Foreign direct investments and economic growth in Namibia.

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SUMMARY

In capital-scarce low income economies, FDI is seen as a stable and important source of financing for developing economies. FDI is therefore expected to generate effects on the country's economic growth potential. However, despite the long history of FDI, it was only after 1990 that Sub-Saharan African countries experienced vast increase in FDI inflows into the region. Evidence of effectiveness of such flows has remained debateable, particularly with the dominance of cross-country studies in such enquiry. With yet no existing country study for Namibia, this research investigates the relationship between FDI and economic growth in the country and the determinants of FDI flows to Namibia. The methodologies adopted in this study are mainly based on co-integration analysis. In order to investigate the impact of FDI on economic growth we employ co-integration tests and estimate both long-run effects and short-run dynamics using the autoregressive distributed lag (ARDL) model. The study also extends co-integration testing by applying the asymmetric (ARDL) model to test for asymmetry. The standard co-integration tests are also appropriately used to investigate the macroeconomic determinants of FDI flows to Namibia. Appropriate econometric procedure has also been employed to examine the sector level FDI and economic growth using a dynamic ordinary least squares (DOLS) model and mean-group (MG) estimation, to consider for the assumptions of both a homogeneity and heterogeneity case across units.

Arising from a pluralistic analytical framework involving a triangulation of econometric estimation approaches, the study finds that FDI in Namibia is significant in promoting economic growth in the country. In terms of the impact on growth, the results show a positive relationship between FDI and economic growth. They also indicate that FDI consistently exerts a positive impact on growth when we incorporate trade openness, inflation and gross fixed capital formation in the analysis. This proves that these variables are indeed important in explaining economic growth in the long-run in the country and its development. With respect to the analysis, the study extended upon the linear framework to allow for the detection of asymmetric effects both in the short and long-run, as not to limit the study to the assumption of a linear paradigm only. The results show no evidence of asymmetric pattern in the relationship between FDI and economic growth. Meaning, the responsiveness of economic growth to FDI flow variations is linear. In terms of the macroeconomic determinant of FDI in Namibia the study finds that the potential market size, interest rates, initial level of income, labour force, the provision of infrastructural facilities and inflation are important determinants of FDI into the country. Although openness is found to be positive it is insignificant in determining FDI to Namibia. This could possibly act as a deterrent and as such the institutional set up's for the export and investment promotion services need a criterion for a successful export and investment support function in order to increase FDI inflows into the country and remove such factors that could inhibit such flows. In terms of sector specific FDI and economic growth the results show a co-integrating relationship. Therefore, there is long run relationship in conformity with the study hypothesis. Accounting for causality the study finds feedback effects between FDI and economic growth both in the short and long-run. Furthermore, the study also finds that FDI to Namibia is not only resource seeking but that Namibia has seen an increase in market-seeking and efficiency seeking foreign investors. As such, differentiated efforts towards attracting different forms of FDI flows to varied sectors are crucial if the economic significance of FDI is to be improved in Namibia.

DECLARATION

This work has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

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Date 17 December 2013

STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary page to be made available to outside organisations.

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TABLE OF CONTENTS

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DEDICATION

To my parents for their constant understanding and supports and my beloved Daughter, Mbinaje, for her consistent patience with her mother's work.

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
ADI	African Development Bank
AECM	Autoregressive Error Correction Model
AIC	Akaike Information Criterion
ARDL	Autoregressive Distributed Lag
ARMA	Autoregressive Moving Average
AU	African Union
BEE	Black Economic Empowerment
CPI	Consumer Price Index
CSD	Cross-Section Dependence
CSO	Central statistics Office
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum Squared
DF-GLS	Dickey-Fuller Generalised Least Squares
DI	Domestic Investment
DOLS	Dynamic Ordinary Least Squares
DTA	Democratic Turnhaile Alliance
ECM	Error Correction Model
EG	Engle-Granger
EPZ	Export Processing Zone
FDI	Foreign Direct Investment
FMOLS	Fully Modified Ordinary Least Squares
GDP	Gross Domestic Product
GMM	Generalised Methods of Moment
GPT	General Purpose Technologies
HIC	Hannan-Quinn Criterion
IMF	International Monetary Fund
IPS	Im, Pesaran and Shin
J-J	Johansen- Julieus
LDC	Least Developing Countries
LLC	Levin-Lin-Chu
LM	Largrane Multiplier
LR	Likelihood Ratio
MFR	Mixed Fixed Random

MG	Mean Group
MNC	Multinational Corporation
MNE	Multinational Enterprise
MTEF	Medium Term Expenditure Framework
MTI	Ministry Of Trade and Industry
NAD	Namibian Dollar
ODC	Overseas Development Cooperation
OECD	Organisation for Economic Co-operation and Development
OLI	Ownership Location Internationalisation
OLS	Ordinary Least Squares
PMG	Pooled Mean Group
PP	Phillip Perron
SACU	Southern African Customs Union
SADC	Southern African Developing Community
SBC	Schawarz Bayesian Criterion
SWA	South West Africa
SWAPO	South West Africa Political Organisation
TFP	Total Factor Productivity
TIPEEG	Targeted Intervention Programme for Employment Economic Growth
TNC	Transnational Companies
UN	United Nations
UNCTAD	United Nations
USD	United States Dollar
VAR	Vector Autoregressive
VECM	Vector Error Correction model
WDI	World Development Indicators
WIR	World Investment Report

CHAPTER 1

RESEARCH INTRODUCTION AND OVERVIEW

1.1 Background of the Study

The substantial increase in foreign direct investments (FDI) flows, in the recent decades, has generated a great area of interest for many economists. This phenomenon opens the gate for many questions concerning the impact of FDI on economic growth. In recent years, many economists and policymakers have turned their attention to the linkage between FDI and growth and various economic and financial variables. FDI is viewed as an engine for growth for host countries through the transfer and diffusion of knowledge; see de Mello (1997). Given the benefits of FDI flows, there is now an increasing need to assess this relationship between FDI and economic growth in host country economies. Although there has been much progress in examining the relationship between FDI and growth in developing countries, only a few number of empirical studies have considered single host countries in Sub Saharan Africa.

The issue of FDI flows, however, has continued to attract considerable economic attention that has been devoted into the economic effects of FDI on the country of origin, particularly at macroeconomic level. Thus, the role of FDI in economic development and poverty reduction has received extensive study in most of the regions. However, the impact of FDI on economic growth or development level of the host country remains open and testable as there is not much empirical evidence on this linkage for Namibia. FDI flows are a stable and important source of foreign income and investment for developing economies (OECD, 2005). They are therefore expected to generate potential effects on the country's economic growth potential. In that respect, this thesis examines the relationship between FDI and economic growth for Namibia, and explores the main determinants of FDI flows to the country.

Foreign direct investments are a macroeconomic and financial phenomena. A comprehensive investigation of this issue needs to examine these aspects in order to understand the nature and true impact of FDI flows to the economy. In assessing the development impact of these flows, economic effects must also be investigated. Hence, studying the impact that FDI has on the host economy can interestingly shed light on largely unexplored effects that lead to

enhance economic growth. Surprisingly, little attention has been directed to the relationship between FDI and economic development in Southern African countries.

Indeed, academics and practitioners have recently turned more attention to the economic impact of FDI flows in Africa on cross-country studies, ignoring the role of these flows on a single host economy especially in the Sothern African region. Despite recent studies on the effects of FDI on economic growth, their overall effects remain unclear for two reasons. Firstly, the focus on cross country analysis does not necessarily provide a mutual result across countries due to policy differences in each country. Secondly, such effects in developing economies are different from developed countries. And hence, the positive effects or negative effects from FDI experienced in one country might not necessarily define effects in another. Therefore, by contrast, this study addresses some gap in the existing empirical literature and examines the role of FDI on economic growth in Namibia.

1.2 Motivation Issues and Objectives

This research, which is on the area of economics of FDI, will explore the effects of FDI in a small developing economy, Namibia. The question which arises in this context is why Namibia is considered as our case study. This can be answered through several points of view. Firstly, FDI has been the largest capital mobility flow to the Namibian economy over the last decade. Namibia has been able to attract substantial FDI flows, from slightly less than N$100 million at independence in 1990 to over N$2 billion by 2002. The total FDI in Namibia as a per cent of GDP increased from 17.8 per cent in 1998 to over 25 per cent in 2004. And, hence, FDI can be considered as a key for Namibia's economic development.

Secondly, FDI inflows have become commendable and as such the need to attract more FDI. A World Bank report stated that such small economies can attract FDI by putting in place a favourable business environment. Namibia was at the top from 29 African countries with a good business climate suggesting that Namibia can actually become competitive internationally and attract FDI on a sustainable basis. These flows have been growing in both inflows and stocks, compared to other sources of external finance. They have become, increasingly, the most notable phenomenon in the Namibian economy and its development, and this needs to be considered empirically. Thirdly, no previous studies have empirically investigated the effects of FDI flows to Namibia and the determinants of these flows. In

addition, no macro studies or very sparse, if any, have even attempted to study the effects of FDI on GDP per capita with a focus on sector-wise FDI in the key economic sectors of the country. Therefore, by choosing an individual country (Namibia), the thesis' results will be more appropriate for policy decisions to an emerging economy in general and to the Namibian economy in particular.

In addition, providing empirical evidence of the determinants of FDI and the type of FDI, within a country-specific experience, will add to the literature on the economics of FDI and is an exciting topic for research. This study will help policy makers in Namibia to understand how the FDI to Namibia is determined and how beneficial it is. Explicitly, it aims to examine whether the effects of FDI is consistently positive on GDP per capita in the presence of other macroeconomic variables considered in the research, and thus enables policy makers to use the best strategies to maintain and utilise such benefits, and improve the available tools and policies currently in place.

The study embarks on a significance and through effort to build a comprehensive empirical analysis for the effects and determinants of FDI in Namibia. The key objective of our empirical work is to identify whether FDI leads to economic growth in Namibia. Moreover, the thesis examines the factors that determine the flows of FDI and the type of FDI inflows to Namibia, more specifically at macroeconomic level. However, in fulfilling this key aim, a number of objectives are considered important to be sufficiently achieved as follows:

1. Provide a comprehensive review of the literature related to the main aspects of our area of research, and discuss the main studies concerning the study of FDI. The study aims to achieve this objective by dividing the literature discussion in four parts; (1) on the effects of FDI on economic growth, (2) provide a discussion on the literature of the determinants of FDI (3) followed by the growing literature on causality, (4) and lastly, to provide a discussion on the spillover channels of FDI.

2. Provide an overview on Namibia and its economy with a focus on the key economic sectors. And, provide a discussion on the geographyical landscape of the country including a comprehensive historical discussion and political regimes.

3. Investigate the macroeconomic determinants of FDI flows to Namibia and to establish the type of FDI - resource seeking, asset seeking or efficiency seeking - flows to the country. And, to investigate the significance of this determinants after the regime i.e. post-independence. The study aims to explain the main determinants of FDI inflows using a co-integration analysis technique.

4. Develop an investigation of the impact of FDI on economic growth in Namibia. Since FDI is a growth enhancing catalyst as per the literature, this implies that FDI can significantly and positively affect the economic growth and development in Namibia. In this thesis, we aim to employ several specifications to provide consistent and robust evidence on the effects of FDI on GPD per capita of the country, using co-integration analysis frameworks.

5. Examine for the presence of potential asymmetric co-integration relationship between FDI and economic growth in Namibia. This study also extends the existing literature on the linkages between FDI and GDP per capita by employing asymmetric co-integration testing.

6. Investigate the casual link between FDI and economic growth. Another key objective of this thesis is to evaluate the potential causality between FDI and GDP per capita, and the direction in which causality between the two runs. Since no studies have been done on the causality link between FDI and economic growth in Namibia, we attempt to fill some gap in the literature by including this phenomenon, in our empirical investigation.

7. Investigate the relationship between FDI and economic growth using sector-wise FDI in key economic sectors in Namibia. This is an important key objective of the thesis. No previous research has considered using sector level FDI to study the impact of FDI in Namibia. Therefore, rather than just employing an analysis using aggregate FDI data, we further employ the use of sector level FDI data in these sectors to investigate consistency in the behaviour of FDI on GDP per capita. And as such, the thesis is not only limited to the use of aggregate information such as in most previous work carried out on FDI in single host economies.

