wachtel (2000), echoed by Levine (1997), is that provision of liquidity through organized exchanges encourages both international and domestic investors to transfer their surpluses from short-term assets to the long-term capital market, where the funds can provide access to permanent capital for firms to finance large, indivisible projects that enjoy substantive scale economies. The fourth and final reason substantiated by the above-mentioned authors is that a stock market provides important information that improves the efficiency of financial intermediation generally. For traded companies, the stock market improves the flow of information from management to owners and quickly produces a market evaluation of company developments.

Summary

Theoretical evidence suggests that SMD at least creates an environment that facilitates economic growth in a country. Sound macroeconomic environment, well-developed banking sector, transparent and accountable institutions, and shareholder protection are necessary preconditions for the efficient functioning of stock markets. From stated arguments, it is evident that financial institutions are imperative for SMD for the reason that efficient and liable institutions tend increase appeal and confidence in equity investment. Since the revolutionary work of Patrick (1967) and the instantaneous contributions by McKinnon (1973) and Shaw (1973), the finance-growth theory has triggered much empirical analysis. The resulting questions have been around the interest to find out whether or not SMD promotes growth. However, owing to the underdevelopment of capital markets in most African economies, the analysis always

put much emphasis on establishing the relationship between the development of the banking sector and economic growth. This has resulted in a situation where the contribution of the stock markets to the growth of the African economies is erratic and inchoate. This study, using empirical data, seeks to narrow this cavernous knowledge void by examining the relationship between the development of the stock market in Namibia and the growth of Namibian economy.

3.2. Empirical Studies

Empirically just like theoretically, there is no consensus on the relationship between SMD and economic growth. Most empirical studies suggested that there is a unidirectional causality between SMD and economic growth with direction from SMD to economic growth, while less supports a two-sided causality linking economic growth and SMD. Other studies have found there is not relationship between these two variables, especially in developing countries that bank-oriented. Empirical evidence agrees that there is indeed a relationship between SMD and economic growth, but have not been conclusive on causality of this relationship as most findings support the “supply-leading” hypothesis.

Guotai and Hailemariam (2014) found a statistically significant positive relationship between SMD and economic growth. They studied the relationship between SMD and economic growth using empirical evidence for emerging market and opined that well-functioning stock markets provide opportunities for firms to have more efficient and

greater risk sharing along with amelioration of information and transaction costs, and thereby, promote economic growth. Their finding further revealed that the development of stock market does help predict the future economy, which to a certain degree supports the "supply-leading" hypothesis.

Antonios and Athanasios (2012) are in support of the "demand-leading" hypothesis. They conducted Granger causality tests in an empirical analysis on SMD and economic growth and found a unidirectional causality between SMD and economic growth bearing from economic growth to SMD. Hence, one would conclude that economic growth has a direct positive effect on SMD. Levine and Zervos (1996) conducted a study on SMD and long-run growth to establish whether there is a strong empirical association between these two variables. Their Cross-country regressions analysis found a positive and strong association between these SMD and economic growth. Moreover, they explained that influential variables procedures indicate a strong correlation between the predetermined elements of SMD and economic growth in the long run but the exact causal relationship between the two variables is not clearly stated. Eita and Jordaan (2007) analysed the causal relationship between financial development and economic growth in Botswana for the period 1977 to 2006, using Granger causality through co-integrated Vector Auto-regression methods. They found a stable long-run relationship between financial development and economic growth with "supply-leading" hypothesis in Botswana. Their results further postulate that the development of the financial sector is important in the economic growth and development in Botswana. They then advised

that financial intermediation and institutional financial reforms are vital in order to promote Botswana’s economic growth.

Kamal (2013) came up with contradicting idea regarding the causal relationship. He re-investigated the relationship between financial development and economic growth in Egypt and found that the banking sector development has a unidirectional causal effect on economic growth, which in theory, is in line with the finance-led growth hypothesis. He, however, stated that SMD does not create growth because the banking in Egypt dominates the financial system and that the Egyptian Exchange (EGX) is susceptible to political or doubtful environment that obstructs the existence of any solid relation between economic growth and SMD in Egypt.

Tachiwou (2010) explains that stock market is an important ingredient and indicator of an economy’s financial health. The author conducted a time series econometric investigation over the period 1995 to 2006 to establish the effect of SMD on growth in West African Monetary Union. The study concluded that SMD positively affects economic growth in West African Monetary Union (WAMU) in both the short and long run, which is in consensus with other findings, but fail to establish the nature of this relationship.

Kolapo and Adaramola (2012) studied the impact of the Nigerian capital market on its economic growth from the period of 1990-2010 in an attempt to uncover whether stock market performance is an impetus for economic growth and development. The economic growth was proxied by Real Gross Domestic Product (RGDP). Capita market

variables in the study were; Market Capitalization (MCAP), Total New Issues (TNI), Value of Transactions (VLT), and Total Listed Equities and Government Stocks (LEGS). The authors applied the Johansen co-integration and Granger causality tests to analyse the data and the outcome from the study concluded that capital market and economic growth in Nigeria are co-integrated. Meaning there is a long-run relationship between capital market and economic growth in Nigeria. The causality test outcome postulated a bi-directional causation between the GDP and the value of transactions (VLT) and a unidirectional causality from MCAP to GDP and not vice versa. The study could not establish a "reverse causation" bearing from GDP to MCAP. The study could also not establish independence "causation" between the GDP and TNI as well as GDP and LEGS. These findings clearly support positive effect of capital market on the Nigerian economic growth. Sajuyigbe and Odetayo (2012) also echoed the findings in their study on Nigeria.

Oladipo and Ogboi (2012) examined stock market-economic growth nexus in the Nigerian economy. They investigated the effects and the causal relationship between the two variables using annual time series data from 1981 to 2008 in Nigeria as they thought to empirical evidence for stock market operation to stimulate economic growth. Authors used an error correction mechanism (ECM) model for data analysis to establish the interaction between stock market and economic growth. The author used the Granger causality test to test the causal relationship amongst the variables. The empirical results obtained from the study showed that, there was unidirectional causality between stock market and economic growth, bearing from economic growth (GDP) to stock market

(MCAP) at 5 percent significant level. They further stated that stock market has negative effect on economic growth in the short-run but positive effect in the long run. The study concluded that, the Nigerian stock market ought to expand in order to improve their ability to mobilize resources and efficiently allocate them to the most productive sectors of the economy to enhance economic growth. These findings are different when compared to those found by Kolapo and Adaramola (2012).

Adebola and Dahalan (2011) examined the concurrent effect of stock market and banking sector on economic growth and the prevalence of "supply-leading" hypothesis in Nigeria for the period 1981-2009. They found that in the short-run, stock market and banks have positive but insignificant effect on economic growth in Nigeria. However, in the long run the relationship turns significant with banks more efficient in promoting economic growth. On the issue of "supply-leading" hypothesis, the causality test indicated that "supply-leading" hypothesis predominate "demand-following" in the long run. This means that development of the financial sector is important in its process of sustainable economic development with the banking system more compatible. In the very same country (Nigeria), Chikeleze and Augustine (2007) collected time serial data covering the period 1986-2006 to test the bearing of causation between SMD and economic growth using the Granger causality test. The empirical confirmation obtained from the study strongly suggested that there is a bi-directional relationship between SMD and economic growth in Nigeria. The findings in study provided a strong support for the "feedback" causal relationship between these two variables. That is, SMD Granger cause economic growth, and economic growth Granger cause SMD. The

author, however, explains that this evidence should be considered carefully as the measures of SMD used to carry out the study may not have been adequate. When compared to the work of Adebola and Dahalan (2011), time factor could have led to studies yielding different results.

