

NEAR EAST UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
ECONOMICS MASTER'S PROGRAMME

MASTER'S THESIS

**THE IMPACT OF FOREIGN DIRECT INVESTMENT ON
ECONOMIC GROWTH:EVIDENCE OF SINGAPORE
FROM THE PERIOD 1980-2014**

HEMN ADL WALI AL.BEWANI

NICOSIA

2016

NEAR EAST UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
ECONOMICS MASTER'S PROGRAMME

MASTER'S THESIS

**THE IMPACT OF FOREIGN DIRECT INVESTMENT ON
ECONOMIC GROWTH:EVIDENCE OF SINGAPORE
FROM THE PERIOD 1980-2014**

PREPARED BY
HEMN ADL WALI AL.BEWANI
20145043

SUPERVISOR
ASSIST. PROF. DR. ERGIN AKALPLER

NICOSIA
2016

**NEAR EAST UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES**

**Economics Master's Program
Thesis Defence**

**THE IMPACT OF FOREIGN DIRECT INVESTMENT ON
ECONOMIC GROWTH:EVIDENCE OF SINGAPORE**

**We certify the thesis is satisfactory for the award of degree of
Master of Economics**

Prepared by

HEMN ADL WALI AL.BEWANI

Examining Committee in Charge

Assoc. Prof. Dr. Hüseyin Ozdeser

**Near East University
Department of Economics**

Assit. Prof. Dr.Ergin Akalpler

**Near East University
Department of Economics**

Assit. Prof. Dr. Tugut Türsoy

**Near East University
Department of Banking and Finance**

Approval of the Graduate School of Social Sciences

Assoc. Prof. Dr. Mustafa SAĞSAN

Acting Director

ACKNOWLEDGMENTS

Utmost appreciation goes to my supervisor Assist. Prof. Dr. Ergin Akalplar who has played a central role towards the completion of this study. Deepest appreciation goes to my best friends Hemin, Hunar, Balen, and Karzan and the staff at Near East University for their support throughout my academic life.

DEDICATION

This study is dedicated to my caring mother and father and supportive brothers and sister who have richly contributed towards the completion of this study and in my academic endeavours. A heartfelt appreciation goes to Garmian University staff who have been a strong pillar of support in life. Lastly, I am debtly indebted to the assistance rendered to me by my elder brother Herish, may the Almighty God richly bless you.

ABSTRACT

The study analyses the impact of foreign direct investment on economic growth with regards to Singapore. This was primarily motivated by robust increases in economic performance in the Singapore economy which was accompanied by similar patterns in foreign direct investment. Such distinct patterns have been surrounded by different perceptions and no consensus has yet been strongly established about the impact of foreign direct investment on economic growth especially with regards to Singapore. The study employed a Vector Error Correction Model using time series data from the period 1980-2014 collected from the World Bank country indicator statistics. The results from the study showed strong evidence of the absence of a long run relationship or causality that runs from gross savings, foreign direct investment, trade and gross fixed capital formation. It was observed that the variables in question do not granger cause each other in the long run. However negative associations between GDP and gross savings; FDI and TR were observed though GFCF was found to be positively related to economic growth.

Key words: *Foreign direct investment, Economic growth, Gross savings, Gross capital formation, Trade.*

ÖZ

Çalışma, Singapur'daki ekonomik büyüme üzerindeki doğrudan yabancı yatırım etkisinin analizini yapmaktadır. Bu öncelikle doğrudan yabancı yatırımdan benzer desenlerin eşlik ettiği Singapur ekonomisindeki ekonomik performansta sağlam artışlar harekete geçirilmiştir. Böyle farklı desenler farklı algılamalar ile çevrilidir ve özellikle Singapur açısından ekonomik büyüme üzerinde doğrudan yabancı yatırımların etkisi hakkında henüz kuvvetli bir görüş birliği sağlanmamıştır. Çalışma Dünya Bankası ülke göstergesi istatistiklerinden 1980-2014 dönemi boyunca toplanan zaman serisi verilerini kullanarak bir Vektör Hata Düzeltme Modeli kullandı. Çalışmadan elde edilen sonuçlar, brüt tasarruf, doğrudan yabancı yatırım, ticaret ve gayri safi sabit sermaye oluşumundan dolayı uzun dönemli bir ilişki ya da nedensellik yokluğu konusunda güçlü kanıtlar ortaya çıkardı. Söz konusu değişkenlerin uzun vadede birbirine granger neden olmadığı gözlenmiştir. Ancak, GSYİH ve brüt tasarruf arasındaki olumsuz birleşmeler olan DYY ve Ticaret GSSSO aracılığıyla gözlemlenmiş ve ekonomik büyüme ile olumlu olarak ilişkili bulunmuştur.

Anahtar Kelimeler: *Doğrudan yabancı yatırım, Ekonomik büyüme, Brüt tasarruf, Gayrisafi sermaye oluşumu, Ticaret.*

TABLE OF CONTENTS

ACKNOWLEDGMENTS	i
DEDICATION	ii
ABSTRACT	iii
ÖZ	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
CHAPTER ONE	1
1.1 Introduction	1
1.2 Problem Statement	2
1.3 Research Objectives	3
1.4 Research Questions	3
1.5 Hypothesis	4
1.6 Scope and limitation of the Study	4
1.7 Significance of the Study	5
1.8 Justification of the Study	5
1.9 Organization of the Study	6
CHAPTER TWO	7
THEORETICAL AND EMPIRICAL LITERATURE REVIEW	7
2.1 Introduction	7
2.1 Theoretical literature Review	7
2.1.1 The Harrod-Domar Growth Model	7
2.1.2 The Solow Growth Model	8
2.1.3 The Modern Neoclassical Growth Model	12
2.1.4 The Production Cycle Vernon	13
2.1.5 The Electric Paradigm of Dunning	13
2.2 Empirical literature Review	14
2.3 Factors Influencing Foreign Direct Investment Inflows	17
2.3.1 Taxes	17
2.3.2 Rate of Return	17

2.3.3 Market Size and Growth Potential.....	18
2.3.4 Macroeconomic and Political Stability.....	18
2.3.5 Openness and Trade Regimes.....	18
2.3.6 Quality of Institutions.....	18
2.3.7 Clustering Effects.....	19
2.3.8 Exchange Rate Raluation.....	19
2.3.9 Labour Costs and Productivity.....	19
2.3.10 Infrastructure.....	19
2.4 Analysis of FDI Contributions.....	20
2.5 Foreign Direct Investment and Economic Growth	21
2.6 Chapter Summary.....	22
CHAPTER THREE	24
GENERAL OVERVIEW OF THE SINGAPORE ECONOMY	24
3.1 Introduction.....	24
3.2 Singapore’s Economic Structure.....	24
3.3 Foreign Direct Investment Definition and Conceptual Issues	26
3.4 Objectives of Foreign Direct Investment in Singapore.....	28
3.5 Determinants of FDI in Singapore	29
3.5.1 Market Size.....	29
3.5.2 Openness.....	29
3.5.3 Productivity and labor Costs.....	30
3.5.4 Inflation.....	30
3.5.5 Political Risk.....	30
3.5.6 Infrastructure.....	31
3.5.7 Growth.....	31
3.5.8 Tax.....	31
3.6 Singapore’s Economic Performance	32
3.6.1 Overall Economy.....	33
3.6.2 Monetary Indicators.....	34
3.6.2.1 Exchange Rate	34
3.6.2.2 Money Supply.....	34
3.7 Domestic Developments.	35
3.8 General Business Outlook.....	35
3.9 FDI Inflow Trends in Singapore	36

3.10 Singapore's Inward Investment Strategies.....	37
3.11 Business and Investment Incentives in Singapore	39
3.12 Chapter Summary.....	41
CHAPTER FOUR.....	42
RESEARCH METHODOLOGY	42
4.1 Vector Error Correction Model (VECM).....	42
4.2 Stationarity	43
4.3 Granger Causality.....	44
4.4 Johansen Co-integration Tests	45
4.5 Diagnostic Tests	45
4.6 Definition and Analysis of Variables	46
4.6.1 Economic Growth (GDP-Dependent Variable).....	46
4.6.2 Independent Variables.....	46
4.6.2.1 Gross Savings (GS).....	46
4.6.2.2 Foreign Direct Investment (FDI)	46
4.6.2.3 Gross Fixed Capital Accumulation (GFCF)	46
4.6.2.4 Trade (TR)	47
4.7 Data Types and Sources	47
4.8 Chapter Summary.....	47
CHAPTER FIVE	48
DATA ANALYSIS AND PRESENTATION	48
5.1 Stationarity Tests Results.....	48
5.2 Lag Selection.....	50
5.3 Johansen Co-integration Test Results	50
5.4 Vector Error Correction Model (VECM) Results.....	52
5.4.1 Short Run VECM Results.....	54
5.5 Diagnostics Tests	55
5.5.1 Heteroskedasticity Test.....	56
5.5.2 Serial Correlation Test.....	56
5.5.3 Model Stability Tests	57
5.6 Granger Causality- Exogeneity Block Test.....	57
CHAPTER SIX	59
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.....	59

6.1 Introduction	59
6.2 Conclusion	59
6.3 Recommendations	60
REFERENCES.....	62
LIST OF APPENDIX	71
Appendix 1. VAR lag Selection Criteria.....	71
Appendix 2. Co-integration Test.....	72
Appendix 3. VECM Results.....	73
Appendix 4. Breusch-Pagan-Godfrey Serial Correlation Test.....	75
Appendix 5 Hetereskedasticity Test.....	76
Appendix 6: Cusum Test.....	77
Appendix 7: Cusum test of Squares.....	78

LIST OF TABLES

Table 3.1: Country Rankin by GDP.....	32
Table 3.2: Singapore's Foreign Direct Investment levels.....	37
Table 3.3: Singapore's Foreign Direct Investment Inflows by Country.....	38
Table 3.4: Singapore's Main Invested Sectors	38
Table 3.5: Country Comparison for the Protection of Investors	40
Table 4.1: Expected and Actual Results.....	47
Table 5.1: Fisher-ADF Test	48
Table 5.2: Phillips Perron Stationarity Tests Results.....	49
Table 5.3: VAR Lag Selection Criteria.....	50
Table 5.4: Johansen Cointegration Test.....	51
Table 5.5: Vector Error Correction (VECM) Results	52
Table 5.6: Short Run VECM Results.....	55
Table 5.7: Heteroskedasticity Results.....	56
Table 5.8: Breusch-Godfrey Serial Correlation LM Test	57
Table 5.9: Granger Causality Test- Exogeneity Block Test,...	57

LIST OF FIGURES

Figure 2.1: The effect of an ncreased savings rate on a steady state capital-labour rati.....	9
Figure 2.2: The effect of a Higher Population on a Steady State Capital-labour Ratio....	10
Figure 2.3: The Effect of a Productivity on a Steady State Capital-labour Ratio.....	11
Figure 3.1: Manufacturing Output by Industry.....	25
Figure 3.2: Value Added by Industry.....	26
Figure 3.3: Singapore's FDI levels from the Period 2009-2013.....	36

LIST OF ABBREVIATIONS

ADF: Augmented Dickey-Fuller

DCPS: Domestic Credit to Private Sector

FDI: Foreign Direct Investment

GDP: Gross Domestic Product

GFCF: Gross Fixed Capital Formation

GS: Gross Savings

TR: Trade

INFL: Inflation Rate

MAS: Monetary Authority Singapore

MNCs: Multinational Corporations

OECD: Organization for Economic Development

PP: Phillips Perron

SGS: Singapore Government Security

TNCs: Transnational Corporations

UNCTAD: United Nations Conference on Trade and Development

CHAPTER ONE

INTRODUCTION

1.1 Introduction

FDI has for the past 30 years grown significantly in importance among nations in the world with most economic analysts strongly contending that FDI is a powerful engine for economic growth. The strong desire by nations to attract significant amounts of FDI has not only being limited to GDP. For instance, it can be noted that FDI also allows nations to enter certain markets especially when countries limit foreign firms' access to domestic markets. Such access can, therefore, be obtained by acquiring or starting a company in that nation. Other explanations seem to be pointing to the need to access and control resources that are not available in the domestic economy while some point to the need to lower costs of production.

In modern economics, much emphasis is being placed on attracting FDI rather than injecting FDI in foreign nations. By FDI outflows, companies can expand their operations and engage in what is known as international or regional diversification. This idea is supported by Busse & Königer (2012). who contends that nations ought to invest in other countries especially at a time when domestic markets seem to be under performing. On the other hand, Agrawal (2000) argues that it is FDI inflows that matter most because it allows new inputs and technology to be incorporated in the domestic production. Economic focus around the world is greatly shifting and is now becoming growth oriented and whether inward or outward with nations such as Zimbabwe blue printing and branding economic goals towards an increase in economic growth in both the short and long run periods.

Meanwhile, the world has suffered numerous economic changes from the rampaging financial and economic crisis and this has significantly altered both FDI and economic growth patterns. Countries, especially in Africa, are now shifting focus from the USA and Britain to Asian and Arabic countries for the source of funds in order to spearhead economic projects. Such as efforts can to some extent prove fruitfulness as most Asian countries are now entering into a financial crisis notably China. Analysts further contend

that the crisis in China is more likely to spread to other countries such as Japan and the neighboring region through a contagion Busse & Königer. (2012). In spite of this, countries, especially in Africa, are in desperate need of FDI.

Despite this, FDI and growth patterns around the world have also shifted and this has seen most undeveloped and developing nations rising as economic powerhouses. These nations include the BRICS nations which constitute of Brazil, Russia, India, China, and South Africa. Various explanations have been drawn to determine what exactly causes changes in FDI with most studies pointing to institutional weaknesses such as poor governance, restrictive economic policies, corruption, political instability etc. (Alam, 2000).

Economic policies on FDI have also changed dramatically as evidenced by economic alliances and coalitions being formed between nations. Countries are now formulating policy initiatives that lure foreign investors and can see huge injections of FDI. Overall, there is a huge need to undertake a study that can incorporate these changes and provide relevant answers about the role and impact of FDI on economic growth. The modern economy is also in deep need of answers as to what strategies can be implemented in order to spur a surge in economic growth, but there is a lack in the literature about the channels FDI takes when influencing a change in economic growth. This study, therefore, seeks to provide such answers by looking at the impact of FDI on economic growth with regards to Singapore.

1.2 Problem Statement

Theoretical studies have shown that an increase in FDI leads to an increase in GDP, but only a few empirical studies have found partially concrete evidence to support such an idea (Sarabapriya 2012: 192). The impacts of FDI on GDP have not been completely ascertained with some arguing that the impacts vary with the level of development (Blomstrom, 1994). On the other hand, Sahoo (2003) argues that the impacts of FDI on GDP are either direct or indirect and sectoral. As a result, he argues that it is difficult to analyse such impacts unless one decomposes the impacts by sector and channel. This was evidenced by Banga (2005) who outlined that the channels through which FDI influences GDP are numerous and the most widely known is through wages and employment.

Contrasting ideas by Borensztein et al. (1998) suggest that FDI can be seen to have a bilateral relationship with GDP. Such an effect is attributed to the level of stock of human capital. This can be attributed to the utilization of advanced technology brought by FDI through interacting with the country's absorptive capacity. Other studies argue that FDI causes an impact on GDP by causing a more proportionate stimulus response in total fixed investments. Furthermore, other researchers have argued that in order to analyse the effect of foreign direct investment on economic growth, there is a need to separate the effects of domestic investment (Borensztein et al. 1998 and Banga 2005). Reasons behind the idea suggest that domestic investment is a significant factor which determines the extent to which the domestic economy grows. Other views that address domestic investment and economic growth issues have taken a different twist (Blomstrom, 1994 and Aslanoglou, 2002). These views point to the idea that domestic investment and other macroeconomic variables can only exert a positive influence on economic growth when factors such as political stability, investment climate, rules and regulation, risk factors are conducive and attractive enough to cause favourable returns. As a result, there is no consensus as to how FDI impacts GDP irrespective of the channels of impacts or scope. This study, therefore, seeks to analyse the impacts of FDI on GDP.

1.3 Research Objectives

The main objective of this study is to analyse the impact of foreign direct investment on economic growth in Singapore. Other objectives of this study are;

- 1) To analyse institutional weaknesses that can hinder the inflow of foreign direct investment in Singapore.
- 2) To determine how foreign direct investment levels affect gross capital formation in Singapore.
- 3) To explore the kind of policies initiatives, that should be implemented in order to attract foreign direct investment so as to bolster economic growth.

1.4 Research Questions

Having established the above objectives, this study will, therefore, seek to answer the following questions;

1. What is the impact of foreign direct investment on economic growth in Singapore?
2. What are the institutional weaknesses that can hinder the inflow of foreign direct investment in Singapore?
3. How does foreign direct investment levels affect gross capital formation in Singapore?
4. What kind of policies initiatives should be implemented to attract foreign direct investment so as to bolster economic growth?

1.5 Hypothesis

The background to this study has revealed that researchers have not yet reached a consensus about the impact of FDI on economic growth. As a result, this study will examine the available empirical literature to test the following hypothesis with specific regards to Singapore;

- **H₀:** Foreign direct investment has no significant impact on economic growth in Singapore.
- **H₁:** Foreign direct investment has a significant impact on economic growth in Singapore.