8. Summarise and evaluate the main findings of the research and draw conclusions based on these findings and their implications for the policy makers and economists to help them understand the nature of FDI in Namibia. And identify directions for future research in this field.

Each chapter in the thesis will explore the main objectives discussed previously with a view to provide empirical evidence to implement and support our objectives. In fact one of the major contributions of this study is the application of co-integration analysis in examining the effects of FDI and macroeconomic determinants of FDI, and very few studies in the literature model sector level FDI using panel co-integration analysis. This thesis also provides a comprehensive empirical study of the effects of FDI, more specifically by testing for the presence of an asymmetric long-run relationship among FDI and economic growth indicators. It also considers the effects of FDI using sector level FDI from key economic sectors as defined by the Bank of Namibia.

1.3 Data and Methodology

Unlike most previous literature the thesis uses modern econometrics (time series and panel time series) analysis, employing a country-specific experience. Cross-country analysis usually provides evidence on determinants and effects of FDI that is not able to distinguish the behaviour patterns of these flows among different countries. Cross-country technique does not allow different countries to exhibit different patterns of the determinants and effects of FDI.

Furthermore, the data used covers the period 1980 to 2009, obtained from several sources mainly the Bank of Namibia (BON), World Development Indicators (WDI), African Development Indicators (ADI) and Barro-Lee. In terms of FDI data, we use the data for the stock of FDI in our analysis. The main difficulty in the study of FDI is the lack of reliable data on annual inflows flows of FDI. Simply gathering accurate data on FDI is extremely difficult because many FDI are not channelled through the banking system and therefore do not appear in the official statistics on FDI. Also, government bodies such as Namibia Investment Centre (NIC) or BON and National office of statistics (NOS) do not make such data accessible on their databases and attempt to obtain such data proves challenging in itself.

In short, there are no reliable measures in place of accessible databases or publications of such data currently in Namibia.

The methodologies adopted in this study are mainly based on co-integration analysis. In order to investigate the effects and macroeconomic determinants of FDI we employ linear ARDL co-integration and panel co-integration approaches. Appropriate econometric procedure has also been employed to examine the linkage between FDI and economic growth using causality tests. The study also extends co-integration testing, used in determining the effects of FDI on economic growth, through applying the newly developed asymmetric co-integration tests proposed by Shin et al. (2011).

Furthermore, in the panel co-integration analysis, the study implements techniques that account for both a homogenous and heterogeneous case. In the homogeneous case we implement the dynamic ordinary least squares (DOLS) and mean group estimator (MG) for the heterogeneous case so as to allow the slope coefficients to vary across sectors. And, hence, we do not only limit our investigation in assuming homogeneity across units. Overall, since most of the macroeconomic series used in this thesis are expected to be non-stationary series, the co-integration framework is a useful one, because it allows us to model the equilibrium relationship among those variables.

1.4 Structure of the Study

This thesis is structured around seven chapters as follows:

Chapter one provides an overview and background of this thesis. It explores the underlying motivation issues for researching the macroeconomic determinants and effects of FDI in Namibia. Further, this chapter also explains the research objectives and the methodology used in fulfilling these objectives.

Chapter two surveys the literature on the economics of FDI and other issues related to our investigation. The review of the literature is mainly emphasised on three aspects. Namely, the macroeconomic determinants of FDI, the effects of FDI on economic growth and causality between FDI and growth. The survey begins by looking at how the traditional theories discuss the economic benefits of FDI flows in a host economy. In this survey, we also focus

on the theories of what determinants FDI flows to a developing country. Then, the relevant literature on the economic effects and spillover channels of FDI is briefly discussed in the last part of this chapter. Specific emphasis is placed on the studies that investigate the phenomenon of FDI in Namibia. We review most of the important literature that directly modelled the role of FDI on economic growth and determinants of FDI in order to put the research topic into perspective.

Chapter three presents a brief discussion on the history and background of the country, including the geographical landscape of Namibia. Importantly, it covers a background of the economy through reviewing a macroeconomic overview of Namibia's economy, in terms of the key economic industries and their contributions to the country's GDP. Including, FDI flows to the key economic sectors and an overall FDI comparison to Africa and Southern African countries.

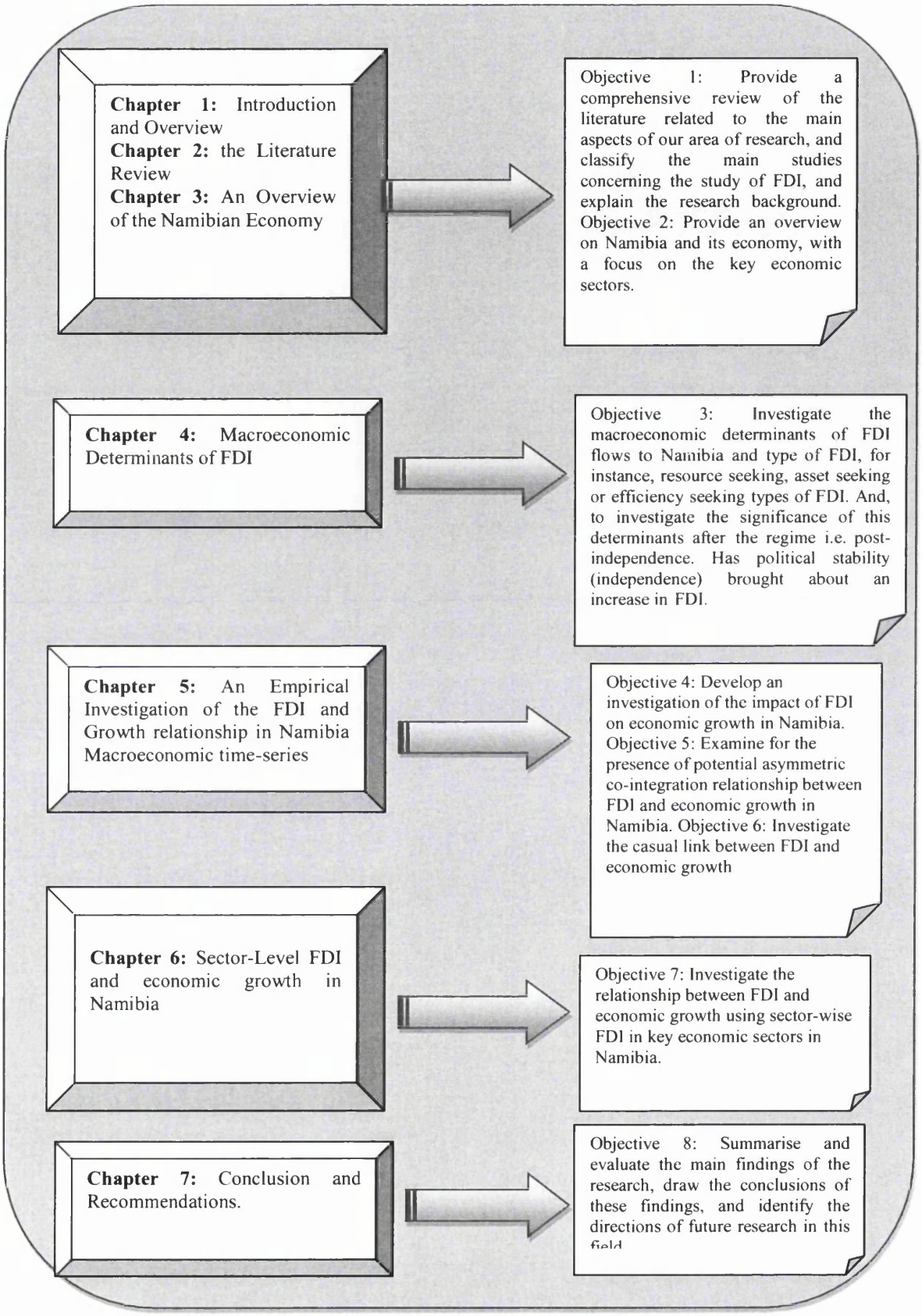
Chapter four empirically investigates the macroeconomic determinants of FDI to and type of FDI flows to Namibia. This chapter is divided into two parts; the first part provides an analysis using FDI stock data covering the time period which includes both pre and post-independence era. This part gives readers a picture of the changes in FDI prior to the change in regime. The second part considers, only, the post-independence era; this is the period where Namibia experienced vast inflows of FDI. The Chapter discusses the empirical methodology employed in both chapter four and five of the thesis in detail. In order to overcome several potential problems of previous studies on determinants of FDI, we adopt co-integration technique using the ARDL approach. This technique is discussed in detail in Chapter 4 to establish the general econometric framework used in this study.

Chapter five explores the effects of FDI on economic growth, it employs aggregate FDI data. More particularly in this chapter we present different specifications to ensure that the results are not driven by the main specification herein and that they are consistent to the positive effects of FDI on growth in Namibia. Another empirical contribution of this chapter involves the estimation of asymmetric co-integration tests, for the first time in this area of research, in order to provide a comprehensive analysis that provides an overall understanding of FDI's effect on economic growth.

Chapter six develops a novel contribution to the literature by examining the impact of sector level FDI on economic growth. This allows for the study of the effects of FDI from a different angle rather then the norm of using aggregate data. More specifically, panel co-integration analysis is employed in this chapter in order to explore the potential effects that sector level FDI have on growth. Another empirical contribution of this chapter involves the panel causality estimation of the link between FDI and growth. The empirical analysis of this thesis provides comprehensive evaluations of sector level FDI impact on economic growth in Namibia.

Chapter seven outlines the research findings emanating from this thesis, and provides policy implications and recommendations for the policy makers. This chapter also discusses limitations of the analysis and identifies gaps for future research, through determining some directions for future research in the field of economics of FDI. For ease of reference we use Figure 1.1 to summarise a brief structure and map of the aims and objectives of this thesis.

Figure 1.1. Research Outlines and Objectives



CHAPTER 2

A LITERATURE REVIEW ON FOREIGN DIRECT INVESTMENTS AND ECONOMIC GROWTH: A SURVEY OF THE EVIDENCE

2.1. INTRODUCTION

In this chapter we provide the state-of-the-art developments in the literature on the effects of foreign direct investments on growth. Indeed, the role of foreign direct investment (FDI) in economic growth has been extensively studied in the literature, especially in recent years when China and India, the world's two most populous and fastest growing economies have been using FDI as a stimulus in the growth process.

There are several potential ways in which FDI can promote economic growth. The neoclassical growth traditional models suggest that FDI increases capital stock and thus growth in the host economy via financing capital formation (Brems, 1970). From the perspective of modernisation theories (neoclassical and endogenous), the transfer of technology through FDI in developing countries is especially important because most developing countries lack the necessary infrastructure in terms of an educated population, liberalised markets, economic and social stability that are needed for innovation to promote growth (Calvo and Sanchez-Robles, 2002).

Although the positive impact of FDI on economic growth seems to have recently acquired the status of a stylised fact (Campos and Kinoshita, 2002), a careful reading of the literature suggests that this positive relationship is far less definitive than generally believed. Agosin and Mayer (2000), for example, argue that FDI in the form of mergers and acquisitions do not necessarily increase the capital stock in capital-scarce economies. More importantly, the positive effect of FDI on growth through capital accumulation requires that FDI does not 'crowd out' equal amounts of investment from domestic sources. Accordingly, FDI may actually harm the host economy when foreign investors claim scarce resources, such as import licenses, skilled manpower, credit facilities, etc., or foreclose investment opportunities

for local investors. In addition, there is also concern that the positive knowledge spill over's predicted by endogenous growth models do not occur in developing countries.

In contrast to the modernization perspective, dependency theorists argue that dependence on foreign investment is expected to have a negative effect on growth and the distribution of income. Bornscheier and Chase-Dunn (1985) claimed that foreign investment creates an industrial structure in which monopoly is predominant, leading to what they describe as "underutilization of productive forces." The assumption being that an economy controlled by foreigners would not develop organically, but would rather grow in a disarticulated manner (Amin, 1974). This is because the multiplier effect by which demand in one sector of a country creates demand in another is weak and thereby leading to stagnant growth in the developing countries. This argument is important as most FDI to Africa is in the natural resources sectors (Pigato, 2000) which have substantial barriers to entry.

