# THE USE OF A SMALL ENTERPRISE STOCK MARKET TO UNLOCK ECONOMIC GROWTH IN SOUTH AFRICA

by

**SIFISO SIBIYA**

Thesis submitted in fulfilment of the requirements for the degree of
Master of Management in Finance and Investments

in the

FACULTY OF COMMERCE, LAW AND MANAGEMENT,
WITS BUSINESS SCHOOL

at the

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

SUPERVISOR: DR. EUPHEMIA GODSPOWER-AKPOMIEMIE

# DECLARATION

I, Sifiso Sibiya declare that the research work reported in this dissertation is my own, except where otherwise indicated and acknowledged. It is submitted for the degree of Master of Management in the University of the Witwatersrand, Johannesburg. This thesis has not, either in whole or in part, been submitted for a degree or diploma to any other universities.

_____ _____

Signature of candidate Date

# ACKNOWLEDGEMENTS

I would like to thank and acknowledge:

- The Almighty God, for the opportunity to reach this milestone and His providence on journeys past, present and future.
- My wife Nakedi Sibiya, daughter Nobuciko Sibiya, parents and siblings for the support, encouragement and prayers.
- My sponsor and current employer, Alexander Forbes Investments. In particular, I thank Ms Janina Slawski for believing in me and supporting my growth.
- My supervisor and lecturer Dr Euphemia Godspower-Akpomiemie for the support.

# ABSTRACT

This study was prompted by concerns about South Africa's recent economic growth trajectory and the implications that this has on overall living standards. Equally concerning, is the relatively low participation by small enterprises in terms of employment levels, which is a contributing factor the high and rising unemployment rate. In addressing these concerns, this study posits that setting up a stock exchange designed for small enterprises would unlock capital, thus enabling many small enterprises to be growth drivers in the economy.

This study has two objectives. The first objective is to explore the features of the proposed small enterprise stock market. This was done by exploring the literature and by presenting a case study of a small enterprise stock market from an emerging markets perspective, called the National Equities Exchange and Quotations (NEEQ) from China. The second objective of this study is to examine whether economic growth can result from a small enterprise stock market. This was done by performing an empirical study of the relationship between small enterprise development and economic growth between 2006 and 2018. The conclusion from this review is that, though weak, there is a causal relationship between small enterprise stock market development and economic growth.

## KEYWORDS

South African stock market, South African small enterprises, junior stock exchanges, granger causality, stock market development and economic growth.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURES

# 1 INTRODUCTION

## 1.1 Overview

This chapter outlines the background (section 1.2), problem statement and motivation (section 1.3) of this research. Section 1.4 describes the research objectives while the significance of this research is discussed in section 1.5. Finally, section 1.6 includes an outline of the remaining chapters of the thesis.

## 1.2 Background

The recent decade has elevated the focus being placed on the dire state of the South African economy, which has had deep structural challenges even post the democratic dispensation. This has been evidenced by the downward trend in the GDP growth trajectory from the high annual growth of 5.6% in 2006 to the recent stagnant annual growth rates that have not exceed 1.5% over the past five years[1]. Further to this effect, is the fact that even while enjoying higher economic growth rates, the South African economy failed to create sufficient employment. The South African unemployment rate has, over the past 20 years, only reached a minimum of 22.4% in 2008 and has been increasing over the past five years to levels above 28%[2]. This sobering reflection of the state of things is indeed a call for solutions and a possible avenue to address low growth and high employment is renewing the importance of having successful small enterprises in the economy.

This study defines a micro and small micro enterprise to be an enterprise consisting of not more than 50 permanent employees and has an annual turnover of not more than R15 million (hereafter referred to as small enterprises)[3]. It is estimated that about 16% of South African formal employment is created by small enterprises. This estimate becomes 28% when medium size enterprises are added (Small Business Institute, 2018). This figure is low considering international trends, where the proportion of overall employment from small and medium enterprises ranges

[1] The World Bank's World Development Indicators database: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=ZA
[2] The World Bank's World Development Indicators database: https://data.worldbank.org/indicator/SL.UEM.TOTL.NE.ZS?locations=ZA
[3] According to the Department of Small Business Development, a small enterprise is a separate and distinct business entity, together with its branches or subsidiaries, which is/are managed by one owner or more predominantly carried on in any sector or subsector of the economy. The Department of Small Business Development defines businesses as Medium, Small or Micro using a set of annual turnover thresholds that are applicable for each of the Standard Industry Classifications (SIC)

between 60% and 70% (Small Business Institute, 2018). This suggests that growth in the number of thriving small and medium enterprises is required in order to reduce unemployment.

Fortunately, there is a realisation of the possible contribution from small enterprises to economic growth from South African policy makers. In 2014, the Gauteng Provincial Government published a strategy document (the Gauteng Township Economy Revitalisation Strategy), on how to modernise and re-industrialise the Gauteng economy. It is the intention of the government to ensure that the township economy (composed mainly of small enterprises) contributes at least 30% to the Gauteng GDP by 2030, and certain plans have been put in place. Regrettably, no concrete details are shared on how some of these plans would be achieved, more so, on how citizens of South Africa can contribute to this strategy. In the current search for solutions, this study is an attempt to give context to one of the policy levers that can be brought to bear in solving the growth trap challenge that the country is facing. On that note, this study only reflects on section 6.5.3 of the mentioned policy document, which discusses the possible establishment an alternative stock exchange.

The Johannesburg Stock Exchange (JSE) has been in operation since 1887 and has largely been the dominant and sole stock exchange in South Africa since 1951 (Clarke, 2016). This has had some favourable outcomes in that the JSE has become the largest and most developed stock exchange in Africa, boasting a market capitalisation of about R15.8 trillion as at end of October 2020[4]. However, the JSE's market dominance has meant less competition in the South African equity markets, placing investors at a disadvantage. This market inefficiency has been partly addressed by the introduction of the Financial Market Act of 2012, which has made it possible for other participants to apply for exchange licenses.

This development has resulted in a number of applications being made for exchange licenses, which bodes well for South African markets, as an increase in the number of participants would be expected to result in a reduction of fees over time and an increase in the number of investment choices. In addition, the increase in the number of equity exchanges is expected to improve the efficiency of the

[4] JSE market data for week ending 30 October 2020: https://www.jse.co.za/sites/default/files/media/documents/2020-11/JSE%20Markets%27%20Weekly%20Statistics%2020201030.xlsx

equity market as a whole due to competitive pressures being exerted by the new entrants, who are offering lower fees and technology that is more advanced. This improved functioning in equity markets is also associated with positive economic development outcomes (Beck and Levine, 2004). Moreover, Mahajan (2014) found that growth in the urban informal economy, which mostly progresses into a set of small enterprises, is associated with higher overall economic growth especially within the emerging market context.

In line with the established relationship between well-functioning equity markets and economic growth, this study investigates whether broadening the equity market by adding a tier that is specific to small enterprises would also have the same or better positive economic growth outcomes. This view based on the theorical basis that financial development has a relationship with economic growth as posited by Schumpeter in 1911. Enisan and Olufisayo (2009) attribute the relationship between financial development and economic growth to the following factors: (1) efficient allocation of capital as savings increase; (2) mobilisation of savings to productive instruments and savings vehicles; (3) establishment of risk pooling and diversification vehicles; and (4) lower costs for gathering and processing information.

The relationship between stock market development and economic growth has been the subject of numerous empirical studies. Earlier work done by Levine and Zervos (1998) used data from 47 countries (between 1976 and 1993) to make general inferences on the relationship between stock market liquidity and economic growth. Rousseau and Wachtel (2000) extended on the Levine and Zervos (1998) study by also investigating 47 countries between 1980 and 1998 in order to show that there is a positive relationship between equity market liquidity and economic growth. However, Beck and Levine (2004) showed that there is a positive relationship between stock market development and economic growth. The Beck and Levine (2004) study was refined by Caporale et al (2004) and it was concluded that there is a causal relationship between stock market development and economic growth. Other studies have been conducted to examine the relationship between stock market development and economic growth in jurisdictions that have not been covered by prior studies, such as Marques et al (2013) who focused on Portugal and Enisan and Olufisayo (2009) who focused on seven sub-Saharan African

countries. Both these studies show that there is a causal relationship between stock market development and economic growth.

The establishment of a stock market specifically for small enterprises is not an unusual idea. The National Equities Exchange and Quotations (NEEQ), known as the 'New Third Board', is a small enterprise stock market and it became operational from January 2013[5]. The NEEQ's listing requirements are less stringent compared to the main Chinese stock exchanges in recognition of the needs and capacity of small enterprises. This has led to growth in the number of NEEQ company listings, from 351 companies collectively valued at RMB 95.77 million in 2013 to 8 547 companies worth RMB 2.7 trillion as at October 2020[6]. In light of the growth seen in the New Third Board, this study examines the relationship between stock market development from the small enterprise stock market development and economic growth in South Africa, should such a stock market be established. In particular, a desktop review is performed on the Chinese New Third Board, while an empirical study is performed on small enterprise stock market development and economic growth in South Africa. This empirical study is based on a Vector Autoregressive (VAR) modelling and Granger causality framework, using data from 2006 to 2018.

## 1.3 Problem Statement and Motivation

South Africa has been in a low growth environment for a number of years and this has continued to have unfavourable consequences for overall living standards and the maintenance of social order. The unemployment rate remained high even during South Africa's high growth years and increased further when economic growth began to stagnate over the past five years (ending October 2020). Small and medium enterprises generally constitute between 60% and 70% of formal employment internationally, but in South Africa this figure is low at 28% (Small Business Institute, 2018). In light of the current low employment proportions from South African small enterprises, growth in the number of thriving small enterprises would be expected to reduce unemployment.

Capital is a key aspect in the development of small enterprises, however, the unavailability of external finance is more prevalent for smaller companies (Beck,

[5] NEEQ start data according the NEEQ website: http://www.neeq.com.cn/en/about_neeq/introduction.html
[6] Market Capitalisation according to the NEEQ's market data: http://www.neeq.com.cn/en/market_data/statistical.html

Demirguc-Kunt and Maksimovic, 2008). This lack of capital, it is viewed, provides a reason for the existence of a small enterprise stock exchange and this is the core focus of this study. To this end, this research conducts an empirical study of the relationship between small enterprise stock market development and economic growth in South Africa, based on the modelling framework presented by Marques et al (2013), who used VAR procedures to conclude that causality exists between stock market development and economic growth in Portugal using data between 1993 and 2013. Empirical studies based on similar modelling frameworks and on South African data have been conducted by Enisan and Olufisayo (2009), Ndako (2010) and Wang and Kalu (2019).This study adds to this body of knowledge, but from the perspective of small enterprises stock market development. This study also discusses the benefits of listed equity markets and the economic benefits thereof. In addition, this describes the South African equity exchange landscape, covering its overall history and main participants, while also explaining why the South African equity capital market is out of reach for small enterprises.

## 1.4 Research Objectives

Based on the benefits of having an exchange market to cater for only small enterprises, this study aims to demonstrate the attractiveness of exploiting the use of capital markets (especially those established to accommodate the needs of small enterprises) as a policy lever in unlocking economic growth. Therefore, the objectives of this study include:

- **To explore the features of the proposed small enterprise stock market**

  The study aims to explore the establishment of capital market primarily for micro and small enterprises through a review of the literature. The structure of this equity exchange is described, along with an emerging market case where such an approach has been adopted. In particular, this refers to a small enterprise equity stock exchange that is currently operational in China, namely the National Equities Exchange and Quotations (NEEQ), which is also known as the “New Third Board”. The NEEQ was considered in this study due to its particular focus on listing micro enterprises (which aligns with this study’s definition of a small enterprise in the South African context).

In addition, the NEEQ was found to be a small enterprise exchange that has shown the highest relative growth (Xu, Zhu, & Wu, 2020).

- **To examine whether economic growth can result from a small enterprise stock market**

  Secondly, this study seeks to determine whether a causal relationship exists between small enterprise development and economic growth by using a measure of small enterprise stock market growth and economic growth in the South African context. This objective is met through an empirical study using South African data from 2006 to 2018.

## 1.5 Significance of the Study

This study intends to contribute to the literature by reflecting the benefits of a small enterprise stock exchange on economic growth within the South African context.

## 1.6 Research Outline

This study is organised as follows. The first chapter details the introduction, along with motivation and objectives of the study. Chapter 2 provides a literature review on the research concepts and also explores the benefits of establishing a small enterprise equity market. Chapter 3 discusses the methodology of the study, including samples and research designs. This is followed by empirical results in Chapter 4 and the overall conclusions in Chapter 5.

# 2 LITERATURE REVIEW

## 2.1 Introduction

This chapter is segmented into two parts, namely (a) Stating the case for the establishment of a small enterprise stock market; and (b) Investigating features of the small enterprise stock market. In probing the need for a stock market set up primarily for small enterprises, some features of the South African equity market are discussed and how they relate to the capital needs of small enterprises. Subsequently, this chapter discusses the empirical studies that have been carried on the relationship between stock market development and economic growth. This is then followed by an outline of the features of the small enterprise stock market.

## 2.2 Theoretical Framework: Stock Market Development and Economic Growth

The theoretical basis that financial development has a relationship with economic growth was posited by Schumpeter in 1911 (Enisan and Olufisayo, 2009). Financial development includes the two components of the financial system or capital market, namely the stock market and debt market (which includes the banking system). Enisan and Olufisayo (2009) attribute the 'supply leading' role of financial development towards economic growth to the following factors: (1) the efficient allocation of capital as savings increase; (2) the mobilisation of savings to productive instruments and savings vehicles; (3) the establishment of risk pooling and diversification vehicles; and (4) lower costs for gathering and processing information. Overall, this theory argues that developed financial market assist in the efficient distribution of scarce resources from surplus units to deficit units and thus promotes economic growth (Caporale et al, 2004).