Austin and Bernard (2011) contacted a time series analysis on the role of SMD on economic growth of Nigeria using a 15-year time series data from 1994-2008. They used Ordinary Least Square (OLS) techniques for data analysis. In this study, the MCAP ratio is a proxy for market size while value traded ratio and turnover ratio proxies for market liquidity. They found that MCAP and value traded ratios have a very weak negative correlation with economic growth while turnover ratio has a very strong positive correlation with economic growth but that stock MCAP has a strong positive correlation with stock turnover ratio. These findings support the notion that stock market liquidity has propensity to spur economic growth in Nigeria and that MCAP influences market liquidity.

Zivengwa *et al* (2011) carried out a study using econometric techniques of Unit Root Tests, Vector Autoregressive (VAR) and Granger causality tests to explore the causal link between SMD and economic growth in Zimbabwe for the period 1980 to 2008. They found a unidirectional causal link that runs from SMD to economic growth and there is evidence of an indirect transmission mechanism through the effect of SMD on investment. This empirical finding supports the "supply-leading" theory.

Ndlovu (2013) examined the causal relation between financial system development and economic growth from a Zimbabwean perspective co-integration and causal relationship between these two variables. Using multivariate Granger causality test the study found existence of "demand-following" financial development in Zimbabwe. The study concluded that there is a unidirectional causality from economic growth to financial development. The author then suggested that concern should focus on trade liberalization and other related activities in order to spur economic growth, since financial system development is a passive reaction to economic growth. Still in Zimbabwe, Ishioro (2013) explored the causal linkage between SMD and economic growth for the period 1990:Q1 to 2010:Q4. The author used the Augmented Dickey-Fuller (ADF) Unit Root Tests and the long run Granger causality estimation technique by Toda and Yamamoto (1995) to test the nature and direction of causality between economic growth proxy by RGDP growth rate and SMD proxied by real market capitalization, value traded ratio and stock market volatility. The researcher found that in line with the "supply-leading" hypothesis. These studies are a typical example of lack of any consensus in this subject of study.

Kimani and Olweny (2011), using Granger causality test approach carried out a study on stock market performance and economic growth in Kenya for the period 2001 to 2010 using quarterly secondary data. They found a unidirectional causality running from stock market performance to economic growth. This study supports the "supply-leading" hypothesis of economic growth. The authors suggested that higher stock index predicts a higher future economic growth rate. In the same study, co-integration test

done in order to examine whether the variables are co-integrated. There was cointegration of variables with at least one cointegrating vector. Results shows that changes of stock prices in the Nairobi stock exchange reflect the macroeconomic state of the country and as a result, it can be a benchmark to envisage the prospect of economic growth.

Enisan and Olufisayo (2009) studied the long run and causal relationship between SMD and economic growth for seven countries in sub-Saharan Africa (Cote D'Ivoire, Egypt, Kenya, Morocco, Nigeria, South Africa, and Zimbabwe). They used autoregressive distributed lag (ARDL) bounds test and found a co-integrated relationship between SMD and economic growth in South Africa and Egypt. The results from this test suggested that in the long run SMD has a significant positive impact on economic growth. They further carried out the Granger causality test based on vector error correction model (VECM) which showed that Stock Market Development Granger causes economic growth in Egypt and South Africa but causality in the context of VAR uncovered a bi-directional relationship between stock market development and economic growth for Cote D'Ivoire, Kenya, Morocco and Zimbabwe. Using market size as indicator of SMD, they found weak evidence of growth-led finance in Nigeria. From their findings, they argued that stock markets could help promote growth in Africa and recommended sound regulatory system and macroeconomic policies be implemented in order to achieve this growth.

Cavenaile, Gengenbach and Palm (2013) conducted a co-integration-based and causality analysis on stock markets, banks and long-run economic growth in order to establish a long run relationship between the three variables under question in five developing countries (Malaysia, Mexico, Nigeria, Philippines and Thailand). They found there to be a single cointegrating vector between financial development and growth and of causality going from financial development to economic growth but there is title evidence on reverse causation as well as bi-directional causality. This evidence amplifies the importance of financial system development for economic growth while banks and stock markets may have diverse effects depending on the stage of economic development.

Using causality test developed by Granger and yearly Malaysian data for the period 1977-2006, Mun *et al*. (2008) concluded that there is a causal relationship between SMD and economic growth. They further stated that the evolution of the financial sector, in particular the stock market, stimulate and promote economic growth when monetary authorities adopt liberalized investment and openness policies and improve the size and the regulations of the stock market and macroeconomic stability.

In Iran, Rad and Etemadmoghaddam (2014) examined the long and short run effects of SMD and banking sector development on economic growth in Iran. Utilizing quarterly data from 1995-2010, the authors used ARDL to establish co-integration in the long run amongst the series, while short-run relationship was tested by ECM. The study found SMD to be essential ingredient of economic growth in the long run, but with less

magnitude in contrast with other determinants of growth, such as banking sector development. Furthermore, the study revealed that SMD has a significant effect on economic growth in short-run, but the short-run coefficient of SMD is lower than the long-run coefficient.

In Pakistan, Shahbaz, Ali and Ahmed (2008) found a long-run relationship between SMD and economic growth and explained that SMD is an imperative driver that leads to economic growth. The Engle-Granger causality tests produced a bi-directional causality relationship between SMD and economic growth in Pakistan in long run while in short-run, the causality runs only one-way. That is from SMD to economic growth. In other words, in the short-run the relationship seems to follow the "demand-leading" growth theory and in the long run, the economy tends to move towards "supply-leading" theory.

By carrying out an empirical analysis, Palamalai and Prakasam (2014) attempted to investigate the direction of causality between SMD and economic growth in the Indian context. Using the co-integration and causality tests for the period June 1991 to June 2013, they found a long-run equilibrium relationship between the SMD indicators and economic growth in India. They then recommended that the capital market regulators should implement effective policy frameworks towards the development of Indian stock market in order to, substantially, enhance its size, depth, and liquidity, and increase economic activities.

Gupta and Paramati (2011) conducted an empirical analysis of stock market performance and economic growth using evidence from India to establish whether the stock market performance leads to economic growth or vice versa an also examined short-run and long-run dynamics of the stock market. They collected monthly Index of Industrial Production and quarterly GDP Gross data for the period April, 1996 to March, 2009 to do Unit Root Tests, Granger causality test, Engle-Granger Co-integration test and ECM. The study provided evidence in favour of “demand-following” hypothesis for the Indian context in the short-run suggesting that economic growth plays an important role in determining the stock price movements and economic growth tends to be more likely to stimulate and promote SMD by adopting appropriate reallocation of resources.

In Malaysia, Hossain, Sadi and Mohammad (2013) used Engle-Granger Co-integration and the Granger causality approaches to establish the causality relationship between stock market and economic growth from 1991:Q1 to 2009:Q4.and concluded that both in the short and long run, there is a causality relationship between these variables respectively but the relationship is unidirectional. They suggested that the share price index can forecast future economic growth of Malaysia, however, economic growth is unable to predict share price.

Mun *et al*. (2008) carried out a study, did a Granger causality test using yearly Malaysian data for the period 1977-2006, and found a "causal" relationship between the stock market and the economy. They found that while stock market Granger-caused economic activity, no reverse causality exists. Their study showed that the stock market

growth Granger cause the economic growth. They then suggested that SMD in Malaysia should be promoted in order to attain economic growth as the stock market can be served as a leading indicator for economic growth.

Ajit and Wang (2013) empirically examined the impact of the SMD on economic growth in China using quarterly data from 1996 to 2011. Within the unit root and the co-integration framework, the empirical obtained indicated a negative relationship between real stock market development and RGDP growth in China in the long run and the short-run. Harris' (1997) supports this view by stating that SMD in emerging economies generally does not positively foster economic growth. Arestis, Demetriades and Luintel (2001) examined the role of stock markets in economic growth. Empirically they found that, while stock markets can contribute to long-term economic growth, their level of influence is, at best, minimum compared to that of the banking system.