To understand why FDI is important in the growth process, it is necessary to compare the different roles of FDI and domestic investment (DI). In the post-Keynesian and neo-classical models, DI is a necessary condition for production growth and technical progress, but it may not enable a newly industrialising economy to take advantage of advanced technologies available in the developed world. FDI is different from DI in two important aspects although both can be treated as a basic physical input in the production process: FDI accelerates the speed of adoption of general purpose technologies (GPT) in the host countries; FDI is embedded with new technologies and know-how unavailable in the host countries.

This research takes a fresh look at key issues related to foreign direct investment in a developing economy in the light of country experience and policy related work in this area. The review is structured in conformity with the objectives of the thesis. Hence, in Part I, the literature reviews the theoretical propositions and empirical findings on the relationship between foreign direct investments and economic growth, while Part II reviews the evidence of the literature on the determinants of foreign direct investments and empirical findings. Part III, reviews the literature and empirical findings on causality in relation to the FDI-growth

nexus, followed by Part IV which sheds some light on the theory of spill over channels of FDI. And, finally, section 2.10 offers a concluding summary of the survey of the evidence.

PART I: FOREIGN DIRECT INVESTMENTS AND ECONOMIC GROWTH

2.2. THE TRADITIONAL THEORETICAL MODELS ON FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH

In this section, the study reviews several models on foreign direct investment. We draw upon one of the first models on FDI dating as far as Findlay (1978) who postulates that FDI increases the rate of technical progress in the host country through contagion effect from the more advanced technology. Secondly, a model by Wang (1990) is reviewed which incorporates this idea (Findlay's) into a model more in line with the neoclassical growth theory by assuming that an increase in knowledge applied to production is determined as a function of FDI. However, the application of these advanced technologies also requires the presence of a sufficient level of human capital in the host country. In this light, Benhabib et.al (1994) states that the stock of human capital in the host economy limits absorptive capabilities of developing countries. Most theoretical models study the impact of one of the many host country factors (human capital, institutional development, technology transfer, and institutional quality) on FDI and growth relationship, but in reality, it is a combination of these factors that shape the economic environment of the host economy.

Thirdly, the model by Borensztein (1998) highlights the roles of both the introduction of more advanced technology and the requirement of absorptive capability in the host country as determinants of economic growth, and investigates the complementarities between FDI and human capital in the process of productivity growth. Thirdly, the study further reviews Borensztein's (1998) model which considers an economy where technical progress is a result of capital deepening both human and physical capital. And finally, the discussion further incorporates a model of FDI and financial institutions presented by Alfaro et. al (2001).

The spread of modern economic growth from the developed countries of the world economy to the relatively more stagnant developing countries is intimately related to the processes by which technological changes have been diffused, imitated, and adapted. Economic historians have detailed, and econometricians have computed the contribution of technological progress to economic growth in a number of countries. International corporations have played a major role in the diffusion of new technology in recent times.

I: A Theoretical Model based on Findlay: 1978: A Foundation of the Thesis

The literature attributes an important role for FDI in fostering economic growth in developing countries because, on the one hand, modern economic growth theories stress the crucial role of technological progress and the creation of new ideas in determining the rate of growth (Barro and Sala-i-Martin, 2004; Grossman and Helpman, 1993), and, on the other hand, FDI literature states that FDI is one of the most important channels through which advanced technologies can be transferred to developing countries (Findlay, 1978; Blomstrom, 1986, Borenzstein, 1998). It is upon Findlay's theory on which the model utilised in the Thesis is built upon.

The implication of this model is to capture aspects of the way in which the transfer of technology takes place and the role of foreign direct investment. The model postulates that the rate of technological progress in a relatively "backward" region is an increasing function of the gap between its own level of technology and that of the "advanced" region which improves at a constant rate, and the degree to which it is open to foreign direct investment, measured by the proportion of foreign capital operating in the backward region to domestic capital in that region (Findlay, 1978).

The greater the gap in development levels between a country at the outset of a process of developing and the already developed part of the world, the faster the rate at which the backward country can catch up. The model assumes a world divided into two distinct regions, one "advanced" and the other "backward." And, $A(t)$ be an index of technological efficiency,

such as the scale parameter of an aggregate production function, in the advanced region. Therefore:

$$A(t) = A_{0e^{nt}} \tag{2.1}$$

such that technological efficiency in the advanced part of the world economy increases at a constant rate n. If $B(t)$ is the corresponding level in the backward region, then:

$$dB/dt = \lambda[A_{0e^{nt}} - B(t)], \tag{2.2}$$

where λ is a positive constant, the magnitude of which depends upon exogenous parameters such as the quality of management and the education of the labour force. Differentiating Eq. (2.2) yields,

$$B(t) = \frac{\lambda}{(n+\lambda)A_{oe}^{nt}} + \frac{(n+\lambda)B_o - A_{oe}^{-\lambda t})}{(n+\lambda)} \tag{2.3}$$

Where B_o is the initial level of efficiency in the backward region. As time tends to infinity, Eq. (2.3) shows that the ratio of $B(t)$ to $A(t)$ will approach an "equilibrium gap" of $\lambda/(n + \lambda)$, which varies directly with λ and inversely with n. If $\frac{B_o}{A_o}$ is less than $\lambda/(n + \lambda)$, the rate of technological progress in the backward region will exceed n but fall toward it asymptotically as the "equilibrium gap" $\lambda/(n + \lambda)$ is approached from below.

Technical innovations are most effectively copied when there is personal contact between those who already have the knowledge of the innovation and those who eventually adopt it. Contact with firms of a higher level of efficiency enables the relatively backward ones to improve not only by copying or imitating but also by inducing them to try hard. As in many fields of human endeavour, the visible example of a high standard can inspire those with a lower level of achievement to perform better.

These leads to the assumption that, other things being equal, the rate of change of technical efficiency in the backward region is an increasing function of the relative extent to which the activities of foreign firms with their superior technology pervade the local economy. The index adopted here to measure the extent of this penetration is the ratio of the capital stock of foreign-owned (and-managed) firms in the backward economy to the capital stock of the domestically owned firms.

Letting *Kf(t)* and *Kd(t)* stand for these capital stocks and *A(t)* and *B(t)* for the levels of technical efficiency in the advanced and backward regions as before, hence defining:

$$x = \frac{B_{(t)}}{A_{(t)}}$$

And,

$$y = \frac{Kf_{(t)}}{Kd_{(t)}}$$

Combining the "relative backwardness" and "contagion" hypotheses, Findlay (1978) postulates that,

$$B/B = f(x, y), \qquad (2.4)$$

with

$\partial f/\partial x < 0$, $\partial f/\partial y > 0$.

In interpreting (2.4), the rate at which new technology is diffused is a function of many other factors as well. The educational level of the domestic labour force, the market structure in which the foreign-owned and domestic firms operate, the terms of royalties and licensing arrangements, patent laws, and all have a bearing on the rate at which the backward region improves its technological efficiency (Findlay, 1978).

This model does focus on an important fact on FDI and growth in that it considers technical diffusion as a contribution of FDI. However, this model has limitations in that it fails to introduce the education level of the domestic labour force or fails to consider human capital factor which has been argued to influence the domestic technical rate diffusion in a positive way. And, Hence, the next section reviews Wang (1990)'s model which builds on Findlay (1978) and incorporates this factor.

II: A Theoretical Model based on Wang: 1990

This model by Wang (1990) is more in line with the neo-classical growth model by assuming that an increase in knowledge applied to production is determined as a function of foreign direct investment. Its implication is based on the assumption that technology is transferred via international capital movements from developed north to developing south. The model extends the MacDougall-Kemp-Ruffin framework[1] by adding to the production function a country-specific variable labelled human capital. Human capital plays an important role in determining the effective rate of return for physical capital and hence affects the direction and the magnitude of international capital movements. The analysis incorporates a hypothesis on technology transfer, proposed by Findlay (1978), that the rate of technological change in a less developed country (LDC) will be an increasing function of the amount of foreign capital operating in the LDC and of the extent to which the technology in the advanced country exceeds that in the LDC.

Drawing on the recent developments in the theory of growth and industrial organisation, highlights the roles of knowledge accumulation and international dissemination in explaining how trade structure and trade policy affect rates of growth. The model assumes a one-good, two-country configuration. The two economies not only have different capital-labour ratios, but also have different qualities of labour or different stocks of technical knowledge. The term 'human capital' is used to refer to human knowledge, which can be accumulated over time without bound, so it cannot be measured by observables like schooling and experience.

[1] MacDougall-Kemp-Ruffin-Framework is based on theoretical models by Hobson (1914), Jasay (1960), MacDougall (1960), Kemp (1964) and Ruffin (1984).

In aggregate, the average human capital within an economy gives a measure of the stock of technical knowledge, and hence can be regarded as an indicator of the technology level there.

The total labour supply is given by *L*,(full employment is assumed). *L(h)* is the number of workers with knowledge h. Therefore total labour is; $\int h \in H_{L(h)}{}^{dh}$, and the effective work force is E= $\int h \in H^{hL(h)\,dh}$.

The average level of human capital in this economy is $h_\alpha = \frac{E}{L}$. For simplicity, the model assumes each worker has the identical level of human capital, *h*, so $h_\alpha = h$. The production function is assumed to be: *Q*=*F*(*K*,*E*) *F*(*) which is twice differentiable and homogeneous of degree one with respect to both arguments. "*F*" is taken to be Cobb-Douglas, that is, $Q = K^{\beta}(hL)^{1-\beta}, \beta \in (0,1)$. Per capita output is written as: $\frac{Q}{L} = h^{1-\beta}(\frac{K}{L})^{\beta} = \varphi(h) f(\frac{K}{L})$.

The contribution of human capital to production is summarised by the power function, $\varphi([h) \equiv h]^{1-\beta}$. β is assumed to be identical for both countries. By the previous assumption, $h_\alpha = h$,, φ (*h*) can be interpreted as an index of the technology level of an economy. Endowments of labour in both countries are assumed to be identical, for simplicity. Let the subscripts S and N denote home (South) and foreign (North), respectively. The two economies are endowed with different amounts of both physical and human capital:

$K_S < K_N,\ h_S < h_N$ (2.5)

How the system evolves over time hinges on the assumptions about the dynamics of human capital, the 'engine of growth'. It is assumed that both countries' stocks of human capital grow at constant rates, μ_S and μ_N, respectively, in autarky. Following Findlay (1978), Dh_s, is assumed to be an increasing function of the degree to which the Southern country is open to direct foreign investment, measured by the ratio of foreign investment to domestically owned capital, *x*. The hypothesis that the greater the relative backwardness of a country, the faster the rate at which it can catch up is also adopted here.

$Dh_S = \mu s\theta(\chi,q)h_S,$

$\theta_1 \equiv \partial\theta/\partial\chi > 0,\ \theta_2 \equiv \partial\theta/\partial q > 0,\ \theta(0,1)=1,$

$$Dh_N = \mu_N\ h_N,\ \mu_N\ > \mu_S\ . \qquad (2.6)$$

Eq. (2.6) is defined only when $x \geq 0$ (therefore $Z \geq 0$) and $q \geq 2$. The intuitive explanation of the term $\theta(\cdot)$ is that a typical developing country wants foreign investment not only because it is capital, but also because it embodies superior technology. The presence of foreign firms generates positive technology spill over's to the LDC firms [e.g. see Blomstrim and Persson (1983)]. This process is called technology transfer in this model and has been empirically important in the world economy. Because strong evidence suggests that physical capital investment leads to the simultaneous creation of new knowledge that spills over and has positive external effects [see Romer (1987)], one-could link Dh_N to the level of investment activities in the North.

The model developed above highlighted the importance of human capital, technology diffusion, and their interactions with foreign investment and domestic physical capital formation in economic development. Two main findings or policy messages emerge from the analysis. First, from a developing country point of view, opening to direct foreign investment from more advanced countries has important beneficial implications.

In addition to the well-known effects on income level as well as on employment, foreign investment facilitates domestic technological change, and hence increases the rate of income growth. Policies prohibiting investment from more advanced countries deprive the LDC of potential gains in the growth rate and may also lead to an increasing income gap between the rich and poor in the world.