There is a contrasting theory called 'demand following' that proposes that financial development is a result of economic development. Proponents of this view posit that financial development react passively to the demand for financial services by a growing economy (Robinson, 1952; Romer, 1990; Stem, 1989, as cited by Enisan and Olufisayo, 2009). There is also a third theory termed the 'feedback hypothesis' and it suggests that there may be a two-way relationship between financial

development and economic growth. The ‘feedback hypothesis’ theory posits that a well-developed financial system may lead to economic expansion and this, in turn, could create the demand for financial services (Levine, 1997 as cited by Enisan and Olufisayo, 2009).

This study focuses only on the stock market component of financial development and the relationship between stock market development and economic growth. A vector autoregressive model (VAR) is followed as it examines the causality of the relationship between stock market development and economic growth, without having a bias towards any of the above mentioned theories.

## 2.3 The Relationship Between Stock Markets and Economic Growth

The relationship between stock market development and economic growth has been well investigated in academic literature and this section discusses the main articles that will be considered for this study. Levine and Zervos (1998), using data from 47 countries from 1976 to 1993, studied the relationship between stock market liquidity; size; volatility and international integration; and economic growth. Their study used multilinear regression and mainly found that banking development and stock market liquidity are good predictors of economic growth. However, the regressions performed by Levine and Zervos (1998) were potentially affected by simultaneity bias and do not control for country fixed effects (Caporale et al, 2004).

In addressing these weaknesses, further research was conducted by Rousseau and Wachtel (2000). In their study, Rousseau and Wachtel (2000) examined the relationship between equity markets and economic growth. Their study was based on panel data from 1980 to 1995 for a set of 47 countries and used Vector Auto Regressions (VAR). Rousseau and Wachtel (2000) found evidence for a relationship between deep liquid equity markets and economic growth. Further, Beck and Levine (2004) applied the generalised-method-of-moments technique to address the weaknesses of their earlier study. Beck and Levine (2004) studied 40 counties using data from 1976 to 1998 and found a positive relationship between stock market development and economic growth.

However, Caporale et al (2004) points out that there are weaknesses in the refined approach by Beck and Levine (2004). In particular, Caporale et al (2004) finds that

the homoscedasticity assumptions made about the error term are not supported by the data. To address these weaknesses, Caporale et al (2004) carried out a study using VAR procedures developed by Toda and Yamamoto (1995), as cited by Caporale et al (2004), to test for causality between stock market development and economic growth. The study was based on data from seven countries for the period between 1977 and 1998. Caporale et al (2004) found that causality exists between stock market development and economic growth. Specifically, it was found that well-developed stock markets lead to economic growth.

A further study was also carried out by Marques et al (2013) for the Portuguese economy based on data from 1993 to 2011. Their study investigated the relationship between financial development and economic growth using Vector Autoregressive (VAR) modeling and Granger causality tests. Marques et al (2013) found evidence of bidirectional Granger causality between stock market growth and economic growth within Portugal.

In terms of studies involving South Africa, Enisan and Olufisayo (2009) examined seven sub-Saharan African countries using data between 1980 and 2004. The objective of their study was to investigate cointegration and causality relationships between stock markets development and economic growth. This was done by using Autoregressive distributed lag (ARDL) boundary tests and the Granger causality (GC) test based on vector error correction model (VECM). Enisan and Olufisayo (2009) found that stock market development, in the countries examined, has a positive long run relationship with economic growth. Further, Enisan and Olufisayo (2009) showed that stock market development Granger causes economic growth in Egypt and South Africa.

Similarly, Ndako (2010) examined the relationship between stock markets, banks and economic growth within South Africa using data between 1983 and 2001. The Ndako (2010) study applied Vector Error Correction Model (VECM) based causality tests, Impulse Response Functions (IRFs), and Variance Decompositions (VDCs) to examine the long and short-term dynamic of the variables studies. Ndako (2010) found that in the long run, there is evidence of bidirectional causality between banking system development and economic growth, while there is a unidirectional causality from economic growth to stock market development. However, in the short

run, both banking system development and stock market development have an impact on economic growth. Lethlape (2013) studied four African countries (including South Africa) between 1991 and 2010. The Lethlape (2013) study applied Ordinary Least Squares (OLS) Regression and concludes that there is an association between stock market development and economic growth. In addition, Wang and Kalu (2019) studied the finance growth relationship in the emerging market block BRICS consisting of Brazil, Russia, India, China and South Africa. Their study was done using Granger causality tests based on VAR models and used data for the period 1992 to 2015. Wang and Kalu (2019) found that causality runs from financial market development to economic growth in Brazil and South Africa, while causality runs from economic growth to financial development in Russia, India and China.

The literature summarised above presents strong evidence for the relationship between stock market development and economic growth. A further question that arises is whether broadening the stock market to include small enterprises yields the same results. The hypothesis from this study is that there is a positive relationship between the development of a small enterprise stock market and economic growth within the South African context. The view held in this study is consistent with that held by the World Federation of Exchanges (2017) study, which posits that there is a link between the stock market and the real economy. This is so because financial market development promotes economic development by facilitating the mobilisation of capital; and enabling the sharing and transfer of risk.

Adding a further tier to the currect stock market is expected not to negatively impact the observed causality between South African stock markets and economic growth. In this study, a positive association between small enterpise market development and economic growth is expected. This was demonstrated through a desktop review firstly, within the Chinese capital markets, where a small enterprise stock market has been operational since January 2013. Secondly, an empirical investigation has been performed within the South African context, using proxy data since a small enterprise stock market is yet to exist.

A summary of the main articles considered in investigating the relationship between stock market development and economic growth is shown in Table 2.1.

**Table 2.1: Articles for Stock Market Development and Economic Growth**

| Author(s) | Region/ Country/ Scope | Methodology | Major Findings |
|---|---|---|---|
| Levine and Zervos (1998) | 47 countries Data between 1976 and 1993 | Multilinear regression | Banking development and stock market liquidity are good predictors of economic growth |
| Rousseau and Wachtel (2000) | 47 countries Data between 1980 and 1995 | Vector auto regressions | Found evidence for a relationship between deep, liquid equity markets and economic growth |
| Beck and Levine (2004) | 40 counties Data between 1976 and 1998 | Generalised-method-of-moments techniques | Found a positive relationship between stock market development and economic growth |
| Caporale et al (2004) | Seven countries Data between 1977 and 1998 | VAR procedures | Causality exists between stock market development and economic growth |
| Enisan and Olufisayo (2009) | Seven sub-Saharan countries Data between 1980 and 2004 | Autoregressive distributed lag (ARDL) boundary tests and the Granger causality (GC) test based on vector error correction model (VECM) | Market development had a positive long run relationship with economic growth. Stock market development Granger causes economic growth in Egypt and South Africa |

| Author(s) | Region/ Country/ Scope | Methodology | Major Findings |
|---|---|---|---|
| Ndako (2010) | South Africa<br>Data between 1983 and 2001 | Vector Error Correction Model (VECM) based causality tests; Impulse Response Functions (IRFs); and Variance Decompositions (VDCs) | There evidence of bidirectional causality between banking system development and economic growth, while there is a unidirectional causality from economic growth to stock market development |
| Lethlape (2013) | Four African countries<br>Data between 1991 and 2010 | OLS Regression | There is an association between stock market development and economic growth |
| Marques et al (2013) | Portugal<br>Data between 1993 and 2011 | Vector Autoregressive (VAR) modeling, Granger causality | There is evidence of Granger bidirectional causality between the stock market and economic growth.<br>There was no evidence of causality running from bank financing to economic growth |
| Wang and Kalu (2019) | BRICS<br>Data between 1992 and 2015 | Vector Autoregressive (VAR) modeling, Granger causality | Causality runs from financial market development to economic growth in Brazil and South Africa |

| Author(s) | Region/ Country/ Scope | Methodology | Major Findings |
|---|---|---|---|
| World Federation of Exchanges (2017) | Stock Exchanges affiliated to the World Federation of Exchanges | Review of academic literature and input from affiliate exchanges | There is a positive relationship between stock exchange development and economic growth |

**Source:** Compiled by the Author

## 2.4 Overview of South African Equity Capital Markets

The Johannesburg Stock Exchange (JSE) of South Africa was established in 1887. It epitomises South Africa's industrialisation and global economic engagement (Lukasiewicz, 2017). Though dominant at the time, the JSE was not the only exchange and other participants existed, such as the Royal Kimberly Exchange, the Barberton Exchange and the Union Exchange. Nevertheless, it was only from 1951 that the JSE ceased to experience competition in the South African equity market (Clarke, 2016).

Other aspects of the South African capital market have also been developing. The South African Futures Exchange (SAFEX) began its operations as an exchange for financial and commodity derivatives in 1990, while the Bond Exchange of South Africa (BESA) was licensed in 1996 as an exchange for trading bonds. Both exchanges, however, were acquired by the JSE in 2001 and 2009 respectively making the JSE the only registered exchange in the South African capital markets over a wide range of products. The JSE continued uncontested in South African markets until June 2013, when the Financial Market Act of 2012 (FMA) came into effect. The FMA allowed for the registration of other exchanges in South African capital markets, in order to promote international and domestic competitiveness as one of the objectives (Clarke, 2016).

The process followed and the requirements for listing on the JSE are onerous. A listing can have a time frame of between 9 to 13 weeks, depending on the method

of listing and the complexity. Companies wishing to be listed need to comply with a range of requirements, including but not limited to the following (The Johannesburg Stock Exchange, Guidelines to Listing on the JSE, 2016):

- Capital Requirements: Companies seeking to be listed must have at least R50 million in equity. Upon listing, companies must issue at least 25 million shares and at least 20% of these shares must publicly held.
- Profitability Requirements: Companies seeking to list must have an annual profitability of at least R15 million before taxation.
- Professional Advisors: The listing company needs to hire the services advisors such as a Sponsor; Corporate Advisor; Legal Advisor; Accountant; Secretary; Public Relations Consultant; and Printers.
- Fees: The listing company needs to pay a once-off listing fee and an annual listing fee.

The above requirements are more viable for large enterprises, therefore in 2003, the JSE launched AltX, an exchange aimed at medium size enterprises[7]. The requirements under AltX are indeed less onerous; however, they remain out of reach for micro and small enterprises. For instance, while AltX's capital requirements are lower at R2 million, the fees (listing and annual) still apply and a listed company is still required to hire a professional advisor[8]. The AltX also requires the listing company's directors to attend a directors training program offered by a local business school, in addition to the educational requirements for directors in the listing requirements (Maxfield, 2009). Moreover, it has been observed that the reduction in the requirements has encouraged some companies to transfer their listing from the JSE to the AltX platform (World Federation of Exchanges, 2017). Despite the relatively lower requirements from the AltX (compared to the JSE), micro and small enterprises would find it challenging to fully comply due to the complexity and costs involved.

### 2.4.1 New Exchanges in the South African Equity Market

As at August 2020, four new exchanges have entered the South African capital market and the presence of these new entrants is beneficial from a competition

[7] The establishment of the Alt-X as the Growth Board: https://www.jse.co.za/about/history-company-overview
[8] Alt-X listing requirements: https://www.jse.co.za/raise-capital/equities-market/altx or https://www.jse.co.za/content/JSEProcessItems/AltX%20Listing%20Requirements.pdf

point of view. These new exchanges have broadened the equity market and each of them has a particular area of focus. Nevertheless, progress towards meeting the capital needs of small enterprises remains limited when inspecting the current listing requirements, current listed companies, and overall area of focus for each of the four new exchanges:

- ZARX was licenced in August 2016 and had seven listings as at August 2020[9]. ZARX has a broad range of listed entities, ranging from Real Estate Investment Trusts (REITS), to exchange traded products. Companies seeking to list on ZARX must have at least R200 million in terms of market capitalisation and at least 30% of shares must be issued to the general public. In addition, the listing company must appoint a professional advisor, an executive financial director and a company secretary as part of the listing requirements. These requirements cannot be easily met by small enterprises so this places ZARX out of reach for small enterprises.
- 4Africa Exchange was licenced on August 2016 and had seven listings as at August 2020[10]. 4Africa acquired RainFin's corporate debt marketplace and this has allowed it to lead in offering technology-led debt products (Jooste, 2019). 4Africa Exchange requires companies to have at least R25 million in market capitalisation in order to be listed and at least 10% of shared must be issued to the general public. The company seeking to list must also appoint a sponsor or issuer agent and a reporting accountant. These requirements cannot be easily met by small enterprises so this makes 4Africa Exchange inaccessible for small enterprises.
- A2X was licenced on April 2017 and had 37 listings as at August 2020[11]. A2X has positioned itself as a secondary market and it competes directly with the JSE in the secondary share market. Platforms offering such products are referred to as Multilateral Trading Facilities (Jooste, 2019). Seeing that this exchange competes directly with the JSE for listings (which is already out of reach for small enterprises), A2X is hence not expected to meet the capital needs of small enterprises. This also evidenced by the fact that companies that are currently listed on this platform are also listed on the JSE.

[9] ZARX market listings: https://www.zarx.co.za/about-us
[10] 4Africa market listings: https://4ax.co.za/Exchange
[11] A2X market listings: https://www.a2x.co.za/wp-content/uploads/2020/07/A2XMonthlyMktStats_June2020.pdf

- Easy Express Securities Exchange (EESE) was licenced on Sep 2017 and had four listings as at August 2020[12]. EESE's focus is on listing BEE share schemes such as Phuthuma Nathi (established by MultiChoice[13]) and Ukhamba Holdings (established by the Imperial Group[14]) and is a platform that serves as a secondary market for current shareholders of these schemes to be able to exit. EESE does not have companies that produce goods and services in its listings, making it unsuitable for the purposes of our analysis.