In Saudi Arabia, Abbas (2013) investigated the relationship between financial development and economic growth in for the period 1989-2008 using Fully Modified Ordinary Least Squares (FMOLS) approach as model to analyse the data. The author postulated that bank credit to the private sector positively affect economic growth in the long run, while this effect is insignificant and negative in the short-run. The author further stated that stock market has an expected positive but insignificant effect on the economy in the long run but unexpected and insignificant effect in the short-run. These findings support banking sector development and less on SMD.

Adamopoulos and Vazakidis (2011) carried out an empirical analysis on financial development and economic growth in United Kingdom for the period 1965-2007 using a VECM. The Granger causality tests conducted found a bilateral causal relationship between economic growth and SMD and a unidirectional causal relationship between economic growth and credit market development bearing from economic growth to credit market development for that period under study. They then concluded that SMD economic growth more than credit market development in the UK.

Carp (2012) used empirical evidence from emerging markets in Central and Eastern Europe to establish whether SMD boosts economic growth. The results showed that economic growth is certainly encouraged by the real investments in the economy, which obliquely generate positive externalities on stock market indicators and in the real sector. Granger causality analysis in the same study concluded that MCAP and stock value traded do not exert any impact on economic growth rates because of low level of SMD and its diminished role in the Romanian economy.

Boubakari and Jin (2010) examined, using Granger causality test, the causality relationship between stock market and economic growth based on the time series data compiled from five countries (Belgium, France, Portugal, Netherlands and United Kingdom) for the period 1995:Q1 to 2008:Q4. Their findings postulate a positive link between the stock market and economic growth for some countries for which the stock market is liquid and highly active. However, there is no causal relationship in countries having small and liquid stock markets.

Antonios (2010) investigated the causal relationship between SMD and economic growth for Germany for the period 1965-2007 using a VECM and Granger causality tests conducted suggested a unidirectional causality between these two variables bearing from SMD to economic growth. This finding supports the "Supply-leading" hypothesis where economic growth is a result of financial system development.

Yıldırım, Kaya and Bayar (2014) examined relationship between SMD and GDP in Turkey during the period 1999-2013 by using Johansen co-integration test and Granger causality test. The empirical results obtained from the study indicates that there is a long run relationship between economic growth and stock MCAP, total value of stocks traded, turnover ratio of stocks traded in Turkey. They established a unidirectional causal relationship bearing from market capitalization, total value of stocks traded and turnover ratio of stocks traded to economic growth. This is in support of the supply-leading hypothesis of growth.

In Belgium, Nieuwerburg (2005) attempted to examine whether SMD causes economic growth found strong evidence that SMD caused economic growth in Belgium, especially in the period between 1873 and 1935. The author further postulated that institutional changes affecting the stock exchange might explain the time-varying nature of the link between SMD and economic growth.

Ajageer *et al*. (2012) did a study on SMD and economic growth in least developed countries for the period 1995 to 2009. Their results show an overall inconsequential

relationship between SMD and economic growth in least developed countries but found that banking development and education are the main factors contributing towards growth of these economies. These findings are justifiable by reason that these economies are typically banking oriented and that their stock markets are comparatively young. This may be considered to be the case for Namibia, a country that is known to be less developed in terms of financial modernization and their financial system is highly dominated by the banking and insurance sectors. Education is an instrument of economic growth that is highly regarded in Namibia.

Summary

From theoretical and empirical studies, there has not been any conclusive evidence to establish the nature of the relationship between SMD and economic growth. There could many reasons as to why this is so. For example, period under study, methodologies, measures of stock market indicators and so on… However, theory and empirical studies have supported a positive relationship between SMD and economic growth. It can thus be said that SMD is critical for economic growth in developing countries of which Namibia make part.

The empirical studies show that stock markets boosts economic growth by creating liquidity of financial assets, making global and domestic risk diversification possible,

promoting calculated and well researched investment decisions, and also influencing corporate governance.

However, from reviewing published literature we found that the current evidence on the relationship between these two variables is conflicting. Our study aims to test this relationship using Namibian data and advanced econometric techniques. Understanding of this relationship will provide important insight into this relationship for policy makers who seek to develop economic policies to best target for a sustainable economic development. This will be of importance for investors who are interested in the future direction of economic development and stock market movements. Namibia provides a unique opportunity for this analysis because of its rapid economic activity.

CHAPTER FOUR

METHODOLOGY

4.1. Introduction

This study employed secondary data obtained from the NSE Annual Reports and Accounts of various years, Namibian Statistics Agency and from the relevant literatures (books, journals, previous research papers, and electronic sites). In an attempt to ascertain the link between economic growth and stock market indicators the researcher employed Unit Root Test, Johansen co-integration test and Toda and Yamamoto (1995) Granger Causality test to the data obtained.

4.2. Sources of Data and Description of Variables

According to Zivengwa *et al*. (2011), economic growth is the increase in a nation's capacity to produce goods and services over time as is shown by increased production levels in the economy. There exist various measures used to scale economic growth and these comprises of RGDP growth rate, Nominal Gross Domestic Product (NGDP) per capita, Real Gross National Product (RGNP) and RGDP per capita amongst others. The study used RGDP per capita growth rate as a measure of economic growth as it focuses on actual domestic production per and gives a generalized view on the actual wellbeing of a country's general public. The study considered other measure such as since it measures production by Namibian factors regardless of their global location. Problems

arise in evaluating the wellbeing of nationals based on production beyond Namibia's boundaries, hence real GDP per capita is the preferred proxy in line with studies by Levine and Zervos (1996) and Tuncer and Alovsat (1998).

The researcher used time series quarterly data of RGDP growth rate, MCAP ratio, total value of stocks traded and turnover ratio of stocks traded during a period 1995: Q4-2013:Q3 to investigate the effects of SMD on economic growth in Namibia. Market capitalization represents the size of the stock market, while total value of stocks traded and turnover ratio of stocks traded variables represent liquidity of the stock market. Economic growth data proxied by GDP comes from National Accounts Time Series provided by the Namibia Statistics Agency. For accuracy, the researcher compared GDP data with those provided by the Central Bank of Namibia. Market capitalization and total value of stocks traded are derived from NSE's Annual Reports and Accounts and Security and Exchange Commission Annual Reports and Accounts and we calculated turnover ratio of stocks traded.

4.3. Measurements of Stock Market Development

The main objective of the study is to analyse the relationship between SMD and economic growth in Namibia for the period 1995Q4 to 2013Q3. The study made use of three sets of variables, as identified by Guotai and Hailemariam (2014) to measure the SMD. They are; Market capitalization, Total Value of Shares Traded, and Turnover ratio. First, the common indicator for the size of stock market is MCAP.

Guotai and Hailemariam (2014) explained that a larger value of MCAP ratio indicates a large country with a larger stock market. In this regard, a country with a well-developed stock market tends to have a larger stock market relative to the size of its economy. Second, the two variables that measure the level of stock market liquidity are Volume Trade and Turnover. Volume Trade is the total value of stock traded divided by GDP. Since volume trade measures the volume of stock traded as a share of total output, it should accurately reflect the stock market liquidity relative to the size of the economy (Levine & Zervos, 1998). Another stock market liquidity variable is Turnover, which equals the total value of stock traded divided by the total value of stocks listed on the domestic market. It is important to distinguish between Turnover and Volume Traded as they reflect different aspects of SMD. Turnover measures the volume of stock trading relative to the size of stock market, whereas Volume Traded measures the volume of stock trading relative to the size of the economy. This would render Turnover a more objective indicator for stock market liquidity than Volume Trade regardless of the size of the economy.

A small but liquid stock market would still have a high value of Turnover. Similarly, a large but inactive stock market would have a low value of Turnover (Levine & Zervos, 1998). Using a variety of measures provides a richer picture of the potential links between SMD and economic growth than if a single measure is used. In this sub-section, we describe the various measures of SMD and formulae.