1.6 Scope and limitation of the Study

This study focuses on analyzing the impacts of foreign direct investment on economic growth in Singapore. The time under consideration will span the period 1980 to 2014. The limitations encountered in this study were centered on time as it took the time to acquire the necessary data.

1.7 Significance of the Study

This study is of significant importance because numerous studies that address the impact of FDI on economic growth are specific to the country of study hence if applied to Singapore they may fail to accurately describe the impact of FDI on economic growth in Singapore. Despite the available literature on the impacts of FDI on economic growth, researchers have not yet reached a consensus about the impact of FDI on GDP and their nature of causality.

It is apparent that the world economy has evolved and witnessed dramatic economic changes. These changes have among others encompassed the financial and economic crisis, shifts in globalization trends, fast-paced technological progress etc. These changes have severely affected policy response to economic problems and analysts have strongly advocated for new studies that are time sensitive so as to completely reflect and address issues at hand. This study is, therefore, a modern and innovative approach to economic growth and foreign direct investment related issues. This study is, therefore, necessary as it provides empirical frameworks and concepts that will significantly enrich the available literature on economic growth and foreign direct investment.

On the other hand, Singapore's economic capacity is on the verge of expansion and studies are in the process of ascertaining the major cause behind such an increase in economic growth. Thus, this study is both an addition and improvement to the existing FDI and GDP literature and will attempt to fill in knowledge gaps.

1.8 Justification of the Study

This study is carried out in partial fulfillment of the requirements of the MSc Economics at Near East University. This thesis will be of great value to the following stakeholders;

- **Researcher**

This study is of profound effect to the researcher as it adds to his existing skills notably analysis and decision making which can be used in future researches and policy making.

- **Near East University**

Since this study was conducted at a time when economic activities are constantly changing, the results of this study will be both modern and effective in explaining and addressing current economic issues. This study will, therefore, serve as a source of reference to other scholars in the area of foreign direct investment and economic growth.

- **Policy Makers and Other Stakeholders**

This study will aid policy makers to have a wide insight on how economic policies can be enacted to promote foreign direct investment and boost economic growth. Further understanding of this study will enable policy makers to

1.9 Organization of the Study

This study is organized into six chapters. Chapter one deals with the problem and its setting. Chapter two addresses both theoretical and empirical frameworks behind the impacts of FDI on economic growth. The overview of Singapore's macroeconomic environment outlook is detailed in chapter three while chapter four looks at research methodology. Chapter five looks at empirical analysis and presentation of research findings. Chapter six concludes this study by looking at policy implications, conclusions and suggestions for future studies.

CHAPTER TWO

THEORETICAL AND EMPIRICAL LITERATURE REVIEW

2.1 Introduction

This chapter looks at the theoretical and empirical frameworks, and concepts that explain the impact of FDI on economic growth. In this study, a combination of theories that independently explain economic growth and foreign direct investment will be used to form a base on which empirical analyses will be based. This chapter will also look at the empirical literature on FDI and economic growth to determine the possible relationship between them, determinants of FDI, and contributions of FDI. This chapter thus will serve as a background upon which discussion of findings will be based and will assist in identifying literature gaps on FDI and economic growth. Both theoretical and empirical literature on FDI and economic growth will be in the context of Singapore.

2.1 Theoretical literature Review

2.1.1 The Harrod-Domar Growth Model

The Harrod-Domar growth model is based on the concepts of saving and investment. Thus according to this theory, if economies are to grow they must save and invest. This model is explained by three factors which are savings rate, capital productivity and capital depreciation. According to Harrod-Domar, economic growth is defined by the following equation (Modalsli 2008);

$$g = s.a - d$$

Where **g** = economic growth

s = savings rate

a = rate of productivity

d = depreciation rate

This model is based on the Leontieff production equation of the following nature;

$$Y = \min [bL_t, vK_t]$$

Where **v** and **b** are constants. **b** represents the marginal productivity of labour while **v** represents the marginal productivity of capital. The associated isoquant is L-shaped. This theory implies that capital investment is obtained from savings. The greater the amount of savings available, the greater the amount of funds available for capital investment and hence the more the economy will grow. There is evidence obtained by which showed that there is a positive association between aid and investment. This evidenced also showed that out of the 88 countries that were under study, 17 countries proved the existence of a positive association between aid and investment (Modalsli, 2008). Furthermore, it was established that investment is a necessary but not sufficient factor for economic growth. The Harrod-Domar model is criticized on the basis that the capital-output ratio is constant, there is an unlimited supply of labour and that it does not make any prediction.

2.1.2 The Solow Growth Model

The Solow growth model is a model that looks at the overall economy in the long run. This model assumes that a country's standard of living is measured by real per capita GDP. This model is based on the following assumptions;

- There is only personal saving
- There is no government and hence no taxes (**G = T = 0**)
- There is no international trade (**Exports = Imports = NX = 0**)

This model is based on four equations and these are;

1) $N_t C_t = (1 - s)Y_t$

2) The production function $Y_t = AK_t^\alpha [(1 + \gamma)N]^{1-\alpha}$

Where **A** measures the rate of efficiency (total factor productivity), **γ** measures the rate at which technology exogenously changes, **N** represents the population while **K** is capital.

3) The capital stock equation $K_{t+1} = (1 - \delta)K_t + sY_t$

Where \mathbf{K}_{t+1} is the capital stock, δ is the depreciation parameter measuring the rate at which assets wear and tear while s is the savings rate.

4) The population growth equation $\mathbf{N}_{t+1} = (1 + n)\mathbf{N}_t$

The Solow growth model gives an explanation of changes in economic growth in response to changes in savings rate, population growth and productivity and these are explained as follows;

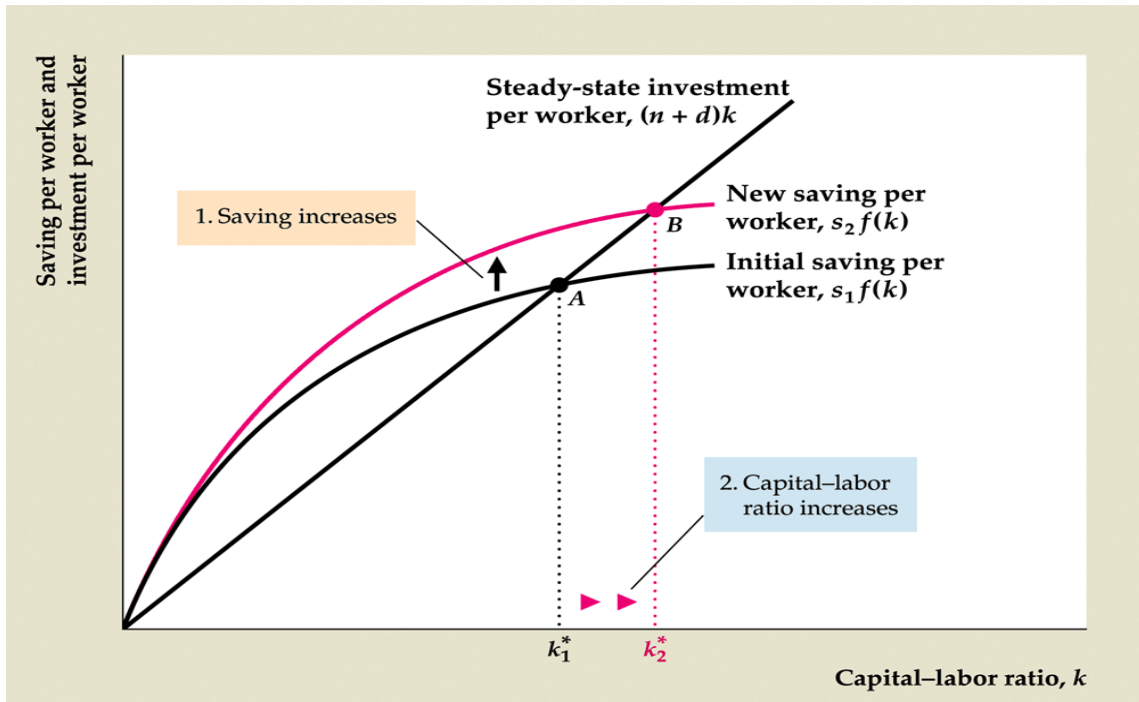


Fig 2.1: The Effect of an Increased Savings Rate on a Steady State Capital-labour Ratio
(Source: Abel and Bernanke, 2005)

From Fig 2.1 policy initiatives should be to increase savings because an increase in savings from \mathbf{SF}_1 to \mathbf{SF}_2 will cause the capital-labour ratio to increase from \mathbf{K}_1 to \mathbf{K}_2 and causing consumption per worker to rise. The steady state will shift from point **A** to point **B**.

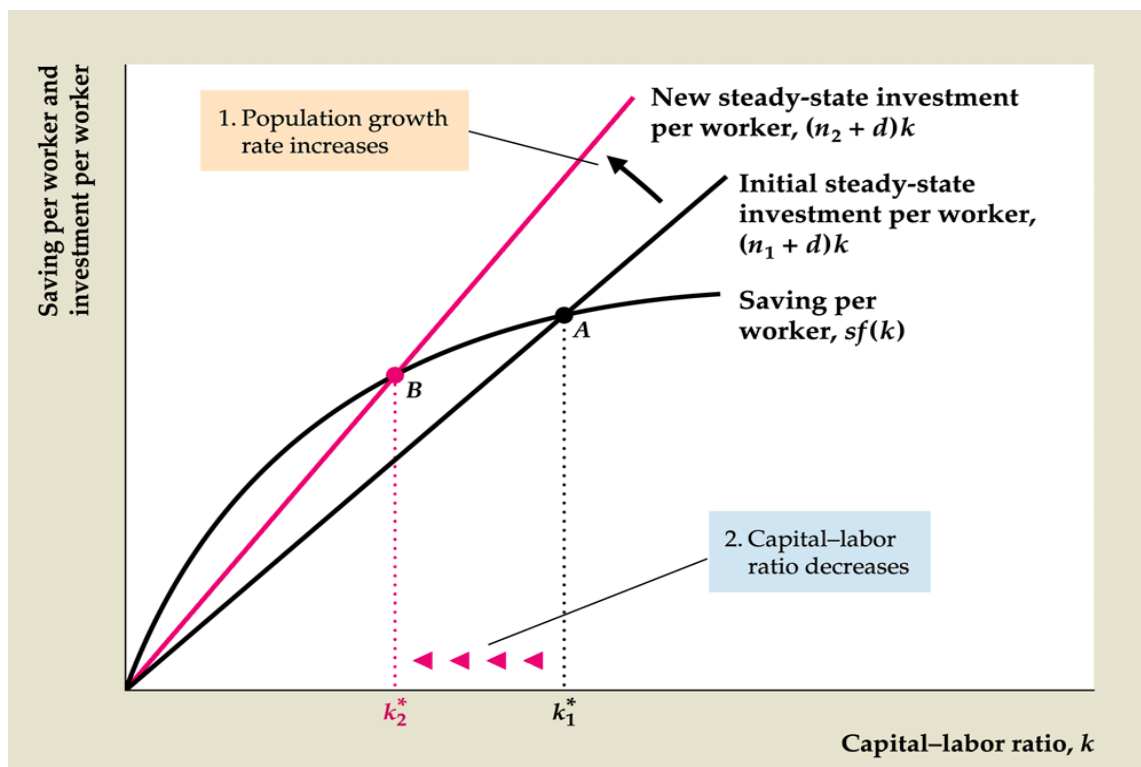


Fig 2.2: The Effect of a Higher Population Growth on a Steady state Capital-labour ratio

(Source: Abel and Bernanke, 2005)

From Fig 2.2 above it can be seen that an increase in the population reduces the capital-labour ratio from k_1 to k_2 while the steady state swivels from $(n_1 + d)k$ on point A to $(n_2 + d)k$ on point B and thus output and consumption per worker will decline. Policy initiatives must therefore reduce population growth so as to increase consumption per worker, but this has negative effects on total output and consumption. Governments must, therefore, encourage research and development and human capital development so as to raise living standards. These policies may include educational policies, worker training, and assisting entrepreneurs.

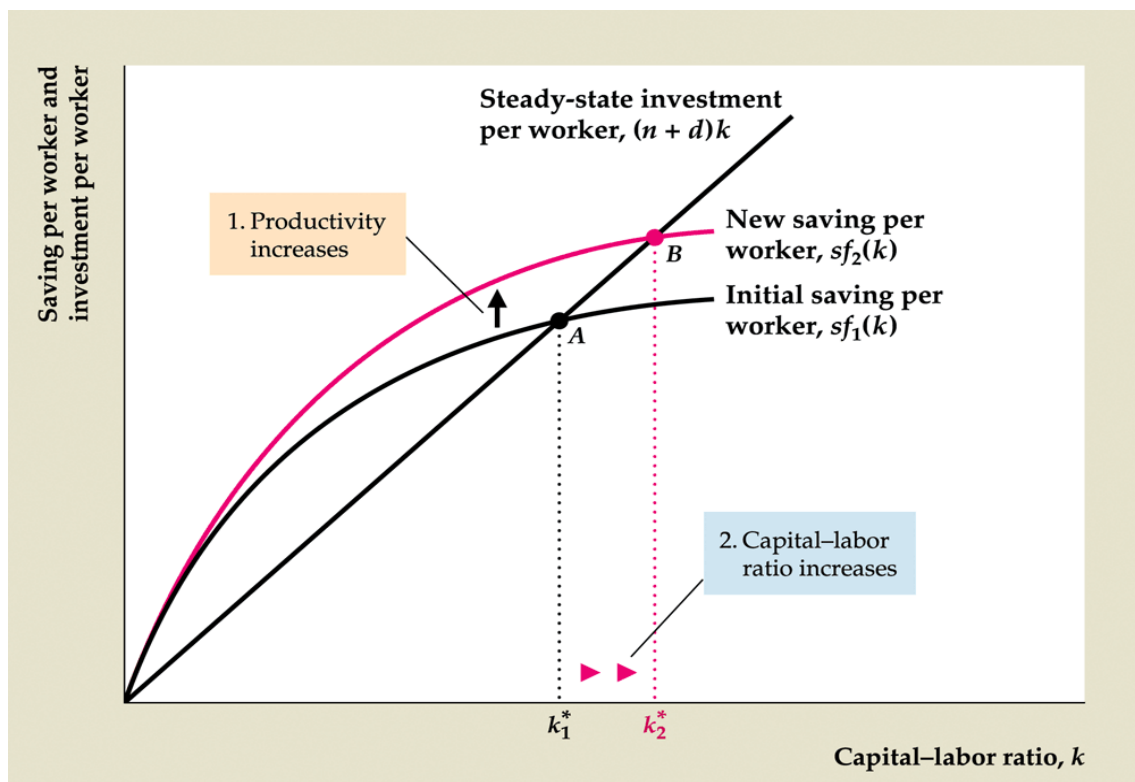


Fig 2.3: The Effect of a Productivity Improvement on a steady state Capital-labour Ratio
(Source: Abel and Bernanke, 2005)

The Solow growth model contends that improvement in productivity is an essential factor in economic growth. From Fig 2.3 above it can be seen that an increase will cause an increase in output per worker to increase. An increase in productivity will cause an increase in savings as the savings curve shifts from sf_1 to sf_2 and hence, in the long run, the capital-labour ratio will increase from k_1 to k_2 while the steady-state shifts from point **A** to point **B**.

In order to boost productivity, economic policies must promote spending in infrastructure development such as roads, utilities, bridges etc. This implies that positive changes must be made to gross fixed capital formation. However, expenditure on infrastructure might not improve productivity. Moreover, political interference may hinder effectiveness and efficiency in infrastructure projects.

The Solow Growth Model contends that there is conditional convergence which takes place when countries have identical characteristics $\{s, n, d, f(k)\}$. If these characteristics are different they will not be any convergence and poor countries will not catch up with rich countries in terms of economic growth. So for poor countries to catch up with rich countries, they must implement policies that will cause an increase in $\{s, n, d, f(k)\}$.

There is however little evidence to support unconditional convergence and this implies that international financial markets are imperfect. Contrasting views established that conditional convergence can be attained when adjustments are made to incorporate population growth and savings rate (Mankiw et al., 1992).

Deductions can be made about the Solow growth model concerning trade, gross fixed capital formation, gross savings and foreign direct investment. Foremost, it can be noted that increases in savings have a resultant positive effect on economic growth. The channels of transmission are capital labour ratio and consumption. This implies that gross savings can only exert positive changes to economic growth if it can resultantly cause positive changes in capital labour ratio and consumption.

2.1.3 The Modern Neoclassical Growth Model

This theory is an extension to the traditional classical theory of growth. The traditional classical theory of growth had a major limitation of the failure of convergence. In addition, the traditional classical theory placed much emphasis on external factors such as technology, neglecting internal factors such as institutions and policies (Chihan, 2006). Thus, this theory placed much emphasis on establishing the conditions that will see countries converging. The modern neoclassical theory added more variables to the traditional classical theory of growth. These variables are; ratio of investment to GDP, ratio of GDP to growth, population growth, political stability, trade, research and development (Barro and McCleary, 2003).