## 2.5 The Structure of a Small Enterprise Capital Market

This section discusses the features of the envisaged stock market for small enterprises, which are defined to be enterprises consisting of not more than 50 permanent employees and having an annual turnover of not more than R15 million. In this study, it is anticipated that the government would play a critical role in the establishment and maintenance of the small enterprise exchange but the involvement of government does not preclude the participation of the private sector.

### 2.5.1 Listed Equity Markets as a Suitable Vehicle

The listed equity market is deemed the most appropriate vehicle to provide capital to small enterprises and Rousseau and Wachtel (2000) outline the reasons underlying this argument as follows:

- The listed equity market provides a potential exit for investors and entrepreneurs. The existence of a listed equity market increases the attractiveness of venture capital funding because the venture capital investors can be assured of the opportunity of realising potential gains from their investments, through an initial public offering.
- The listed equity market is a source of portfolio inflows and foreign direct investments. While foreign direct investments are not expected into small enterprises, there exists the possibility of financial intermediaries structuring products that facilitate exposure into this segment of the capital markets.

[12] Easy Express Securities Exchange market listings: https://www.eese.co.za/Public/ClientStats.aspx
[13] EESE's BEE listings: https://www.phuthumanathi.co.za/information/
[14] EESE's BEE listings: http://www.ukhamba.co.za/

These products would then create a channel for possible portfolio inflows from both domestic and foreign investors.

- The listed equity market provides liquidity and an organised avenue for investors to exchange their holdings for cash or other assets.
- The listed equity market ensures the flow of information from shareholders and management quickly and improves the efficiency of financial intermediation.

Besides listed equity, other funding alternatives are possible for small enterprises such as Venture Capital, Private Equity, and Crowdfunding. However, these funding mechanisms do not rise to the above-mentioned level of benefit of listed equity markets. More so, there are limitations in these funding alternatives being available for small enterprises, which include the following:

- Venture Capital is relatively new in South Africa and tends to only focus on enterprises that are already profitable (van der Merwe, 2019), making capital very scarce.
- Private Equity focuses on companies at later stage of development and, in South Africa, it focused on medium to large companies who on fund closure could list on the JSE.
- Crowdfunding can be defined as capital that is provided by the general public to an entrepreneur to fund an idea or enterprise that is usually at concept stage (van der Merwe, 2019). Crowdfunding is very new to South Africa and the African continent. This novelty and the fact that operators are not directly regulated is expected not to inspire significant public confidence in Crowdfunding within South Africa.

### 2.5.2 Government Sponsorship and Participation

For the successful acceptance and implementation of a small enterprise stock exchange, government is required to play a critical sponsoring role in order to create sufficient public confidence as well as to ensure the financial viability and stability of the exchange. The existence of such an exchange would entail broad economic and societal benefits that can be considered as part of macroeconomic policy.

The need for small enterprise exchange is also recognised in South African policymaking. The Gauteng Township Economy Revitalisation Strategy (2014 –

2019) articulates government's vision to have vibrant and sustainable enterprises that would build an inclusive labour absorbing and growing economy. The Gauteng government aims to have township economies contributing at least 30% to the province's GDP by 2030. To achieve such, the government has set out a range of programmes to support micro, small and medium enterprises and cooperatives. To further these efforts, Government has set out seven strategic focus areas, one of which is "Financing and investing in the township economy". Under this focus area, Government articulates various initiatives to generate capital for small enterprises, including the establishment of an "alternative stock market". Since no further details are provided in the proposed strategy to generate capital for small enterprises, the findings from this research may be considered to provide some insights on the potential impact of an efficient small enterprise stock market on the South African economy. The key areas of consideration and government participation in the small enterprise stock market are outlined below.

**Regulation**

The envisaged stock exchange would have to be regulated by the Financial Services Conduct Authority (FSCA) as other exchanges and comply with the Financial Markets Act to ensure the same level of trust that the South African public gives to financial services providers. Moreover, effective regulation and enforcement has also been shown to be a significant factor that contributes to stock market development (Yartey, 2007, as cited by Cai, 2010). Administratively, the small enterprise may be set up as a separate agency or fall under a currently existing relevant government agency such as the Small Enterprise Finance Agency, which is mainly focused on providing credit facilities to small, medium and micro enterprises[15].

**Listing Requirements**

As a functioning exchange, the small enterprise stock market would have to institute a set of requirements in order to be qualified as an exchange. This is necessary for building and maintaining public confidence in order to safeguard investor funds. These listing requirements and the listing process in general would have to be feasible for small enterprises, which according to most recent definition, are

[15] Sefa's outline and overview: https://www.sefa.org.za/about/history

enterprises consisting of not more than 50 employees and have an annual turnover of not more than R15 million[16]. In particular, the listing requirements should be less onerous than is the case for the AltX. For example, the capital requirements could be R1 million (half of AltX's requirements); the annual fee could be removed; and the need to hire a professional adviser could removed (the exchange should assign an advisor at no cost to the listing company).

**Listing Process and Financial Disclosures**

The listing process would include a due diligence exercise on the small enterprise applicant to ensure the accuracy of submitted information. A risk rating would also be given (and reviewed annually) to listing entities in order to give market participants full independent investment guidance in addition to the financial information disclosed. To ensure the validity of a company's financial information, the listing companies can be compelled to use an approved bank, which can use algorithms to compile a proxy set of financial statements from the company's financial transactions. These proxy financial statements would be compared to the company's submitted records and differences would be interrogated and may even be disclosed to the market. The compulsory disclosure of financial records is beneficial because it is expected to lead to increase investor confidence and participation (Sin-Yu & Njindan, 2017). In addition, increased transparency and regulation are expected to increase the efficiency of the equity market as a whole (Pagano 1993a, 1993b as cited by Sin-Yu & Njindan, 2017).

**Small Enterprise Share Purchases**

As a sponsor of the exchange, government would participate in all public offerings made on the exchange by purchasing a proportion of the issued shares, which can be sold at a later stage. This would help to create liquidity and confidence in the stock market. Further to this, government exposure to the listed companies would force the exchange to be accurate in the due diligence exercise performed in the listing process since this would have the effect of aligning governments' interests with the exchanges' investors. Government could also consider providing implicit

[16] According to the Department of Small Business Development, a small enterprise is a separate and distinct business entity, together with its branches or subsidiaries, which is/are managed by one owner or more predominantly carried on in any sector or subsector of the economy. The Department of Small Business Development defines businesses as Medium, Small or Micro using a set of annual turnover thresholds that are applicable for each of the Standard Industry Classifications.

loss guarantees by having a set of minimum share prices per sector and purchase shares in the market to ensure this.

Interestingly, the existence of a small enterprise exchange may have enhanced the form and efficiency of government support for small enterprises during the coronavirus-induced economic recession. In April 2020, South Africa initiated a debt relief scheme for small and medium enterprises that have been negatively affected by the coronavirus pandemic (South African Government, 2020). This scheme aimed to provide a loan facility for a period of six months in order to help small enterprises to recover from the effects and aftermath of the pandemic. Having a small enterprise stock exchange in place would have made the application process more efficient for the government and small enterprises since the required documentation (for the loan scheme) would be readily available. Further to this, the government could have achieved similar objectives to the loan scheme (in support of small enterprises) through direct capital injections by purchasing the affected companies' shares on the small enterprise stock exchange.

Nevertheless, explicit limits on the extent of government participation would have to be established, such as a an upper cap on share ownership per company or maximum term limits for share ownership per company, in order to promote efficiency and company profitability. This is because privately owned companies have been shown to be more profitable than state-owned companies (Cai, 2010). Moreover, partnerships could be created with the private sector to ensure the efficient use of resources and availability of the required skills. The exchange would need to be run as a professional organisation and certain aspects of the exchange's functions may be outsourced to certain private sector entities.

**Non-profit Motive**

According to Maxfield (2009), a stock exchange having non-profit motive, especially in the emerging economy context, would serve the public interest directly and indirectly. This is because a stock exchange facilitates business finance (which may lead to economic growth) and also provides plaftorms that contribute to financial education. In addition, stock exchanges in more developed capital markets began as non-profit associations between brokers and dealers, and in their evolution to become for-profit stock exchanges there was a greater need for robust risk

management frameworks (Polato & Floreani, 2014). This is because the profit maximisation motive may incentivise more risk taking activitites by the management of the exchange (for example, promoting speculative share trading and launching complex derivative instruments). Given the undeveloped state of maturity of the small enterprise exchange in South Africa and the anticipated involvement of the government as a sponsor, it may be appropriate to initiate the small enterprise exchange as non-profit entity and revisit this decision over time.

**The Use of an Electronic Platform**

Maxfield (2009) finds that electronic exchanges have significantly lowered long term operational costs, and this cost saving would be beneficial to the government as the sponsor of the proposed stock exchange. Electronic exchanges also offer lower transaction fees and also provide direct access for retail investors (Maxfield, 2009). Current technological innovation may also be utilised to futher reduce costs through the use of distributed ledger technology (Blockchain), which can be described as a database that keeps track of who owns a specific asset over time. Distributed ledger technology would also improve the tradability and transparency of shares listed on the exchange (Robeco, 2016). An example of the application of distrubuted ledger technology within the stock exchange context is Linq. Linq is a pilot stock exhange within Nasdaq Private Markets, which is built on distributed ledger technology, and currently has a small number of technological companies listed[17].

### 2.5.3 Successful Implementations: A Case of China's NEEQ

There is historical precedence in the establishment of small enterprise stock markets. The creation of stock exchange segments with lower listing requirements has been viewed as an essential measure to reduce the dependency of small and medium enterprises on banks for external funding (Revest & Sapio, 2013). More broadly, this type of stock market is referred to as a Junior Stock Exchange and is defined as a specialised stock exchange or a stock exchange segment that has less onerous regulations, designed essentially for small enterprises (Valerie & Alessandro, 2019). An example of a small enterprise stock exchange or Junior Stock exchange is the China's third tier of the listed equity market[18], known as the National Equities Exchange and Quotations (NEEQ), also known as the 'New Third

[17] Linq description and overview: https://www.nasdaq.com/articles/building-blockchain-2016-03-23
[18] NEEQ overview and details: http://www.neeq.com.cn/en/about_neeq/introduction.html

Board'. This exchange has been operational from January 2013. Xu, Zhu, & Wu (2020) posits that there are other examples of small enterprise exchanges, such as the Alternative Investment market (AIM) from Great Britain and Second Marche from France, but it is the NEEQ that has enjoyed a relatively higher growth rate in the number of listed companies. As a result, the NEEQ forms part of this study.

The NEEQ is a critical component of the Chinese multi-tiered capital market, boasting the highest number of listed companies compared to all Chinese stock exchanges (Xu, Zhu, & Wu, 2020). According to Li et al (2015), China's stock markets consist of three layers. The first layer is the Main Board Market and it is composed of the Shanghai Stock Exchange and Shenzhen Stock Exchange, with 1 963 listed companies as at 31 July 2019 according to Xu, Zhu, & Wu (2020). The second layer is the Growth Enterprise Market (GEM), which was established in 2009 by the Shenzhen Stock Exchange and had 1 702 listed companies as at 31 July 2019 according to Xu, Zhu, & Wu (2020). The third layer is occupied by the NEEQ and its primary purpose is to service the capital needs of micro and small enterprises, with 9 579 listed companies as at 31 July 2019 according to Xu, Zhu, & Wu (2020).

The NEEQ was initially focused only on innovative, start-ups, and high-growth (technology-based) small enterprises. However, this was later lifted to include a broader range of companies such as those focusing on manufacturing and construction. Listed companies are categorised to into the 'innovation market' and 'basic market' to distinguish companies at different stages of development, where the former is deemed more prestigious than the latter[19].

According to Liu & Xu (2016), the NEEQ's listing requirements are less stringent compared to the other layers of the Chinese equity market in recognition of the needs and capacity of small enterprises. At the NEEQ's launch as the New Third Board in 2013, about 351 companies were listed and the size of the market was RMB 95.77 million. This has grown to 8 281 companies and a market capitalization of RMB 2.7 trillion as at October 2020[20], indicating that small enterprise stock markets can be established with some success.

[19] NEEQ overview: https://www.china-briefing.com/news/neeq-chinas-new-stock-market-smes/
[20] NEEQ market capitalisation as at 30 October 2020: http://www.neeq.com.cn/en/market_data/statistical.html

## 2.6 Summary

This chapter discussed the reasons for establishing a small enterprise stock exchange within South Africa by showing that the current equity market is out of reach for small enterprises. Literature has shown positive relationship between stock market development and economic growth within various jurisdictions including South Africa. This relationship between stock market development and economic growth is examined empirically later in this study, but from the perspective of a small enterprise stock exchange within South Africa. In the event that a small enterprise stock market is established, this chapter outlined the key features that this market could adopt and the level of government participation that may be required. Moreover, the case of the National Equity Exchange and Quotations (NEEQ), China's small enterprise stock market, was explored. A further review of the NEEQ is presented later in this study.

# 3 RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter describes how this study is designed and conducted. A desktop review on the NEEQ in China and an empirical review (of the relationship between stock market development and economic growth within South Africa) is outlined in detail. In addition, this chapter also discloses the data sources that were used for the study and details how the variables were measured.

## 3.2 Research Design

This desktop review on the NEEQ focused on the factors that led to the successful implementation of this small enterprise stock market (NEEQ) in China. The review was carried out by examining literature on the NEEQ and the reasons for its establishment.