Stock Market Variables

Market Capitalization Ratio (MCP): This measure equals the value of listed shares divided by GDP. The assumption behind this measure is that overall market has a positive correlation with the ability to mobilize capital and diversify risk on an economy-wide basis. Adenuga (2010) as well utilizes this measure.

$$\boldsymbol{CAP = \frac{StockMarketCapitalization}{MarketGDP} \times 100} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{1})$$

Total Value of Shares Traded Ratio (STV): This measure equals total value of shares traded on the stock market exchange divided by GDP. The total value traded ratio measures the organized trading of firm equity as a share of national output and therefore should positively reflect liquidity on an economy-wide basis. The total value traded ratio complements the MCAP ratio: although a market may be large, there may be little trading. Rousseau and Wachtel (2000); Beck and Levine (2004) and Adenuga (2010) used this measurement.

$$\boldsymbol{STV = \frac{Total\ Value\ of\ Shares}{Market\ GDP} \times 100} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (\mathbf{2})$$

Turnover Ratio (STR): This ratio equals the value of total shares traded divided by MCAP. Though it is not a direct measure of theoretical definitions of liquidity, high turnover is most of the time utilized as an indicator of low transaction costs. The turnover ratio complements the MCAP ratio. A large but inactive market will have a large MCAP ratio but a small turnover ratio. Turnover also complements the total value

traded ratio. While the total value traded ratio captures trading relative to the size of the economy, turnover measures trading relative to the size of the stock market. A small liquid market will have a high turnover ratio but a small total value traded ratio.

$$\boldsymbol{STR = \frac{Total\,Value\,of\,Shares}{Market\,Capitalization} \times 100} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(\mathbf{3})$$

4.4. Econometric Analysis

The motive to carry out this study springs from the following three specific objectives: Firstly, to examine whether there is a long-run relationship SMD and economic growth whereby we establish whether there is co-integration using Johansen co-integration test. The secondly, to examine whether there is a causal relationship between these two variables and thirdly to establish the direction of causality (if any). Since most of the time series data are non-stationary, we decided to carry out the Unit Root Tests to determine if the time series data are stationary and to determine the time series properties of the variables in our equations. To characterize the existence of a long-run relationship amongst variables in question, we used using the modernized Johansen co-integration technique (Augustine & Chikeleze, 2007). In order to establish a causal relationship between SMD and economic growth, we employed a modified version of the Granger causality test, which is robust for the co-integration features of the process.

Toda and Yamamoto (1995) suggested this procedure with the objective to overcome the problem of invalid asymptotic critical values when causality tests are performed in the

presence of non-stationary series. The researcher used EVIEWS 6.0 software package in the analysis of the dataset. According Toda and Yamaoto (1995), even if the series are non-stationary, a level vector autoregressive (VAR) model can be estimated and a standard Wald test can be applied. The Toda and Yamamoto (1995) procedure essentially suggests the determination of the d-max, that is, the maximal order of integration of the series in the model, and to intentionally over-fit the causality test underlying model with additional d-max lags – so that the VAR order is now p = k + d (where *k* is the optimal lag order).

4.4.1. Unit Root Tests

The usual techniques of regression analysis can result in highly misleading conclusion when variables contains stochastic trend. In particular, if the dependent variable and at least one independent variable contain stochastic trend, and if they are not co-integrated, the regression results are spurious, (Phillips (1986), Granger and Newbold (1974)). To identify the correct specification of the model, an investigation of the presence of stochastic trend in the variables is important. To test for the stationarity of economic growth, and SMD a number of econometric techniques have been employed. The DF-GLS Unit Root Test is applied in order to investigate that each of the variables contains stochastic trend or not.

Following the studies of Adenuga (2010) and Antonios (2010), the ADF test involves the estimation of one of the following equations:

$$\Delta X_t = \beta X_{t-1} + \sum_{j=1}^{p} \delta_j \, \Delta X_{t-j} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (4)$$

$$\Delta X_{\mathrm{t}} = \alpha_{\mathrm{o}} + \beta X_{t-1} + \sum_{\mathrm{j=1}}^{\mathrm{p}} \delta_{\mathrm{j}} \, \Delta X_{\mathrm{t-j}} + \varepsilon_{\mathrm{t}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

$$\Delta X_{\mathrm{t}} = \alpha_{\mathrm{o}} + \alpha_1 t + \beta X_{t-1} + \sum_{\mathrm{j=1}}^{\mathrm{p}} \delta_{\mathrm{j}} \, \Delta X_{\mathrm{t-j}} + \varepsilon_{\mathrm{t}} \ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The additional lagged terms are included to ensure that the errors are uncorrelated. The null hypothesis is that the variable X_t is a non-stationary series (H_o: β = 1) and is rejected when β is significantly negative (H_a: β<0). If the calculated ADF statistic is higher than McKinnon's critical values in absolute terms, then the null hypothesis (H_o) is rejected and the series is said to be stationary or integrated of order zero I (0). Alternatively, non-rejection of the null hypothesis implies non-stationarity and this brings about the need for further tests on the difference of the series in order to achieve stationarity and the null hypothesis are rejected (Dickey & Fuller, 1979).

4.4.2. Johansen Co-Integration Analysis

In the literature, a number of studies have applied co-integration analysis in examining then relationship between SMD and economic growth (Kamal & Hossain 2010; Prakasam & Palamalai 2014, amongst others). Co-integration tests in this study are conducted using the method developed by Johansen (1988), Johansen and Juselius

(1990). Following the studies of Chang (2002), Adamopoulos and Vazakidisand (2009), since it has been determined that the variables under examination are integrated of order 1 the co-integration test is performed. The testing hypothesis is the null of non-co-integration against the alternative that is the existence of co-integration using the Johansen maximum likelihood procedure (Johansen & Juselius, 1990; 1992). The multivariate co-integration techniques developed by Johansen (1988) and Johansen and Juselius (1990) using a maximum likelihood estimation procedure allows researchers to estimate simultaneously models involving two or more variables to circumvent the problems associated with the traditional regression methods used in previous studies on this issue. Therefore, the Johansen method applies the maximum likelihood procedure to determine the presence of co-integrated vectors in non-stationary time series. The researcher used the equation bellow to determine whether a long-run equilibrium relationship exists between real GDP and each of the indicators of SMD:

$$In\, Y_t = \beta_0 + \beta_1 InSMD_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots (7)$$

Where Yt is RGDP per capita in period t, SMD represents the indicators of Stock Market Development while ε is a standard error term which is assumed to be white noise and all variables are in natural logarithms. Following the study of Chang and Caudill (2005), Johansen (1988), Johansen and Juselius (1990) (as cited by Adamopoulos & Vazakidis, 2011), this study used two test statistics for testing the number of co-integrated vectors (or the rank of Π): the trace ($\lambda\, trace$) and the maximum

eigenvalue($\lambda\, max$) statistics. The likelihood ratio statistic (LR) for the trace test (λ trace) as suggested by

Johansen (1988) is:

$$\lambda\, trace = -T \sum_{i=r+1}^{p} ln(1-\lambda_1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(8)$$

Where λ_1 is the largest estimated value of ith characteristic root (eigenvalue) obtained from the estimated Π matrix, r = 0, 1, 2…p-1, and T is the number of usable observations. The $\lambda trace$ statistic tests the null hypothesis that the number of distinct characteristic roots is less than or equal to r, (where r is 0, 1, or 2,) against the general alternative. In this statistic $\lambda trace$ will be small when the values of the characteristic roots are closer to zero (and its value will be large in relation to the values of the characteristic roots, which are further from zero).

Alternatively, the maximum eigenvalue (λmax) statistic as suggested by Johansen is:

$$\lambda_{max(r,r+1)=-T\, ln(1-\lambda_{r+1})} \ldots\ldots\ldots (9)$$

The λmax statistic tests the null hypothesis that the number of r co-integrated vectors is r against the alternative of (r+1) co-integrated vectors. Thus, the null hypothesis r=0 is tested against the alternative that r=1, r=1 against the alternative r=2, and so forth. If the estimated value of the characteristic root is close to zero, then the λmax will be small.