If foreign direct investment policies are enacted and implemented with the main emphasis to boost economic growth then greater need to understand what drives foreign direct investment. There are two theories that best describe the determinants and forces behind the changes in foreign direct investment. These models are the Production Cycle Vernon and the Electric Paradigm Dunning and are explained in detail as follows;

2.1.4 The Production Cycle Vernon

This theory contends that there are different types of foreign direct investments and are determined by the stage of production that country is in. This theory attempted to explain the different types of foreign direct investments made to Western Europe by United States' companies after the Second World War. Thus according to Vernon, production is composed of four stages which are innovation, growth, maturity and decline (Denisia, 2010). Foreign direct investments from the United States were seen to be a result of an increase in demand for United States' manufactured products. The war Europe stirred an increase in demand for manufactured products which by then were available from the USA at a lower price. United States' companies dominated on the international market because of technological advantages. Innovation is thus seen as a contributing factor to international dominance. As a result, United States' companies begin to investment in Western Europe where demand was high and costs were low because of technological advantages.

The implications of this theory are that if international companies can achieve technological advantages, they will be in a position to invest abroad. This also entails that technological advantages are the main determining factor of foreign direct investment. It can also be noted that this theory suffers from scope problems since it is a study based on United States companies' investments in Western Europe.

2.1.5 The Electric Paradigm of Dunning

This theory is composed of three theories of foreign direct investment, that is, ownership advantages (O), location (L) and internalization (I). According to this theory, ownerships advantages are as a result of owning intangible assets. The production cycle asserts that the notion behind FDI is to transfer assets transnationally from one company to the other at a lower costs. Thus, FDI is seen as a cost-effective way of transferring assets from one nation to the other at a lower costs.

Dunning (1973) posits that monopoly advantages and property competencies are the driving force towards FDI. The basic idea is the need by firms to attain profitability margins will propel firms to use these advantages and competencies abroad where they can earn abnormal or relatively high profits. Monopoly advantages are as a result of

technology and economies of scale. Successful entrance into foreign markets by transnational corporations (TNCs) requires that TNC possesses certain advantages that will lower costs of production (Denisia, 2010). Such advantages are inherent to TNC's specific advantages and property competencies.

This theory entails that if TNCs able to utilize their specific advantages and property competencies in another location then there is a strong incentive to undertake foreign direct investments. Thus, locations advantages are as a result of economic, political and social advantages such as telecommunications, market size, policies affecting FDI, cultural diversity etc.

On the other hand, internalization to the way the TNCs will utilize their advantages to distribute and sell their products in the new market. Internalization must, therefore, offer TNCs significant benefits for them to undertake production in foreign markets (Dunning, 1973). The greater the benefits of internalization the more TNCs will undertake foreign production.

It can be established from this theory that production, location and internalization factors vary from one company to the other. Of great importance is that this theory assumes that foreign direct investment is determined by social, political and economic factors of the host country. These factors are the ones that contribute to both challenges and opportunities from investing abroad that is, engaging in foreign direct investments.

2.2 Empirical literature Review

Agrawal conducted a cross-sectional analysis of Pakistan, India, Nepal, Bangladesh and Sri Lanka. He used time series data to analyse the impacts of foreign direct investment on national investment. The results revealed that there is a linkage between foreign direct investment and national investment. Further results revealed that there was a unilateral relationship between FDI and economic growth before 1980, mildly positive in the early eighties and positively strong in the early nighties.

Athukorala (2003) carried out an examination of the impact of foreign direct investment on economic growth based on Sri Lanka. Time series data from the periods 1959 to 2002

was used to and the results of Athukorala (2003) showed that there is no robust linkage between economic growth and FDI. Having used the Vector Error Correction model, the results also showed that FDI was positively related to domestic economic activities and business opportunities. Factors such as corruption, bad governance, bureaucracy inertia and political instability were given as major factors that were hampering the investment outlook.

Blomstoerm et al. (1994) assert there is a significant correlation between FDI and per capita GDP. Blomstoerm et al. (1994) study was based on time series data from the period 1960 to 1985 and further results suggest there is a large technological and productivity gap between poor and rich countries. This gap was assumed to be in the relation between domestically owned and foreign owned firms. This study argues that foreign direct investment does not always benefit poor countries.

Other studies have found that there is a positive linkage between FDI and human capital. For example, a study conducted by Mody and Wang (1997) in China posits that FDI has positive effects on human capital on the condition that there is an addition of knowledge. The results, however, showed that a negative relationship can also exist and this was after taking into consideration the effect of the interaction term.

Campos and Kinoshita (2002) analysed the impact of FDI on economic growth based on 25 Eastern and Central European economies between the periods 1990 to 1998. The results point to FDI having a positive effect on economic growth. This was reinforced by Calvo and Robles (2002) who undertook a study based on panel data from 18 Latin American countries from the periods 1970 to 1999. They found that a positive relationship exists between FDI, economic freedom and economic growth.

In a study based on European countries, Moudatsou (2001) did an empirical assessment of foreign direct investment on economic growth. The data span was from 1980 to 1996. The study obtained different country estimates that showed that past FDI levels have a significant impact on economic growth.

Various studies have found FDI to be having significant positive impacts on economic growth. Among these studies, is a study by Sun (1998) established that FDI has a positive

impact on economic growth through improved exports. Kabir (2007) shared a similar view by outlining that an increase in FDI results in an increase in foreign currency earnings which can be used to set-off external debts. Thus expending more resources for other productive uses. This was further reinforced by Zhang (2006) who established a positive relationship between FDI and economic growth in China.

Other studies have found no concrete evidence to support the causal relationship between FDI and economic growth. For instance, Aslanoglou (2002) undertook a case study of Turkey using time series data from the periods 1975 to 1995. Granger causality tests showed an insignificant positive causality of FDI on economic growth. This was also supported by Bhattarai and Ghatak (2010) who used the Vector Autoregression Model (VAR) and the Yoda-Yamamoto causality test to determine the causality between FDI and economic growth. Their results still point that an insignificant linkage exist between FDI and economic growth.

Contradictions arise especially between a study done by Mello (1999) which indicate that FDI play a significant contribution to economic growth when complimented by both domestic and international capital, and a study done conducted by Lipsey and Zejan (1994) and Blomstoerm et al. (1994) which strongly contend that there is no significant effect between FDI and economic growth.

No consensus has been reached about the impact of FDI on economic growth as most studies have problems in the determination of the direction of causality between FDI and economic growth. Major problems arise when one tries to distinguish and separate the effects especially of capital formation and economic growth. For example, questions might be asking if the economic is growing because of high capital formation or is capital formation high because the economic is growing. Thus, these gaps in literature need to be explained and this study, therefore, seeks to answer these questions in the context of Singapore.

Pavelescu (2008) examined the implications of GFCF on economic growth among EU member countries. The study outlined that positive changes in economic growth as a results of similar changes in GFCF are caused by improvements in efficiency and inflation. The study further reveals that negative implications on economic growth caused

by increases in GFCF are as a result of inefficiency on GFCF and that increases in government expenditure on GFCF may be as a result of inflationary pressure. Hence the changes are not in absolute terms but changes in monetary measures. This was echoed by Ray (2012) who established that negative association between GDP and GFCF can be observed when share prices decline as the volume of shares supplied increases. This is because increases in gross fixed capital formation through equity and bond financing might be expensive in such a way that it can drain the available resources that can be used to make further improvements in GFCF. This is because in the long run GFCF is subject to depreciation and hence lack of funds to maintain, improve and add more fixed capital will negatively influence GDP in long run. This was also supported by Tvaronavičius and Tvaronavičienė (2008) who contends that though increases in GFCF can be made, depreciation and inflation are the major hindrances that impede positive contributions of GFCF to GDP.

2.3 Factors Influencing Foreign Direct Investment Inflows

2.3.1 Taxes

The impacts of taxes on FDI have not been clearly established by empirical studies as most do not agree to a common effect. Studies by Hartman (1985) and Grubbert and Mutti (1991) have found corporate taxes to be negatively related to FDI. On the other hand, Studies by Lim (1991) and Braunerhjelm and Svensson (1996). established that corporate taxes do not significantly affect FDI inflows.

2.3.2 Rate of Return

Rate of return is considered to be the main motive behind FDI with the main thrust being to make profits. According to Markowitz, a rate of return encompasses a risk-free rate and a risk premium. The higher the rate of return the more the investor will make assuming all things remain constant. Rate of return is also an indication of risk. When the level of risk is high investors will demand a high rate of return to commensurate with the level of risk (Lim, 1991). As result FDI inflows tend to be high when the rate of return is high.

2.3.3 Market Size and Growth Potential

Market size and growth potential offer a lot of opportunities for investment. This is because a bigger market size is synonymous to high potential demand. Alternatively, technological advantages allow transnational corporations to engage in mass production which results in economies of scale and hence lowering costs. This was supported by Resmini (2000) who undertook a study based on Eastern and Central Europe. The results showed evidence that there is a strong positive relationship between market size and growth potential.

2.3.4 Macroeconomic and Political Stability

Macroeconomic and political stability are an essential element in any investor's decision-making process. Macroeconomic and political stability are associated with risk and thus the higher the level of macroeconomic and political instability the riskier it becomes to invest in that nation. A significant number of studies established that political instability poses serious negative effects on FDI inflows (Schneider and Fray 1985; and Root and Ahmed 1979). This however, contradicts with findings by Braunerhjelm and Svensson (1996), who outlined that administrative efficiency and political risk do not significantly influence US firm's decisions to set up production facilities.

2.3.5 Openness and Trade Regimes

Openness and trade determine the type of FDI inflows and investors attempt to avoid hindrances in trade. Horizontal FDI has been highly associated with better trade openness and trade regimes potential and this however varies with location. For instance, Resmini (2000) established that vertical FDI can be significantly high in areas where trade in capital goods is high. However, FDI inflows can be high when augmented by high export orientation strategies.

2.3.6 Quality of Institutions

Quality of institution is important in FDI-related issues because there is a relationship between quality of institution and economic growth. Studies have it that nations with governance practices are in a better position to significantly attract FDI. In addition, poor institutional quality tends to promote corruption which has a negative impact on profitability as it heightens investment costs. Moreover, poor institutional quality is associated with high uncertainties as FDI inflows have high inherent sunk costs. Empirical literature results

about the effects of institutional quality and FDI inflows is inconclusive and vague. Factors such as bureaucratic hurdles, regulatory framework, red tape, corruption and judicial transparent are contended to be insignificantly affecting FDI inflows (Wheeler and Moody, 1992) though factors such corruption and judicial transparent are contended to be significantly affecting FDI inflows (Wei, 2000).

2.3.7 Clustering Effects

Clustering effects can cause more FDI inflows as linkages in projects can cause foreign firms to be located closely to one another. Clustering effects are also associated with external economies of scale and positive spillover effects (Barrel and Pain, 1999).

2.3.8 Exchange Rate Raluation

Exchange rate valuation plays a significant role in determining the strength of the type of FDI. For example, when the real exchange rate is weak, expectations are high that vertical FDI will increase. This is because prices will be relatively low and firms will be willing to exploit such opportunities and, as a result, FDI inflows will increase (Food and Stain, 1991). However, there is a hypothesis that a stronger real exchange rate can result in horizontal FDI taking place as a result of barriers to entry.

2.3.9 Labour Costs and Productivity

Cheap labour is one of the essential elements which determines FDI levels. This is supported by the modernization hypothesis and the dependency hypothesis which suggest that FDI inflows will be relatively high in nations with cheap labour. Thus expensive labour costs can be to discourage FDI inflows especially when the type of production is labour intensive. However, there is little empirical evidence to support this idea and most studies argue that the relationship between labour costs and FDI inflows is not significant (Saunders, 1992). Some argue that labour costs vary from country to country and that labour costs are an indication of the quality labour skills available Food and Stain, 1991).

2.3.10 Infrastructure

Infrastructure such as railways, telecommunications and roads pose challenges to FDI inflows. This is because when these factors are absent, investing firms might view it as having a lot of sunk costs and might not be willing to invest such amounts in projects that are not profit related. Infrastructure thus is said to be positively related to productive potential and hence, it helps in attracting FDI inflow. This can, however, serves as an

opportunity as more foreign firms have indicated willingness to participate in infrastructure projects (Trade Chakra, 2008).

2.4 Analysis of FDI Contributions

FDI has been on great demand by many nations worldwide, especially undeveloped economies. The reasons suggest that FDI inflows are a powerful engine of economic growth. The benefits of FDI inflows are said to be the numerous and most notable effect is on economic growth. FDI has positive impacts on economic growth and this is through factor productivity and can be said to raise factor productivity. The channels through which FDI raises factor productivity are;

- I. Trade inflows
- II. Spillovers
- III. Other externalities

The contributions of FDI to the host economy are assumed to outweigh contributions by the domestic economy as FDI is also assumed to boost income growth in host economies.

High-interest rates and other incentives to attract FDI inflows have been contended to cause a crowding out effect. The contributions of FDI are however subjective though they are still advocates that FDI boosts domestic income. Despite the crowding out effect, the net effect from FDI inflows is contended to be positive and expends scarce resources to the production of other goods and services (Trade Chakra, 2008). The effects of FDI are effects on growth can be attributed to threshold externalities but it requires that there be developments in technology, education, health and infrastructure before the benefits of FDI can be reaped. In most cases, underdeveloped and imperfect financial markets are an obstacle to FDI and can prevent economies from reaping the full benefits of FDI inflows. This is because financial markets are a source of funds needed to propel economic activities.

Foreign direct investments normally improve trade as transnational corporations engage in international trade. Thus, the domestic economy is integrated to world markets. There is a mutual relationship between foreign direct investments and trade. FDI, however, can

pose serious consequences when significant amounts of profits are ploughed back to the TNCs home country. This is detrimental when the host country has serious current account deficit problems. On the other hand, the extent to which FDI inflows contribute positively to the host economy depends on the availability of export processing zones. Export processing zones are an important tool of integrating the host economy with world trade. Both imports and export usually rise with the level and effectiveness of export processing zones.

However, measures to promote FDI inflows can have repercussions on import substitution strategies. Consequently, imports tend to rise as a result of FDI inflows. Externalities do occur especially technology is transferred to the host economy. The extent to which technological spillover occur varies from one country to another and is also influenced by the sectors to which FDI is being made.

2.5 Foreign Direct Investment and Economic Growth

The extent to which foreign direct investment contributes to economic growth has been debatable among scholars while a significant number of them arguing that foreign direct investment contributes positively to economic growth. Other scholars assert that the extent to which foreign direct investment induces changes to economic growth is subjective and hence can be negative. Despite the differences in conclusions by scholars, foreign direct investment still plays a significant role towards economic growth. The following are the positive contributions emanating from foreign direct investment;

Foreign direct investment results in increased competition on the domestic market as more and more Transnational Corporations (TNCs) enter the domestic market. TNCs usually introduce new and modern technology into the domestic economy. Such advanced technology results in mass production and at lower production costs. This usually leads to increased competition as both domestic firms and TNCs compete for the same market.

Several conditions have been laid about the conditions under which foreign direct investment exerts a positive change on economic growth. Among such is the macroeconomic stability of the domestic economy. The more unstable it is to investment abroad the more risk it entails and investors are risks sensitive. Macroeconomic stability is usually associated with inflationary pressure and recessions or depressions in economic

activities. On the other hand, the higher the expected growth of the economy the higher the level of foreign direct investment *ceteris paribus*. This anticipated growth is associated with an increase in economic activities. As a result, investors will pour in funds so as to profit from such activities.

On the other hand, the government can generate more corporate taxes as a more taxes revenue is collected by taxing the activities of TNCs. This depends on the marginal rate of taxation and marginal propensity to consume. If both the marginal rate of taxation and marginal propensity to consume is high, the government can obtain more tax revenue.

Moreover, FDI will cause countries to relax their trade policies. This relaxation in trade policies is essential as firms can transfer capital from one industry to another. Thus, diversity of goods and services are made available on the domestic market as individuals and corporations engage in specialization and mass production.

The most significant contribution of foreign direct investment is the area of the human capital formation. TNCs employ a lot of people and this is followed by a lot of training programs and educational training as employees compete on the job market. Meanwhile, the government will also avail more expenditure on educational development. TNCs have been argued to be one of the few organizations that invest in their employees through research and training programs for their employees.

2.6 Chapter Summary

This chapter has analysed both theoretical and empirical frameworks and concepts that address the impact of foreign investment on economic growth. The Electric Paradigm of Dunning established that production, location and internalization factors are the ones that determine the level of foreign direct investment vary from one company to the other. The Production Cycle Vernon showed that productions levels in one country determine whether foreign direct investments will be made to other countries abroad. The Solow Growth Model advocated for policies that promote savings and improve savings so as to boost economic growth. On the other hand, empirical results revealed no consensus amongst the available studies concerning the role of foreign direct investment on

economic growth. Most of these studies suffered from poor methodological studies. This study, therefore, seeks to fill gaps in the literature and adopt a proper model that can be used to analyse the role of foreign direct investment on economic growth.