Second, after opening up to foreign capital, an initially backward country making efforts to increase domestic human capital accumulation and technology adoptive efficiency of

domestic firms may eventually reduce the equilibrium per capita income gap between itself and more advanced countries.

III: A Theoretical Model based on Borenzstein: 1998

The implications of the model is to address the technology gap question by developing a growth model in which FDI contributes to technological progress through capital deepening i.e. in the form of the introduction of new varieties of capital goods. Recognising that such beneficial effects are likely to depend on the skills of the domestic labour force, they interact the FDI variable with a measure of human capital development (secondary school attainment). Multinational Corporation (MNC)'s possess more advanced 'knowledge', which allows them to introduce new capital goods at lower cost[2].

An economy where technical progress is the result of 'capital deepening' in the form of an increase in the number of varieties of capital goods available is considered here, as in Romer (1990) and Sala-i-Martin (1995)[3]. A single consumption good is produced according to the following technology:

$$Yt = AHt^{a}Kt^{1a} \qquad (2.7)$$

A denotes the exogenous state of 'environment', human capital as *H*, and *K* for physical capital. The level of productivity in the economy is influenced by the state of environment which consists of various control and policy variables. Human capital *H* is assumed to be a given endowment. Physical capital comprises an aggregate of different varieties of capital goods; therefore, capital accumulation takes place through the expansion of the number of varieties. At each instant in time, the stock of domestic capital is given by:

[2]It is most likely that a foreign firm that decides to invest in another country enjoys lower costs than its domestic competitors deriving from higher productive efficiency. The higher efficiency may owe partly to the combination of foreign advanced management skills with domestic labour and inputs. Several micro-studies have attempted to assess empirically the impact of FDI on the domestic economy. (See, for example, United Nations (1992), Aitken and Harrison (1993), and references therein).

[3]Borensztein followed the specification of Barro and Sala-i-Martin (1995).

$$K = \left\{ \int_0^N x(j)^{1-\alpha} \, dj \right\}^{\frac{1}{1-\alpha}} \tag{2.8}$$

Which is, total capital is a combination of continuous varieties of capital goods, each one being denoted by $x(j)$[4]. N is the total number of varieties of capital goods. Domestic and foreign firms are the two types of firms that produce capital goods and have taken a direct investment in the economy. n are varieties out of the total number N produced by domestic firms, and n^* varieties produced by foreign firms:

$$N = n + n^* \tag{2.9}$$

And, assuming that specialized firms produce each variety of capital good, and rent it out to final goods producers at a rental rate $m(j)$. The demand for each variety of capital good, $x(j)$, comes from the optimality condition that equates the rental rate to the marginal productivity of the capital good in the production of the final good. This condition is:

$$m(j) = A(1-\alpha) H^{\alpha} x(j)^{-\alpha} \tag{2.10}$$

Acquiring and adapting technology available in advanced countries is required to increase the number of capital varieties to permit the introduction of a new type of capital good. This process of technology adaptation is assumed to be costly, with a fixed setup cost (F) before production of the new type of capital can take place. F is assumed to depend negatively on the ratio of the number of foreign firms operating in the host economy to the total number of firms (n^*/N). This assumption is intended to capture the notion that foreign firms bring to the developing economy an advance in 'knowledge' applicable to the production of new capital goods that may be already available in other countries.

Thus, by making it easier to adopt the technology necessary to produce new capital varieties, foreign direct investment is the main channel of technological progress in this model. Furthermore, it is assumed that there exists a 'catch-up' effect in technological progress to

[4]This formulation is due to Ethier (1982).

reflect the fact that it is cheaper to imitate products already in existence for some time than to create new products at the front line of innovation[5].

This is implemented by assuming that the setup cost depends positively on the number of capital varieties produced domestically compared to those produced in the more advanced countries ,denoted by N^*). That is, in the countries with lower N/N^* imitation possibilities are larger and thus the costs of adopting new technology is lower. Hence, the functional form for the setup cost is postulated as follows:

$$F = F(n^*/N, N/N^*), \text{ where } \frac{\partial F}{\partial (n^*/N)} < 0 \text{ and } \frac{\partial F}{\partial (N/N^*)} > 0 \qquad (2.11)$$

Eq. (2.11) can be interpreted in terms of 'quality ladders,' as in Grossman and Helpman (1991). Borensztein (1998) states that the increase in the number of varieties could be interpreted as an improvement in the quality of existing goods.

And that, if the presence of foreign firms reduces the cost of improving the quality of existing capital goods, it will generate the same negative relationship between foreign direct investment and setup costs. The catch-up assumption could be reinterpreted as meaning that the cost of improving an existing capital good is smaller the lowest is its quality. In addition to the fixed setup cost, once a capital good is introduced, the owner must spend a constant maintenance cost per period of time. Similarly, it is assumed that there is a constant marginal cost of production of $x(j)$ equal to 1, and that capital goods depreciate fully. With the assumption of a steady state where the interest rate (r) is constant, profits for the producer of a new variety of capital j are:

$$\pi(j)_t = -F(n_t^*/N_t, N_t/N_t^*) + \int_t^{\infty} [m(j)x(j) - x(j)]e^{-r(s-t)}\, ds \qquad (2.12)$$

The equilibrium level for the production of each capital good $x(j)$ is generated by maximising Eq. (2.12) subject to the demand Eq. (2.10), that is:

[5]The importance of the 'technology gap' as a determinant of technological diffusion has been stressed in previous research, for example, Nelson and Phelps (1966).

$$x(j) = HA^{\frac{1}{\alpha}}(1-\alpha)^{\frac{2}{\alpha}} \tag{2.13}$$

$x(j)$ is independent of time, meaning that, at every instant the level of production of each new good is the same. And, the level of production of the different varieties is also the same due to the symmetry among producers. The rental rate is obtained by substituting Eq. (2.13) into the demand function Eq. (2.10), yielding:

$$m(j) = 1/(1-\alpha) \tag{2.14}$$

This gives the rental rate as a mark-up over maintenance costs. It is assumed that there is free entry, and hence, the rate of return r will be such that profits are equal to zero. Solving for the zero profits condition yields:

$$r = A^{1-\alpha}\,\Omega F(n^*/N, N/N^*)^{-1}H \tag{2.15}$$

where

$$\Omega = \alpha(1-\alpha)^{\frac{2-\alpha}{\alpha}}$$

To close the model, a description of the process of capital accumulation is therefore needed, which is driven by saving behaviour[6]. Hence, the assumption is that individuals maximize the following standard inter temporal utility function:

$$U_{(t)} = \int_{\delta}^{\infty} \frac{C_S^{1-\delta}}{1-\delta} e^{-p(s-t)}\,ds \tag{2.16}$$

C denotes units of consumption of the final good Y. Given a rate of return equal to r, the optimal consumption path is given by the standard condition:

[6]Borensztein did not introduce international trade in the model; however, this is not a closed economy because of the presence of foreign firms. However, with the proportion of foreign firms remaining constant in a steady-state situation, equilibrium conditions are analogous to those prevailing in a closed economy, Borensztein (1998).

$$\frac{C_t}{C_t} = \frac{1}{\delta(r-p)} \tag{2.17}$$

In a steady state equilibrium the rate of growth of consumption must be equal to the rate of growth of output, denoted by g. Substituting Eq. (2.15) into Eq. (2.17), obtains the following illustration for the rate of growth of the economy:

$$g = \frac{1}{\delta}[A'(1-\alpha)\Omega F(\frac{n^*}{N}, \frac{N}{N^*})'(-1)H - p \tag{2.18}$$

Eq. (2.18) shows that foreign direct investment, which is measured by the fraction of products produced by foreign firms in the total number of products (n^*/N), reduces the costs of introducing new varieties of capital goods, thus increasing the rate at which new capital goods are introduced (Borensztein, 1998). The cost of introducing new capital goods is also smaller for more backward countries; that is, countries that produce fewer varieties of capital goods than the leading countries - countries with lower N/N^*- enjoy lower costs of adoption of technology, and will tend to grow faster.

The effect of FDI on the growth rate of the economy is positively associated with the level of human capital, that is, the higher the level of human capital in the host country, the higher the effect of FDI on the growth rate of the economy. Therefore the theoretical model emphasises that FDI is in fact an important vehicle for the transfer of technology, contributing to growth in larger measure than domestic investment. The theory finds that there is a strong complementary effect between FDI and human capital, that is, the contribution of FDI to economic growth is enhanced by its interaction with the level of human capital in the host country.

Thus, it appears that the main channel through which FDI contributes to economic growth is by stimulating technological progress, rather than by increasing total capital accumulation in the host economy. In particular, they argue that FDI raises growth in those countries where the labour force has reached a minimum threshold of educational attainment. They also find

that FDI tends to "crowd in" domestic investment, suggesting that the attraction of complementary activities outweighs the displacement of domestic competitors.

IV: A Theoretical Model Based on Alfaro (2001)

The model examines various links among foreign direct investment, financial markets, and economic growth. It explores whether countries with better financial systems can exploit FDI more efficiently. Countries with well-developed financial markets gain significantly from FDI. While it may seem natural to argue that FDI can convey greater knowledge spill over's, a country's capacity to take advantage of these externalities might be limited by local conditions. The model takes its cue from the recent emphasis on the role of institutions in the growth literature.

The financial system influences the number of local entrepreneurs that can absorb FDI spill over's, which decides the actual FDI benefits to be materialised locally. The model assumes a small, open economy consisting of two sectors: the foreign production sector and the domestic production sector.

Foreign production sector:

The foreign production sector follows a standard constant-returns-to-scale Cobb-Douglas production function. It uses domestically supplied labour and foreign capital,

$$Y_t^{FDI} = AL_t^{\beta}(K_t^{FDI})^{1-\beta} \tag{2.19}$$

from which the international rate of interest, and the wage rate, in the foreign sector can be derived,

$$r = (1-\beta)AL_t^{\beta}(K_t^{FDI})^{-\beta} \tag{2.20}$$

$$w = \beta A^{\frac{1}{\beta}} \{\frac{(1-\beta)}{r}\}^{\frac{1-\beta}{\beta}} \tag{2.21}$$

The stock of foreign capital is also obtained,

$$K_t^{FDI} = \left(\frac{(1-\beta)A}{r}\right)^{\frac{1}{\beta}} L_t \tag{2.22}$$

Domestic production sector:

The domestic product is modelled as a sum of individual domestic entrepreneurs output. First, the economy is assumed to be populated by a continuum of agents of total mass 1, indexed by their level of ability, ε_t^i, following a standard uniform distribution, $\varepsilon_t^i \in (0,1)$.

Then, there exists a threshold level of ability ε_t^*, above which agents become entrepreneurs and undertake entrepreneurial activities in the domestic production sector. Subject to a fixed investment S, each entrepreneur produces output Y_t^i benefiting from the presence of FDI, K_t^{FDI}.

$$Y_t^i = \varepsilon_{i,t} \beta (K_t^{FDI})^{\theta} S^{\gamma}, \ (0<\theta<1;\ 0<\gamma<1) \tag{2.23}$$

So the domestic output is the sum of the outputs produced by all these entrepreneurs. The threshold level of ability divides agents into two groups. The first group consists of agents having above-threshold ability and subsequently become entrepreneurs working in the domestic production sector with a total amount equal to ε_t^* . The second group has agents of below-threshold ability. They then join the labour force of the foreign sector equal ε^*.

The role of the financial market efficiency appears in the model due to its role in determining the threshold ability level and therefore the number of entrepreneurs that can benefit from FDI spill over's. Financial inefficiency is measured as δ, the difference between the lending rate r and the borrowing rate i. A bigger δ indicates higher financial costs which characterizes

an inefficient financial system. When $\partial\varepsilon$ * / $\partial\delta$ > 0 *t*, which suggests a higher level of financial efficiency increases the number of entrepreneurs. Comparative statistics reveal how FDI's output effects hinge on local financial market conditions. First, the total output of the economy is:

$$Y_t = Y_t^{FDI} + (1-\varepsilon_t^*)\beta(K_t^{FDI})^{\theta} S^{\gamma} \tag{2.24}$$

So the total effect of FDI on output is:

$$\frac{\partial Y_t}{\partial K_t^{FDI}} = r + (1-\varepsilon_t^*)\beta\theta(K_t^{FDI})^{\theta-1} S^{\gamma} > 0 \tag{2.25}$$

However, FDI effects depend on local financial intermediation because:

$$\frac{\partial^2 Y_t}{\partial K_t^{FDI}\partial\delta} < 0 \tag{2.26}$$

An improvement in the financial sector increases the number of domestic entrepreneurs and therefore increases the marginal product of FDI. In other words, an efficient financial system enhances FDI's output effects whereas an incompetent financial system diminishes FDI effects. In particular, it emphasises the role of financial institutions and argues that the lack of development of local financial markets can limit the economy's ability to take advantage of potential FDI spillovers.