4.4.3. Toda and Yamamoto Granger causality test

Granger causality test is applied in order to find the direction of causality between examined variables of the estimated model. This study uses Granger causality test proposed by Toda and Yamamoto (1995) for testing statistical causality between SMD and the economy growth. Toda and Yamamoto (1995) utilize a Modified Wald (MWALD) test for restrictions on the parameters of a VAR (k) model (where k is the lag length in the system). Toda and Yamamoto (1995) proved that this test has an asymptotic x^2 distribution when a VAR (k+ max d) model is estimated (where max d is the maximal order of integration suspected to occur in the system). The advantage of this procedure is that it does not require knowledge of co-integration properties of the system. This test can be done even if there is no co-integration and/or the stability and rank conditions are not satisfied. Ziramba (2013) found MWALD statistic would have an asymptotic Chi-square distribution when VAR (k + d-max) is calculated. Therefore, using the work of Ziramba (2013); Kasimu and Osamwonyi (2013) and Prakasam and Palamalai (2014), the Toda and Yamamoto (1995) augmented Granger causality test has been adopted in the present study by estimating the following VAR model:

$$lnEG = \sum_{j=1}^{k+d\,max} \alpha_j\, lnEG_{t-j} + \sum_{j=1}^{k+d\,max} \beta_j\, lnSMD_{t-j} + \varepsilon 1t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (10)$$

$$lnSMD = \sum_{j=1}^{k+d\,max} \chi_j\, lnSMD_{t-j} + \sum_{j=1}^{k+d\,max} \delta_j\, lnECG_{t-j} + \varepsilon_{2t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (11)$$

Where, EG is economic growth proxies by real GDP and SMD is stock market development proxies by MCAP, Value of traded stock and turnover.

Therefore, four different hypotheses come from equation (5 and 6):

(a) A unidirectional causality where SMD facilitates the forecast of the economic growth but not vice versa. Therefore, β_j # 0 for all j = 1…k, and that δ_j=0 for all j=1...k.

(b) A unidirectional causality from economic growth to SMD but not vice versa. Therefore, δj#0 for all j =1…k and βj = 0 for all j = 1…k.

(c) Bi-directional or feedback causal relationship where SMD cause Economic Growth and vice versa. In this βj # 0 for all j = 1…k, and that δj # 0 for all j=1…k.

(d) Independence between the two variables where there exist No Granger causality in any direction. Therefore, βj = 0 for all j = 1…k, and that δj= 0 for all j=1….k.

Where, $\boldsymbol{m}$ is number of lagged terms and k is the number of parameters. If the MWald chi-square statistic value exceeds the critical $\boldsymbol{\lambda}$ value at the chosen level of significance, we reject the null hypothesis, in which case the lagged GDP terms belong in the regression. This is another way of saying that GDP cause SMD.

CHAPTER FIVE

EMPIRICAL RESULTS AND INTERPRETATION

5.1. Introduction

All the econometric models come from EVIEWS version 6. The empirical inferences are drawn based on DF-GLS Unit Root Test, Johansen Co-Integration test and finally, Bivariate Granger causality test based on Toda and Yamamoto (1995) Modified Wald test. Before conducting any econometric analysis, the time series properties of the data were investigated. Researcher first conducted DF-GLS (ERS) Unit Root Test to establish the order of integration for the economic growth proxied by GDP and stock market indicators. The selection of lag procedure is a very important step when testing for co-integration between two variables. Given the Quarterly data available for estimation, we set the maximum lag order of the various variables in the model equal to eight. In this study, the lag length criteria was obtain from unrestricted VAR estimation results which based on the maximum value of Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC) and Hannan-Quinn information criterion (HQ). For Unit Root Test, the automatic lag length is based on SIC, MAXLAG=11 (MacKinnon, 1996). For Granger causality, the researcher created systems to establish equations and then the test for causality between each stock market indicator and economic growth.

5.2. Unit Root Tests

In order to carry out the co-integration test, the order of integration of the variables is initially determined using the Dickey-Fuller GLS (ERS) test. The testing measures are based on the null hypothesis that a unit root exists in the autoregressive representation of the series. This test establishes whether the series are stationary or not and establishes the level of integration of variables under study.

Table 4: DF-GLS Unit Root Test Results for Level and First Difference

	DF-GLS Unit Root Test			
Variables	**Levels**		**1st Difference**	
	Intercept	**Trend and Intercept**	**Intercept**	**Trend and Intercept**
lnGDP	1.185 **(-1.614)**	-2.621 (-2.830)	-13.093*** (-2.598)	-11.979*** (-3.694)
lnMCR	0.005 (-1.614)	-1.810 (-2.827)	-8.595*** (-2.598)	-8.783*** (-3.694)
lnSTR	-1.485 (-1.614)	-2.467 (-2.830)	-12.660*** (-2.598)	-12.841*** (-3.694)
lnVTR	-0.747 (-1.614)	-1.984 (-2.830)	-12.656*** (-2.598)	-12.871*** (-3.694)

*** denotes the rejection of the null hypothesis at the 1 percent level of significance. VTR, STR, and MCR represents value Traded, Stock Turnover and Market Capitalization ratios, respectively.
Source: Researcher's own calculations based on data from NSA and NSE

As tabulated in table 4, the results showed that all three measures of SMD are non-stationary at first difference being first order integrated. The observed t-statistics in

table 4 fail to reject the null hypothesis of the presence of a unit root for all variables in their levels confirming that they are non-stationary at 1% and 5% levels of significance.

5.3. Co-integration Analysis

Table 5: Johansen Co-Integration Test Results

Series	Hypothesized No of CE(s)	Trace Statistic	Max.Eigen Statistic	5% Critical Value Trace	5% Critical Value Max. Eigen	Prob** Trace	Prob** Max.Eigen
LNRGDP LNMCR	None *	19.314	13.444	12.321	11.225	0.002	0.020
	At most 1 *	5.871	5.871	4.130	4.130	0.018	0.018
LNRGDP	None *	22.275	11.630	12.321	11.225	0.000	0.042
LNSTR	Atmost 1 *	10.645	10.645	4.130	4.130	0.001	0.001
LNRGDP LNVTR	None *	20.500	12.296	12.321	11.225	0.001	0.032
	At most 1 *	8.204	8.204	4.130	4.130	0.005	0.005

Source: ***Researcher's own adaptation***
Both Trace and Max-eigenvalue tests indicate two cointegrating equations at 0.05 levels (*).

The hypothesis of no co-integration between stock market indicators and economic growth is rejected. The results of the co-integration above inveterate that there is at most one co-integration relationship between variables included in the model specifically, the result of the co-integration test suggests that GDP has balance condition with stock market indicators, which in the long run keeps them in proportion to each other. This evidence of co-integration amongst the variables confirms that one direction

of influence can be established amongst the variables. However, Oladipo and Ogboi (2012) explain that it is important to understand that the existence of cointegrating elements amongst a group of variables may not imply that there is causal influence between pairs of variables in the model of co-integration test. This is justified by Granger causality results bellow.