CHAPTER THREE

GENERAL OVERVIEW OF THE SINGAPORE ECONOMY

3.1 Introduction

This chapter is mainly centered on the Singapore economy and hence will, therefore, look at Singapore's economic structure, Singapore's macroeconomic environment outlook, and economic growth patterns in Singapore, FDI trends in Singapore and Singapore's economic policies and strategies. As a result, this chapter provides a detailed analysis and evaluation of major economic elements and how they relate to FDI and economic growth.

3.2 Singapore's Economic Structure

In the early years of its development, Singapore had a weak economy. It had the highest unemployment rate, unskilled labor, political unrest and uneducated citizens. With good policies set by the government, Singapore developed strategies that would encourage FDI and Multi-National Enterprises. This would introduce new technology, provide the necessary expertise and make markets more accessible.

The government also instilled policies that would ensure that physical infrastructure, for example, transport and communication were well built. During the years of 1965 to 1980, the country benefited a lot from foreign capital flow which in turn boosted the economy. In the 1970s, the country restructured its economy, by changing from labor intensive to capital oriented and high value-added industries (ODI, 1997).

To date, Singapore can be defined as a mixed economy. Manufacturing and service sector dominate the industries. The services sector accounts for two-thirds of the economy while the manufacturing sector contributes a fifth to the total Gross domestic product. Foreign trade plays a major role in the country. The country deals with exports in electronic parts, petrochemical products and refined petroleum. The following charts show the

manufacturing sector and value added sector that contribute to the economic structure in Singapore.

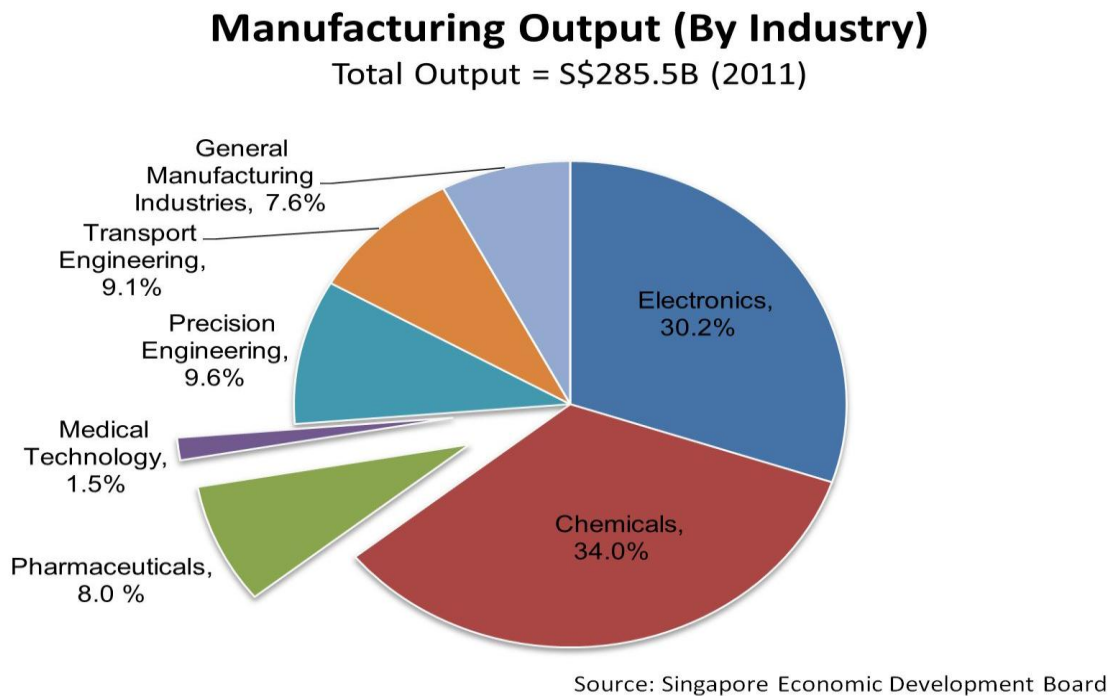


Fig 3.1: Manufacturing output by Industry (Source:Singapore Economic Development board)

It can be deduced from 3.1 that Singapore's manufacturing output is hugely denominated by chemicals manufacturing which accounts for 34% of the entire manufacturing output produced. The second highest contributing industry to Singapore's manufacturing output is electronics which constitutes about 30.2% of the entire manufacturing output.

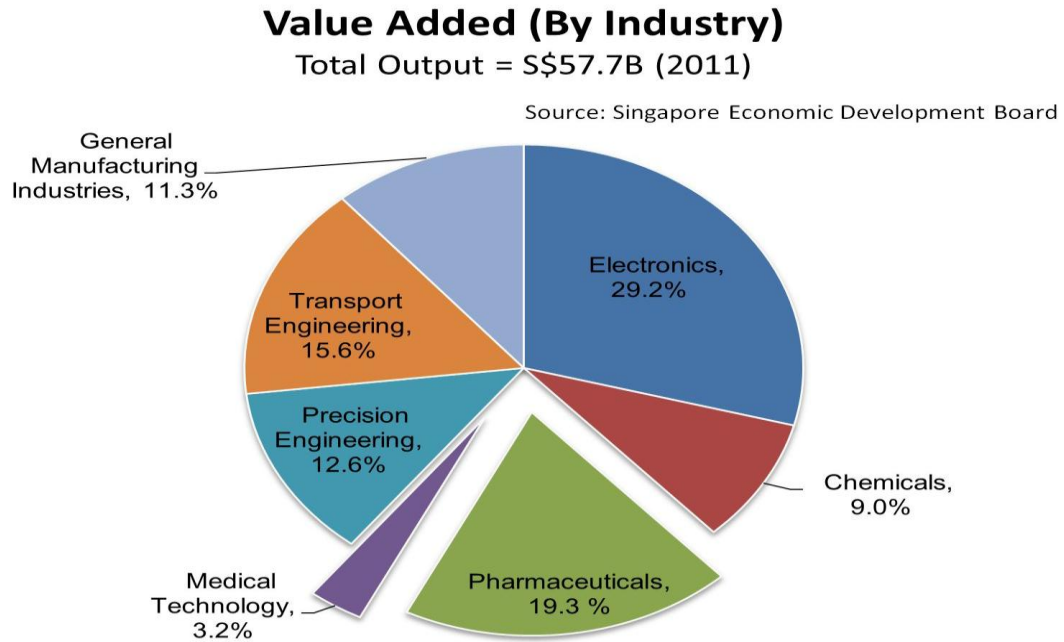


Fig 3.2: Value Added by Industry (Source: Singapore Economic Development Board)

Since the country relies on foreign trade, it has a high degree of economic openness in order for it to continue thriving. The country's economic freedom is 89.4, which makes it the second freest in the 2015 index. The economic model in Singapore has shown that it is possible to succeed globally and regionally.

The Singapore workforce is skilled attracting multinational corporations, one of the reasons is that there are fluent in English. Current the unemployment rate is 2% and the labor workforce occupies service, industry and agricultural sectors.

3.3 Foreign Direct Investment Definition and Conceptual Issues

UNCTAD (2014) defined foreign direct investment as a situation which occurs when a parent company or foreign investors invest in a foreign affiliate or another company resident in another country. This definition was however extended by Onyilola (1995) to encompass export earnings and foreign capital that ultimately leads to positive externalities on technology. The notion behind the idea by Onyilola (1995) is built on the assertion that most MNCs usually invest so as to gain access of resources that are not

available in their domestic economies. It is also seen that FDI gives foreign enterprises access to foreign markets and as such investments are made to make sure that that objective manifests.

A lot of FDI definitions have been put forward and most have differed on on scope as they now include elements such as spillover effects from FDI. It was also observed from the definition by the European Union (2008) that for an investment to be considered as FDI, at least 10% stake must be acquired by an investor in a foreign company. This definition inherently excludes investments whose value is not significantly high enough to be considered as FDI.

On the contrary, FDI is defined according to the intended purpose of the investor. For instance, OECD (Organization for Economic Co-operation and Development) contends that FDI is when is made in a foreign enterprise so as to acquire a permanent benefits.

It can be noted from these given definitions that FDI is centered on the concept of acquiring stakes in a foreign enterprise so as to obtain long term benefits. Thus, the concepts of FDI are a linkage between what the domestic or host economy will obtain as benefits and what the investors gains at the end of the day in terms of rewards. These two fundamental concepts have significantly become the foundation upon which the benefits and costs of FDI are weighed. As a result, the decision to invest in another country hinges on the potential to obtain long term benefits and further intended objectives of the investors (Oyinlola, 1995). The host nation however focuses on net effects such as improvements in employment levels, increase in output (GDP), influx of new and modern technology and integration with world markets. Thus, factors that hinder an investors' perceptions about the decision to invest in a foreign nation or those that affect his potential to reap desired rewards are considered to be detrimental to FDI. Nations around the world are struggling to enact policies and maintain a conducive environment that can lure, nature and spur more FDI inflows.

Host nations do suffer at the expense of luring FDI inflows as they engage in activities and policies that are at the expense of the economy's future position all for the sake of attracting FDI. The net effects of FDI are being weighed and most researchers contend that they are minimal and that it is the initial impact that counts most in the first case

(Oyinlola, 1995). Possible reasons suggest that high FDI inflows are associated with high capital flights as MNCs repatriate profits to their home countries. Moreover, MNCs are now been accused of mismanagement of natural resources so as to further their gains. There is therefore strong need to host economies to strictly assess investment application by foreign investors so as to ensure that there is no mismanagement of resources and that the domestic economy does not suffer at the expense of attracting FDI inflows.

However, foreign direct investment is usually composed of foreign direct investment inflows and foreign direct investment outflows. Foreign direct investment outflows involve investments that are made by the domestic firms or country into other countries whereas foreign direct investment inflows are investments made by other foreign companies of other countries into another nation. This study will draw its attention on foreign direct investment inflows.

3.4 Objectives of Foreign Direct Investment in Singapore

Foreign direct investment in Singapore is very crucial for economic development. The country is open to outside investors and they also partake in investing abroad as well. Companies are encouraged to invest in the economy and are mostly attracted by the tax incentives that the country offers. Companies that wish to investment in Singapore need to register with the economic development board. However, it can be noted that not all sectors of the economy are open for foreign investment (Trade Chakra, 2008). For example media, telecommunication and financial services. The investment opportunities in the country mainly lie in the following sectors, computer hardware and software, scientific devices, aircraft and parts, oil trading and medical and scientific equipment.

With those sectors in mind, the objectives of Singapore foreign investment policy are as follows; Lim (2001)

- To utilize foreign investment for promoting international business serve
- To become a center for globalization,
- To advance in industrial structure
- To promote exports and fostering the manufacturing industry

- To improve productivity and foster high-tech industry
- To continue introducing new technology and processes

3.5 Determinants of FDI in Singapore

These are important factors that impact the level of foreign direct investment in the country. They are different theories that try to explain the determinants of FDI. The determinants of foreign direct investment play an important role in order to attract FDI in Singapore. The following determinants affect FDI in Singapore.

- Market share
- Openness
- Productivity and costs of labor
- Inflation
- Political risk
- Growth
- Tax

3.5.1 Market Size

In previous studies, market size seems to be an important determinant of FDI in econometric studies. The market size relevant to this is measured by GDP or GDP per capita. Market size is very important for Horizontal FDI and useless for vertical FDI. According to Charkrabarti (2001), market size is of greater value because the larger the market there is, the more FDI is likely to increase. Economies of scale can be ripped from a larger market size.

3.5.2 Openness

Singapore is an open economy that allows for exports and imports of goods and services. It is ranked the most open in the world and also ranked the seventh least corrupt country in the world. The degree of openness with regards to foreign direct investment has impacted the country's economic development as a whole. Singapore public policies and legal are in support for foreign investors. According to U.S Department of state (2014) foreign investors are not obliged to enter into any local ventures, the same rules that apply

for locals also apply to investors. Openness as a determinant of FDI is measured by the ratio of exports plus imports to GDP. Literature suggests that the impact of openness on FDI depends on the type of investment (Jordan, 2004). For example, if the existing investments are self-seeking it, therefore, means that there will be less openness. The imposition of trade restrictions results in positively to FDI. In Singapore, multinational companies prefer to invest there because of its open economy and more so the availability of trade protections that are offered by the country means that higher transaction costs emanate from exporting.

3.5.3 Productivity and labor Costs

The wage rate as a determinant of FDI is used as to analyse the labor costs available in the country. Cheap labor can be an attractive characteristic for FDI. On the other hand higher wage rate tends to discourage FDI. Previous studies indicate that labor costs have a huge impact on foreign investment in labor-intensive industries and for export based subsidiaries. However, foreign multinational companies might need to consider the skills of the labor force as it influences the decisions about the location of FDI.

In order to attract foreign skilled labor force, Singapore government have a strategy called the employment pass which main aim is to improve productivity in the economy as well as to promote the countries a competitive advantage.

3.5.4 Inflation

Inflation (INF) discourages FDI in that it increases the cost of production and eats into the profits that an MNC may hope to repatriate. A high inflation rate also slows the real GDP growth rate and erodes the purchasing power of Singapore consumers. The current inflation rate in Singapore is at 1% which is one of the lowest in comparison to other Asian countries.

3.5.5 Political Risk

As businesses in Singapore are becoming more diverse and expanding to other countries. FDI outflows have a high risk of being affected by unfavorable political situations. The instability of one country's political situation can translate to problems affecting multinational companies in Singapore (ODI, 1997). However, research has shown that Singapore has benefited a lot from its stable political environment as well as a prominent

investment climate. Since its independence in 1965, the People's Action Party has been in ruling and they have fostered liberalization as well as international trade.

3.5.6 Infrastructure

The availability of ports, roads, telecommunication and railways influences FDI. According to ODI (1997), inadequate infrastructure poses as both an opportunity and a hindrance to FDI. For countries with poor infrastructure, investors see this as a potential to the development and play a big part in the infrastructure sector. Whereas, the availability of good infrastructure translates into potential investment by attracting FDI thereby increasing FDI flows. A look at Singapore shows that the country has up to par infrastructure that generally attracts investors.

3.5.7 Growth

The economy in Singapore is regarded as one of the highest FDI inflow financiers in the continent. Growth rate of the economy as a determinant of FDI has been a bone of contention among researchers in the field. Charkrabarti (2001) articulates that a growing economies have a better chance of obtaining higher profits than those that are lagging behind slowly. A research done by Lunn (1980) and Culem (1988) reported that growth has a positive relationship with FDI. However, in another research carried out by TSAI (1975-1978), the researcher reported that there was a negative relationship between developed economies and a positive relationship developing economies.

3.5.8 Tax

Foreign direct investment is sensitive to tax policies imposed by a country. Some literature suggest that a host countries tax can have a negative effect on FDI, whilst other authors report that there is no significant impact of FDI. Singapore tax regime has helped the country to attract FDI. Singapore offers very low tax rates in comparison to what other countries are charging. The country also offers low pricing strategies for international corporations. Tax incentives in Singapore are mainly offered in the following sectors:

- Commodity trading
- Biotechnology
- Fund management
- Shipping.

Because of the tax incentives being offered by the country, Singapore has managed to attract FDI of 74% (\$203 billion). Companies such as yahoo, linked in apple have been attracted to set up headquarters in Singapore. The following table shows Singapore as the second country that has attracted FDI because of the tax incentives imposed by the government.

Table 3.1 Country Rankin by GDP

	Country	Total FDI inflow 2008-2012 US \$ million	FDI as % of GDP
1	Belgium	442,255	91.4%
2	Singapore	203,336	74.0%
3	Ireland	92,851	44.1%
4	Estonia	6,897	31.6%
5	Uruguay	11,139	22.7%
6	Croatia	12,744	22.6%
7	Peru	42,283	21.5%
8	Israel	42,487	16.8%
9	Romania	26,458	15.6%
10	Australia	231,209	15.2%
11	Nigeria	38,942	14.8%
12	Czech Republic	28,429	14.5%
13	United Arab Emirates	39,968	14.5%
14	United Kingdom	329,419	13.5%
15	Spain	181,839	13.5%
16	Malaysia	39,957	13.2%
17	Russian Federation	261,034	13.0%
18	Brazil	251,445	11.2%
19	Canada	200,100	11.0%
20	Egypt, Arab Rep.	24,908	9.7%
21	Argentina	44,024	9.4%
22	India	165,654	9.0%
23	Austria	34,694	8.7%
24	Mexico	100,039	8.5%
25	France	185,670	7.1%
26	Netherlands	52,728	6.8%
27	China	563,111	6.7%
28	New Zealand	11,179	6.7%
29	United States	1,042,432	6.6%
30	Germany	143,499	4.2%
31	Denmark	9,769	3.1%
32	Italy	62,369	3.1%
33	Japan	35,090	0.6%
	Global Average		17.1%
	BRIC average		10.0%
	EU average		20.0%

Source: World Bank 2015

3.6 Singapore's Economic Performance

Despite having experienced swings in economic performance, the Singapore economy has achieved significant improvements in economic performance in 2014. 2014 third quarter economic performance was reported to be 2.8% compared to 2.1% of the third quarter

(MIT, 2014). The favourable changes in economic performance was attributed to significant improvements in business and service, insurance and finance sectors and an increase in oil trading activities. This saw the Singapore economy expanding to a growth rate of 2.9% in 2014 lower than the 2013 figure of 4.4% (MIT, 2014). However, this was also characterized by mixed performances within and between sectors. This growth pattern is expected to increase in 2016 and MAS (2015) forecasts showed that the economy is foreseen to grow within the range of 1-3%. However, issues such declining Chinese demand, a decline in investments opportunities from the G3 economies and destocking of inventory have been established to be posing serious risks on Singapore's economy.