The model fails to ascertain importance to capital accumulation both physical and human, does not seem to consider this as the main channel through which countries benefit from FDI. Instead, Alfaro et.al. (2009) find that countries with well-developed financial markets gain significantly from FDI via total factor productivity. It also does not consider non-financial institutions which are important in that they can inhibit the ability of a host country to benefit from FDI and the inflows of FDI.

Whereas bad financial markets may mean that a country is not in a position to cope with unregulated short-term capital flows. The theory suggests that the full benefits of long-term stable flows also may not be realized in the absence of well-functioning financial markets. Furthermore, countries should weigh the cost of policies aimed at attracting FDI versus those that seek to improve local conditions. The two policies need not be incompatible. Improved local conditions not only attract foreign companies but also allow host economies to maximise the benefits of foreign investments.

Overall, the theoretical review on FDI highlights the role of spillover effect of FDI on economic growth. Therefore, FDI plays an increasingly important role in the economic growth of the host developing countries, through its distribution in capital formation, human resource development, technology transfer and international trade. Furthermore, according to the recent literature on FDI, foreign investors in a rich natural resource host country can be a curse. Notably, Namibia has abundant resources and as the literature states, FDI flows to these economies is associated with negative effect on the host country's economic growth.

However, Moran (2010) states that the negative effect on growth associated with 'Dutch Disease' is manageable and that positive effects on economic growth are achievable with appropriate macroeconomic policies. Therefore, as Namibia has seen vast improvement in its macroeconomic stability and investment policies, thus a positive linkage is to be expected between FDI and economic growth as suggested by the views of endogeneous and neoclassical growth theorists. Moreover, the study will consider these factors to conduct a necessary empirical investigation, which will fairly and accurately evaluate the total impact of these flows on the Namibian economy.

2.3 THE EMPIRICAL SURVEY OF FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH

Estimating the relationship between FDI and Growth has been an issue amongst empirical economists for some time. A large body of empirical work examines the impact of FDI on

economic growth in developing countries. In this section we review the empirical work including methodologies undertaken in tracking the influence of FDI and which relate to our investigation in Chapter 5 and 6. The discussion is centred around the old empirical methodologies of cross-section to time series and panel studies with stationary and non-stationary properties. Therefore, the discussion is not only biased to single country time series work such as studied in the thesis but gives an overall empirical background and findings on the FDI-Growth nexus.

2.3.1. Cross-Section Studies

Historically, initial efforts to conduct econometric testing of FDI spillovers were limited in scope due to lack of data. In particular, only cross-section databases were available, or in the best of cases collections of cross-sections for a few years. Therefore, it was not possible to follow over time what the impact of foreign investor's entry and permanence was on domestic enterprises (Kugler, 2005). Since technological diffusion is essentially a dynamic phenomenon, the conclusions that can be drawn in these studies based solely on contemporaneous effects have serious limitations.

Balasubramanyam et al. (1996) analyse how FDI affects economic growth in developing economies. Using cross-section data and OLS regressions he finds that FDI has a positive effect on economic growth in host countries having an export promoting strategy but not in countries having an import substitution strategy. Johnson (2006), studied both cross-section and panel data analysis on a dataset covering 90 countries during the period 1980 to 2002 and found FDI inflows enhance economic growth in developing economies but not in developed economies.

Olofsdotter (1998) provides a similar analysis. Using cross-sectional data, she finds that an increase in the stock of FDI is positively related to growth, and the effect is stronger for host countries with a higher level of institutional capability as measured by the degree of property rights protection and bureaucratic efficiency in the host country.

Subsequent analyses argue that spillovers are more likely in some industries than others. In concentrated industries, where there is a wide technology gap between local producers and MNCs, externalities from MNC presence are unlikely to materialize. In the context of Mexico, Kokko (1994) found that in Mexican manufacturing, there is a positive correlation between foreign presence and local productivity only in sectors where the market share of MNC affiliates is low. A similar pattern for Uruguayan manufacturing is also found (Kokko, Tansini and Zejan, 1996).

There is evidence that the incentives for the MNC to transfer state-of-the-art technology are higher when the host-country competitive fringe faces lower barriers to entry. Blomstrom, Kokko and Zejan (1992) find that in consumer goods industries, with relatively low intensity in complex technology and with low capital requirements, MNCs deploy more advanced technologies to overcome the disadvantages of alien status. The way for MNCs to outdo competitors is to keep one step ahead. They conclude that a more competitive local market structure leads to an increase in the potential for spillovers due to the increase in technology flows.

In contrast, to the studies that found a positive effect of FDI on growth using cross-sectional analysis, others found mixed effects of FDI on growth. In a cross-country regression of data for 69 countries, Borensztein *et al.* (1998) find that the direct effect of FDI on growth is not significant, although it is positive. But when it is interacted with human capital, the interaction term is positive and significant. This implies that the positive effect of FDI depends on the level of human capital. Several other studies have found similar ambiguous exogenous effects from FDI. Alfaro *et al.* (2004) find an unclear effect from FDI flows on growth, but a positive effect of FDI can be facilitated by a better financial system in a cross-section of over 70 countries. Both these studies relied on cross-sectional data, which ignores country-specific factors. Durham (2004) also does not detect any direct positive effect from FDI on growth in a cross-section of 80 countries. But the effect of FDI is positive if financial or institutional development is high.

Moreover, limitations against the use of cross-sectional data and in favour of the use of time series data are two-fold. First, using cross-sectional data implicitly impose or assume a common economic structure and similar production technology across different units which is most likely not true. In cross-section studies, time series properties are not taken into account. The most serious insufficiency present in cross-sectional studies is rooted in the causal interpretation that is attempted.

Previous cross-sectional studies implicitly assumed a causality from FDI to economic growth. It is important to understand that the theory relating to causality tests is based upon time-series analysis and hence a causal relationship is best tested in the time-series framework instead of the cross-sectional context. It is not possible to infer anything, in cross-sectional context, more than a contemporaneous correlation between FDI and output growth instead of a long-run relationship.

They do not allow for different cross sections to exhibit different patterns of causal relationships. Finally, since the causality result from these studies is only valid, if at all, on average, it can easily change with the addition or reduction in the number of units or provinces. Alfaro (2007), states that since unobserved heterogeneity might be correlated with FDI and growth, cross sectional studies fail to establish causality and are likely to generate biased coefficients. Yet, this early econometric literature is important as a first approximation to quantify the mechanisms documented in case studies.

2.3.2. Time Series Studies

Time series identify trends of FDI and growth over time with several studies using cointegration techniques to investigate the causal relationship between FDI and growth for individual countries. In this respect, time-series models provide a preliminary test of the linearity hypothesis, in so far as the greater the accumulation of reproducible inputs, the greater the growth rate of output. For example, Zhang (2001) examines cointegration between FDI and growth for 11 developing countries, on a country-by-country basis, in East Asia and Latin America covering the period 1970–1995. His results indicate cointegration and that FDI

was more likely to promote growth in Asia than in Latin America. Furthermore, Zhang (2001) finds that FDI tends to promote economic growth when the host country adopts liberalized trade policies, improve education, and maintain macroeconomic stability. Cuadros et al. (2004), using quarterly data from 1980 to 2000, find cointegration between FDI and GDP for two out of three Latin American countries. Moreover, they find that for both countries long-run and short-run causality run from FDI to GDP.

Fedderke and Romm (2006) investigate the FDI-led growth hypothesis for South Africa using annual data for the period 1960–2003. Their results suggest that FDI and GDP are cointegrated and that long-run causality runs from FDI to GDP. However, these results should also be viewed with scepticism. Gursoy et al. (2012) investigate the impact of FDI on economic growth of Georgia over the period 1997-2010 and found that FDI has a positive effect on GDP in Georgia. Marwah and Tavakoli (2004) test the effect of FDI on economic growth in Indonesia, Malaysia, Philippines, and Thailand. Using time series annual data over the period 1970-1998, they find that FDI has positive correlation with economic growth for all four countries.

Herzer, 2007 suggests that some types of FDI projects are better than others. And, that the level of technological spillover to the host country is dependent on the absorptive capacity of its citizens, which is related to the ability of a firm to recognize the value of new external information, assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990; Marcin, 2007). Lumbila (2005) claims that Africa will be able to take advantage of FDI only if it meets some basic conditions since the impact of FDI on economic growth is constrained by absorptive capacity in terms of trained workforce, basic infrastructure network, and depth and efficiency of the financial system. Similarly, Ayanwale (2007) asserts that the lack of significant effect of FDI on economic growth in Nigeria could be attributed to the low level of education. Bachtiar (2003), have examined the impact of FDI in Indonesia. Using annual time series data (1970-2000), he identifies a positive sign for the coefficient on FDI inflows with GDP as the dependent variable.

In contrast to the studies that find a positive correlation between FDI and growth, others find a non-significant or negative effect, Akinlo, 2004 and Ayanwale, 2007. However, FDI has both costs and benefits. Thus, MNCs can be agents of both development and underdevelopment of the host country depending on what types of investment and what the profits from the investments are used for. Though Tandon's (2002) assertion is appreciated that the foreign investor is in business for profit and not for development, the peculiar case of SSA (the poorest region of the world) points to the fact that MNCs in the region must be development oriented to be able capture the hearts and minds of the people (and consequently their money). The assumption is that in the long run, the growth of the economies would lead to a higher level of income and therefore higher purchasing power of the citizens and subsequently market expansion for the MNCs. A win–win situation for both MNC and host country.

2.3.3. Panel Studies

In the study of FDI, time-series estimations of cross-country lead to simultaneity and omitted variable bias. Panel estimation makes it possible to account for unobserved country-specific effects, thereby eliminating a possible source of omitted-variable bias[7]. Therefore, in Panel data the existence of unobservable growth determinants that are country-specific can be acknowledged and taken into account in the estimation procedure. Cross-country studies are known to suggest a positive role for FDI in generating economic growth. In this sub-section we review the empirical work on the FDI-Growth nexus by considering both branches of panel data analysis which are stationary and non-stationary panels. Table 2.1, presents a survey of the empirical literature.

[7] The fixed effects panel model controls for unobserved time-invariant heterogeneity by treating country-specific effects as fixed but unknown constants. Similarly, the random effects panel model allows for time-invariant heterogeneity. Instead of treating the country-specific effects as fixed constants, the random effects model, however, assumes that the individual-specific effects can be considered as random and drawn from a distribution. In contrast to the fixed and random effects models, the pooled model does not account for any heterogeneity.

Table 2.1. FDI and Growth: Empirical Literature Survey

Author(s)	Year	Sample	Type of data	Findings
Jie Ji et. al	2010	1987-2008, Chongqing	time series	Positive, FDI generates growth
Majagaiya K P	2010	1980-2006, 12 Latin American Countries	panel	Positive
Thangavelu et. al	2009	1970-2005, Chile, India, Malaysia, Pakistan and India	panel	Positive & bidirectional causality between FDI and output
Mun Kar et. Al	2008	1970-2005, Malaysia	time series	Positive
Dhakal D	2007	1980-2001, South & South east Asia	panel	Positive, strengthened by greater openness to trade
Alfaro L	2003	1981-1999, OECD Countries	panel	Negative in Primary sector and Positive in Manufacturing sector
Bengoa and Sanchez-Robles (2003)	2003	18 Latin American countries 1970-1999	panel	FDI has a positive effect on economic growth, magnitude depends on host country conditions
Zhang	2001	1970-1995, 11 Latin American Countries	time series	Positive, however FDI impact depends on country specific factors
Carkovic et. al	2002	1960-1995	cross section and panel	Negative
Bende-Nabende et. al	2000	1970-1994, 5 Asian countries	panel	Positive for 3 and negative for 2 due to country specific factors

De Mello	1999	1970-1990, 16 OECD & 17 non-OECD countries	panel and time series	Positive but not for all countries depends on country specific factors
Borensztein et. al	1998	1970-1989, 69 Developing Countries	cross-section	Positive and depends on absorptive capabilities of technology in host country
Balasubramanyam et al.	1996	46 developing countries 1970-1985	cross-section	FDI has a positive effect but only for export promoting host countries

Source: Compiled by Author.