5.4. Granger Causality Test Results

Table 6: Bivariate Granger-Causality using Toda and Yamamoto (1995) Modified Wald test

Null hypothesis	**Chi-square**	Prob.
GDP growth rate versus Market capitalization Ratio		
MCR does not Granger Cause GDPGR	0.712	0.700
GDPGR does not Granger Cause MCR	1.903	0.386
GDP growth rate versus Stock Turnover Ratio		
STR does not Granger Cause GDPGR	6.893**	0.032
GDPGR does not Granger Cause STR	0.992	0.609
GDP growth rate versus Value Traded Ratio		
VTR does not Granger Cause GDPGR	7.111**	0.029
GDPGR does not Granger Cause VTR	2.160	0.340

** denotes rejection of the hypothesis at 5% level of significance
Source: Researcher's own adaptation

The Granger causality test is performed to determine the causality relationship between SMD and economic growth. Looking at table 2, the probability for the null hypothesis

stated *'MCR does not Granger cause GDPGR'* and '*GDPGR does not Granger cause MCR'* is significantly high at 0.7009 and 0.3868 at the same levels of significance, which fails to reject both hypothesis, and therefore there is no causal relationship between MCAP and GDP. However, table 2 also shows that the probability for the null hypothesis stated as *'STR does not Granger cause GDPGR'* and '*VTR does not Granger cause GDPGR*' is significantly low at 0.0319 and 0.0286 respectively at 10% level of significance, which rejects the null hypothesis and therefore, STR and VTR does Granger cause GDP. From the result, it can be said that there is unidirectional relationship between SMD and GPDGR bearing from stock market development to economic growth. The Granger causality results seem to validate the existence the supply-leading hypothesis but contradict the findings of Sunde (2013) on Namibia. Similar results were found in studies by Soliman, Howells, and Caporal (2004); Mun *et al* (2008) and Zivengwa (2011). In Turkey Yıldırım, Kaya and Bayar (2014) come up with the same conclusion although they utilized the Granger causality test originally proposed by Granger (1969) which is consistent with the general trend in the literature.

Summary

The results of the co-integration analysis indicate that there is a long-run cointegrating relationship between SMD and economic growth. The results of the causality analysis demonstrate that there is a unidirectional causality running from SMD to economic growth implying the former Granger causes the latter to long-run equilibrium. The findings are in support of the "supply-leading" hypothesis which most literature state to be the case for many developing countries as rely heavily on bank financing.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

Many emerging economies are heavily dependent on Foreign Direct Investment (FDI) inflows but after the financial crisis in 2008-2009, drawing FDI is becoming a challenge. Consequently, introduction of new financial institutions, such as stock markets, expedites resource accumulation process. Stock exchanges, in general, are vital elements of financing private sector growth. Equity markets are necessary for the expansion of business as they gather funds to finance innovative and growth-oriented projects. However, over the years, there has been an ever growing debate on the causal and direction of the relationship between SMD and economic growth.

The aim of the study was to test whether causality exists between SMD and economic growth in the Namibian economy using time series data from 1995:Q4 up to 2013:Q3. The result of the Granger causality test shows that at 5% levels of significance, SMD Granger causes economic growth, but economic growth does not Granger cause SMD. There is therefore a unidirectional causality between the two variables bearing from SMD to economic growth. Similar results were obtained in Zimbabwe by Zivengwa, Mashika, Bokosi and Makova (2011). This is an indication that there is a need to develop the financial system as it contributes to economic growth of the country. The potentials and prospects for growth in the Namibian stock market can be explored by increasing the degree of trading relative to the size of the economy. This will effect a

positive change in the stock market liquidity. Stock market liquidity positively affects MCAP. In Namibia, low liquidity hinders the development of stock market. Improving liquidity is an approach through which the country can promote SMD and encourage economic growth. Stock markets provide services to the non-financial economy that are crucial for long-term economic development. Given the comparatively strong pro-growth effect of financial intermediation, the clear policy implication is that financial liberalization in the form of say deregulation and establishment and development of stock markets can be expected to lead to enhanced economic growth.

Policymakers should consider reducing impediments to liquidity in the stock market and make the development of the stock market a priority by reducing impeding laws and listing requirements for investors so as to encourage both local and international companies operating in the domestic economy to be listed on the domestic stock exchanges and thus increases competition and quality of securities investments resulting in a significant influence on economic growth in Namibia. The Government and the self-regulatory organizations should create and ensure strong, more transparent institutional and legal framework and should also encourage investment in human capital to bring about efficiency at the stock exchange and their supporting services. Efficiently allocating the available financial resources for investment purpose and also creating the platform that will engender best corporate practice will result in growing investment, increased confidence in the financial system and further growth of the economy. Therefore, the present study financial system regulators should implement effective

policy frameworks towards the development of Namibian stock market in order to substantially enhance the size, depth and liquidity of the Namibian stock market which in turn leads to increased economic activities. An important emerging issue relates to the optimal speed of introducing such financial deregulation is not directly addressed in this paper but is an important element of the agenda for future research related to the important question of the links between financial intermediation and economic growth.

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APPENDIX

APPENDIX 1: DF-GLS Tests

Table1: Log on Market Capitalization at Level (intercept)

Null Hypothesis: LNMCR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		0.005125
Test critical values:	1% level	-2.597939
	5% level	-1.945456
	10% level	-1.613799

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 00:24
Sample (adjusted): 1996Q1 2013Q3
Included observations: 71 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	9.02E-05	0.017599	0.005125	0.9959

R-squared	-0.045976	Mean dependent var	0.032210
Adjusted R-squared	-0.045976	S.D. dependent var	0.151286
S.E. of regression	0.154725	Akaike info criterion	-0.880350
Sum squared resid	1.675789	Schwarz criterion	-0.848481
Log likelihood	32.25242	Hannan-Quinn criter.	-0.867677
Durbin-Watson stat	1.979607		

Table 2: Log on Market Capitalization at Level (Trend and Intercept)

Null Hypothesis: LNMCR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-1.810467
Test critical values:	1% level	-3.690200
	5% level	-3.122800
	10% level	-2.827000

*Elliott-Rothenberg-Stock (1996, Table 1)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Date: 05/15/03 Time: 00:32
Sample (adjusted): 1996Q1 2013Q3
Included observations: 71 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.092846	0.051283	-1.810467	0.0745

R-squared	0.044670	Mean dependent var	-0.001200
Adjusted R-squared	0.044670	S.D. dependent var	0.151286
S.E. of regression	0.147869	Akaike info criterion	-0.970999
Sum squared resid	1.530562	Schwarz criterion	-0.939130
Log likelihood	35.47047	Hannan-Quinn criter.	-0.958326
Durbin-Watson stat	1.975048		

Table 3: Log on Market Capitalization at 1st difference (Intercept)

Null Hypothesis: D(LNMCR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-8.594979
Test critical values:	1% level	-2.598416
	5% level	-1.945525
	10% level	-1.613760

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 00:46
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.034131	0.120318	-8.594979	0.0000

R-squared	0.517055	Mean dependent var	-0.000199
Adjusted R-squared	0.517055	S.D. dependent var	0.219258
S.E. of regression	0.152371	Akaike info criterion	-0.910809
Sum squared resid	1.601976	Schwarz criterion	-0.878687
Log likelihood	32.87831	Hannan-Quinn criter.	-0.898050
Durbin-Watson stat	2.006308		

Table 4: Log on Market Capitalization at 1st difference (Trend and Intercept)

Null Hypothesis: D(LNMCR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-8.783182
Test critical values:	1% level	-3.694000
	5% level	-3.126000
	10% level	-2.830000

*Elliott-Rothenberg-Stock (1996, Table 1)

DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 00:50
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.055835	0.120211	-8.783182	0.0000

R-squared	0.527862	Mean dependent var	0.000477
Adjusted R-squared	0.527862	S.D. dependent var	0.219258
S.E. of regression	0.150657	Akaike info criterion	-0.933438
Sum squared resid	1.566131	Schwarz criterion	-0.901317
Log likelihood	33.67035	Hannan-Quinn criter.	-0.920679
Durbin-Watson stat	2.012960		

Table 5: Log on Stock Turnover Ratio at Level (Trend)

Null Hypothesis: LNSTR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-1.485429
Test critical values:	1% level	-2.598416
	5% level	-1.945525
	10% level	-1.613760

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares

Date: 05/15/03 Time: 01:04
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.086889	0.058494	-1.485429	0.1421
D(GLSRESID(-1))	-0.364100	0.112822	-3.227224	0.0019