Productivity remained constrained by limitations on the supply side of the economy and firms have embarked on initiatives to improve productivity. Supply side effects were further worsened by an increase in core inflation. Expectations are high that core inflation will increase in 2016 within the range of 0.5% to 1.5% (MAS, 2015). The increase in core inflation is as a result of shifts from disinflationary policies. External developments such as growth in the Eurozone and G3 economies and economic expansion in the US are expected to contribute to Singapore's foreseeable 2016 favourable expectations.

3.6.1 Overall Economy

The overall economy grew in 2014 as evidenced by an increase in GDP at current market prices of \$390 billion Singapore dollars from \$378.2 billion Singapore dollars coupled with an increase in per capita GNI from \$67 902 in 2013 to \$69 168 billion Singapore dollars. Year on year real GDP, however, fell from 4.4% in 2013 from to 2.9% in 2014 (MIT, 2014). In 2014, the Singapore economy was composed of 70.4% service-producing industries, 25% goods-producing industries, 18% manufacturing industries and 4.6% ownership of dwellings (MIT, 2014). Singapore Government Securities (SGS) 2015 contends that the sound economic performance was also enhanced by effective economic policies that have resulted in a favourable operating environment.

3.6.2 Monetary Indicators

3.6.2.1 Exchange Rate

There are four elements that characterize Singapore's exchange rate system. The first one is that Singapore's exchange rate system tracks an index of currencies based on the economy's competitors and trading partners. Thus, currency weights are assigned according to the level of trade dependence and importance and it changes in response to changes in trade.

The Monetary Authority of Singapore utilizes a managed float exchange regime. Thus, changes in the Singapore dollar are allowed to fluctuate within predetermined limits. Such limits are meant to account for short-term changes in exchange rates and allow the exchange rate to adjust to levels that accurately reflect market conditions.

The exchange rate limits are revised periodically so as to reflect changes in the economic environment. This will also accommodate financial market volatility and deal with the problem of currency misalignments. The period of review is usually after three months.

The above three elements have important bearings on domestic interest rates. This means that domestic interest rates will no longer be in control of MAS. Thus, investor expectations and foreign interest rates will be the main determinants of domestic interest rates. Estimates by MAS (2014) revealed that an appreciating trend has been witnessed to be the characteristic feature of the Singapore's exchange rate. Reports by MAS (2014) showed that Singapore's exchange rate recorded gains of 25% and 20% since 1991 against the Deutsche mark and the US dollar.

3.6.2.2 Money Supply

Money supply levels were high since the period 2011 to 2013 and this has led to increases in core inflation. Singapore's core inflation refers to inflation rates that do not consider road transport and accommodation costs. The effect of core inflation on domestic consumers were, however, minimal as they were countered by positive changes in economic performance. The MAS embarked on measures to ease the effects of inflation and this included a reduction in money supply. Such a disinflationary process was embarked on since the period 2011-2013. MAS, however, contends that such a

disinflationary policy will be put to a halt so as to promote more expenditure and activities that can spur economic growth upward.

3.7 Domestic Developments.

They were major domestic developments in the Singaporean economy notably increases in oil-related activities. The expansion in economic activity that was witnessed in the 3rd quarter of 2015 which saw GDP expanding by 1.9% was attributed to increases in oil-related activities. The manufacturing sector experienced negative changes in output declining by a margin of 17.3%. The fall in total industrial production was a result of declines in the transport engineering and electronic industries. Tourism, business and other services rebounded strongly on the economy and thus further resulting in an improvement in economic performance.

The Singaporean economy is also dependent on G3 activities and China's economic performance. Thus, improvements in G3 activities are expected to have positive effects on Singapore's industrial sector while a slump in the Chinese economy is expected to pose challenges on exports to China.

3.8 General Business Outlook

There are vast amounts of mixed sentiments that surround Singapore's business outlook with a significant number of firms expectant of positive achievements while others foreseeing unfavorable outcomes in the forthcoming period marking the end of 2015. In the services sector, retail and trade, food and beverages and the accommodation industry were among those expectant of positive achievements. On the other hand, transport and storage, wholesale trade and transport and real estate pessimistic about future achievements. Singstats (2015: 2) estimated that the retail and trade, food and beverages and the accommodation industry are to grow by 30%, 36% and 40% respectively by the end of December 2015. Singstats (2015: 2) further revealed that 22% of the net weighted balance of firm in the real estate industry were expressing negative sentiments about future opportunities in the period spanning from October 2015 to March 2016. This was

amid of fears of the Total Debt Servicing Ratio and Buyer's Stamp Duty that are expected to be imposed before the end of December 2015.

3.9 FDI Inflow Trends in Singapore

FDI inflows in Singapore have been increasing and this is because of a conducive operating environment coupled with favourable domestic policies. The level of FDI inflows has been surpassing FDI outflows. Singstats (2012) reports that the 2011 FDI inflow figure stood at SG\$672 billion surpassing FDI outflows which stood at SG\$449 billion. These figures are strongly believed to have surpassed the 2001 figures by 3 times more.

Major sources of FDI inflows in Singapore were from Europe and Asia which accounted for 62% of the total FDI inflows in Singapore with rates of 37.5 % and 39% of in 2001 and 2011 respectively (Singastats, 2012).

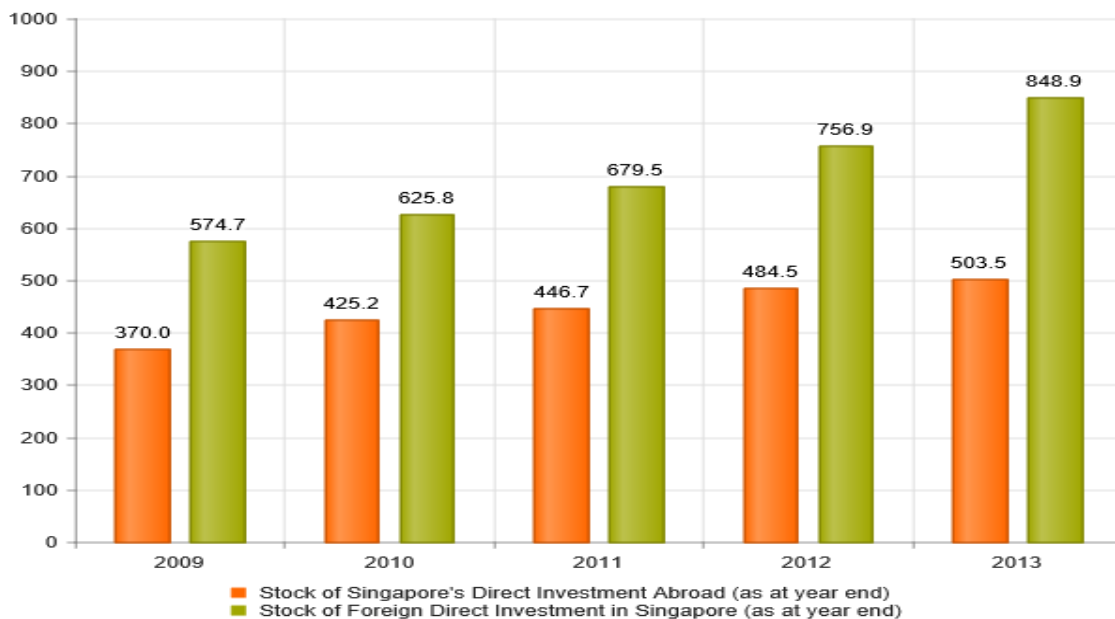


Fig 3.3: Singapore's FDI levels from the period 2009-2013 (Source: Singstats.gov.sg)

From the above figure, it can be noted that both FDI inflows and outflows have been on an upward trend since the year 2009. The rate at which FDI inflows and outflows were changing has been different with FDI inflows increasing at a higher rate compared to FDI

outflows. For instance, in the year, 2012 FDI inflows stood at SD\$756 billion while FDI outflows stood at SD\$484.5 billion. This was against 2013 figures of SD\$848.9 and SD\$503.5 respectively.

3.10 Singapore's Inward Investment Strategies

Inward FDI has significantly increased in Singapore and this is attributed to its investment policies that are been viewed as conducive for both foreign and domestic investors. According to Santander (2015), the upward trends in Singapore's inward FDI is attributed among others to political stability, tax incentives, affordable lending rate, simple regulatory framework, trade openness etc. These factors have made it swift for both domestic and foreign investors to conduct business in Singapore. This is reinforced by UNCTAD (2014) which asserts that Singapore ranks 5th in terms of FDI inflows in the world and 3rd among South Eastern and East Asian nations. Santander (2015) further established that Singapore's inward FDI surged high in 2013 by a margin of 27% to close at 81 billion United States dollars. Major players in Singapore's inward FDI improvements are Japan, United Kingdom, Netherlands and United States of America. These improvements are reinforced by the following table;

Table 3.2: Singapore's Foreign Direct Investment levels from the period 2012 to 2014

FOREIGN DIRECT INVESTMENT	2012	2013	2014
FDI inflow (million USD)	56 659	64 793	67 523
FDI Stock (million USD)	820 991	869 858	912 355
Number of Grenfield Investments	400	394	440
FDI Inwards (in % of GFCF)	73.1	81.1	86.4
FDI Stock (Inwards (in % of GFCF)	283.2	287.8	296.2

Source: UNCTAD 2014

From the table above it can be noted that FDI inflows have been increasing since the period 2012 with the highest figure of 67 523 being recorded in 2014. These figures have

been supported by increases in both FDI inward stocks and the number of Greenfield investments which stood at USD\$912 355 million and 440 in 2014. This is strong support of favourable investment policies to both domestic and international investors.

Table 3.3: Singapore's Foreign Direct Investment Inflows by Country

MAIN INVESTING COUNTRIES	2012 (IN %)
United States	11.6
Netherlands	10.0
United Kingdom	8.3
Japan	7.8
Switzerland	4.3

Source: Singstats (2014)

The United States has been the biggest investor in Singapore raking in a total of 11.6% of the total FDI inflows that were recorded in Singapore for the period of 2012. Second on the list was Netherlands with Switzerland at the bottom with percentages of 10% and 4.3% respectively. The following table shows main invested sectors in Singapore.

Table 3.4: Singapore's Main Invested Sectors

MAIN INVESTED SECTORS	2012 (IN %)
Financial and insurance services	43.1
Manufacturing	20.4
Wholesale and retail	17.6
Professional and technical, administrative and support services	5.9
Transport and storage	5.2
Real estate	4.1

Source: Singastats (2014)

The financial and insurance services sector dominated the list as being the most invested sector in Singapore and it accounted for 43.1% of the total 2012 FDI inflows. The manufacturing sector was second with 20.4% and the real estate sector amounting a total

of 4.1%. Such differences are as a result of incentives that are offered by the Singapore government to productive sectors of the economy. Such incentives include mergers and acquisitions schemes, development and expansion incentives. These incentives are explained in 3.6.1

3.11 Business and Investment Incentives in Singapore

The Singapore government has laid a significant number of incentives to both lure more business and promote the production of these businesses and those that are already in existence. These incentives are available for those that have growth strategies and are willing to expand operations beyond Singapore's borders. These incentives are;

The International and Regional Award: it is aimed at reducing the effect of corporate tax on operating income.

Land Intensification Allowance: This involves giving taxes allowances on expenditure spent towards renovations or construction of a company structure. These allowances are initially 25% and extend to 5% of capital expenditure (ODI, 1997).

Integrated Investment Allowance: This seeks to encourage domestic firms to invest abroad. As such it provides allowances to domestic firms that have spent funds on production equipment in other countries other than Singapore.

Mergers and Acquisitions Scheme: This scheme has the capacity to provide allowances of US\$5 million a year for funds spent on acquisition. This scheme aims at reducing acquisition expenditure by 25%.

Pioneer Incentive: Pioneer incentives are exemptions that are given to companies in the form of corporate tax. For one to qualify, the level of capital expenditure must be high enough to promote economic growth, improve skilled jobs, innovations and to the whole economy of Singapore (Trade, Chakra, 2008).

Development and Expansion Incentive: this is similar to the pioneer incentive, but the only difference is that the development and expansion incentive deducts a certain proportion of tax paid in the form of corporate tax.

Land Productivity Grants: These are grants that are given to individuals or corporations that are willing to embark in projects that can enhance and optimize available land.

Factors such as a strong good transport networks, sound financial structure and advanced telecommunications systems have greatly contributed to the increase in FDI inflows in Singapore. This is coupled by the fact that it is strategically located and close to external markets that are big in size and this has further strengthened its strategic advantages. However, are a lot of shortcomings have been identified to be surrounding the administration of investment incentives. Santander (2015) asserts that investment incentives are not being administered in a transparent manner and the fact that the Singaporean dollar has not been internationalized, still poses major challenges to investors. Of notable effect is that industrial firms are not being offered protection in the form of tariffs. The Singapore government, however, has embarked on efforts to improve business operations for both domestic and foreign owned companies. This has been significantly in the form of incentives. Despite all these incentives, the telecommunications, professional and financial services have remained under monopoly.

To further improve FDI inflows, Singapore has amassed numerous Bilateral Treaties and among the list is Bahrain (27 October 2003), Bangladesh (24 June 2004), Cote d'Ivoire (27 August 2014) etc (UNCTAD, 2014). These Bilateral Treaties are aimed at providing protection to corporations from events such as nationalization, war and expropriation and indigenization policies are not of effect in Singapore.

Table 3.5: Country Comparison for the Protection of Investors

Type of index	Singapore	East Asia & Pacific	United States	Germany
Index of Transaction Transparency	10.0	5.0	7.0	5.0
Index of Manger's responsibility	9.0	5.0	9.0	5.0
Index of Shareholders' power	9.0	6.0	9.0	5.0
Index of Investor Protection	9.3	5.4	8.3	5.0

From the above table, it can be noted that Singapore is ranked number one when compared against East Asia and Pacific, United States and Germany in terms investor protection. Singapore leads the list in both indexes followed by the United States and lastly Germany. Such rankings can be translated into low levels of operational risks and hence investors are more willing to invest in nations such as Singapore

3.12 Chapter Summary

Despite having experienced swings in economic performance, the Singapore economy has achieved significant improvements in economic performance. The favourable changes in economic performance were attributed to significant improvements in business and service, insurance and finance sectors and an increase in oil trading activities. This growth pattern is expected to increase in 2016 (Singstat, 2015). However, productivity remained constrained by limitations on the supply side of the economy and firms have embarked on initiatives to improve productivity. Moreover, expectations are high that core inflation will increase in 2016. Factors such as a strong good transport networks, sound financial structure and advanced telecommunications systems have greatly contributed to the increase in FDI inflows in Singapore. This is coupled by the fact that it is strategically located and close to external markets that are big in size and this has further strengthened its strategic advantages. Lastly favourable policies and incentives have both created a conducive and safe business environment and lured both domestic and international investors. Singapore's economy has thus grown because of sound investment policies. It can, therefore, be concluded that FDI is playing a significant role on economic growth in Singapore. This also follows a lot of initiatives such as incentives that are being given to business and investors in Singapore. The next chapter will now proceed to look at research methodology.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Vector Error Correction Model (VECM)

A VECM is a systematic method with the features that the variation of the contemporary state from its long-run association will be incorporated into its short-run dynamics. The chief element in error correction model estimation is that there must be cointegration between the variables (Gujarat, 2009). If there is no cointegration then VAR models are the next best alternative. The VECM is based on the following set of equations;

$$\Delta Y_t = \alpha_1 + P_1 e_1 + \sum_{i=0}^n \beta \Delta Y_{t-i} + \sum_{i=0}^n \delta \Delta X_{t-i} + \sum_{i=0}^n \beta \gamma Z_{t-i}$$

$$\Delta X_t = \alpha_2 + P_2 e_{t-1} + \sum_{i=0}^n \beta \Delta Y_{t-i} + \sum_{i=0}^n \delta \Delta X_{t-i} + \sum_{i=0}^n \beta \gamma Z_{t-i}$$

The above VECM can be used to determine the number of cointegrating vectors which are linearly independent of each other. Moreover, it can also be used to obtain the is termed the speed of correction which measures the rate at which the variables adjust to a long run equilibrium. The speed of adjustment is known as the error correction term and it is shown by EC_{t-1} . The proposed study model can be expressed as a functional form of the following nature;

$$GDP = F(GS, FDI, GFCF, TR) \dots \dots \dots (1)$$

where GDP is gross domestic product, GS is gross savings, FDI is foreign direct investment, GFCF is gross fixed capital formation and TR is trade. The variables were converted to natural logs so as to deal with heteroscedasticity. The above function can be changed into a VECM expression as shown in equation in 2.

$$\ln GDP_t = \beta_0 + \beta_1 \ln GS/GDP + \beta_2 \ln FDI/GDP + \beta_3 \ln GFCF/GDP + \beta_4 \ln TR/GDP + \mu_t. (2)$$

The study hypothesis for this research is that foreign direct investment has no significant effect on economic growth in Singapore. This is explained as follows:

- **H0:** Foreign direct investment has no significant impact on economic growth in Singapore.
- **H1:** Foreign direct investment has a significant impact on economic growth in Singapore.