I. Stationary Panel Data

The econometric theory for Panel studies was largely developed for survey data where the number of individuals was large and the number of time periods small. However, in recent years there has been growing interest in cases where there are fairly long time-series for a large number of groups. There is a large literature dealing with dynamic models in the small time period cases. Many economic relationships are dynamic in nature and one of the advantages of stationary Panel data is that they allow to better understand the dynamics of adjustment by including lags. Including lagged explanatory variables, panel procedures allow control for endogeneity bias, and in the framework of dynamic model specifications it is also possible to explicitly test for Granger causality.

There is an increase in number of papers that use dynamic panel data methods like system-GMM approach to investigate the productivity spillovers of FDI. For example, by Barrios *et al.* (2009), Crespo *et al.* (2009), Suyanto *et al.* (2009), Halpern and Muraközy (2005) and Muraközy (2007). Carkovic and Levine (2005) use the GMM dynamic panel data estimator of Arellano and Bover (1995) and Blundel and Bond (1998) with data averaged over seven 5-year periods between 1960 and 1995 for a sample of 68 countries. After controlling for the potential bias induced by endogeneity and omitted variables, they do not confirm the results

of the cross-country studies by Blomström et al. (1994), Balasubramanyam et al. (1996), Borensztein et al. (1998) and Alfaro et al. (2004).

It is now generally accepted that cross sectional industry-level studies are unable to identify the relevant causality. Consequently, recent studies have exclusively used firm level designs, typically combined with the use of panel data analysis. This provides better tools to solve the causal identification problem[8]. The effect of these methodological changes has been quite striking. The generally positive results in the earlier generation of studies have largely disappeared, both for advanced industrial economies e.g. Sweden (Braconier et al., 2001) or the USA (Chung, 2001), and also when they are transition or industrialising economies[9].

The advantage of the panel data approach is that it can control for foreign investor selection bias. These studies examine whether foreign presence increases the productivity of the firms in the same industry. The results, however, have been mixed. In a study of Venezuelan factories, Aitken and Harrison (1999) find net negative benefits to domestic firms, a result that they attribute to the crowding-out effect. Some other studies also found negative spillovers such as Haddad and Harrison (1993) for Morocco, Djankov and Hoekman (2000) for the Czech Republic, Konings (2001) for Bulgaria, Romania, and Poland, and Javorcik (2004) for Lithuania.

A problem with most of the empirical literature is treating the link between FDI and productivity of domestic firms as a black box. Usually, researchers do not attempt to address the channels through which these effects take place. In order to understand how the spillovers of FDI work, a detailed analysis about the channels of these effects is needed: like effects on innovation, work practices, and knowledge flows to domestic firms. So far, few studies have studied the FDI spillovers on innovation activities of domestic firms. These include Bertschek (1995), Blind and Jungmittag (2006) and Girma *et al.* (2006). Girma *et al.* (2006) study the FDI spillovers to innovativeness of Chinese state-owned enterprises. Bertschek

[8] But it has not addressed the problem that, if the competitive pressure effects ('pseudo-spill-over's') are not partial led out, positive results might still be obtained in the absence of 'genuine' knowledge spillovers.
[9] See for example Haddad and Harrison, (1991 and 1993) on Morocco, Djankov and Hoekman (2000) on Czech Republic, Aitken and Harrison (1999) on Venezuela, and Konings, (1999) on Poland, Bulgaria and Romania.

(1995) and Blind and Jungmittag (2006) use German data and find that the market share of foreign-owned firms is positively associated with innovation propensity of domestic firms in the same industry.

Also, one can explain the differences in results to being that standard cross-country and panel studies on FDI and growth typically restrict the relationship between FDI and GDP to be in growth rates or first differences. The preclusion of a potential long-run or cointegrating relationship between the levels of the variables a priori can, however, severely bias the results in such analyses. As Ericsson et al. (2001) show, simply using first differences or growth rates without allowing for a level relationship can lead to serious misspecification problems even in cross-country analyses.

II. Non- Stationary Panel Data

With large number of individuals and large number of time periods, Panel time-series tend to be non-stationary, (Smith, 2001). The non-stationarity of such panels means cointegration and determining the order of integration becomes important. Therefore, more recent econometric studies use panel cointegration techniques. Many economic time-series appear to be integrated of order one, I(1), and are said to exhibit a unit root. However, the Chapter does not intent to discuss this methods of unit root testing or spurious regressions but intends to review FDI studies that have applied this econometric technique and their findings.

For example, Basu et al. (2003) apply cointegration tests to examine the relation between FDI and growth using a panel of 23 developing countries over the period 1978–1996. Allowing for individual country and time-fixed effects as well as country-specific cointegration vectors they find a cointegrating relationship between FDI and GDP. Their results indicate bidirectional causality between these two variables for relatively open economies. For relatively closed economies, however, long-run causality mainly runs from growth to FDI, thus implying that growth and FDI are not reinforcing under restrictive trade regimes.

Similarly, Hansen and Rand (2006) analyse the relationships between FDI and GDP in a sample of 31 developing countries for the period 1970–2000. Using estimators for heterogeneous panel data they find cointegration between FDI and GDP as well as between the share of FDI in gross capital formation and GDP. Their empirical evidence indicates that FDI has a lasting impact on GDP, whereas GDP has no long-run impact on FDI. They also find that a higher ratio of FDI in gross capital formation has positive effects on GDP. Hansen and Rand (2006) interpret this finding as evidence in favour of the hypotheses that FDI has an impact on GDP via knowledge transfers and adoption of new technologies. With such panel cointegration analyses, heterogeneity remains, however, a serious concern. One problem is that a rejection of the null hypothesis of no panel cointegration can be driven by a few cointegrated relationships (see, e.g. Gutierrez, 2003).

In addition, and perhaps more significantly, in the presence of cointegration across countries in a panel, the null of no panel cointegration may also be falsely rejected (see, e.g. Banerjee et al., 2004, 2005). Consequently, there is a high risk that the whole panel is erroneously assumed to be cointegrated, although only a few or even none of the (within-country) relationships are actually cointegrated.

If, however, only a small fraction of the relationships in the panel actually cointegrates, it is not appropriate to apply cointegration techniques to the entire panel, since the mixing of cointegrated and non cointegrated relationships can lead to serious bias in determining causality as well as the short and long-run parameters (see, e.g. Strauss and Wohar, 2004). Therefore, Banerjee et al. (2004) argue that many of the conclusions in the panel literature may be based upon misleading inference, and that it may be better to look at the evidence from country-by-country analyses. Therefore, we consider using a single host country in the thesis as suggested by Banerjee et al. (2004) amongst others. In addition, there is no doubt that FDI flows are beneficial to the economic growth and development of recipient host countries. And, drawing from the empirical literature, it is clear that there are no recent studies that exclusively investigate the largely growing flows of FDI to the Namibian economy. Moreover, having reviewed the empirical work, the thesis will conduct both a time series and non-stationary panel data techniques.

PART II: DETERMINATS OF FOREIGN DIRECT INVESTMENTS

2.4. THEORATICAL ASPECTS ON THE MACROECONOMIC DETERMINANTS OF FOREIGN DIRECT INVESTMENT

To fully capture the benefits of FDI on economic growth it is important to understand what determines such flows to a host country. There is a variety of theoretical models explaining FDI and a wide range of factors that can be experimented with in empirical studies in order to find the determinants of FDI. In general, at least eight different approaches to explaining FDI as the location decision of multinational enterprises (MNEs) can be distinguished. These are:

- determinants according to the Neoclassical Trade Theory and the Heckscher-Ohlin model in which capital moves across countries owing to differences in capital returns[10];
- ownership advantages as determinants of FDI (including monopolistic advantage and internalisation theory) based on imperfect competition models and the view that MNEs are firms with market power[11];
- determinants of FDI in Dunning's (1977 and 1979) OLI framework which brought together traditional trade economics, ownership advantages and internalisation theory;
- determinants of FDI according to the horizontal FDI model or Proximity-Concentration Hypothesis[12];
- determinants of FDI according to the vertical FD model, Factor-Proportions Hypothesis or the theory of international fragmentation[13];
- determinants of FDI according to the Knowledge Capital Model[14];
- determinants of FDI according to the diversified FDI and risk diversification model[15];

[10] See, for instance, Markusen et al. (1995), pp.98-128 and Aliber (1970) for the model with currency risks.
[11] See Hymer (1960), Kindleberger (1969) and Caves (1971) for ownership advantages and Buckley and Casson (1976) for internalisation theory.
[12] See Krugman (1983), Markusen (1984), Ethier (1986), Horstmann and Markusen (1992), Brainard (1993).
[13] See Helpman (1984). For models on international fragmentation of production see Dixit and Grossman (1982), Deardorff (2001) and Jones and Kierzkowski (2004).
[14] See Markusen (1997).
[15] See Hansen et al. (2001), Grossman and Helpman (2002), Ekholm et al. (2003) for studies on new forms of FDI, and Rugman (1975) for risk diversification.

- policy variables as determinants of FDI when FDI is seen as the result of a bargaining process between MNE and governments[16].

Interest in the effects of taxes on FDI has been considerable from both international and public economists. An obvious hypothesis is that higher taxes discourage FDI with the more important question one of magnitude. Most of the literature on taxation effects of FDI point to Hartman's papers [1984; 1985] as the starting point of the literature, as these were the first to point out a way in which certain types of FDI may surprisingly not be very sensitive to taxes. The key insight by Hartman is that earnings by an affiliate in foreign country will ultimately be subject to parent and host country taxes regardless of whether it is repatriated or reinvested in the foreign affiliate to generate further earnings. There is no way to ultimately avoid foreign taxes on these earnings. On the other hand, new investment decisions consider transfers of new capital from the parent to the affiliate that do not originate from the host country and, thus, have not yet incurred any foreign taxes. This has a number of important implications.

First, it means that firms will want to finance new FDI through retained earnings as much as possible, before turning to new infusions from the parent. Second, this means that FDI through retained earnings should only respond to host country tax rates, not parent country tax rates or the parent country's method of dealing with double taxation issues. FDI through new transfers of capital, on the other hand, will potentially respond to both parent and host country taxes and rates of return available in both the parent and host markets. The quality of institutions is likely an important determinant of FDI activity, particularly for less-developed countries for a variety of reasons. First, poor legal protection of assets increases the chance of expropriation of a firm's assets making investment less likely. Poor quality of institutions necessary for well-functioning markets (and/or corruption) increases the cost of doing business and, thus, should also diminish FDI activity.

[16] Game-theoretic frameworks in which this bargaining process is analysed include Bond and Samuelson (1986), Black and Hoyt (1989), Barros and Cabral (2001), Haaland and Wooton (2001).

And finally, to the extent that poor institutions lead to poor infrastructure (i.e., public goods), expected profitability falls, as does FDI into a market. The hypothesised link between FDI and trade protection is seen as fairly clear by most trade economists-higher trade protection should make firms more likely to substitute affiliate production for exports to avoid the costs of trade production. This is commonly termed tariff-jumping FDI.

Aggarwal, (1997), explains that economic reforms in a host country not only confer greater freedom on TNCs in their choice to internalize or not, but also affect the market conditions, which in turn, influence this choice. J. Peter (2002), this paper 'FDI and single markets' extends the theory of multinational corporations, found three distinct influences of internal trade liberalization by a group of countries on the level and pattern of inward foreign direct investment (FDI).