In addition to the above, Vector Autoregressive (VAR) modelling and Granger causality was deployed to investigate the relationship between small enterprise stock market development and economic growth within the South African context. This approach is beneficial because it is based on a transparent framework and gives robust evidence based on causality linkages (Caporale et al, 2004). This approach also treats variables as potentially endogenous and evaluates relationships without the need to distinguish between endogenous and exogenous variables.

## 3.3 Population and Sample

This study used the NEEQ in China for a desktop review. The NEEQ was selected due to its relatively higher growth rate in the number of company listings compared to similar stock small enterprise exchanges (Xu, Zhu, & Wu, 2020). The relative success enjoyed by the NEEQ is considered to be particularly relevant for this study because it offers a precedent from an emerging market perspective. In addition to this, South Africa is in the BRICS trading block, a grouping of leading emerging market economies (consisting of Brazil, Russia, India, China and South Africa), and this established relationship with China may allow South Africa to learn and form

strategic partnerships that could help in the development of a successful small enterprise stock exchange. China has achieved the highest economic growth amongst the BRICS countries and has made strong progress in reducing poverty levels in its population (Wang and Kalu, 2019), making it a good candidate to learn from.

As the main country of concern for this study, the empirical review was based in South Africa. The study used the longest available data series for the small enterprise market proxy and macro-economic data.

## 3.4 Data Collection

The data used for this study was collected from publicly available data sources within each respective country. The data for the NEEQ desktop review and the South African empirical review is described below.

### 3.4.1 Data for the NEEQ Review

The data for the NEEQ desktop review was collected from the stock exchange's website[21]. An extract of the monthly market capitalisation from January 2015 to October 2020 was made, giving 70 data points. Public data from the NEEQ website is only available from January 2015, so this represents the longest possible data series available at the time of data collection. Macroeconomic data for China was also extracted from the IMF's International Financial Statistics database from 2015 to 2020.

The lack of public data before 2015 results in a misalignment relative to the data period used in the South African study. It is therefore not possible to make generalisations and comparisons between the NEEQ and the envisaged South African small enterprise stock market. In addition to the data period misalignment, the limited time period in the NEEQ dataset, between 2015 and 2020, resulted in a desktop review being performed instead of an empirical review. A possible further area of study may be to undertake an empirical review of the relationship between the development of the NEEQ and Chinese economic growth, once more data becomes available.

[21] NEEQ market data: http://www.neeq.com.cn/en/market_data/statistical.html

### 3.4.2 Data from the South African Market

The data for the South African empirical review was mostly collected from South Africa's national statistical agency (Stats SA). A small enterprise stock market is non-existent at this stage so a proxy was derived from the data published in the Annual Financial Statistics survey. Stats SA conducts the Annual Financial Statistics (AFS) survey to collect a range of financial statistics in respect of enterprises in the formal business sector of the South African economy[22]. The results of this annual survey are a set of nationally consolidated financial statements for small, medium and large enterprises for the data period 2006 to 2018, which is the longest available data series.

The proxy data for the development of the small enterprise stock market was based on the total equity data field within the small enterprises category as this aligns most with this study's definition of small enterprises. For the purpose of this study, small enterprises are enterprises consisting of not more than 50 permanent employees and having an annual turnover of not more than R15 million[23]. Using total equity as a proxy equates to following the book value methodology of approximating the value of small enterprises on an annual basis (Mitenko & Okleshen, 1998). However, according to Mitenko & Okleshen (1998) the book value Approach has two weaknesses; (1) The approach is not reflective of the market value since some items on a company's balance sheet are on a historic cost basis; and (2) This approach does not reflect the value of intangible assets.

Other approaches to value private non-traded companies include the earnings methodology and the market methodology. However, despite the above mentioned weaknesses, the book value methodology remains the most appropriate for this study. This because the other valuation approaches require more data, but the lack of data on South African small enterprises makes it impossible to use them. In addition, the other valuation approaches require subjective parameter inputs such as the risk discount rate and an earnings multiple, making them unsuitable for the purposes of this study.

---

[22] AFS publications from Stats SA: http://www.statssa.gov.za/?page_id=1866&PPN=P0021&SCH=7681

[23] According to the Department of Small Business Development, a small enterprise is a separate and distinct business entity, together with its branches or subsidiaries, which is/are managed by one owner or more predominantly carried on in any sector or subsector of the economy. The Department of Small Business Development defines businesses as Medium, Small or Micro using a set of annual turnover thresholds that are applicable for each of the Standard Industry Classifications (SIC)

AFS annual data on small enterprise development index from 2006 to 2018 were converted to quarterly data between 30 March 2006 and 30 March 2018. This is because the AFS data uses a financial year that starts from 1 July of the current calendar year and ends at 30 June of the calendar next year. This data conversion is implemented using the Low-frequency data to High-frequency procedure within Eviews11, by applying the linear interpolation method. A summary of the annual data points that are used as a small enterprise stock market development proxy is shown in Table 3.2.

**Table 3.2: Small Enterprise Development Proxy Data**

| Year | Total Equity |
|---|---|
| 2 006 | 147 684 |
| 2 007 | 175 196 |
| 2 008 | 341 237 |
| 2 009 | 125 936 |
| 2 010 | 345 286 |
| 2 011 | 256 138 |
| 2 012 | 279 865 |
| 2 013 | 367 651 |
| 2 014 | 559 348 |
| 2 015 | 492 331 |
| 2 016 | 395 333 |
| 2 017 | 505 175 |
| 2 018 | 541 466 |

**Source:** Compiled by the author from Stats SA AFS data

Macroeconomic data for South Africa was extracted from the World Bank's Development Indicators database and Stats SA for the period March 2006 to March 2018. To ensure consistency with the small enterprise data, quarterly data was extracted and a Low-frequency to High-frequency data conversion (within Eviews11) was implemented to all the annual data series.

## 3.5 Measurement of Variables

The following variables were used to apply the VAR modelling framework to estimate the relationship between stock market development and economic growth within South Africa.

1) Real Gross Domestic Product ($X_1$): This is a measure of economic growth and its inclusion is in line with most studies on the relationship between stock market development and economic growth (Levine and Zervos, 1998; King

and Levine, 1994; Caporale et al, 2004; Ndako, 2010; and Marques et al, 2013). The quarterly Real GDP data for South Africa was extracted from Stats SA and was used for this variable[24].

2) Small Enterprise Capitalization to GDP ($X_2$): This variable is measured as the total value of shares listed in the small enterprise stock market to GDP. It aims to capture the development of the small enterprise stock market. As described above, the quarterly proxy data (from the AFS) was used for this variable.

Enisan and Olufisayo (2009) point out that the omission of variables that could have an impact on economic growth may bias the direction of the causality between stock market development and economic growth. To minimise such bias, the following variables were added as control variables in this model.

3) Market Capitalization to GDP ($X_3$): This variable is calculated as the total value of all listed shares to GDP. It aims to capture the development of the stock market by assuming that the size of the market is positively correlated to liquidity (Levine and Zervos, 1996). The South African data for this variable was extracted from the Word Bank's World Development Indicators database. The data series is annual and was converted to a quarterly dataset using the above-mentioned linear interpolation procedure.
4) Investment Ratio ($X_4$): This variable is measured as Gross Fixed Capital Formation to GDP and is included as a control variable in line with Bassanini et al. (2001) and Leahey et al. (2001), as cited by Marques et al, (2013). The South African data for this variable was extracted from the Word Bank's World Development Indicators database. The data series is annual and was converted to a quarterly dataset using the above-mentioned linear interpolation procedure.
5) Credit to GDP ($X_5$): This variable aims to measure the development of the banking system and is a ratio of total domestic credit to GDP. The inclusion of this variable is recommended for economies with a high dependency on banking credit (Marques et al, 2013). The South African data for this variable was extracted from the Word Bank's World Development Indicators

[24] SA GDP data: http://www.statssa.gov.za/?page_id=1854&PPN=P0441

database. The data series is annual and was converted to a quarterly dataset using the above-mentioned linear interpolation procedure.

6) Consumer Price Index ($X_6$): This variable is a measure of inflation and is included as a control as recommended by Bassanini et al. (2001) and Leahey et al. (2001), as cited by Marques et al, (2013). The data for this variable was extracted from Stats SA's monthly CPI database (P0141) and the data points at quarterly intervals were considered for this study.

## 3.6 Data Analysis

A desktop review was carried out on China's New Third Board. This analysis sought to determine the main trends that can be observed, following key metrics from the NEEQ. Some of the factors reviewed include; market capitalisation, number of listings overt time, and the returns earned by investors over time.

From the South African context, the Vector Autoregressive framework was applied using the defined macro-economic variables and the small enterprise stock exchange proxy. Natural logarithms of each of the variables were taken and the modelling was carried out with and without the control variables. The variables were tested for stationarity, after which the VAR models were fit to determine the long run causality based on Granger causality.

The VAR equations deployed is as follows:

$$X_t = \sum_{i=1}^{k} \beta_i \cdot X_{t-i} + \varepsilon_t \quad (1)$$

Where:

- $X_t$ is the vector of the defined variables i.e. $X_t = [X_1, X_2, X_3, X_4, X_5, X_6]$;
- $\beta_i$ is the coefficient matrix of the defined variables;
- $\varepsilon_t$ is the vector of error terms; and
- $k$ is the optimal lag number

The set equations for an optimal lag of one are as follows:

$$X_{1,t} = \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \beta_5 X_{5,t} + \beta_6 X_{6,t} + \varepsilon_{1,t}$$

$$X_{2,t} = \beta_1 X_{1,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \beta_5 X_{5,t} + \beta_6 X_{6,t} + \varepsilon_{2,t}$$

$$X_{3,t} = \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_4 X_{4,t} + \beta_5 X_{5,t} + \beta_6 X_{6,t} + \varepsilon_{3,t}$$

$$X_{4,t} = \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_5 X_{5,t} + \beta_6 X_{6,t} + \varepsilon_{4,t}$$
$$X_{5,t} = \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \beta_6 X_{6,t} + \varepsilon_{5,t}$$
$$X_{6,t} = \beta_1 X_{1,t} + \beta_2 X_{2,t} + \beta_3 X_{3,t} + \beta_4 X_{4,t} + \beta_5 X_{5,t} + \varepsilon_{6,t} \quad (2)$$

## 3.7 Ethical Considerations

For the purpose for this study, no human contact is involved as the data used are all sourced secondarily. The data used for the study was collected from the following publically available data sources:

- Stats SA (Statistics South Africa)
- Development Indicators database from the World Bank
- International Financial Statistics database from the IMF
- National Equities Exchange Quotations market data from the NEEQ website

I commit that I have used the data in an ethical manner and in accordance with the ethical requirements of the University of the Witwatersrand.

## 3.8 Validity and Reliability

The validity and reliability of data was insured by collecting data from reputable institutions and databases. The data was also properly edited and captured correctly without errors of omission. The validity and reliability of the modelling results has been ensured by only using software packages that are well documented and have long established track records. Microsoft Excel and Eviews11 were used in this study for all the data extraction, summarising, and modelling that was performed.

## 3.9 Limitations

The following limitations apply to this study:

- This study focuses on South Africa's equity market and does not consider other sections of the capital market.
- The study focuses on small enterprises as defined by the South Africa's Department of Small Business Development, which is an enterprise

consisting of not more than 50 employees and has an annual turnover of not more than R15 million.

- The empirical review and analysis was limited to the period between March 2006 and 2018. This is currently the longest data series available and this study can be revisited at a later stage when more data is available.
- A linear interpolation procedure was used to convert annual data points to quarterly data points. Different interpolation approaches (for example polynomial or cubic approaches) may lead to different modelling outcomes.
- The modelling and analysis performed was based on the data currently available from the mentioned public data sources. Any restatement of the data series used may lead to different modelling outcomes.

# 4 RESULTS AND ANALYSIS

## 4.1 Introduction

This chapter presents and interprets the results of this study. As outlined in Chapter 3, the analysis and interpretation is presented in two parts: (1) the desktop review of the NEEQ, focusing on the factors that have led to a successful implementation of the Chinese small enterprise stock exchange; and (2) the empirical review within South African context, examining the relationship between small enterprise stock market development and economic growth.

## 4.2 Desktop Review of the NEEQ

The National Equities Exchange and Quotations (NEEQ) is a stock exchange designed for small enterprises within China. The NEEQ (also known as the 'New Third Board') has been in operation since January 2013 and it is the third tier of the Chinese equity market. Whereby, the Shanghai Stock Exchange and Shenzhen Stock Exchange form the first tier, while the Growth Enterprise Market (which is housed within the Shenzhen Stock Exchange) forms the second tier.

This section discusses the factors that led to successful implementation of NEEQ in China. In addition, this section presents and discusses the listings on the NEEQ and how they have developed over time. The growth of the market capitalisation over time and the returns that investors have earned by investing on the NEEQ are also discussed.

### 4.2.1 Factors for Success

The NEEQ had its origins as a small local stock exchange based in Beijing before its evolution and formal launch as a national stock exchange in January 2013. As a stock market dedicated to small enterprises that has achieved significant growth, there are notable factors that have driven the NEEQ's success. Some of the factors from the reviewed literature are discussed in this section.

**Regulation and Effective Enforcement**

The NEEQ has a short and simple listing process compared to other stock exchanges in the Chinese market, and this is very appropriate for small enterprises (Liu & Xu, 2016). The Chinese Security Regulation Committee (CSRC) regulates the NEEQ and the key listing requirements are that a firm must be operational for more than two years, have clear ownership, and have sound oversight. This effort to keep requirements at a minimum has allowed small enterprises to gain quick access to the equity market and has driven the growth in the number of listings over time (Liu & Xu, 2016).