A VECM model will thus be employed to test the above hypothesis..

4.2 Stationarity

Standard regression techniques, such as ordinary least squares (OLS), require that the variables be covariance stationary. A variable is covariance stationary if its mean and all its autocovariances are finite and do not change over time. Cointegration analysis provides a framework for estimation, inference, and interpretation when the variables are not covariance stationary. Instead of being covariance stationary, many economic time series appear to be “first-difference stationary (Dickey and Fuller, 1979). This means that the level of a time series is not stationary but its first difference is. First difference stationary processes are also known as integrated processes of order 1, or I(1) processes. Covariance-stationary processes are I(0). In general, a process whose d th difference is stationary is an integrated process of order d , or I(d). The canonical example of a first-difference stationary process is the random walk. This is a variable x_t that can be written as

$$X_t \text{ at level} \quad x_t \dots\dots\dots (1)$$

$$X \text{ at } 1^{\text{st}} \text{ difference} \quad x_t - x_{t-1} \dots\dots\dots (2)$$

$$X \text{ at } 2^{\text{nd}} \text{ differenc} \quad x_t - x_{t-2} \dots\dots\dots (3)$$

This study adopted the Augmented Dickey Fuller and the Phillips Perron tests to determine if the data has a unit root. The presence of a unit root is synonymously referred to as non-stationary. Non-stationary data leads to spurious regression results.

4.3 Granger Causality

The Granger causality test is an analytical foundation test for determining either one-time series is useful in projecting another. Ordinarily, regressions exhibit "mere" associations, but Clive Granger argued that causality in economics could be measured by estimating the capacity to forecast the likely values of a time series using prior values of another time series (Engle and Granger, 1987). Since the subject of "true causality" is deeply profound, and because of the post hoc ergo propter hoc fallacy of concluding that one thing preceding another can be used as a proof of causation, econometricians warrant that the Granger analysis detects only "predictive causality".

A time series X is said to Granger-cause Y if it can be explained, customarily by a group of F-tests and t-tests on lagged values of X (and with lagged values of Y also included), that those X values offer statistically vital knowledge about expected values of Y.

$$\Delta X_t = \sum_{i=1}^n \alpha_i \Delta Y_{t-i} + \sum_{j=1}^n \beta_j \Delta X_{t-j} + \dots \dots \dots (1)$$

$$\Delta Y_t = \sum_{i=1}^n \lambda_i \Delta Y_{t-i} + \sum_{j=1}^n \delta_j \Delta X_{t-j} + u_{2t} \dots \dots \dots (2)$$

Granger causality requires that there be no auto correlation between u_{1t} and u_{2t} . It is in this regard that this study will examine the bilateral causality that exists between economic growth and foreign direct investment. Causality from economic growth to foreign direct investment can be observed using the estimated lagged Y in equation (1). At this point it is said to be statistically different from zero ($\sum \alpha_i \neq 0$). Estimated coefficients on foreign direct investment denoted by equation (2) are said not to be statistically different from zero ($\sum \delta_j = 0$).

Bilateral causality implies that regression coefficients of X and Y be statistically different from zero. That is, ($\sum \alpha_i \neq 0$) and ($\sum \delta_j \neq 0$) and thus the null hypothesis that X does not granger cause Y and that Y does not granger cause X is accepted. Unilateral causality therefore exists when either one of the regression coefficient sets is not statistically different from zero.

4.4 Johansen Co-integration Tests

The Johansen co-integration test is a combination of the Maximum Eigenvalue test and the Trace test. The most distinguishing feature between the Maximum Eigenvalue test is that it subjects the null hypothesis of r co-integrating equations against the alternative of $r+1$ cointegrating equations Johansen, (1992). Computation of the Maximum Eigenvalue statistics under Johansen co-integration is derived from the following expression;

$$LR_{MAX} (r/n+1) = -T^* \text{Log}(1-\lambda) \dots \dots \dots (1)$$

In which the sample size is denoted by T and the Maximum Eigenvalue by λ . This expression implies that trace statistics subjects to testing the hypothesis of co-integrating equations (r) together with the alternative hypothesis of n co-integrating equations. Thus the number of variable sis denoted by n . The Trace statistic can be derived using the following expression.

$$LR_{TRACE} (r/n+1) = -T^* \sum_{l=r+1}^N \text{Log}(1-\lambda) \dots \dots \dots (2)$$

It must be noted that computation of the Johansen Co-integration test may yield different results and if such a case manifests then Trace statistic results are more preferable than Maximum Eigenvalue statistics.

4.5 Diagnostic Tests

The VECM will be subjected to Serial autocorrelation and validity tests. Serial autocorrelation is a condition which occurs when there is a relationship between the error terms. A positive relationship between the error terms is known as positive serial autocorrelation whilst a negative relationship is known as negative serial autocorrelation. Autocorrelation is associated with high standard errors and t-statistics. The results of the study can be affected by serial autocorrelation and it therefore of paramount importance to detect the presence of heteroskedastcity. A Breusch Godfrey Serial Autocorrelation will be used to test for serial autocorrelation . The validity of the VECM will be analysed using the significance of the error correction term and the F-statistic.

4.6 Definition and Analysis of Variables

The selection of model variables was based on those variables that can adequately explain the impact of FDI on economic growth and these variables are herein discussed in detail below;

4.6.1 Economic Growth (GDP-Dependent Variable)

Economic growth is defined as a change in national income over a period of one year. Thus economic growth usually entails percentages changes in the level of national income. In a study conducted by Ndikumana and Verick (2008) it was observed that there is a positive linkage between economic growth and foreign direct investment. This study will therefore expect a positive relationship between economic growth and foreign direct investment.

4.6.2 Independent Variables

4.6.2.1 Gross Savings (GS)

Economic policies usually contend that there must be a minimum rate of domestic savings available to propel an upward trend in economic growth. Rasmidatta (2011) found that savings have a positive effect on economic growth. This study will adopt the principle that savings cause an increase in economic growth.

4.6.2.2 Foreign Direct Investment (FDI)

The World Bank country indicators (n.d) defines FDI as investments that are made by non-resident investors into another country. Younus and Azeem (2014) in their study sought to examine the effect of FDI on economic growth and the results established that FDI has a positive impact on economic growth. Expected results from this study will therefore be in line with the results by Younus and Azeem (2014). The inclusive of FDI into the analysis is based on significant changes in FDI inflows that have been witnessed in Singapore.

4.6.2.3 Gross Fixed Capital Accumulation (GFCF)

In this study, a definition derived from World Bank country indicators which asserts GFCF to be measurement in net changes in physical assets. The importance of GFCF stems from its ability to enhance the productive capacity of the economy. Sarel (1996) asserts that there are substantial benefits that can be obtained from increases in GFCF.

Thus it can be deduced that GFCF is positively related to economic performance this is because the volume and nature of net assets procured or invested into would have increased. This is traced into increases in capital labour ratio. Expected results of the impact of GFCF on GDP are thus in line with the study results obtained by Sarel (1996).

4.6.2.4 Trade (TR)

Buse and Koniger (2012) defined trade as the volume of exports and imports as a shared of lagged GDP. The study by Busee and Koniger (2012) found a highly and significant effect of trade on economic growth. This study will therefore expect similar results. Table 4.1 provides an outline of expected results from the actual results obtained. A negative relationship was however observed between GFCF and GDP and implications drawn pointed to the effects on depreciation and inflation. Notable effects were strongly attributed to high inflation which undermines government's ability to procure, maintain and improve existing fixed capital formations and hence this hampers increases in GDP

Table 4.1: Expected and Actual Results

Variable	Expected results	Actual results
GS	(+)	(+)
FDI	(+)	(+)
TR	(+)	(+)
GFCCF	(+)	(-)

4.7 Data Types and Sources

Secondary time series data spanning from the 1980 to 2014 will be used to estimate the VECM. The data was retrieved from the World Bank country indicator statistics database.

4.8 Chapter Summary

This chapter has outlined the basic methodological structure that will be used to analyse the impact of foreign direct investment on economic growth in Singapore. This will be conducted using stationarity, co-intergration and VECM techniques. Heteroskedasticity and the F-statistics will be used to determine the validity of the used model.

CHAPTER FIVE

DATA ANALYSIS AND PRESENTATION

5.1 Stationarity Tests Results

The model variables were subjected to the Augmented Dickey-Fuller Test and the Phillips Perron test to determine if they contain a unit root. The results are presented in table 5.1.

Table 5.1 Fisher-ADF Test

Fisher-ADF Test @ level						
Variables	Intercept no Trend			Intercept and Trend		
	Critical	Test	Prob*	Critical	Test	Prob*
	Value	Statistic		Value	Statistic	
GDP	-3.639407	3.076665	1.0000	-4.252879	-0.583348	0.9737
GS	-3.639407	-2.085105	0.2516	-4.252879	-2.250086	0.4483
FDI	-3.639407	-2.191025	0.2130	-4.252879	-2.373432	0.3859
TR	-3.639407	-1.925597	0.3171	-4.252879	-2.252288	0.4472
GFCF	-3.639407	-3.345149	0.0205	-4.252879	-3.317639	0.0805
Fisher-ADF Test @ 1 st Difference						
Variable	Intercept no Trend			Intercept and Trend		
	Critical	Test	Prob*	Critical	Test	Prob*
	Value	Statistic		Value	Statistic	
GDP	-3.646342	-4.063936	0.0035*	-4.262735	-5.161307	0.0010*
GS	-3.646342	-4.729302	0.0006*	-4.262735	-4.651926	0.0038*
FDI	-3.646342	-5.837444	0.0000*	-4.262735	-5.809262	0.0002*
TR	-3.646342	-5.386752	0.0001*	-4.262735	-5.291558	0.0007*
GFCF	-3.653730	-5.096630	0.0002*	-4.273277	-5.034092	0.0015*
*, ** Rejection of null hypothesis of unit root at 1% level of significance.						

Source: Computed by Author (E-Views 8.0 iterations Results) Test of Stationarity

From table 5.1 it is evidenced that the all the variables become stationary when first differenced using the ADF stationarity test. The null hypothesis of a unit root for all the variables is accepted at 5% using the ADF at levels but rejected at rejected at 1% when first differenced. Similar results were observed when the variables were subjected to the Phillips Perron stationarity test. The results are shown in table 5.2.

Table 5.2 Phillips Perron Stationarity Tests Results

Phillips Perron @ Level test						
Variables	Intercept no Trend			Intercept and Trend		
	Critical	Test	Prob*	Critical	Test	Prob*
	Value	Statistic		Value	Statistic	
GDP	-3.639407	3.076665	1.0000	-4.252879	-0.626716	0.9707
GS	-3.639407	-2.285212	0.1823	-4.252879	-2.498770	0.3267
FDI	-3.639407	-2.311092	0.1744	-4.252879	-2.458803	0.3451
TR	-3.639407	-1.968746	0.2985	-4.252879	-2.425207	0.3609
GFCF	-3.639407	-3.056299	0.0397	-4.252879	-3.072280	0.1289
Phillips Perron Test @ 1st Difference						
Variable	Intercept no Trend			Intercept and Trend		
	Critical	Test	Prob*	Critical	Test	Prob*
	Value	Statistic		Value	Statistic	
GDP	-3.646342	-4.080925	0.0033*	-4.262735	-5.161307	0.0010*
GS	-3.646342	-4.723728	0.0006*	-4.262735	-4.646267	0.0039*
FDI	-3.646342	-6.006018	0.0000*	-4.262735	-6.242253	0.0001*
TR	-3.646342	-5.358495	0.0001*	-4.262735	-5.252431	0.0008*
GFCF	-3.646342	-9.883488	0.0000*	-4.262735	-9.603597	0.0000*
*, ** Rejection of null hypothesis of unit root at 1% level of significance.						

Source: Computed by Author (E-Views 8.0 iterations Results) Test of Stationarity

All the variables GDP, GS, FDI, TR and GFCF are said to be stationary at 1st difference as evidenced by both the Augmented Dickey-Fuller Test and the Phillips Perron tests. Thus the condition for co-integration is said to be satisfied.

5.2 Lag Selection

It is of paramount importance that the optimum number of lags be determined prior to the estimation of the Vector Error Correction Model. The VAR Lag Order Selection was used to determine the number of lags to be used for running Johansen Cointegration test. The results are presented below in table 5.3.

Table 5.3 VAR Lag Selection Criteria

Lag	Sequential Modified LR	Final Prediction Error	Akaike Information Criterion	Schwarz Information Criterion	Hanna-Quin Information Criterion
0	NA	1.44e-06	0.738871	0.965614	0.815163
1	229.2745*	1.37e-09*	-6.237626*	-4.877164*	-5.779872*
2	24.66874	2.28e-09	-5.843781	-3.349602	-5.004565

Source: Computed by Author (E-Views 8.0 iterations Results) VAR Lag selection Criteria

Using the obtained results exhibited in table 5.3, it can be noted that both the Final Prediction Error, Akaike Information and the Criterion Hanna-Quin Information Criterion have prescribed the utilization of 1 lag. Thus the optimum number of lags to be used in both the Johansen Cointegration test and the Vector Error Correction Model is 1. Since the number of lags has been determined, we can now proceed to look at the Johansen Cointegration test.

5.3 Johansen Co-integration Test Results

The most essential pre-requirement of the Johansen Cointegration is that the variables must be non-stationary at level but when converted to first difference become stationary, this entails that the variables must be integrated of the same order. Cointegration analysis provides a framework for estimation, inference, and interpretation when the variables are not covariance stationary. Instead of being covariance stationary, many economic time series appear to be “first-difference stationary”. This means that the level of a time series is not stationary but its first difference is. First difference stationary processes are also known as integrated processes of order 1, or I(1) processes. Covariance-stationary processes are I(0).

The main thrust behind the Johansen Cointegration test is to determine if a long equilibrium association exist between the variables. Computed Eigenvalue and Trace

Statistics can be used to determine the number of cointegrating equations. The Johansen Cointegration test proposes the null hypothesis that there are no cointegrating equations at 5% significance level. The decision criteria is to accept the null hypothesis of no cointegrating equations when the obtained probability is greater than 5%. The obtained results are presented in table 5.4

Table 5.4 Johansen Co-integration Test

Unrestricted Co-intergration Rank Test (Maximum Eigenvalue)			
Hypothesized	Max-Eigenvalue	Sig. Level: 0.05	
No, of CE(s)	Statistic	Critical Value	Prob**
None	39.56503	33.87687	0.0094
At most 1	18.36890	27.58434	0.4647
At most 2	17.16923	21.13162	0.1642
At most 3	8.913416	14.26460	0.2934
At most 4	2.854695	3.841466	0.0911
Max-eigenvalue indicates 1 cointegrating eqn(s) at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			
Unrestricted Co-intergration Rank Test (Trace Test)			
Hypothesized	Trace	Sig. Level: 0.05	
No, of CE(s)	Statistic	Critical Value	Prob**
None*	86.87128	69.81889	0.0012
At most 1	47.30624	47.85613	0.0563
At most 2	28.93734	29.79707	0.0626
At most 3	11.76811	15.49471	0.1684
At most 4	2.854695	3.841466	0.0911
Trace test indicates 1 cointegration at the 0.05 level			
* denotes rejection of the hypothesis at the 0.05 level			

Source: Computed by Author (E-Views 8.0 iterations Results) Johansen Cointegration test

Using the Maximum Eigenvalue statistic, it can be seen that there no cointegration but the Trace method indicates the presence of cointegration. Thus Trace statistic results will be used to estimate a VECM of the impact of FDI on economic growth in Singapore. The main emphasis is to determine if there is a long run or short run association between the dependent variable and the independent variables.

5.4 Vector Error Correction Model (VECM) Results

The VECM was estimated using 1 lag and cointegrated at 1 equation. The results show that there is no long run causality that runs from GS, FDI, TR and GFCF. The presence of a long run VECM relationship requires that a negative error correction term be obtained and must be significant. Results presented in table 5.5 do reveal that the error correction term is insignificant and positive. This implies that there is no long run relationship GDP that runs from FDI, GS, TR and GFCF.

Table 5.5 Long Run Vector Error Correction (VECM) Results

Variables	Coefficient	Standard error	T-statistics
LGS(-1)	-0.873440	3.68514	0.23702
LFDI(-1)	-1.047538	1.09695	0.95496
LTR(-1)	-3.669705	2.58740	1.41830
LGFCF(-1)	2.8122287	0.35520	-7.91755
C	46.23043	-	-

Source: Computed by Author (E-Views 8.0 iterations Results)

By utilizing the above estimated results the following cointegrating equation can be established;

$$\mathbf{LGDP} = 46.23043 - 0.873440\mathbf{LGS} - 1.047538\mathbf{LFDI} - 3.669705\mathbf{LTR} + 2.812287\mathbf{LGFCF}$$

The error correction term of 0.000269 signifies that the speed of adjustment is 0.03%. Alternatively, it is the speed at which the variables will adjust into a long run equilibrium.