As laid out by the model of Buckley and Casson (1981), one can think of exports as involving lower fixed costs, but higher variable costs of transportation and trade barriers. Servicing the same market with affiliate sales from FDI allows one to substantially lower these variable costs, but likely involves higher fixed costs than exports. This suggests a natural progression from exports to FDI once the foreign markets demand for the MNE's products reach a large enough scale (size).

First, since Markusen (1984) and Helpman (1984), MNE general equilibrium theory has suggested two very distinct motivations for FDI: To access markets in the face of trade frictions (horizontal FDI) or to access low wages for part of the production process (vertical FDI). More recently, a number of papers have begun to sketch out more complicated patterns of FDI. For example, an important possibility is export platform FDI (Ekholm et al., 2003, and Bergstrand and Egger, 2004) where a MNE places FDI into a host country to serve as a production platform for exports to a group of (neighboring) host countries. Another important example is a more complicated vertical interaction (or fragmentation) result where affiliates of an MNE in a variety of hosts are shipping intermediate goods between them for further processing before shipping a (more) finished product back to the parent (see e.g., Baltagi et al. (2004)).

Francisca *et al* (1996), suggested that market size, growth rate, labour costs, export flows and tariff barriers have shown to influence U.S. foreign direct investment in the European Union. Saskia *et al* (1998), they have analysed the determinants of net foreign direct investment inflows in emerging economies between 1978 and 1995. The theoretical framework of this study is based on the concept of the Institutional FDI Fitness theory, which stipulates that FDI is determined less by intransigent fundamentals than by institutional variables more amenable to change, namely policies, laws, and their implementation. They tested the FDI Fitness concept in an econometric cross-section across 67 emerging economies. Their econometric analysis showed government and market variables as the most significant determinant of FDI inflows. Government fitness is reflected in economic openness with only minimal trade and exchange rate controls. Government Fitness also means a strong rule of law and low corruption, based on legal and administrative equity and transparency (Saskia et al. (1998).

Dunning (1977, 1979, 1988 and 1993) presented the OLI (ownership, location, and internalisation) theory as an eclectic approach. In analysing prerequisites for FDI to take place, he asserted that a firm should have a firm specific advantage (ownership), a location advantage to mobilise this firm specific know-how (location), and an incentive to internalise external transactions (internalisation). Location advantage also embodies other characteristic (economic, institutional and political) such as large domestic markets, availability of natural resources, an educated labour force, low labour cost, good institutions (the clarity of country's law, efficiency of bureaucracy and the absence of corruption), political stability, corporate and other tax rates among others.

Nebende *et al* (2000), stated that the cost related factors are the dominant determinants of FDI. In particular, the dominance of real wage rates and human capital suggest that the "under-priced" skilled (semiskilled) labor is the driving force behind FDI. Bhasin et al (1994) followed by Morrissey and Rai (1995), claims that the size of the domestic market, as well as, growth prospects of recipient economy are highly taken into consideration when foreign investors relocate production in the host country. They argue that argue that international agreements on trade and investment also affect the volume and direction of FDI flows.

2.5. MACROECONOMIC DETERMINANTS OF FOREIGN DIRECT INVESTMENTS: EMPIRICAL EVIDENCE

Kogut and Chang (1991) and Blonigen (1997) provide evidence that Japanese firms' acquisition FDI in the US was motivated by accessing firm-specific assets, not necessarily due to internalization of their own firm-specific assets. These motivations may or may not be contradictory to internalization motivations for FDI. As predicted, Blonigen finds that these exchange rate effects on acquisition FDI are primarily for high-technology industries where firm-specific assets are likely of substantial importance.

Other studies have generally found consistent evidence that short-run movements in exchange rates lead to increased inward FDI, including Grubert and Mutti (1991), Swenson (1994), and Kogut and Chang (1996), with limited evidence that the effect is larger for merger and acquisition FDI (Klein and Rosengren, 1994). Thus, the evidence has largely been consistent with the Froot and Stein (1991) and Blonigen (1997) hypotheses that aggregate FDI is related to fluctuations in real exchange rate.

Using these more precise measures of changes to a trade protection faced by a firm, i.e. ways in which changes in exchange rate level may affect inward FDI for a host country, Belderbos (1997) and Blonigen (2002) both find more robust evidence of tariff-jumping FDI, though Blonigen results strongly suggest that such responses are only seen from multinational firms based in developed countries. Early papers by Lipsey and Weiss (1981, 1984) find a positive coefficient when regressing US outbound FDI measures to host countries on exports to the host countries, which is inconsistent with the notion of FDI replacing exports.

Root and Ahmed (1979) also found that the number of regular (constitutional) changes in government leadership between 1956 and 1967 was significant. However, other political variables, such as the number of internal armed attacks, the degree of nationalism and colonialism and colonial affiliations, were not significant. Schneider and Bruno Frey (1985) found a negative relationship between the number of political strikes and riots in the host countries and FDI flows. For developing countries, intra country political events had a more

robust relationship with FDI. Wheeler and Moody (1992), has found a broad principal component measure of administrative efficiency and political risk as the determinants of FDI. Stephen *et al*, (1997), According to the findings of their research work the gross domestic product (GDP), imports, exports, infrastructure, political risk, are significant influences on the decisions of MNCs to invest abroad.

PART III: CAUSALITY BETWEEN FOREIGN DIRECT INVESTMENTS AND ECONOMIC GROWTH

2.6. MUTUAL RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENTS AND ECONOMIC GROWTH

Most research investigating or discussing foreign direct investments is concerned with the causal relationship between FDI and economic growth. Examples include Hansen and Rand (2004), Coe (2003), De Mello (1999), Nair-Reichart and Weinhold (2001) and Basu, Chakraborty and Reagle (2003) among others.

The causal link between FDI and economic growth has strategic and policy implications for developing economics (LDC). FDI and economic growth may be linked in one of the three possible ways: (1) Causal link may run from economic growth to FDI. If the causal link runs from economic growth to FDI, it means that economic growth is a prerequisite for attracting and absorbing FDI. In such a case, the policy implication is that developing countries (LDC) must lay emphasis on economic growth rather than going after FDI. (2) Causal link may run from FDI to economic growth. If there is unidirectional causality from FDI to economic growth, it leads credence that FDI not only leads capital formation and employment generation but also provides economic growth to host counties. The policy implication, in such case, suggests that corporate rules and regulations of host countries must address to attract FDI. (3) Causal relation may run in both ways. If the causal link is bidirectional, that is, both economic growth and FDI have reinforcing effects on each other.

2.7 THE EMPIRICAL EVIDENCE ON CAUSALITY

Another strand of the literature has focused more directly on the causal relationships between FDI and growth, at least, several studies have tested for Granger causality between the two series using different samples and estimation techniques. Similarly, the results by Ramírez (2000) indicate that FDI Granger causes GDP in Mexico for the 1960 to1995 period, both in the short and in the long run. Xiaohui et al. (2002) use quarterly data for China from 1981 to 1997 and find cointegration as well as bi-directional short-run and long-run causality between FDI and GDP.

Chowdhury and Mavrotas (2003) tested for Granger causality using the Toda and Yamamoto (1995) specification, thereby overcoming possible pre-testing problems in relation to tests for cointegration between series. Using data from 1969 to 2000, they find that FDI does not Granger cause GDP in Chile, whereas there is a bi-directional causality between GDP and FDI in Malaysia and Thailand. De Mello (1999) looks at causation from FDI to growth in 32 countries of which 17 are non-OECD countries. First he focuses on the time series aspects of FDI on growth, finding that the long run effect of FDI on growth is heterogeneous across countries. Second, de Mello complements his time-series analysis by providing evidence from panel data estimations.

In the non-OECD sample he finds no causation from FDI to growth based on fixed effects regressions with country specific intercepts, and a negative short run impact of FDI on GDP using the mean group estimator. Nair-Reichert and Weinhold (2001) test causality for cross country panels, using data from 1971 to 1995 for 24 countries. Like De Mello (1999), they emphasise heterogeneity as a serious issue and, therefore, use what they refer to as the mixed fixed and random (MFR) coefficient approach in order to test the impact of FDI on growth. The MFR approach allows for heterogeneity of the long run coefficients, thereby avoiding the biases emerging from imposing homogeneity on coefficients of lagged dependent variables. They find that FDI on average has a significant impact on growth, although the relationship is highly heterogeneous across countries.

Choe (2003) uses the traditional panel data causality testing method developed by Holtz-Eakin *et al.* (1988) in an analysis of 80 countries. His results points towards bi-directional causality between FDI and growth, although he finds the causal impact of FDI on growth to be weak. Finally the study by Basu *et al.* (2003) addresses the question of the two-way link between growth and FDI. Allowing for country specific cointegrating vectors as well as individual country and time fixed effects they find a cointegrated relationship between FDI and growth using a panel of 23 countries. Basu *et al.*(2003) emphasise trade openness as a crucial determinant for the impact of FDI on growth, as they find two-way causality between FDI and growth in open economies, both in the short and the long run, whereas the long run causality is unidirectional from growth to FDI in relatively closed economies.

Econometric studies based on the assumption that there is one-way causality from FDI to GDP growth has been noted and criticised in more recent studies (see, e.g. Kholdy, 1995). In other words, not only can FDI 'Granger-cause' GDP growth, but GDP growth can also affect the inflow of FDI. Failure to consider either direction of such causality can lead to an inefficient estimation of the model and hence is subject to the simultaneity bias. The presupposition of the existence of causality is valid and very important to study

Second, new developments in econometric theory, such as time series concepts of cointegration and causality testing, have further expanded the debate on the FDI-growth relationship. Using a Granger no-causality testing procedure developed by Toda and Yamamoto (1995), Shan *et al.* (1999) found that in the case of China there is indeed a two-way causality between FDI and output. They thus pointed out that previous studies using a single equation approach may be subject to a simultaneity bias, and hence future studies should consider the use of simultaneous equation model, Shan *et al.* (1999).

There is a need for investigating the strength of causality between FDI and output as well as the determinants of FDI as in the study by Shan (2002). Theoretically, the causality between FDI and GDP growth could run in either direction: FDI could promote further GDP growth in the Solow spirit of growth model as argued by Todaro (1982), Dunning (1970), World Bank (1993) and Kruger (1987). However, the causality could also run the opposite way: rapid

GDP growth could induce more inflow of FDI. This is because rapid GDP growth will usually create a high level of capital requirement (and a resource gap) in the host country, and hence the host country will demand more FDI by offering concessional terms for FDI to attract overseas investors.

It is revealed in economic literature that casual association between said variables is mixed due to heterogeneity among economies, diverse nature of long and short run impacts and openness to trade (Bashier and Bataineh (2007). The endogeneity problem, resulting from the feedback effects or measurements errors, along with unavailability of appropriate data to address this issue, stands in the way of providing an informative interpretation of causality. The presupposition of the existence of causality, nevertheless, is valid and very important to study. This rendered continuous engagement of researches in theorizing about and developing models of the casual process in the realm of the FDI-Growth relationship, and evaluating those models using standards of evidences.