Despite the minimal regulatory framework, the NEEQ has maintained high vigilance and intensity terms of regulatory enforcement in order to preserve market integrity (Xu, Zhu, & Wu, 2020). The NEEQ has taken a more active role, compared to other comparable small enterprise stock exhanges, in sanctioning listed firms. In fact, the NEEQ's enforcement activities have resulted in a number of companies being delisted from the exchange and the failure to disclose financial records within the required time is the main cause for mandatory delistings from the NEEQ. This is because all companies listed on the NEEQ have a requirement to disclose their annual reports, semi-annual reports, and adhoc information that has material impact on the company (Xu, Zhu, & Wu, 2020).

**Market Structure and Functioning**

The NEEQ was initially only focused on high-tech small enterprises; however, in January 2014 its focus was broadened by the CSRC and all small enterprises that have been in operation for more than two years were allowed to list on the exchange. The NEEQ's decision to broaden the type of companies that are allowed to be listed, and the simple (and quick) listing process have led to significant growth in the number of companies listed (Liu & Xu, 2016).

Despite having no company type preference, the NEEQ has aimed to distinguish between the types of companies that are listed and it has divided its listed market into two segments. First is the Innovative Segment, and it composed of higher quality listings that are subject to stricter regulations, some of which include the following:

- a minimum share capital requirement of 20 million RMB ($2.99 million as 30 October 2020);
- a minimum profitability of 10 million RMB ($1.49 million as 30 October 2020) over any two-year period;
- a minimum growth rate of 8% on net assets over any two-year period;
- a minimum annual revenue amount of 60 million RMB ($8.96 million as 30 October 2020) over any two-year period; and
- a minimum revenue growth rate of 50% over any two-year period.

The second segment is the Basic Segment, which is composed of the remaining companies that meet the listing requirements but not meet the strict measures of the Innovative Segment.

Once listed on the NEEQ, a company has to select a mechanism through which its shares will be traded. There are two types of mechanisms, namely, negotiation and market making. Under the negotiation mechanism, buyers and sellers negotiate directly for the price and quantities of the shares traded. The market making mechanism was introduced in August 2014; companies that select this method must find at least two market makers (Liu & Xu, 2016). Whereby, a market maker is a specialised financial services provider that is willing to buy and sell a listed company's shares. According to Liu & Xu (2016), most companies use the negotiation mechanism, and this is also confirmed by Li, Meng, & Wei (2015). This contributes to the liquidity challenges experienced on the NEEQ because the market making mechanism improves market liquidity (Liu & Xu, 2016). Small enterprise stock exchanges are generally less liquid than their equivalent major or senior stock exchanges, Illiquidity is therefore not unique to the NEEQ (Xu, Zhu, & Wu, 2020).

**Investor Participation and Restrictions**

One of the distinguishing factors about the Chinese equity market is the extent of participation by retail investors. Chinese retail investors significantly dominate institutional investors as follows:

- Retail investors accounted for 87.3% of all trading volumes during October 2003 and March 2004 for stocks sampled by Bailey, Cai, Cheung & Wang (2009), as cited by Ali & Ulku (2020).
- Retail investors accounted for 99.6% of all trading accounts between April 2001 and April 2002 for Shanghai Stock Exchange (SSE) A shares sampled by Ng and Wu (2006), as cited by Ali & Ulku (2020).
- Retail investors accounted for about 94% to 99% of all SSE index futures trading volumes between April 2010 and April 2012 (Xu and Wan, 2015, as cited by Ali & Ulku (2020)).

This scale of dominance by retail investors is unique to the Chinese stock market. In fact, it is reported that "the average Chinese investor holds a stock for just 24 days compared to 260 days for investors in Hong Kong, and longer for investors in the United States" (Ali & Ulku, 2020, p. 12). This means that there is a potential for market volatility due to speculative trading. Moreover, after studying the GDP and stock market returns between 1991 and 2014 for China, USA, Japan, India, Brazil and Mexico, Guoping & Hong (2016) posits that China has the most stable economy but the riskiest stock markets.

The risks inherent from excessive speculative trading by retail investors were highlighted during the period 2014 and 2015. Guoping & Hong (2016) reports that from early 2014 to mid 2015 the Chinese stock markets experienced a dramatic boom and bust cycle, where the Shanghai Stock Exchange rose from 2 115 in 2013 to 5 178 as at June 2015, and then fell to 3 373 in July 2015. This resulted in a loss of about $3 trillion in market capitalisation and the government was forced to intervene in the markets.

It is in light of the above mentioned potential for market volatility, that the NEEQ introduced restrictions in the participation of retail investors from its inception in 2013. According to the NEEQ Management Rules for Accredited Investors, institutional investors such as legal persons are qualified to participate in the exchange, however, natural investors are subject to strict rules in order to qualify as investors on the exchange. Natural persons are required to already own financial securities (from the other Chinese exchanges) worth at least 5 million RMB ($0.75 million as at 30 October 2020). In addition, natural investors are required to have at

least two years of experience in investments, finance or accounting. Li, Meng, & Wei (2015) reports that the restrictions applied to retail investors were designed to protect investors, however, these restrictions have also lead to a decrease in liquidity.

**Government Sponsorship and Participation**

The establishment of the NEEQ was a policy response to address the financial constraints faced by small enterprises and in January 2013, the State Council (the chief administrative authority in the People's Republic of China) approved the launch of the NEEQ as a national stock exchange. In addition to the endorsement at national level, the provinces or local governments within China provide subsidies for locally based companies in order for them to list on the NEEQ (Xu, Zhu, & Wu, 2020). Moreover, Xu, Zhu & Wu (2020) posit that Guangdong (with 1 498 listings), Beijing (with 1 336 listings), Jiangsu (with 1 207 listings), Zhejiang (with 877 listings), and Shanghai (with 821 listings) are the top five provinces in terms of the number of companies listed on the NEEQ in April 2019. Interestingly, the five provinces listed are very developed economically (Xu, Zhu, & Wu, 2020).

Over and above the policy support and the financial support provided, the state also takes an active role in the Chinese stock market (Ali & Ulku, 2020). The state's intervention is mainly through monetary policy, short-sale restrictions and government communication to investors through the media. In fact, it is understood that the state, through its various agencies, intervenes by buying stocks when there are severe market crashes (Ali & Ulku, 2020). These actions are in line with the "Chinese Dream" policy (the vision of a prosperous and successful Chinese nation) which seeks to ensure that stock markets do not cause server losses for investors (Guoping & Hong, 2016).

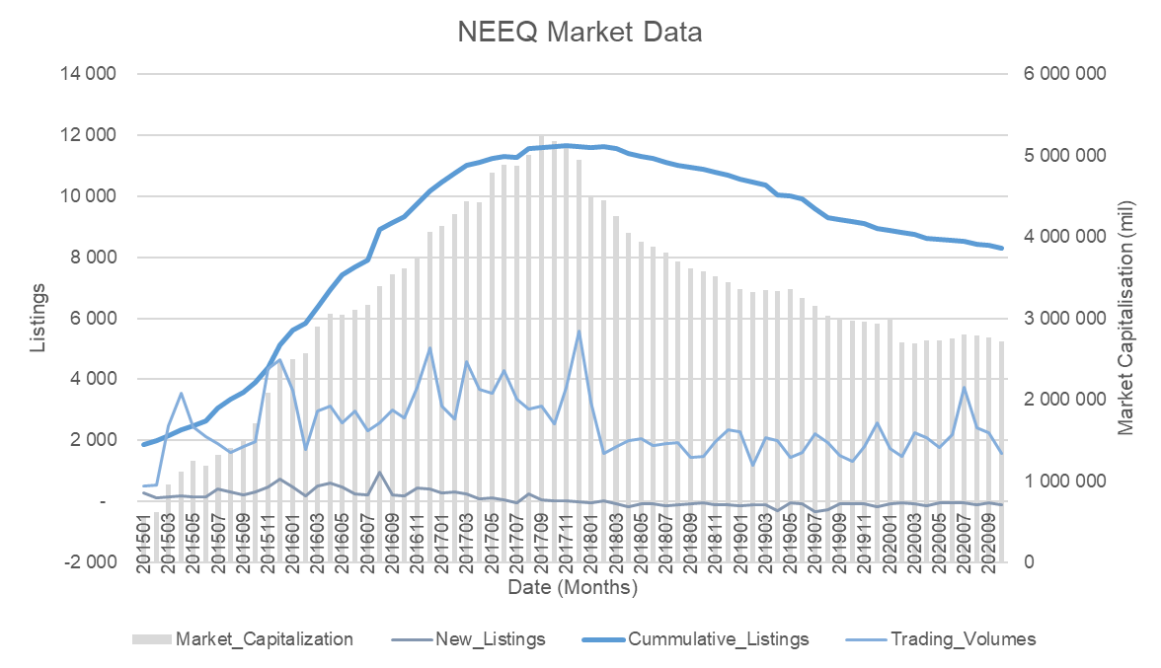
### 4.2.2 Listings Analysis

The simple and quick listing process adopted by the NEEQ allowed small enterprises to gain quick access to the equity market and has led to significant growth in the number of new listings. The growth experienced on the NEEQ is illustrated in Figure 4.1; where there was a peak of 11 645 listed companies in November 2017. Subsequently, there have been a number of de-listings, mainly as

a result of sanctions from the NEEQ due to regulatory lapses, and the number of listings was 8 281 as at October 2020.

As expected, the market capitalisation over time showed a similar pattern to the total number of companies listed. The NEEQ's market value peaked at 5.2 trillion RMB in September 2017 and this reduced to 2.7 trillion RMB on October 2020. The NEEQ's trading volumes also align to the observations from the number of listings over time. Firstly, there were higher volumes prior the September 2017 market peak (averaging at 2.9 billion trades per month). Lastly, there were lower trading volumes after the peak (averaging at 1.9 billion trades per month). The NEEQ has liquidity challenges and this contributes to share price volatility. This means that reduced trading volumes beyond September 2017 further add to the liquidity challenges being experienced on the NEEQ.

**Figure 4.1: NEEQ Market Data**



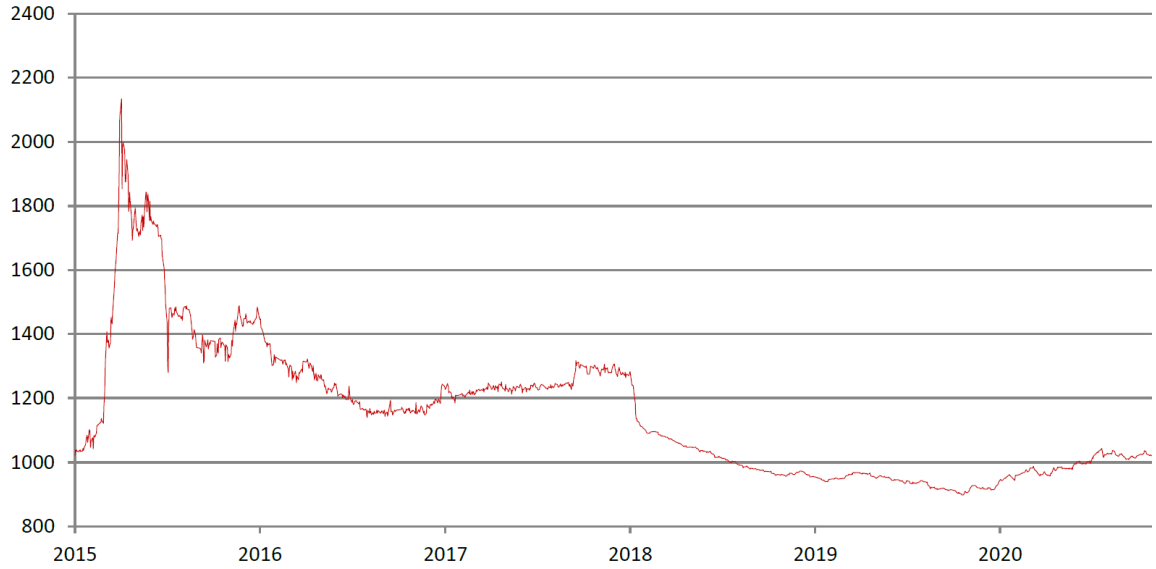

**Source:** Compiled by the author using NEEQ Market Data

### 4.2.3 Returns Analysis

In investigating the returns that would be achieved by an investor on the NEEQ, it is appropriate to use the NEEQ Composite Index, which is the best representation of market performance on the NEEQ[25]. The NEEQ Composite Index is available from March 2015, and it includes all companies listed on the NEEQ (whose shares have been traded at least once, and whose price is not zero). The NEEQ Composite Index is a total return index, meaning that it accounts for capital gains (or price appreciation) and income from dividends that would be earned by an investor.

The performance of the NEEQ Composite Index is shown in Figure 4.2 and from this, it can been that there was a dramatic rise in early 2015 and this was followed by downward trend from mid-2015 onwards. Interestingly, the Chinese stock market bubble that occurred between early 2014 and mid-2015 appears to have also affected the performance on the NEEQ.