R-squared	0.191006	Mean dependent var	0.027841
Adjusted R-squared	0.179109	S.D. dependent var	0.717556
S.E. of regression	0.650128	Akaike info criterion	2.004860
Sum squared resid	28.74132	Schwarz criterion	2.069103
Log likelihood	-68.17011	Hannan-Quinn criter.	2.030378
Durbin-Watson stat	1.694404		

Table 6: Log on Stock Turnover Ratio at Level (Trend and Intercept)

Null Hypothesis: LNSTR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-2.467315
Test critical values:	1% level	-3.694000
	5% level	-3.126000
	10% level	-2.830000

*Elliott-Rothenberg-Stock (1996, Table 1)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 01:06
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.220784	0.089484	-2.467315	0.0161
D(GLSRESID(-1))	-0.301054	0.114729	-2.624053	0.0107

R-squared	0.236016	Mean dependent var	0.005993
Adjusted R-squared	0.224781	S.D. dependent var	0.717556
S.E. of regression	0.631783	Akaike info criterion	1.947615
Sum squared resid	27.14221	Schwarz criterion	2.011857
Log likelihood	-66.16651	Hannan-Quinn criter.	1.973133
Durbin-Watson stat	1.645681		

Table 7: Log on Stock Turnover Ratio at 1st difference (Trend)

Null Hypothesis: D(LNSTR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-12.66073
Test critical values:	1% level	-2.598416
	5% level	-1.945525
	10% level	-1.613760

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 01:53
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.398125	0.110430	-12.66073	0.0000

R-squared	0.699076	Mean dependent var	0.000459
Adjusted R-squared	0.699076	S.D. dependent var	1.204855
S.E. of regression	0.660941	Akaike info criterion	2.023879
Sum squared resid	30.14219	Schwarz criterion	2.056001
Log likelihood	-69.83577	Hannan-Quinn criter.	2.036638
Durbin-Watson stat	1.722344		

Table 8: Log on Stock Turnover Ratio at 1st difference (Trend and Intercept)

Null Hypothesis: D(LNSTR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-12.84115
Test critical values:	1% level	-3.694000
	5% level	-3.126000
	10% level	-2.830000

*Elliott-Rothenberg-Stock (1996, Table 1)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 01:56
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.409871	0.109793	-12.84115	0.0000

R-squared	0.704996	Mean dependent var	0.000988
Adjusted R-squared	0.704996	S.D. dependent var	1.204855
S.E. of regression	0.654408	Akaike info criterion	2.004012
Sum squared resid	29.54927	Schwarz criterion	2.036134
Log likelihood	-69.14043	Hannan-Quinn criter.	2.016771
Durbin-Watson stat	1.735158		

Table 9: Log on Value of Stock Traded at Level (Trend)

Null Hypothesis: LNVTR has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-0.746988
Test critical values:	1% level	-2.598416
	5% level	-1.945525
	10% level	-1.613760

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 02:01
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.027278	0.036517	-0.746988	0.4576
D(GLSRESID(-1))	-0.377316	0.112833	-3.344033	0.0013

R-squared	0.154861	Mean dependent var	0.058586
Adjusted R-squared	0.142432	S.D. dependent var	0.717100
S.E. of regression	0.664070	Akaike info criterion	2.047297
Sum squared resid	29.98727	Schwarz criterion	2.111540
Log likelihood	-69.65541	Hannan-Quinn criter.	2.072815
Durbin-Watson stat	1.775754		

Table 10: Log on Value of Stock Traded at Level (Trend and Intercept)

Null Hypothesis: LNVTR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-1.984235
Test critical values:	1% level	-3.694000
	5% level	-3.126000
	10% level	-2.830000

*Elliott-Rothenberg-Stock (1996, Table 1)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)
Method: Least Squares
Date: 05/15/03 Time: 02:03
Sample (adjusted): 1996Q2 2013Q3
Included observations: 70 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-0.146837	0.074002	-1.984235	0.0513
D(GLSRESID(-1))	-0.329446	0.113923	-2.891836	0.0051

R-squared	0.207027	Mean dependent var	0.003943
Adjusted R-squared	0.195366	S.D. dependent var	0.717100
S.E. of regression	0.643249	Akaike info criterion	1.983585
Sum squared resid	28.13629	Schwarz criterion	2.047827
Log likelihood	-67.42547	Hannan-Quinn criter.	2.009103
Durbin-Watson stat	1.735180		

Table 11: Log on Value of Stock Traded at 1st difference (Trend)

Null Hypothesis: D(LNVTR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-12.65594
Test critical values:	1% level	-2.598416
	5% level	-1.945525
	10% level	-1.613760

*MacKinnon (1996)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.397856	0.110451	-12.65594	0.0000

R-squared	0.698917	Mean dependent var	-0.000327
Adjusted R-squared	0.698917	S.D. dependent var	1.200540
S.E. of regression	0.658749	Akaike info criterion	2.017233
Sum squared resid	29.94253	Schwarz criterion	2.049355
Log likelihood	-69.60316	Hannan-Quinn criter.	2.029992
Durbin-Watson stat	1.797254		

Table 12: Log on Value of Stock Traded at 1st difference (Trend and Intercept)

Null Hypothesis: D(LNVTR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic based on SIC, MAXLAG=11)

		t-Statistic
Elliott-Rothenberg-Stock DF-GLS test statistic		-12.87088
Test critical values:	1% level	-3.694000
	5% level	-3.126000
	10% level	-2.830000

*Elliott-Rothenberg-Stock (1996, Table 1)
DF-GLS Test Equation on GLS Detrended Residuals
Dependent Variable: D(GLSRESID)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GLSRESID(-1)	-1.411805	0.109690	-12.87088	0.0000

DF-GLS Test Equation o	DF-GLS Test	DF-GLS Test Equation on GL	DF-GLS Tes
Adjusted R-squared	0.705957	S.D. dependent var	1.200540
S.E. of regression	0.651002	Akaike info criterion	1.993575
Sum squared resid	29.24246	Schwarz criterion	2.025696
Log likelihood	-68.77512	Hannan-Quinn criter.	2.006334
Durbin-Watson stat	1.815922		

APPENDIX 2: Johansen Co-integration Test

Table 13: VAR Lag Order Selection Criteria-GDP and MCR

Endogenous variables: LNRGDP LNMCR
Exogenous variables: C
Date: 05/15/03 Time: 02:39
Sample: 1995Q4 2013Q3
Included observations: 64

Lag	LogL	LR	FPE	AIC	SC	HQ
0	13.24887	NA	0.002412	-0.351527	-0.284062	-0.324949
1	158.8495	277.5513	2.89e-05	-4.776548	-4.574152*	-4.696814
2	165.8002	12.81534*	2.64e-05*	-4.868757*	-4.531431	-4.735867*
3	166.7483	1.688748	2.90e-05	-4.773384	-4.301128	-4.587339

4	167.5269	1.338155	3.22e-05	-4.672714	-4.065528	-4.433513
5	172.0403	7.475427	3.17e-05	-4.688760	-3.946644	-4.396403
6	174.6652	4.183394	3.33e-05	-4.645787	-3.768741	-4.300274
7	175.7015	1.586889	3.68e-05	-4.553173	-3.541196	-4.154504
8	177.4065	2.504176	3.98e-05	-4.481453	-3.334546	-4.029629

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 14: Co-integration between GDP and MCR

Series: LNRGDP LNMCR
Lags interval (in first differences): 1 to 2
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.177030	19.31429	12.32090	0.0029
At most 1 *	0.081562	5.870601	4.129906	0.0183

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.177030	13.44369	11.22480	0.0201
At most 1 *	0.081562	5.870601	4.129906	0.0183

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNRGDP	LNMCR
-1.278634	1.276597
1.726385	-1.947706

Unrestricted Adjustment Coefficients (alpha):

D(LNRGDP)	-0.010336	-0.008059
D(LNMCR)	-0.048546	0.028351

1 Cointegrating Equation(s):	Log likelihood	167.5172

Normalized cointegrating coefficients (standard error in parentheses)