The results presented in table 5.5 exhibit that there is a negative association that exist between GDP and GS of 0.8734. This means that a 1 unit increase in gross savings results in positive increase in GDP by 0.8734 units. This result contradicts the study results obtained by Rasmidatta (2011) which have shown strong evidence that domestic savings have a strong tendency to propel an upward trend in economic growth. Possible reasons suggest that there a decrease in national income since gross savings tend to move parallel with changes in income. Further reasons can point to the idea that savings are being put to unproductive uses or are mainly being put for more consumption purposes rather than productive purposes. Alternatively, increases in investments from savings can be said not be generating employment and causing a further increase in output.

The results also exhibit that there is a negative linkage that exist between GDP and FDI of 1.0476. This translates to an decrease in GDP by 1.0476 units following an increase in FDI by 1 unit. Possible reasons can be pointed to the fact that foreign direct investment inflow policies are are not conducive for economic growth.

Moreover, FDI inflows can be said that they are not being accompanied by new technology and hence there might be little or no improvements in efficiency and effectiveness in production. Thus there might be no mechanisms and incentives that can lower costs of production and result in mass production so that more resources can be expended to the production of other goods. This propels a downward movement in GDP and this contradicts study results established by Younus and Azeem (2014) which established that there is a bilateral association between FDI and GDP.

It can also be noted that there is a negative relationship that exist between trade and GDP of 3.67. Buse and Koniger (2012) postulated that there is a unilateral association between trade and GDP and this contradicts the obtained results. Possible reasons suggest that an increase in trade is being associated with a negative trade balance which is squeezing foreign currency inflows. It can be noted that foreign currency inflows heightens an economy's purchasing ability to acquire goods, services and advanced technology which is needed and essential for the development of the domestic economy. A negative trade

balance therefore constricts that capacity to acquire more goods, services and advanced technology that is needed to promote economic growth.

The results have shown that there is a positive relationship that exists between GDP and GFCF and are in disagreement with findings by (Sarel, 1996). This can be attributed to the fact that GFCF is being put to productive purposes that add to the economic performance of the nation. Thus an increase in GFCF increases the amount of net physical assets that are available for productive uses.

5.4.1 Short Run VECM Results

Short run VECM results were estimated to determine short run influences of the variables. Using results presented in table 5.6, it can be noted that an ECt of 0.000269 was obtained signifying that the speed of adjustment is 0.027%. An ECt measures the speed at which the variables return to long run equilibrium. Thus the obtained ECt can be said to be very low and implications point to the fact that it will take time for economic policies such as monetary and fiscal policies to bring the economy into long run equilibrium. Alternatively, it can be said that 0.027% of the disequilibrium is rectified within 1 year. Durbin Watson statistic of 2.16 was obtained and when compared with the standard rule of thumb which requires that the value lies between 1.5-2.5 to signify the absence of serial correlation. Hence it can be deduced that there is no serial correlation. This can be supported by the Breusch-Godfrey Serial Correlation LM Test results shown (see table 5.7).

Table 5.6 Short Run VECM Results

Independent Variables (Lagged Variables)	Coefficient	Standard Error	T-Statistics
ECM _{t-1}	0.000269	0.00623	0.04311
R ²	0.236978	F-Statistics (Prob.)	0.273117
DW	2.164449	S.E of regression	0.055167
Δ LGDP _t (-1)	0.108812	0.27269	0.39904
Δ LGS _t (-1)	0.077393	0.16712	0.46311
Δ LFDI _t (-1)	0.005208	0.03909	0.13322
Δ LTR _t (-1)	-0.197410	0.14189	-1.39129
Δ LGFCF _t (-1)	0.023101	0.01334	1.73139**
Constant	0.070155	0.02448	2.86546*

*, ** Significant at 1% and 10% level of significance

In the short run, inherent changes in GDP are positive and significant at lag 1 with a coefficient of 0.1088. This entails that issues such as previous GDP rates had positive implications on Singapore's future GDP rates. Changes in gross savings can also be observed to be inflicting positive influences on GDP of 0.077 units in the short run. Further positive effects on GDP can be observed to be emanating from FDI with a magnitude of 0.0052. It can thus be deduced that foreign direct inflows are resulting in positive changes in GDP in the short run. This same notion can be deduced between GFCF and GDP with a positive but significant coefficient of 0.023. However TR can have insignificant negative effects on GDP of 0.197. It can thus be deduced that negative changes in GDP in the short are emanating from trade.

5.5 Diagnostics Tests

It is of significant importance that the validity of the model be determined so that the obtained results can be a laid foundation upon which policy initiatives and

recommendations can be based. Diagnostics tests were applied to the ECt model derived from the VECM in which the ECt model strives to ascertain the significance of the ECt. In this regard, a p-value which is less than 5% implies that the ECt is significant in the long run. The following were used to determine the validity of the model;

5.5.1 Heteroskedasticity Test

Heteroscedasticity test was conducted using the Breusch-Pagan-Godfrey Heteroskedasticity Test based on an equation estimation of the ECt. Such a model estimation seeks to determine the probability of the ECt and that of the other variables at first difference. The null hypothesis is that there is no heteroskedasticity that is, the variance of the dependent variable is homoskedstic. Heteroskedasticity tends to under estimate variance of the estimators causing high F and t statistics values. Table 5.6 shows evidence of the absence of heteroskedasticity. The study results revealed that the probability of the Chi-square value is 0.7673 and thus the null hypothesis of no heteroskedasticity is accepted at 5%. It can therefore be concluded that there is heteroskedasticity. The results are presented in table 5.6.

Table 5.7 Heteroskedasticity Results

F-statistic	0.873288	Prob. F(10,22)	0.5702
Obs*R-squared	9.377091	Prob. Chi-Square(10)	0.4967
Scaled explained SS	6.548555	Prob. Chi-Square(10)	0.7673

Source: Computed by Author (E-Views 8.0 iterations Results)

5.5.2 Serial Correlation Test

Serial correlation test was conducted using the Breusch-Godfrey Serial correlation LM test. The null hypothesis is that there is no autocorrelation. Autocorrelation occurs when the error terms are correlated. Alternatively the presence of autocorrelation signifies that the errors terms are independently distributed. Using results obtained and shown in table 5.7, it can be observed that the obtained Chi-square value is 0.1686 which is more than 5% and thus we accept the null hypothesis of no autocorrelation.

Table 5.8 Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.451358	Prob. F(2,24)	0.2541
Obs*R-squared	3.560593	Prob. Chi-Square(2)	0.1686

5.5.3 Model Stability Tests

Model stability tests were conducted using the Cusum test. The Cusum test tests the data for stability to determine if the model can be used for policy related issues. Thus a model is considered stable if it satisfies stability tests in terms of the residuals and the squares. Cusum test results exhibit that the model is stable and hence our estimated model can be said to be stable and usable for policy making (see appendix 6 and 7).

5.6 Granger Causality- Exogeneity Block Test

Table 5.9 Granger Causality Test- Exogeneity Block Test

Dependent variable	$\Delta LGDP$	ΔLGS	$\Delta LFDI$	ΔLTR	$\Delta LGFCF$	ECt
$\Delta LGDP$	-	0.2145 (0.6433)	0.0177 (0.8940)	1.9357 (0.1641)	2.9977 (0.0834)	0.000269 (0.9659)
ΔLGS	0.5714 (0.4497)	-	0.5319 (0.4658)	0.1671 (0.6827)	0.0001 (0.9891)	-0.0026 (0.7494)
$\Delta LFDI$	0.2672 (0.6052)	1.1417 (0.2340)	-	1.4111 (0.2349)	0.0066 0.9353	-0.01126 (0.7427)
ΔLTR	3.1168 (0.0775)	0.1511 (0.6975)	1.0716 (0.3006)	-	0.2933 (0.5881)	-0.0187 (0.0347)**
$\Delta LGFCF$	0.7996 (0.3712)	2.6292 (0.1049)	0.4272 (0.5134)	0.7595 (0.3835)	-	0.2827 (0.0018)*

Exogeneity Block test was conducted to establish if there is causality between the variables in the long run. The results are presented in table 5.8. All the obtained Chi Square probability results are more than 5% and thus the hypothesis that there is no causality

between the variables in the long run is accepted at 5%. Therefore all the variables do not granger cause each other in the long run. Significant error correction terms are related trade and GFCF at 5% and 1% respectively while the error correction terms become insignificant when GDP, GS and FDI are endogenously explained.

All the obtained Chi Square probability results are more than 5% and thus the hypothesis that there is no causality between the variables in the long run is accepted at 5%. Therefore all the variables do not granger cause each other in the long run

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The study was motivated by the growing levels of foreign direct investment inflows in Singapore. The economic response in terms of growth in gross domestic product have been insignificant despite the increase in policy initiatives by the Singapore government to lure both domestic and foreign direct investment. The resultant effects of foreign direct investment have been subjected to questions with most studies showing that foreign direct investment can fail to yield intended results especially when there is no corresponding increases in output and employment. In this regard, other studies have strongly advocated that in the short run there is no relationship between growth and foreign direct investment and that in the long run foreign direct investment causes an increase in economic growth. No consensus has been established on empirical grounds. Thus this study sought to establish the impacts of foreign direct investment of economic growth.

Vector error correction model results showed strong evidence of the absence of a long run relationship or causality that runs from gross savings, foreign direct investment, trade and gross fixed capital formation. It was observed that the variables in question do not granger cause each other in the long run. However negative associations between GDP and; GS, FDI and TR were observed though GFCF was found to be positively related to economic growth. Therefore conclusions will therefore be made based on these obtained results.

6.2 Conclusion

It can thus be concluded that foreign direct investment has positive effects on economic growth in the short run. Economic variable such as GS and GFCF have positive implications on economic growth in the short run. However, probable negative effects

can be foreseen in the long run and this is being attributed to inconsistent and poor foreign direct policies. For foreign direct investment to yield substantial positive changes in economic growth, there must be well formulated and strategic policies that will involve positive changes in gross fixed capital accumulation, market capitalization and reduce the impact of tax on investments. Economic variable such as GS and GFCF have positive implications on economic growth in the short run and this has been established to being caused by improvements in the capital labour ratio. Probable negative effects between GDP and GFCF can be foreseen in the long run and this is being attributed to the idea that capital formation is not productive or not being strategically designed to support productive sectors of Singapore's economy. Changes in net trade can be concluded to be posing negative effects on economic growth in the short run and this is being caused by low export proceeds or an increase in low value exports. Inflation can be concluded to be a major factor that undermines the positive effects of net exports on economic growth. In overall, it can thus be concluded that there is a unilateral relationship between economic growth and foreign direct investment in Singapore.

6.3 Recommendations

There is need to ensure that FDI inflow policies do not affect economic growth policies and efforts must be made to ensure that FDI inflows are directed to strategic sectors of the economy. Incentives or schemes can be given to foreign investors so that they can be encouraged to invest in productive sectors of the economy.

Economic policies must promote domestic savings. Gross savings is an important source of investment funds. Improvements and diversification of the financial system can help mobilize savings. This can be coupled by effective monetary and fiscal policies stock market can significantly result in huge increases in market capitalization. Such savings must be however be made available to those in productive need of funds so that a positive effect on employment and capital structure.

Government policies must promote investment in gross fixed capital accumulation. This is because there is a positive association that exists between gross fixed capital

accumulation and investment and growth. High gross fixed capital accumulation increases the economy's potential to produce more output in the long run.

Trade policies must be designed to promote trade between Singapore and other economies. Such policies can involve tax reduction on industries that into foreign trade or in the form of subsidies. This can also be enhanced by engaging in bilateral and multilateral trade agreements with other economies however deregulation of trade of productive goods that improve the economic performance of Singapore and foreign currency inflow can also be used as an initiative. Trade policies must be designed to promote increases in exports so as to obtain the much needed foreign currency that can spur economic growth.

6.4 Suggestions for Future Research

The study has significantly provided the much need understanding of the impact of foreign direct investment on economic growth. Other studies can however employ different factors in the model so as to extend the analysis to other sectors.

REFERENCES

- Abel, A. B., Bernake, B. and Croushore, D. (2005). *Macroeconomics*, Student Value Edition, 8th Edition, Prentice Hall.
- Agrawal, P., Gokarn, S., Mishra, V., Parikh, K., & Sen, K. (2001). Policy Regimes and Industrial Competitiveness. *IGIDR and ISEAS*.
- Aitken, B., Harrison, A., & Lipsey, R. E. (1996). Wages and foreign ownership A comparative study of Mexico, Venezuela, and the United States. *Journal of international Economics*, 40(3), 345-371.
- Alam, M. S. (2000). FDI and Economic Growth of India and Bangladesh: A comparative study. *Indian Journal of Economics*, 80(316 Part I), 1-15.
- Arestis, P., & Sawyer, M. (2005). *Another Look into the Phillips Curve*. mimeo.
- Aslanoglou, E. (2002). *The Structure and Impact of Foreign Direct Investment in Turkey*. *Journal of Economics*, 17(1), 31-50.
- Athukorala, P. P. A. W. (2003, November). The impact of foreign direct investment for economic growth: a case study in Sri Lanka. In *9th International Conference on Sri Lanka Studies, Full Paper* (No. 092).
- Banga, R. (2005). Impact of liberalisation on wages and employment in Indian manufacturing industries. *Indian Council for Research on International Economic Relations*.

Barrell, R., & Pain, N. (1999). Domestic institutions, agglomerations and foreign direct investment in Europe. *European Economic Review*, 43(4), 925-934.

Bhattarai, K., & Ghatak, S. (2010). *FDI, investment and growth in OECD countries*. School of Economics, Kingston University.

Blomstrom, M., Lipsey, R. E., & Zejan, M. (1994). What explains the growth of developing countries?. *Convergence of productivity: Cross-national studies and historical evidence*, 243-59.

Bosworth, B. (2014). Interest Rates and Economic Growth: Are They Related?. *Center for Retirement Research at Boston College Working Paper*, (2014-8).

Braunerhjelm, P., & Svensson, R. (1996). Host country characteristics and agglomeration in foreign direct investment. *Applied Economics*, 28(7), 833-840.

Busse, M., & Königer, J. (2012). Trade and economic growth: A re-examination of the empirical evidence. *Available at SSRN 2009939*.

Campos, N. F., & Kinoshita, Y. (2002). Foreign direct investment as technology transferred: Some panel evidence from the transition economies. *The Manchester School*, 70(3), 398-419.

Chakrabarti (2001) the determinants of foreign direct investment: sensitivity analysis of cross sectional regressions. *Kyklos* 54, (1), pg 89-114.

Chenery, H. B., & Strout, A. M. (1966). Foreign assistance and economic development. *The American Economic Review*, 56(4), 679-733.

Culem (1988) the locational determinants of FDI among industrialized countries. *European economic review*, 32, pg 885 -904.

De Prato, G., & Simon, J. P. (2013). Singapore, an Industrial Cluster and a Global IT Hub. *Communications & Strategies*, (89), 125.

Denisia, V. (2010). Foreign direct investment theories: An overview of the main FDI theories. *European Journal of Interdisciplinary Studies*, (3).

Dickey, David A., Wayne A. Fuller, “Distribution of the Estimators for Autoregressive Time Series with a Unit Root”. *Journal of the American Statistical Association*, Vol. 74, 1979, pp. 427–431.

Engle, Robert F., Clive W. Granger, (1987). “Cointegration and Error Correction: Representation, Estimation and Testing”. *Econometrica*, Vol. 55, pp. 251–276.

Gujarati, D. N. (2009). *Basic econometrics*. Tata McGraw-Hill Education.

Johansen, S. (1991) Estimation and Hypothesis Testing of Co-Integration Vectors in Gaussian Vector Autoregressive Models, *Econometrica* 59, 1551–1580.

Jordaan, J. C (2004) foreign direct investment and neighboring influences. Thesis University of Pretoria.

Kabir, R. (2007). *Foreign direct investment and sustainable growth: A case study on Bangladesh* (Doctoral dissertation, Emory University).

Lim, D. (2008). Foreign Direct investment and incentives. The journal of development studies[online]. Available at: www.investkorea.org/ikwork/iko/eng/com/fileDown.jsp?...=/ [accessed 20 December 2015].

Mbate, M. (2013). Domestic debt, private sector credit and economic growth in Sub-Saharan Africa. *African Development Review*, 25(4), 434-446.

Modalsli, J. H. (2008). *Economic Growth and Development*. Department of Economics, Oslo University.

Mody, N. and Wang, S. (1997). *The Impact of Foreign Direct Investment on Economic Growth: A Case Study of China*. Journal of International Economics, Vol. 6, No. 3, pp126-144.

Ndikumana, L., & Verick, S. (2008). The linkages between FDI and domestic investment: Unravelling the developmental impact of foreign investment in Sub-Saharan Africa. *Development Policy Review*, 26(6), 713-726.