**Figure 4.2: NEEQ Composite Index**




**Source: China Securities Index Ltd[26]**

The returns that would be achieved by investing in the NEEQ Composite Index as at 30 October 2020 (currently the only available factsheet date published by the China Security Index Company[27]) are summarised in

[25] NEEQ Composite Index Description: http://www.neeq.com.cn/en/market_data/neeq_composite_index/neeq_component.html
[26] NEEQ Composite Index History: http://www.csindex.com.cn/en/indices/index-detail/899001
[27] From 31 July 2020 the China Security Company was authorised to publish indices based on companies listed on companies listed on the NEEQ (http://www.neeq.com.cn/index/apply_index.html)

Table 4.3. Despite there being positive returns for the year ending October 2020, there are negative returns for the three and five year periods ending on October 2020. Moreover,

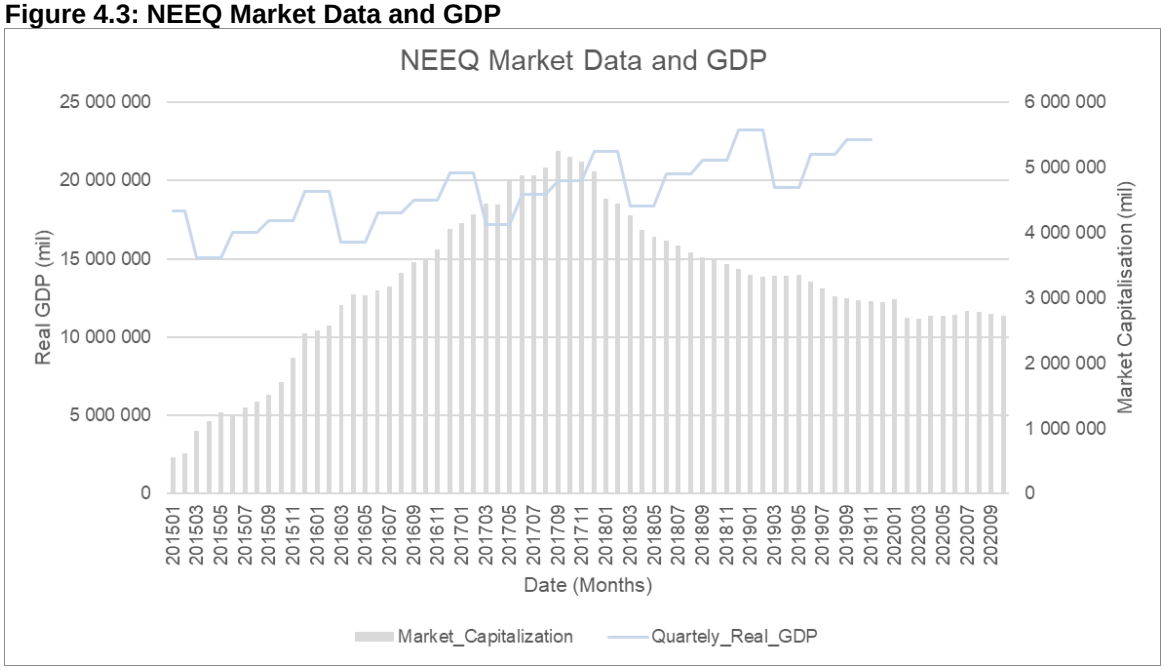
Table 4.3 shows that 2017 is the only historical calendar year with positive returns. Lastly, the development of the NEEQ appears not to be related to the performance of the overall economy. This is shown in Figure 4.2, by the NEEQ market capitalisation not moving in line with the published quarterly GDP for China over the data period observed. This relationship would, however, need to be examined statistically (for example, using Granger causality) in order to reach a conclusion about the NEEQ's contribution to the Chinese economy, and could be an area for further research.

**Table 4.3: NEEQ Composite Index Fact Sheet as at 30 October 2020**

| Horizon | Returns | Volatility |
|---|---|---|
| 1 Month | 0.13% | N/A |
| 3 Months | -0.27% | N/A |
| Year to date | 9.86% | N/A |
| 1 Year | 12.62% | 6.33% |
| 3 Years | -7.57% | 6.08% |
| 5 Years | -5.67% | 10.03% |

| Calendar Year | Returns |
|---|---|
| 2016 | -16.23% |
| 2017 | 2.55% |
| 2018 | -25.13% |
| 2019 | -2.73% |

**Figure 4.3: NEEQ Market Data and GDP**




**Source:** Compiled by the author using NEEQ Market Data

## 4.3 Empirical Review of the South African Context

As highlighted in Chapter 3, this study has conducted an empirical review of the relationship between stock market development and economic growth within the South African context. The data used and the results from the modelling performed are shown below.

### 4.3.1 Data Analysis

The empirical part of this study is based on South Africa quarterly data between March 2006 and March 2018, giving 49 data points. Capital market and macro-economic data was used, and this was collected South Africa's national statistical agency (Stats SA) and the Word Bank's Development Indicators database. A small enterprise stock market is non-existent at this stage, so a proxy was derived from the data published in the Annual Financial Statistics survey (from Stats SA). The variables in the dataset have different units of measurement so a natural logarithm was applied to ensure consistency in the unit of measurement across all variables. The descriptive statistics of the transformed data set and a plot of the data over time are respectively shown in Table 4.4 and Figure 4.4 below.

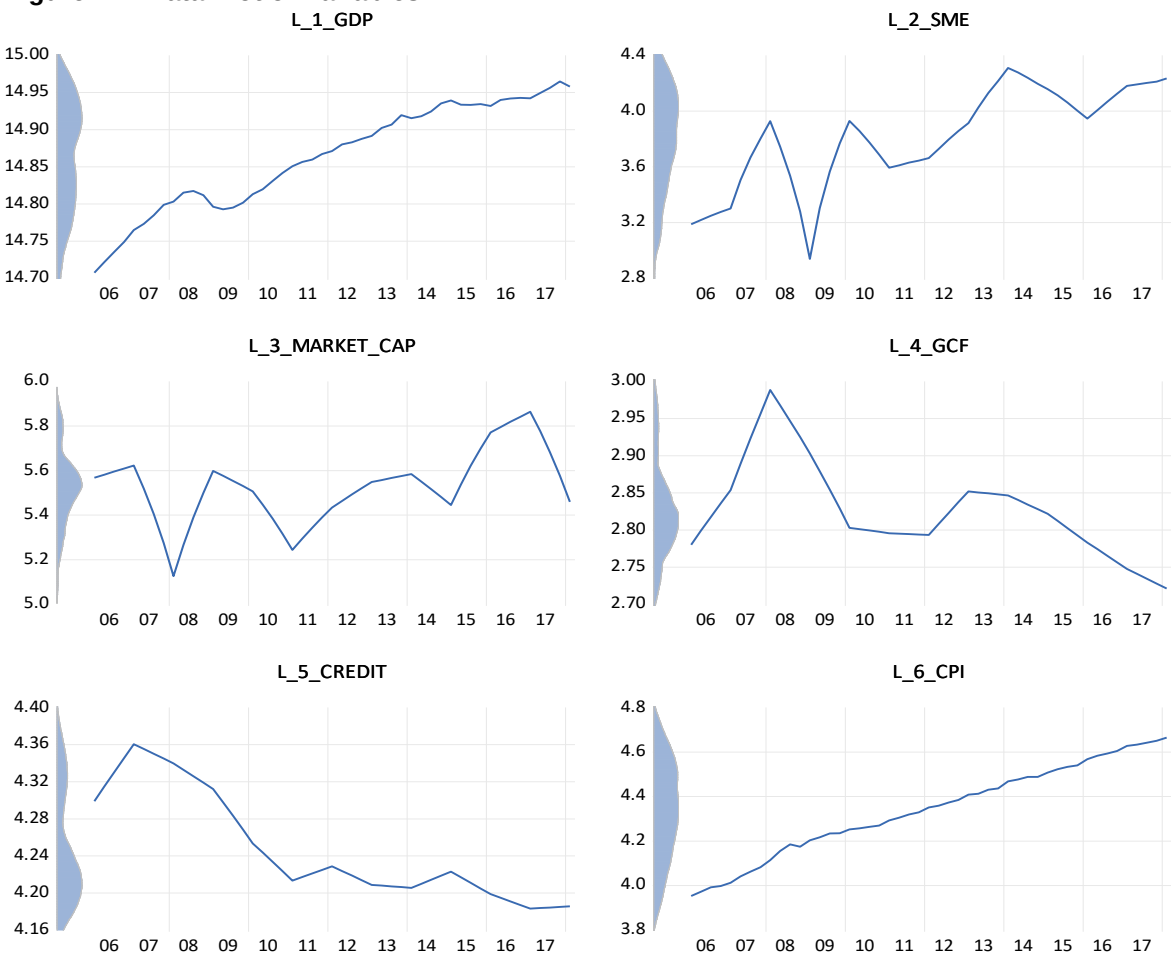
**Table 4.4: Descriptive Statistics: Logged Data**

| | L_1_GDP | L_2_SME | L_3_MARKET_CAP | L_4_GCF | L_5_CREDIT | L_6_CPI |
|---|---|---|---|---|---|---|
| Mean | 14.8636 | 3.8136 | 5.5272 | 2.8270 | 4.2474 | 4.3405 |
| Median | 14.8713 | 3.8570 | 5.5375 | 2.8176 | 4.2211 | 4.3516 |
| Maximum | 14.9649 | 4.3103 | 5.8641 | 2.9885 | 4.3605 | 4.6653 |
| Minimum | 14.7073 | 2.9388 | 5.1259 | 2.7212 | 4.1831 | 3.9532 |
| Std. Dev. | 0.0716 | 0.3483 | 0.1589 | 0.0618 | 0.0575 | 0.2063 |
| Skewness | -0.3732 | -0.5349 | -0.0277 | 0.7444 | 0.7387 | -0.2033 |
| Kurtosis | 1.9921 | 2.3971 | 3.0990 | 3.2949 | 2.0038 | 1.9983 |
| | | | | | | |
| Jarque-Bera | 3.2114 | 3.0787 | 0.0262 | 4.7024 | 6.4822 | 2.3860 |
| Probability | 0.2008 | 0.2145 | 0.9870 | 0.0953 | 0.0391 | 0.3033 |
| | | | | | | |
| Observations | 49 | 49 | 49 | 49 | 49 | 49 |

| Variable | Definition |
|---|---|
| L_1_GDP | Natural Logarithm of Real GDP |
| L_2_SME | Natural Logarithm of the small enterprise stock exchange data proxy |
| L_3_MARKET_CAP | Natural Logarithm of Market Capitalisation per GDP |
| L_4_GCF | Natural Logarithm of the Investment ratio |
| L_5_CREDIT | Natural Logarithm of Credit to GDP |
| L_6_CPI | Natural Logarithm of CPI |

**Source:** Compiled by the author from Eviews output

**Figure 4.4: Data Plot of Variables**




**Source:** Compiled by the author from Eviews output

From Figure 4.4, it is observed that most of the variables have a distinct trend (upwards or downwards) and this indicates that the data series is not stationary. This means that further transformations have to be performed on the data before fitting any model; otherwise, there is a possibility that spurious regressions would be produced (Caporale et al., 2004).

### 4.3.2 Estimation Technique

#### Unit Root Analysis

In light of the non-stationarity observed in the data with a natural logarithm transformation, first differences were taken on the logged data series. The application of first differencing has resulted in a transformed data set that is more symmetric and that follows a Normal distribution (all variables have variables' significance level is above 5% for the Jarque-Bera Test Statistic) (See Table 4.3 and Figure 4.5). More crucially, the transformed data set does not have any distinct trends and this indicates that the variables are more stationary (compared to the initial data series).

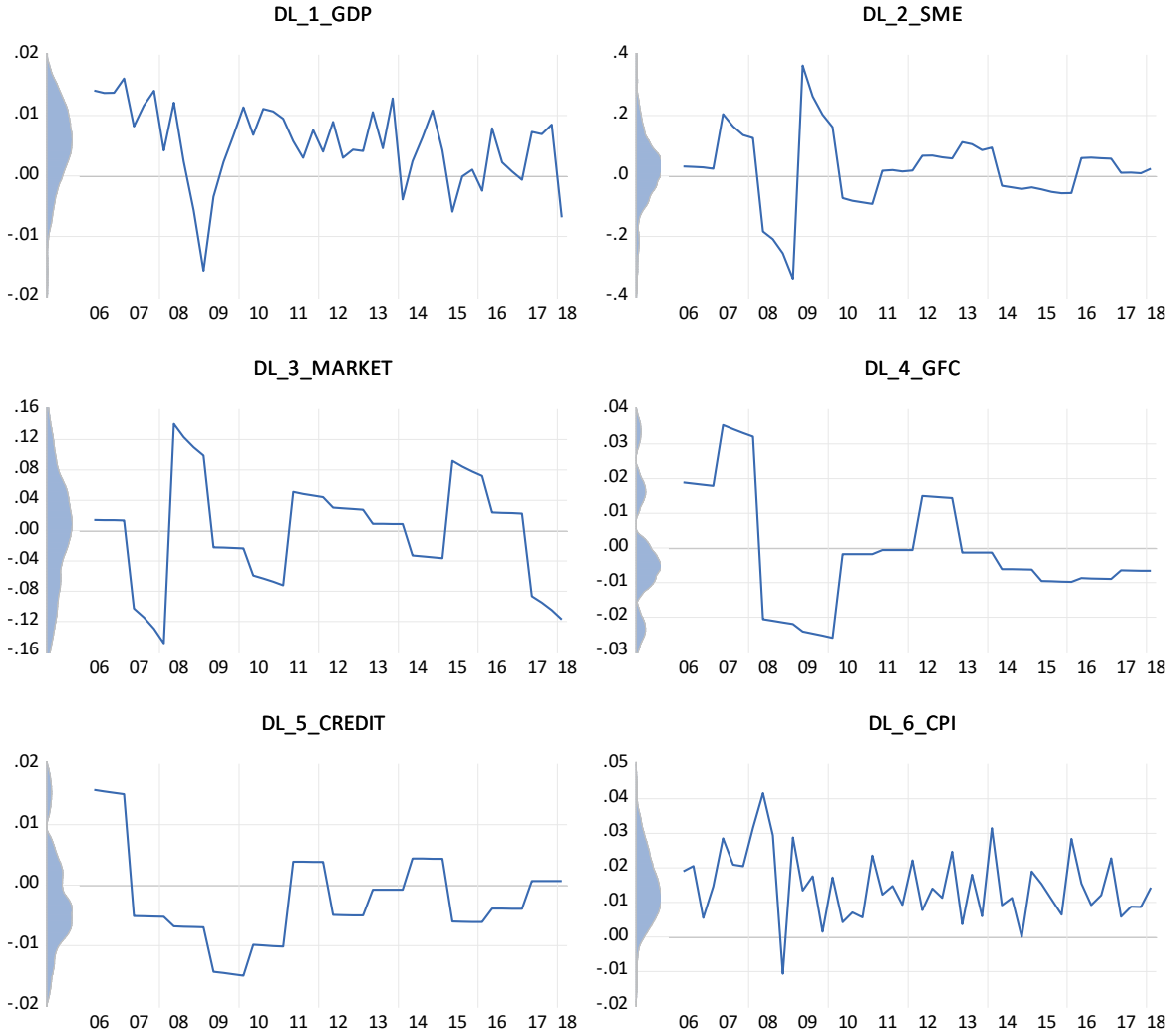
**Table 4.5: Descriptive Data Summary of Differenced Log Data**