LNRGDP	LNMCR
1.000000	-0.998406
	(0.02811)

Adjustment coefficients (standard error in parentheses)

D(LNRGDP)	0.013216
	(0.00575)
D(LNMCR)	0.062072
	(0.02306)

Table 15: VAR Lag Order Selection Criteria for GPD and STR

Endogenous variables: LNRGDP LNSTR
Exogenous variables: C
Sample: 1995Q4 2013Q3

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-42.46123	NA	0.013755	1.389413	1.456878	1.415991
1	66.01854	206.7896	0.000525	-1.875579	-1.673184	-1.795846
2	80.69086	27.05209*	0.000377*	-2.209089*	-1.871764*	-2.076200*
3	82.36245	2.977531	0.000406	-2.136327	-1.664071	-1.950281
4	82.58316	0.379335	0.000457	-2.018224	-1.411038	-1.779023
5	86.31584	6.182262	0.000463	-2.009870	-1.267754	-1.717513
6	88.22345	3.040241	0.000496	-1.944483	-1.067436	-1.598970
7	91.38455	4.840441	0.000512	-1.918267	-0.906291	-1.519599
8	91.62738	0.356648	0.000581	-1.800855	-0.653949	-1.349031

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 16: Co-integration between GDP and STR

Series: LNRGDP LNSTR
Lags interval (in first differences): 1 to 2
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.155114	22.27503	12.32090	0.0008
At most 1 *	0.142962	10.64484	4.129906	0.0013

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**

None *	0.155114	11.63019	11.22480	0.0424
At most 1 *	0.142962	10.64484	4.129906	0.0013

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNRGDP	LNSTR
0.681176	1.845691
-0.312813	-1.234645

Unrestricted Adjustment Coefficients (alpha):

D(LNRGDP)	0.007319	0.011787
D(LNSTR)	-0.180482	0.101805

1 Cointegrating Equation(s): Log likelihood 82.42904

Normalized cointegrating coefficients (standard error in parentheses)

LNRGDP	LNSTR
1.000000	2.709565
	(0.15064)

Adjustment coefficients (standard error in parentheses)

D(LNRGDP)	0.004985
	(0.00303)
D(LNSTR)	-0.122940
	(0.04257)

Table 17: VAR Lag Order Selection Criteria-GDP and VTR

Endogenous variables: LNRGDP LNVTR
Exogenous variables: C
Date: 05/15/03 Time: 03:46
Sample: 1995Q4 2013Q3
Included observations: 64

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-46.79038	NA	0.015748	1.524699	1.592164	1.551277
1	64.36597	211.8918	0.000553	-1.823936	-1.621541	-1.744203
2	80.70314	30.12166*	0.000377*	-2.209473*	-1.872148*	-2.076584*
3	82.84873	3.821837	0.000399	-2.151523	-1.679267	-1.965477
4	83.14470	0.508699	0.000449	-2.035772	-1.428586	-1.796571
5	86.37838	5.355786	0.000462	-2.011824	-1.269708	-1.719467
6	88.68684	3.679102	0.000489	-1.958964	-1.081917	-1.613451
7	90.95721	3.476498	0.000519	-1.904913	-0.892936	-1.506244
8	91.43426	0.700674	0.000585	-1.794821	-0.647914	-1.342996

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error

AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 18: Johansen Co-integration Test- GDP and VTR

Series: LNRGDP LNVTR
Lags interval (in first differences): 1 to 2
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.163223	20.49959	12.32090	0.0017
At most 1 *	0.112102	8.203986	4.129906	0.0050

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.163223	12.29560	11.22480	0.0323
At most 1 *	0.112102	8.203986	4.129906	0.0050

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

LNRGDP	LNVTR
-0.177120	0.862501
0.043070	-1.224277

Unrestricted Adjustment Coefficients (alpha):

D(LNRGDP)	-0.011720	-0.007277
D(LNVTR)	-0.131971	0.141158

1 Cointegrating Equation(s): Log likelihood 82.61550

Normalized cointegrating coefficients (standard error in parentheses)

LNRGDP	LNVTR
1.000000	-4.869588

	(1.57526)
Adjustment coefficients (standard error in parentheses)	
D(LNRGDP)	0.002076
	(0.00076)
D(LNVTR)	0.023375
	(0.01144)

APPENDIX 3: Toda and Yamamoto (1995) Granger Causality test

Equation 1: Causality between GDP and MCR

System: SYS01

Estimation Method: Seemingly Unrelated Regression

Equation: LNRGDP = C(1)*LNRGDP(-1) + C(2)*LNRGDP(-2) + C(3)
*LNRGDP(-3) + C(4)*LNMCR(-1) + C(5)*LNMCR(-2) + C(6)*LNMCR(-3)
+ C(7)

Observations: 69

R-squared	0.974117	Mean dependent var	9.270745
Adjusted R-squared	0.971613	S.D. dependent var	0.215143
S.E. of regression	0.036248	Sum squared resid	0.081465
Durbin-Watson stat	1.991694		

Equation: LNMCR = C(8)*LNRGDP(-1) + C(9)*LNRGDP(-2) + C(10)
*LNRGDP(-3) + C(11)*LNMCR(-1) + C(12)*LNMCR(-2) + C(13)
*LNMCR(-3) + C(14)

Observations: 69

R-squared	0.938746	Mean dependent var	8.537152
Adjusted R-squared	0.932818	S.D. dependent var	0.570325
S.E. of regression	0.147826	Sum squared resid	1.354850
Durbin-Watson stat	2.024533		

Equation 2: Causality between GDP and STR

System: SYS02

Estimation Method: Seemingly Unrelated Regression

Equation: LNRGDP = C(1)*LNRGDP(-1) + C(2)*LNRGDP(-2) + C(3)
*LNRGDP(-3) + C(4)*LNSTR(-1) + C(5)*LNSTR(-2) + C(6)*LNSTR(-3) +
C(7)

Observations: 69

R-squared	0.975719	Mean dependent var	9.270745
Adjusted R-squared	0.973369	S.D. dependent var	0.215143
S.E. of regression	0.035109	Sum squared resid	0.076424
Durbin-Watson stat	1.969059		

Equation: LNSTR = C(8)*LNRGDP(-1) + C(9)*LNRGDP(-2) + C(10)
*LNRGDP(-3) + C(11)*LNSTR(-1) + C(12)*LNSTR(-2) + C(13)*LNSTR(
-3) + C(14)

Observations: 69

R-squared	0.251556	Mean dependent var	-3.085909
Adjusted R-squared	0.179125	S.D. dependent var	0.569425
S.E. of regression	0.515911	Sum squared resid	16.50218
Durbin-Watson stat	2.159552		

Equation 3: Causality between GDP and VTR

System: SYS03

Estimation Method: Seemingly Unrelated Regression

Equation: LNRGDP = C(1)*LNRGDP(-1) + C(2)*LNRGDP(-2) + C(3) *LNRGDP(-3) + C(4)*LNVTR(-1) + C(5)*LNVTR(-2) + C(6)*LNVTR(-3) + C(7)

Observations: 69

R-squared	0.975861	Mean dependent var	9.270745
Adjusted R-squared	0.973525	S.D. dependent var	0.215143
S.E. of regression	0.035006	Sum squared resid	0.075977
Durbin-Watson stat	1.983171		

Equation: LNVTR = C(8)*LNRGDP(-1) + C(9)*LNRGDP(-2) + C(10) *LNRGDP(-3) + C(11)*LNVTR(-1) + C(12)*LNVTR(-2) + C(13)*LNVTR(-3) + C(14)

Observations: 69

R-squared	0.520831	Mean dependent var	0.845958
Adjusted R-squared	0.474460	S.D. dependent var	0.715296
S.E. of regression	0.518548	Sum squared resid	16.67130
Durbin-Watson stat	2.140266		