Younus, S., Ishfaq, K., Usman, M., & Azeem, M. (2014). Capital Structure and Financial Performance: Evidence from Sugar Industry in Karachi Stock Exchange

Pakistan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4(4), 272-279.

Moudatsou, A. (2001). *Foreign Direct Investment and Economic Growth: Evidence from 14 European Union Countries*. www.cs.teiher.gr/school/sdo/ep_log_en.html.

Pavelescu, F. M. (2008). Gross Capital Formation and Economic Growth During Early 2000's in EU Member and Candidates States. *Romania*, 11(12.17), 0-48.

Ram, R., & Zhang, K. H. (2002). Foreign Direct Investment and Economic Growth: Evidence from Cross-Country Data for the 1990s*. *Economic Development and Cultural Change*, 51(1), 205-215.

Rasmidatta, P. (2011). The Relationship Between Domestic Saving and Economic Growth and Convergence Hypothesis: Case Study of Thailand.

Ray, S. (2012). Impact of foreign direct investment on economic growth in India: A co integration analysis. *Advances in Information Technology and Management*, 2(1), 187-201.

Resmini, L. (2000). The determinants of foreign direct investment in the CEECs: new evidence from sectoral patterns. *Economics of transition*, 8(3), 665-689.

Root, F. R., & Ahmed, A. A. (1979). Empirical determinants of manufacturing direct foreign investment in developing countries. *Economic Development and Cultural Change*, 751-767.

Rosenstein-Rodan, P. N. (1961). International aid for underdeveloped countries. *The Review of Economics and Statistics*, 107-138.

Sahoo, D., & Mathiyazhagan, M. K. (2003). Economic growth in India: " Does Foreign Direct Investment inflow matter?". *The Singapore Economic Review*, 48(02), 151-171.

Sarel, M. (1996). Growth in East Asia: What we can and what we cannot infer (Vol. 1). International Monetary Fund.

Schneider, F., & Frey, B. S. (1985). Economic and political determinants of foreign direct investment. *World development*, 13(2), 161-175.

Ball, L., & Mankiw, N. G. (1992). *Asymmetric price adjustment and economic fluctuations* (No. w4089). National Bureau of Economic Research.

Barro, R. J., & McCleary, R. (2003). *Religion and economic growth* (No. w9682). National Bureau of Economic Research.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford economic papers*, 51(1), 133-151.

Dunning, J. H. (1973). The determinants of international production. *Oxford economic papers*, 25(3), 289-336.

Hartman, D. G. (1985). Tax policy and foreign direct investment. *Journal of Public economics*, 26(1), 107-121.

Kaplan, C., Ozmen, E., & Yalcin, C. (2006). *The Determinants and Implications of Financial Asset Holdings of Non-Financial Firms in Turkey: An Empirical Investigation* (No. 0606).

Lim, M. E. G. (2001). *Determinants of, and the relation between, foreign direct investment and growth: a summary of the recent literature* (No. 1-175). International Monetary Fund.

Oyinlola, O. (1995). External capital and economic development in Nigeria (1970–1991). *The Nigerian Journal of Economic and Social Studies*, 37(2&3), 205-22.

Saunders, H. D. (1992). The Khazzoom-Brookes postulate and neoclassical growth. *The Energy Journal*, 131-148.

Sun, H. (1998). Macroeconomic impact of direct foreign investment in China: 1979–96. *The World Economy*, 21(5), 675-694.

Tsai, P. (1994) Determinants of foreign direct investment and its impact on economic growth. *Journal of Economic Development*, 19(1), pg 137-163.

Tvaronavičius, V., & Tvaronavičiene, M. (2008). Role of fixed investments in economic growth of country: Lithuania in European context. *Journal of Business Economics and Management*, 9(1), 57-64.

Utomi, W. (2014). *The Impact of External debt on Economic Growth in Nigeria* (Doctoral dissertation, Covenant University).

Wei, S. J. (2000). How taxing is corruption on international investors?. *Review of economics and statistics*, 82(1), 1-11.

Wheeler, D., & Mody, A. (1992). International investment location decisions: The case of US firms. *Journal of international economics*, 33(1), 57-76.

Zhang, K. H. (2006). Foreign direct investment and economic growth in China: A panel data study for 1992-2004. In *Conference of WTO, China and Asian Economies*.

Internet sources

Foo, R. (2015) *Singapore businesses and hedging against political risk* – [online]. Available at: <http://sbr.com.sg/economy/commentary/singapore-businesses-and-hedging-against-political-risk#sthash.TAMXVa25.dpuf> [accessed 20 December 2015].

Monetary Authority Singapore , MAS. (2014). October 2014 Monetary Policy Statement. Accessed from <http://www.mas.gov.sg/News-and-Publications/Speeches-and-Monetary-Policy-Statements/Monetary-Policy-Statements/2014/Monetary-Policy-Statement-14-Oct-14.aspx> on 17 November 2015.

News UHY (2014) Belgium, Singapore and Ireland's tax regimes attract world-beating levels of FDI [online]. Available at: <http://www.uhyincroatia.com/en/uhy-rudan/news/belgium-singapore-and-irelands-tax-regimes-attract-world-beating-levels-of-fdi/> [accessed 20 December 2015].

ODI (1997) foreign direct investments flows to low income countries: a review of evidence. [online]. Available at: <http://odi.org.uk/publications/briefing/3>.

Santander (2015). 2015 Statistics. Accessed from <http://www.singstat.gov.sg/> on 17 November 2015.

Singapore Economic Development Borad (n.d). Future Ready Singapore. Accessed from <https://www.edb.gov.sg/content/edb/en.html> on 17 November 2015.

Singstats (2012). Economic Forecasts. Accessed from <http://www.singstat.gov.sg/> on 17 November 2015.

Singstats (2014). 2014 Statistics. Accessed from <http://www.singstat.gov.sg/> on 17 November 2015.

Trade Chakra (2008) Singapore Trade and Commerce [online]. Available at: <http://www.tradechakra.com/economy/singapore/singapore-trade-and-commerce-133.php> [accessed 20 December 2015].

U.S Department of state (2014) U.S. Relations with Singapore. [Online]. Available at: <http://www.state.gov/r/pa/ei/bgn/2798.htm> [accessed 20 December 2015].

UNCTAD (2014). World Investment Report 2014. Accessed from <http://unctad.org/en/pages/PublicationWebflyer.aspx?publicationid=937> on 13 December 2015.

World Bank Countries Indicators (2016). <http://data.worldbank.org/data-catalog/world-development-indicators> on 13 December 2015.

LIST OF APPENDIX

Appendix 1. VAR lag Selection Criteria

VAR Lag Order Selection Criteria

Endogenous variables: LGDP LGS LFDI LTR LGFCF

Exogenous variables: C

Date: 03/30/16 Time: 13:56

Sample: 1980 2014

Included observations: 33

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-7.191370	NA	1.44e-06	0.738871	0.965614	0.815163
1	132.9208	229.2745*	1.37e-09*	-6.237626*	-4.877164*	-5.779872*
2	151.4224	24.66874	2.28e-09	-5.843781	-3.349602	-5.004565

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Appendix 2. Co-integration Test

Date: 03/30/16 Time: 13:55
Sample (adjusted): 1982 2014
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: LGDP LGS LFDI LTR LGFCF
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.698486	86.87128	69.81889	0.0012
At most 1	0.426865	47.30624	47.85613	0.0563
At most 2	0.405646	28.93734	29.79707	0.0626
At most 3	0.236700	11.76811	15.49471	0.1684
At most 4	0.082870	2.854695	3.841466	0.0911

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.698486	39.56503	33.87687	0.0094
At most 1	0.426865	18.36890	27.58434	0.4647
At most 2	0.405646	17.16923	21.13162	0.1642
At most 3	0.236700	8.913416	14.26460	0.2934
At most 4	0.082870	2.854695	3.841466	0.0911

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Appendix 3. VECM Results

Vector Error Correction Estimates

Date: 03/30/16 Time: 14:04

Sample (adjusted): 1982 2014

Included observations: 33 after adjustments

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1				
LGDP(-1)	1.000000				
LGS(-1)	0.873440 (3.68514) [0.23702]				
LFDI(-1)	1.047538 (1.09695) [0.95496]				
LTR(-1)	3.669705 (2.58740) [1.41830]				
LGFCF(-1)	-2.812287 (0.35520) [-7.91755]				
C	-46.23043				
Error Correction:	D(LGDP)	D(LGS)	D(LFDI)	D(LTR)	D(LGFCF)
CointEq1	0.000269 (0.00623) [0.04311]	-0.002620 (0.00811) [-0.32290]	-0.011260 (0.03393) [-0.33182]	-0.018701 (0.00839) [-2.22833]	0.282670 (0.08109) [3.48573]
D(LGDP(-1))	0.108812 (0.27269) [0.39904]	-0.268486 (0.35518) [-0.75591]	-0.767975 (1.48556) [-0.51696]	-0.648632 (0.36740) [-1.76545]	3.174611 (3.55019) [0.89421]
D(LGS(-1))	0.077393 (0.16712) [0.46311]	0.101682 (0.21768) [0.46713]	1.083592 (0.91043) [1.19020]	0.087532 (0.22516) [0.38875]	-3.527925 (2.17575) [-1.62148]
D(LFDI(-1))	0.005208 (0.03909) [0.13322]	0.037133 (0.05091) [0.72932]	-0.177432 (0.21295) [-0.83321]	0.054520 (0.05267) [1.03519]	0.332636 (0.50891) [0.65363]
D(LTR(-1))	-0.197410 (0.14189) [-1.39129]	0.075538 (0.18481) [0.40872]	-0.918223 (0.77299) [-1.18788]	-0.000261 (0.19117) [-0.00137]	-1.609891 (1.84730) [-0.87149]
D(LGFCF(-1))	0.023101 (0.01334) [1.73139]	-0.000237 (0.01738) [-0.01362]	-0.005900 (0.07269) [-0.08117]	-0.009736 (0.01798) [-0.54156]	0.243967 (0.17371) [1.40445]
C	0.070155	0.027576	0.057555	0.062062	-0.269249

	(0.02448) [2.86546]	(0.03189) [0.86473]	(0.13338) [0.43151]	(0.03299) [1.88142]	(0.31875) [-0.84471]
R-squared	0.236978	0.071650	0.107168	0.182248	0.445877
Adj. R-squared	0.060897	-0.142585	-0.098871	-0.006464	0.318003
Sum sq. resids	0.079127	0.134244	2.348403	0.143641	13.41208
S.E. equation	0.055167	0.071856	0.300538	0.074328	0.718226
F-statistic	1.345842	0.334446	0.520134	0.965746	3.486834
Log likelihood	52.72295	44.00095	-3.219236	42.88465	-31.96917
Akaike AIC	-2.771088	-2.242482	0.619348	-2.174828	2.361768
Schwarz SC	-2.453647	-1.925041	0.936789	-1.857387	2.679209
Mean dependent	0.077386	0.005744	-0.007591	0.009040	-0.027986
S.D. dependent	0.056927	0.067223	0.286699	0.074089	0.869701
Determinant resid covariance (dof adj.)		9.82E-10			
Determinant resid covariance		2.98E-10			
Log likelihood		127.7693			
Akaike information criterion		-5.319349			
Schwarz criterion		-3.505401			

Appendix 4. Breusch-Pagan-Godfrey Serial Correlation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.451358	Prob. F(2,24)	0.2541
Obs*R-squared	3.560593	Prob. Chi-Square(2)	0.1686

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 03/30/16 Time: 14:14

Sample: 1982 2014

Included observations: 33

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.002352	0.007027	-0.334711	0.7408
C(2)	0.461642	0.432212	1.068091	0.2961
C(3)	0.049634	0.168611	0.294371	0.7710
C(4)	-0.001143	0.038434	-0.029745	0.9765
C(5)	-0.029030	0.144565	-0.200808	0.8425
C(6)	-0.001678	0.014146	-0.118641	0.9065
C(7)	-0.037019	0.036465	-1.015199	0.3201
RESID(-1)	-0.620238	0.434863	-1.426283	0.1667
RESID(-2)	-0.363599	0.258308	-1.407615	0.1721
R-squared	0.107897	Mean dependent var	-1.39E-17	
Adjusted R-squared	-0.189471	S.D. dependent var	0.049726	
S.E. of regression	0.054233	Akaike info criterion	-2.764049	
Sum squared resid	0.070590	Schwarz criterion	-2.355911	
Log likelihood	54.60682	Hannan-Quinn criter.	-2.626723	
F-statistic	0.362840	Durbin-Watson stat	1.898369	
Prob(F-statistic)	0.929965			

Appendix 5 Hetereskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.873288	Prob. F(10,22)	0.5702
Obs*R-squared	9.377091	Prob. Chi-Square(10)	0.4967
Scaled explained SS	6.548555	Prob. Chi-Square(10)	0.7673

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

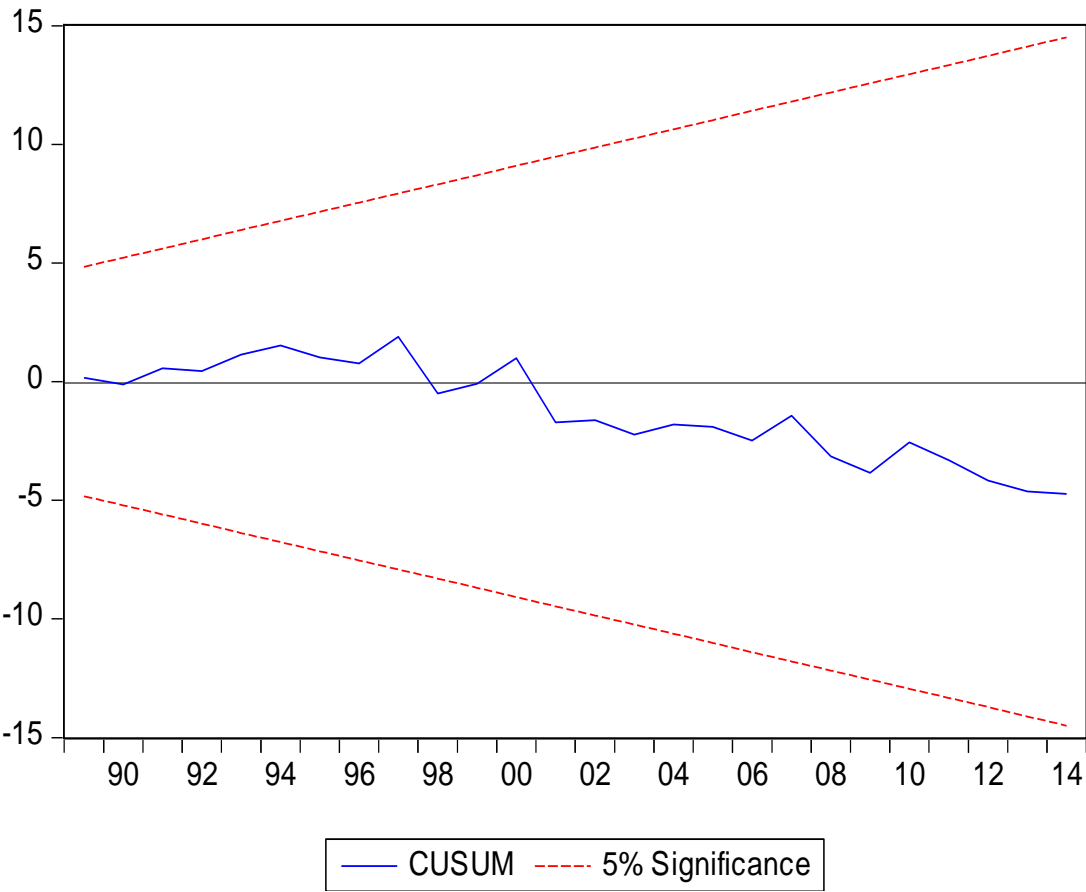
Date: 03/30/16 Time: 14:15

Sample: 1982 2014

Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.034237	0.050261	-0.681172	0.5029
LGDP(-1)	0.021841	0.021410	1.020163	0.3187
LGS(-1)	-0.014567	0.014560	-1.000458	0.3280
LFDI(-1)	0.003300	0.003286	1.004307	0.3261
LTR(-1)	0.011154	0.010760	1.036674	0.3111
LGFCF(-1)	0.000325	0.001512	0.214861	0.8319
LGDP(-2)	-0.020846	0.020802	-1.002120	0.3272
LGS(-2)	-0.008133	0.013129	-0.619429	0.5420
LFDI(-2)	-0.000738	0.003520	-0.209755	0.8358
LTR(-2)	0.003477	0.010983	0.316603	0.7545
LGFCF(-2)	0.000160	0.000941	0.169880	0.8667
R-squared	0.284154	Mean dependent var		0.002398
Adjusted R-squared	-0.041230	S.D. dependent var		0.003652
S.E. of regression	0.003727	Akaike info criterion		-8.085218
Sum squared resid	0.000306	Schwarz criterion		-7.586382
Log likelihood	144.4061	Hannan-Quinn criter.		-7.917375
F-statistic	0.873288	Durbin-Watson stat		2.145114
Prob(F-statistic)	0.570191			

Appendix 6: Cusum Test



Appendix 7: Cusum test of Squares