| | DL_1_GDP | DL_2_SME | DL_3_MARKET | DL_4_GFC | DL_5_CREDIT | DL_6_CPI |
|---|---|---|---|---|---|---|
| Mean | 0.0052 | 0.0218 | -0.0023 | -0.0012 | -0.0024 | 0.0148 |
| Median | 0.0060 | 0.0238 | 0.0111 | -0.0040 | -0.0044 | 0.0141 |
| Maximum | 0.0161 | 0.3649 | 0.1406 | 0.0355 | 0.0157 | 0.0416 |
| Minimum | -0.0157 | -0.3402 | -0.1491 | -0.0260 | -0.0150 | -0.0107 |
| Std. Dev. | 0.0065 | 0.1245 | 0.0696 | 0.0160 | 0.0076 | 0.0098 |
| Skewness | -0.7769 | -0.2292 | -0.1588 | 0.6549 | 0.7281 | 0.2715 |
| Kurtosis | 3.7451 | 4.4471 | 2.4524 | 2.9180 | 3.4537 | 3.3358 |
| Jarque-Bera | 5.9391 | 4.6081 | 0.8014 | 3.4450 | 4.6523 | 0.8154 |
| Probability | 0.0513 | 0.0999 | 0.6698 | 0.1786 | 0.0977 | 0.6652 |
| Observations | 48 | 48 | 48 | 48 | 48 | 48 |

| Variable | Definition |
|---|---|
| DL_1_GDP | First Difference of L_1_GDP |
| DL_2_SME | First Difference of L_2_SME |
| DL_3_MARKET | First Difference of L_3_MARKET_CAP |
| DL_4_GFC | First Difference of L_4_GCF |
| DL_5_CREDIT | First Difference of L_5_CREDIT |
| DL_6_CPI | First Difference of L_6_CPI |

**Source:** Compiled by the author from Eviews output

**Figure 4.5: Plot of Differenced Data**




**Source:** Compiled by the author from Eviews output

To further confirm stationarity of the data, unit Root tests were performed on each of the variables in order to test for stationarity and the results are shown in

Table 4.6. The Augmented Dickey-Fuller (ADF) results show that the first two variables are stationary (at a 5% significance level) without further differencing being applied to the data, while the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) results show that all variables are stationary at a 5% significance level. Given that the KPSS test is more robust, all the variables used in this study were considered to be stationary and this appropriately enables the fitting of models. To that end, to apply pair wise regression, VAR models were fitted on the first two variables (GDP and the SME) and also on all the variables.

**Table 4.6: Unit Root Tests**

| | ADF Test Statistic | | | | KPSS Test Statistic | | |
|---|---|---|---|---|---|---|---|
| | Null Hypothesis: Variable Not Stationary | | | | Null Hypothesis: Variable is Stationary | | |
| | Levels | | 1st Difference | | Levels | | 1st Difference |
| DL_1_GDP | -3.9177 | *** | N/A | | 0.3145 | * | N/A |
| DL_2_SME | -6.4142 | *** | N/A | | 0.0672 | | N/A |
| DL_3_MARKET | -2.1211 | | -5.9156 | *** | 0.0647 | | N/A |
| DL_4_GFC | -2.2846 | | -6.5888 | *** | 0.1928 | | N/A |
| DL_5_CREDIT | -2.9144 | * | N/A | | 0.1157 | | N/A |
| DL_6_CPI | -1.7323 | | -10.2789 | *** | 0.3396 | | N/A |

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

## Vector Autoregression Analysis: Uni-variate Model

A VAR model was fitted using the “DL_1_GDP” and “DL_2_SME” variables in order to determine the causal relationship between small enterprise stock market development (DL_2_SME) and economic growth (DL_1_GDP), the result indicates that a small enterprise stock market may lead to an increase in economic growth. In order to fit the VAR model, the optimal lag structure was tested using the sequential modified Likelihood Ratio (LR) test, the final prediction error, the Akaike information criterion, the Schwarz information criterion, and the Hannan-Quinn information criterion. These tests (shown in Table 4.7) indicated that a lag of 1 or 4 could be used, so an optimal lag of 1 was chosen as a parsimonious model based on the Schwarz information criterion.

**Table 4.7: Optimal Lag Tests**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 191.6119 | NA | 0.00 | -8.61872 | -8.537621 | -8.588645 |
| 1 | 204.0457 | 23.17223 | 0.00 | -9.002079 | -8.758780* | -8.911852* |
| 2 | 207.3047 | 5.777245 | 0.00 | -8.968395 | -8.562897 | -8.818017 |
| 3 | 209.3636 | 3.462763 | 0.00 | -8.880165 | -8.312468 | -8.669636 |
| 4 | 218.8124 | 15.03219* | 0.000* | -9.127838* | -8.397942 | -8.857157 |

| Test | Description |
|---|---|
| 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 |

**Source:** Compiled by the author from Eviews output

## Causality Analysis: Multi-variate Model

Granger causality tests (Shown in Table 4.8) were carried out on the above VAR model and the results indicate that there is a one-way causal relationship from small enterprise stock development to economic growth. This is because the Granger

Causality test statistic has a significance level of less than 5%, indicating that the null hypothesis should be rejected. This is a positive result and favours the development of a small enterprise stock market in South Africa, as there is a possibility that a small enterprise stock market may result in higher economic growth.

**Table 4.8: Pairwise Granger Causality Tests: GDP vs Small Enterprise Proxy**

| | Dependent Variable | |
|---|---|---|
| **Null Hypothesis** | DL_1_GDP | DL_2_SME |
| DL_1_GDP does not Granger cause | - | 1.9110 |
| DL_2_SME does not Granger cause | 5.5003** | - |

**Note:** ***, ** and * denote significance at 1%, 5% and 10% respectively
**Source:** Compiled by the author from Eviews output

In addition to the above, we fit the two-variable model to the remaining variables in order to test the pairwise Granger causality more broadly. The two-variable VAR model ignores the presence of the variables that are not included in the model and the results from each variable pair are shown in Table 4.9. From these results, it is observed that there is a statistically significant two-way causal relationship between Gross Fixed Capital Formation and economic growth. In addition, there is a causal relationship from the South African stock market to economic growth, but this is only significant at 10% making this a weak relationship.

**Table 4.9: Pairwise Granger Causality Tests: All Variables**

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| **Null Hypothesis** | DL_1_GDP | DL_2_SME | DL_3_MARKET | DL_4_GFC | DL_5_CREDIT | DL_6_CPI |
| DL_1_GDP does not cause | - | 1.9110 | 0.0987 | 7.381*** | 0.7083 | 1.4871 |
| DL_2_SME does not cause | 5.5003** | - | 0.1286 | 0.0719 | 0.1667 | 0.2391 |
| DL_3_MARKET does not cause | 3.7367* | 0.2544 | - | 0.9060 | 0.3810 | 1.0162 |
| DL_4_GFC does not cause | 6.022*** | 0.0525 | 0.2456 | - | 0.2354 | 7.1796** |
| DL_5_CREDIT does not cause | 0.1849 | 0.3373 | 0.1094 | 3.010* | - | 0.1110 |
| DL_6_CPI does not cause | 3.523* | 0.5414 | 0.6013 | 1.4166 | 0.0417 | - |

**Note:** ***, ** and * denote significance at 1%, 5% and 10% respectively
**Source:** Compiled by the author from Eviews output

**Vector Autoregression Analysis: Multi-variate Model**

In this section the modelling framework included all the variables at the same time. This approach serves as a robustness check, and examines whether the observed causal relationships remain intact in the presence of other variables. A VAR model was fitted using all the variables considered in the study, where “DL_1_GDP” and “DL_2_SME” are the variables of main concern and the remaining variables (“DL_3_MARKET”, “DL_4_GFC”, “DL_5_CREDIT”, and “DL_6_CPI”) are control variables as recommended by Caporale et al.(2004). As in the two-variable case (where the control variables were not included), this model seeks to determine the causal relationship between small enterprise stock market development and economic growth. However, the modelling is carried out with the inclusion of control variables since they may also have a relationship with economic growth. This is done in order to reduce potential bias in the causal relationship between “DL_1_GDP” and “DL_2_SME” (Enisan & Olufisayo, 2009).

In order to fit the VAR model, the optimal lag structure was tested using the sequential modified LR test, the final prediction error, the Akaike information criterion, the Schwarz information criterion, and the Hannan-Quinn information criterion. These tests (shown in

Table 4.10) indicated that a lag of 1 or 4 could be used, so an optimal lag of 1 was chosen as a parsimonious model based on the Schwarz information criterion.

**Table 4.10: Optimal Lag Tests**

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 693.9005 | NA | 0.000 | -31.2682 | -31.02491 | -31.17798 |
| 1 | 783.7739 | 151.1507 | 0.000 | -33.7170 | -32.01391* | -33.08541 |
| 2 | 812.4994 | 40.47685 | 0.000 | -33.38634 | -30.22346 | -32.21339 |
| 3 | 833.9978 | 24.43003 | 0.000 | -32.72717 | -28.1045 | -31.01286 |
| 4 | 958.114 | 107.1912* | 0.000* | -36.73245* | -30.64999 | -34.47678* |

| Test | Description |
|---|---|
| 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 |

**Source:** Compiled by the author from Eviews output

### Causality Analysis: Uni-variate Model

Block Granger causality tests were carried out on the VAR model and the results are shown in Table 4.11. The results from the model indicate that there is a two-way causal relationship from the small enterprise stock market variable (DL_2_SME) to the GDP variable (DL_1_GDP); however, this is at a 10% significance level making it a weak relationship. Nevertheless, this can be viewed as a positive outcome since it means that there is a positive relationship between small enterprise stock development and economic growth within South Africa. Interestingly, the results also show that there is no causal relationship between stock market development and economic growth in the period studied. This may be related to the fact that there has been a dispersion between stock market performance and economic growth, where annual economic growth averaged 2.25%[28] between 2006 and 2018 but returns on the JSE All Share Index were 8.72%[29] p.a. over the same period.

The other statistically significant causal relationship, from the results in Table 4.11, is from GDP (DL_1_GDP) to Gross Fixed Capital Formation (DL_4_GFC) and this indicates that there is a positive relationship between these two variables. This relationship is intuitive because an increase in economic growth is expected to result in an increase in the capacity to spend on fixed assets.

**Table 4.11: Block Granger Causality Tests**

| | Dependent Variable | | | | | |
|---|---|---|---|---|---|---|
| **Null Hypothesis** | DL_1_GDP | DL_2_SME | DL_3_MARKET | DL_4_GFC | DL_5_CREDIT | DL_6_CPI |
| DL_1_GDP does not cause | - | 2.7118* | 0.0371 | 6.6139** | 0.3521 | 0.0933 |
| DL_2_SME does not cause | 2.9108* | - | 0.2198 | 0.5574 | 0.0018 | 0.1201 |
| DL_3_MARKET does not cause | 1.0455 | 0.0138 | - | 3.1612 | 0.0406 | 0.2052 |
| DL_4_GFC does not cause | 0.8246 | 0.0750 | 0.3902 | - | 0.0003 | 6.0807 |
| DL_5_CREDIT does not cause | 0.5847 | 1.0204 | 0.2526 | 0.4019 | - | 1.1698 |
| DL_6_CPI does not cause | 2.5426 | 0.2080 | 0.2384 | 0.6521 | 0.0813 | - |
| All | 13.815** | 3.8144 | 1.1941 | 12.741** | 0.7903 | 0.9776 |

**Note:** ***, ** and * denote significance at 1%, 5% and 10% respectively
**Source:** Compiled by the author from Eviews output

[28] Annual GDP Growth for South Africa: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=ZA
[29] JSE All Share Index historical value: https://www.jse.co.za/sites/default/files/media/documents/2020-12/Monthly%20Alsi%20Values.xlsx

**Diagnostic Testing**

Caporale et al.(2004) and Brooks (2014) posit that the validity of a model and its results need to be evaluated through diagnostic tests. The tests performed aim to examine the following key assumptions from the applied modelling framework:

- Residual Means

  The residual means from the fitted models are assumed to be zero and this assumption is fulfilled when a constant term is included in the regression equation (Brooks, 2014). The VAR models from this study included a constant term so this assumption is fully met, as confirmed by results from the Mean Equality Tests in Table 4.12.

- Residual Normality

  As part of the VAR framework, the residuals from the fitted models are assumed to follow the Normal distribution and this is tested using the Jarque Bera test. The results from this test are shown in Table 4.12, which shows that only the residuals for “DL_1_GDP” and “DL_6_CPI” satisfy this assumption at a 5% significance level. The model could be re-specified in order to meet this assumption by increasing the number of lags used. However, this was considered inappropriate due to the limited size of the data used and the transformations already applied on it (i.e. the linear interpolation conversion to quarterly data points and the differences applied to the logged data set).

- Residual Heteroscedasticity

  The residuals from the fitted model are assumed to have a constant variance over time (i.e. homoscedastic) and this was tested using the White heteroscedasticity test. The results in Table 4.12 show that this condition was not met at a 5% significance level. Similarly, the model could be re-specified in order to meet this assumption by increasing the number of lags used. However, this was considered inappropriate due to the limited size of the data used and the transformations already applied on it (i.e. the linear interpolation conversion to quarterly data points and the differences applied to the logged data set).

- Residual Autocorrelation

  The residuals from the fitted model are assumed to be uncorrelated and this was tested using the Autocorrelation LM test. The results in Table 4.12 show that this condition was met at a 5% significance level.

Given the partial fulfilment of the diagnostic test assumptions, the results from the modelling performed are not invalid; however, they need to be interpreted with caution. The conclusions from this empirical study should therefore be limited to the data period observed and generalisations should only be made or investigated when more data is available as this would allow for more robust modelling.

**Table 4.12: VAR Diagnostic Test Results**

**1. Mean Equality Tests**

Null hypothesis: Means are Equal within and across variables

| **Test** | **Test Stat** | **df** |
|---|---|---|
| Anova F-test | 0.00 | (5, 276) |
| Welch F-test | 0.00 | (5,123.751) |

**2. Normality Test**

Null Hypothesis: Residuals are multivariate normal

| **Component** | **Skewness** | **Chi-sq** | **Kurtosis** | **Chi-sq** | **Jarque-Bera** |
|---|---|---|---|---|---|
| DL_1_GDP | -0.6612 | 3.425* | 3.3795 | 0.2820 | 3.7070 |
| DL_2_SME | 0.9280 | 6.7454** | 8.6270 | 62.0074*** | 68.7528*** |
| DL_3_MARKET | 0.4734 | 1.7558 | 4.9237 | 7.247*** | 9.0028** |
| DL_4_GFC | 0.7529 | 4.4405** | 4.6040 | 5.0386** | 9.4792*** |
| DL_5_CREDIT | -0.2835 | 0.6296 | 7.5553 | 40.637*** | 41.2666*** |
| DL_6_CPI | -0.6810 | 3.6324* | 3.9128 | 1.6317 | 5.2642* |
| Joint | | 20.6287*** | | 116.8437*** | 137.4724*** |

**3. VAR Residual Heteroscedasticity Tests**

Null hypothesis: No Heteroscedasticity

| **Chi-sq** | **df** |
|---|---|
| 370.4954*** | 252 |

**4. Auto Correlation Test**

Null hypothesis: No serial correlation at lag h

| **Lag** | **LM-Statistic** |
|---|---|
| 1 | 35.25519 |

**Note:** ***, ** and * denote significance at 1%, 5% and 10% respectively
**Source:** Compiled by the author from Eviews output

## 4.4 Summary

This chapter presented and interpreted the results of this study. This was presented in two parts. Firstly, there was a desktop review of the NEEQ and this focused on the factors that have led to a successful implementation of the Chinese small

enterprise stock exchange. Secondly, there was an empirical review within South African context that examined the relationship between small enterprise stock market development and economic growth. The results of the empirical review have shown that there is a statistical relationship between the small enterprise stock market and economic growth.

# 5 CONCLUSION AND POLICY RECOMENDATION

## 5.1 Introduction

This chapter discusses the findings, policy recommendations, and further areas of research. This study has two objectives. The first objective is to explore the features of the proposed small enterprise stock market. This was achieved by exploring the literature about stock exchanges that are designed for small enterprises. In addition, a desktop review of the NEEQ was performed in order to provide a case study of a small enterprise exchange from an emerging market context. The second objective of this study is to examine whether an increase in economic growth can result from a small enterprise stock market. This was achieved by performing an empirical study of the relationship between small enterprise development and economic growth between 2006 and 2018.

## 5.2 Summary of Research Findings

Based on the main attributes for a small enterprise stock market reviewed in this study, for South Africa to set up such market, the following features should be adhered to:

- It should be government initiated, maintained and sponsored;
- It must be subject to the strictest regulations available;
- It must have listing requirements that are relevant for small enterprises;
- It's listing process and on-going disclosure requirements must be transparent and relevant for small enterprises;
- It should be initiated with a non-profit motive; and
- It needs to leverage off current technological innovations such as distributed ledger technology.

With regard to the empirical review, the results have shown that there is a weak causal relationship between small enterprise stock market development and economic growth.

## 5.3 Policy Recommendation

From the findings of this study, it is recommended that a small enterprise stock market should be set up in order to enhance economic growth within South Africa. It is further recommended that the rollout program for setting up a small enterprise stock exchange occur in phases, starting with pilot exchanges at regional or provincial level to gather learnings and capacity. This is in line with the NEEQ's development, which began as a regional exchange, then progressed to become a national stock exchange. Once the pilot exchanges are found to be successful, they should be scaled up to form a national stock exchange for small enterprises.

## 5.4 Recommendations for Further Research

The results from the empirical study depend on the data available as at 30 October 2020 and the modelling approach that was selected. It then follows that different outcomes may be obtained should changes be made in the factors outlined below.

- Data Period

  The empirical study was based on data from 2006 to 2018 because this is the longest data series available (as at 30 October 2020) for the Annual Financial Statistics survey, which was used as proxy for the small enterprise stock market. A further study may be undertaken in future when more data points are available to verify the empirical results from this study.

- Data Conversions

  The data used in the empirical review includes annual data series that were converted to become quarterly data series. This conversion was implemented by using the linear interpolation method of the Low-frequency data to High-frequency data procedure within Eviews. Other methods could have been followed in the data conversion and is possible that this could result in different modelling outcomes. It then follows that a further study could be undertaken to determine if the use of other data conversion techniques would significantly alter the empirical results that were obtained in this study.

- Modelling Approach

  The VAR modelling approach was used in the empirical review to determine the relationship between the small enterprise stock market and economic growth. When more data is available, the impulse response functions and the variance decompositions could be investigated to reveal further insights about the relationships between the variables that have been included in the study. Impulse response functions and variance decompositions require long-term data series. Whereby, impulse response functions show the sensitivity of a particular variable to shocks applied in other variables, the variance decompositions show the proportion of a variable's movements that are attributed to its own shocks compared the shocks of other variables (Brooks, 2014). A further VAR model-based study could be undertaken that would focus on the impulse and variance decompositions, in addition to Granger causality.

- Empirical Review of the Chinese Market

  This study conducted a desktop review of the NEEQ due to the lack of long-term data from the NEEQ (public data is available from January 2015 onwards). In similar fashion to the empirical review that was conducted in the South African market, an empirical review can be conducted within the Chinese market. This further study can be undertaken in future (for example in five years' time) when more data becomes available from the NEEQ.

# 6 REFERENCES

Ali, F., & Ulku, N. (2020). Weekday seasonality of stock returns: The contrary case of China. *Journal of Asian Economics, 68, 101201, https://doi.org/10.1016/j.asieco.2020.101201*.

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

Beck, T., Demirguc-Kunt, A., & Maksimovic, V. (2008). Financing patterns around the world: Are small firms different? *Journal of Financial Economics, 89(3)*, 467–487.

Brooks, C. (2014). *Introductory Econometrics for Finance.* United Kingdom: MPG Printgroup Ltd.

Cai, W. (2010). State Control and the Weak Stock Market in China. *Journal of Financial Crime, 17(2)*, 179-194.

Caporale, G. M., Howells, P. G., & Soliman, A. M. (2004). Stock Market Development and Economic Growth: The Casuasal Linkage. *Journal of Economic Development, 29(1)*, 33-50.

Clarke, G. (2016, October). *New stock exchanges enter the South African market,*. Retrieved from South African Financial Markets Journal: https://financialmarketsjournal.co.za/new-stock-exchanges-enter-the-south-african-market/

Enisan, A. A., & Olufisayo, A. O. (2009). Stock market development and economic growth: Evidence from seven sub-Sahara African countries. *Journal of Economics and Business, 61(2)*, 162–171.

Gauteng Provincial Government. (2014). *Gauteng Township Economy Revitalisation Strategy.* Retrieved from Gauteng Enterprise Propeller: https://www.gep.co.za/wp-content/uploads/2018/12/Gauteng-Township-Economy-Revitalisation-Strategy-2014-2019.pdf

Government, S. A. (2020, April). *www.gov.za*. Retrieved from https://www.gov.za/covid-19/companies-and-employees/support-business

Guoping, L., & Hong, Z. (2016). The Systematic Politicization of China's Stock Markets. *Journal of Contemporary China, 25(99)*, 422-437.

Jooste, R. (2019, April). *How are SA's new stock exchanges doing?* Retrieved from Daily Maverick,: https://www.dailymaverick.co.za/article/2019-04-03-how-are-sas-new-stock-exchanges-doing/#gsc.tab=0

King, R. G., & Levine, R. (1993). Finance, entrepreneurship and growth. *Journal of Monetary Economics, 32(3)*, 513-542.

Letlape, B. (2013). Stock market development in africa: is there a need for a cross-regional collaborative stock exchange? *Master of Management in Finance and Investment. University of the Witwatersrand*.

Levine, R., & Zervos, S. (1998). Stock Markets, Banks, and Economic Growth. *The American Economic Review, 88(3)*, 537-558.

Li, Y., Meng, X., & Wei, X. (2015). China's New Third Board Market: Opportunities and Challenges. *Procedia Computer Science, 55*, 1050-1059. https://10.1016/j.procs.2015.07.067.

Liu, N., & Xu, W. (2016). Stock liquidity on China NEEQ Exchange. *Eurasia Business and Economics Society, 7(2)*, 255–275.

Lukasiewicz, M. (2017). From Diamonds to Gold: The Making of the Johannesburg Stock Exchange,. *Journal of Southern African Studies, 43(4)*, 715-732.

Marques, L. M., Fuinhas, J. A., & Marques, A. C. (2013). Does the stock market cause economic growth? Portuguese evidence of economic regime change. *Economic Modelling, 32*, 316–324. https://doi.org/10.1016/j.econmod.2013.02.015.

Maxfield, S. (2009). Stock Exchanges in Low and Middle Income Countries. *International Journal of Emerging Markets, 4(1)*, 43-55.

Mitenko, G., & Okleshen, H. (1998). Valuing a Non-Publicly-Traded Business: A Review and Update. *Journal of Legal Economics, 8(2)*, 33-47.

Ndako, U. B. (2010). Stock Markets, Banks and Economic Growth: Time Series Evidence from South Africa. *The African Finance Journal, 12(2)*, 72-92.

Polato, M., & Floreani, J. (2014). *The Economics of the Global Stock Exchange Industry.* England: Macmillan.

Revest, V., & Sapio, A. (2013). Does the Alternative Investment Market Nurture Firm Growth? A Comparison Between Listed and Private Companies. *Industrial and Corporate Change, 22(4)*, 953–979.

Robeco. (2016). *Distributed Ledger Technology for the Financial Industry.* Retrieved from Chartered Alternative Investment Analyst Association: https://caia.org/sites/default/files/1.distributed_ledger_for_financial_industry.pdf

Rousseau, P., & Wachtel, P. (2000). Equity markets and growth: Cross-country evidence on timing and outcomes: 1980-1995. *Journal of Banking & Finance, 24(12)*, 1933-1957.

Sandeep Mahajan. (2014). A Conceptual Framework for the Township Economy. In The World Bank, *Economics of South African Townships* (pp. 51-62). Washington DC: World Bank,: Creative Commons Attribution.

Sin-Yu, H., & Njindan, I. B. (2017). Determinants of Stock Market Development: A Review of the Literature. *Studies in Economics and Finance, 34(1)*, 1086-7376.

Small Business Institute. (2018). *The number of formal micro, small & medium businesses in South Africa.* Retrieved from https://www.smallbusinessinstitute.co.za/2018/10/31/the-number-of-formal-micro-small-medium-businesses-in-south-africa-preliminary-findings-of-stage-1-of-the-baseline-study-of-small-businesses-in-south-africa/

South African Government. (2020, April). *www.gov.za*. Retrieved from https://www.gov.za/covid-19/companies-and-employees/support-business

The Johannesburg Stock Exchange. (2016). *Guidelines to Listing on the JSE.* Retrieved from The Johannesburg Stock Exchange: https://www.jse.co.za/content/JSESpecificationsItems/Guidelines%20to%20Listing%20on%20the%20JSE.pdf

The Johannesburg Stock Exchange. (n.d.). *Alternative Exchange Listing Requirements.* Retrieved from https://www.jse.co.za/content/JSEProcessItems/AltX%20Listing%20Requirements.pdf

Valerie, R., & Alessandro, S. (2019). Alternative equity markets and firm creation. *Journal of Evolutionary Economics, 29(3)*, 1083–1118.

van der Merwe, W. (2019). Alternative sources of risk capital: Mezzanine and crowdfunding. *A journal of activity and trends in Southern African private equity and venture capital*, pp. 20-23.

Wang, H., & Kalu, K. (2019). Financial Market Structure and Finance-Growth Relationships in the BRICS. *International Journal of Business and Economics, 4(1)*, 58-70.

World Federation of Exchanges. (2017). *The Role of Stock Exchanges in Fostering Economic Growth and Sustainable Development.* WFE and UNCTAD.

Xu, W., Zhu, S., & Wu, Z. (2020). Building a Junior Stock Exchange: Lessons from China. *European Business Organization Law Review, 21*, 139–170. https://doi.org/10.1007/s40804-020-00181-0.