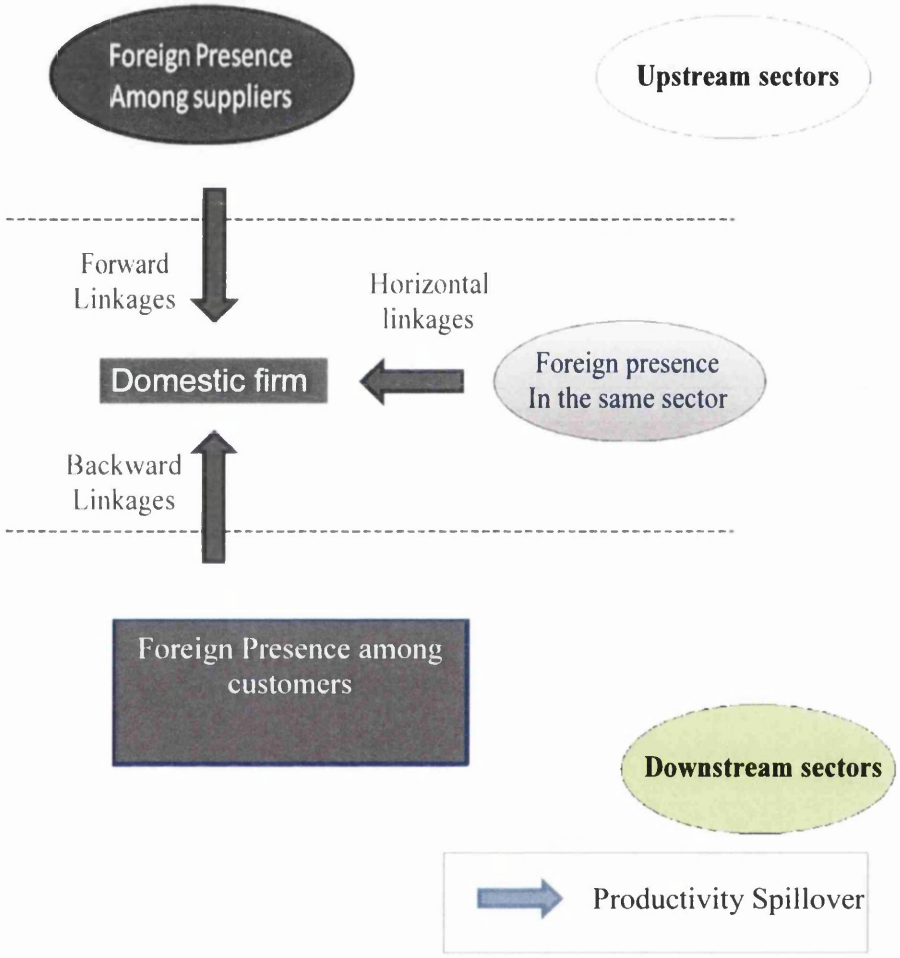
PART IV: INDIRECT IMPACT OF FDI ON ECONOMIC GROWTH: SPILLOVER CHANNELS OF FDI

2.8. HORIZONTAL SPILLOVERS

In this section, we discuss the spillovers affiliated with the presence of foreign investors. Having reviewed the theory and empirical findings of the beneficial effects of FDI flows, one needs to understand the spillover channel mechanism behind these flows. There are two types of spillover channels considered in the literature as indirect impacts of FDI on economic growth; namely, the vertical and horizontal channels. Spillover effect FDI has proven to be vertical across firms rather than horizontal. Horizontal spillovers of FDI occurs when the presence of FDI increases the productivity of the domestic firms in the same industry. Teece (1977) argues that such spillovers can occur through demonstration effects, labour turnover and competition effect channels.

Firstly, through the demonstration effect channel, domestic firms may be able to reduce the innovation costs simply by observing and imitating the foreign invested firms. Secondly, with labour turnover channel workers employed and trained by foreign invested firms may join domestic firms or create their own firms. The third channel is the competition effect. Figure 2.1, below shows the channels of Spillover and linkages therein.

Figure 2.1: Spillover and Linkages



Recent literature argues that the spillover theory only holds for firms that are jointly owned by domestic and foreign owners. And that the spillover effect does not hold in fully foreign owned firms. Jointly owned firms tend to source locally whereas fully foreign owned firms import inputs required for production and as such there is no transfer of technology or knowledge spillover.

The spillover effect can be seen in domestic firms that supply inputs to foreign firms. Such domestic firms benefit from the presence of foreigners due to the transfer of skills and new technology. The increase in demand for the products insure that domestic firms keep up with their foreign customer and ensure good quality product are produced and delivered in time. Domestic firms utilise their resources efficiently which increases productivity and the technology and skills obtained are then used to reduce product error not only for the current customer but for other products and market as well.

Ideally, increased competition resulting from FDI might induce domestic technological improvements by contributing to the elimination of inefficient indigenous firms, encouraging the birth of new innovative firms and inducing local firms to react to the foreign threats by assimilating foreign technologies and mobilising resources. Caves (1974) and Chung (2001) argue that this should not be considered a spillover effect because it does not involve any flow of knowledge. In addition, as noted by Aitken and Harrison (1999), increased competition associated with foreign presence might also reduce the productivity of domestically owned firms if foreign firms draw demand from them and the domestic firms have to cut production and increase costs[17].

Grossman and Helpman (1991) show that knowledge spillovers need not be limited to domestic investment, but can be increased through international trade which has the ability to introduce a country to technology that may not exist within its own borders. The presence of multinational corporations should allow for technology to be transferred between countries through a process of learning by watching. Active participation by employees in the production process will accelerate the rate of diffusion and increase the rate of growth. The net horizontal effect of FDI on domestic firms is inconclusive; it depends on the relative magnitudes of the positive technological spillovers and the negative crowding-out effect.

[17] Indeed there is no agreement about the relationship between FDI, competition and technical change in domestic firms. Conventional wisdom has mostly argued that FDI will introduce more competition in local market and therefore that local efficiency will be improved. However, some empirical works have found that FDI may increase concentration rather than competition, although it is also argued that sometimes concentration may promote innovation.

Empirical evidence on horizontal effects are split into two studies, the industry-level and firm-level panel data. Most industry-level studies find a positive correlation between FDI and industry productivity. As most of them use cross-sectional data, it is difficult to distinguish whether FDI actually increases domestic firms' productivity, or whether foreign investors are simply attracted to the high-productivity industries. However, studies on developed countries often find evidence of positive spillovers such as Castellani and Zanfei (2002) for Italy, Keller and Yeaple (2003) for the United States, Görg and Strobl (2003) for Ireland, and Haskel, Pereira, and Slaughter (2007) for the United Kingdom.

However, positive results from this type of research design can be explained by reasons other than the existence of technology spillovers from FDI. In particular, Aitken and Harrison (1999) have noted an important identification problem: MNCs tend to operate in relatively high-productivity sectors in the host economy. The relatively high incidence of FDI in an industry may induce the exit of less competitive domestic firms, thus raising the average productivity level of the industry because of the larger share of technologically superior foreign firms in its output[18], rather than by diffusing any productivity raising technology to domestic firms.

2.9. VERTICAL SPILLOVERS

In their review of the literature on productivity spillovers, Blomstrom and Kokko (1998) point out that "local firms may be able to improve their productivity as a result of forward or backward linkages with MNC affiliates." With backward spillovers of FDI, technology transfer is through supply chains from foreign invested firms to domestic suppliers. And, in the case of forward spillovers, domestic firms gain access to new or less costly intermediate inputs as a result of the foreign investment in upstream industries. If foreign invested firms are successful at preventing the leakage of their firm-specific knowledge to domestic competitors in the same industry, there is no scope for intra-industry technology spillovers.

[18] Caves (1974) has denominated this effect, changes in the allocative efficiency.

On the other hand, multinationals have no incentive to prevent technology diffusion to upstream sectors, as they may benefit from improved performance of intermediate input suppliers. Thus, backward linkages should be most likely channel through which spillovers would manifest themselves (Javorcik, 2004).

Similarly, domestic firms may become more productive as a result of gaining access to new, improved, or less costly intermediate inputs produced by multinationals in upstream sectors (forward linkage channel). Sales of these inputs by multinationals may be accompanied by provision of complimentary services that may not be available in connection with imports. Literature suggests that, foreign invested firms voluntarily or involuntarily help increase the productivity of domestic suppliers through backward linkages. Lall (1980) points out that technology transfer from multinationals to local suppliers can take place in several ways. A multinational might (1) help prospective suppliers set up production capacities; (2) provide technical assistance to raise the quality of suppliers' products and to facilitate innovations; and (3) provide training and help in management and organization (also see UNCTAD, 2001). Several factors may affect multinationals' decisions to transfer technology to local suppliers and their effects on the degree of backward linkages.

First, as Rodriguez-Clare (1996) notes that, if a multinational can easily access international market and import intermediate goods from overseas, it will choose the channel that yields the highest profit. In particular, it may choose to import the intermediate goods for quality considerations for instance, instead of sourcing them locally (Lin et al., 2009).

For example, in the 1990s, China's machine tool and aircraft industries suffered significant decline partly because their downstream customers insisted to source intermediate goods from overseas markets. Such displacement of pre-existing linkages, as emphasized in Rodriguez-Clare (1996), could be damaging to the host country. Second, even if the foreign investors source locally, their local suppliers may fail to learn and absorb the technology to be transferred if they are far behind their foreign partners in productivity (Smarzynska, 2002).

Finally, entry of foreign investors can also lower the degree of backward linkages with domestic suppliers if the foreign investors require its domestic suppliers to cease supplying other downstream firms as a condition for transferring its technology. Lin and Saggi (2007) show that such exclusive technology transfer arrangements can indeed emerge in equilibrium and hurt the domestic economy in terms of both vertical linkages and welfare.

However, with respect to forward linkages, local firms were found to lose market share due to foreign presence in their sector, and experienced lower employment and slower Total Factor Productivity (TFP). Whereas, some firms benefit from the presence of FDI and have increased employment and increased TFP as such. In some cases, local firms report rising competition pressures but as a result of FDI enjoy increased employment and TFP. And others lost employees to MNC's.

An interesting find was by Javorcik and Spatareanu (2003), who found three scenarios associated with backward linkages and also found that demand or sourcing local inputs increased as a result of FDI. First scenario is that of 'cherry picking', this is when MNC's award contracts to the best local firms that are already at the required level. Secondly, Potential suppliers experience positive productivity shock after which they reach the performance level sufficient to obtain contracts from a multinational. This shock may include higher requirements demanded by the foreigner, i.e. such requirements might require Hugh funding, and in cases MNC's then do not accept the ISO 9000 certificates (this are usually certificates required by MNC's for local firms to qualify as suppliers) once achieved. And thirdly, local firms improve their performance while supplying MNC's. MNC's offer support by advance payments and financing, employee training and leasing or borrowing of machines.

Evidence of technology transfer through vertical supply chains is well documented in case studies. For example, MacDuffe and Helper (1997) provide a rich description of technology transfer to U.S. parts suppliers following the entry of Japanese car makers. Driffield, Munday, and Roberts (2002) examine vertical spillovers with industry-level data from the UK. Blalock (2002) analyzes Indonesian firms and Javorcik (2004) studies a panel dataset

from Lithuanian industries, both of which find positive FDI spillovers through backward linkages. Gorodnicjenko, Svejnar, and Terrell (2007) use firm-level data from 17 former Eastern European countries to test both horizontal and vertical FDI spillovers.

They find that backward spillovers are consistently positive; horizontal spillovers are mostly insignificant; and forward spillovers are positive only for old and service sector firms. They also find that lack of absorptive capability on the part of domestic firms tends to dampen spillovers. Most recently, Girma, Gorg, and Pisu (2007) studied FDI spillovers in the U.K. and find that both horizontal and vertical spillovers depend on export orientation of foreign invested firms.

2.10. CONCLUSION

In this Chapter, we provided a detailed survey of the literature on foreign direct investments and effect on economic growth. The discussion is centred on four main aspects. The first aspect is centred around the theoretical and empirical literature on the impact of foreign direct investments on economic growth. The second aspect presents the theory and empirical work that has been done on the determinants of foreign direct investments followed by the third aspect which discusses several issues on the causality 'mutual relationship' in the FDI-growth nexus. Finally, the fourth aspect has highlights several important discussions concerning the spillover channels of FDI.

The theoretical literature on the effects of foreign direct investments on economic growth suggests that FDI exerts a positive impact on economic growth. It also highlights that FDI is an enhancing factor for growth and a vital mechanism for which developing countries consider as a new development catalyst. However, the empirical evidence to support that foreign direct investment promotes growth has remained mixed. And, as such, no clear relationship between FDI and growth is the same across countries.

Although substantial evidence show FDI to have promoted economic growth since the late 1990's, there still remains a notable number of studies that critic such findings, thus creating continuity for research into this literature. In this light, Lipsey et al. (2005) notes that the diverse results may be attributed to differences in the country's ability to benefit from FDI, due to varying levels of indigenous human resources, to disparate degrees of private-sector sophistication, to differing levels of competition, and to contrasting host country policies toward trade and investment.

The existing literature on the effects of FDI on growth has identified various economic factors to explain the benefits achieved through FDI and the motivation of FDI inflows to the host country. It is clearly noticed that most of the results obtained in this literature are based on cross-country studies and few single country studies. Indeed, single host country studies in Southern Africa have not received as much attention on the study of FDI and economic growth nor the determinants of FDI flows to these countries. Historically, the investigation related to macroeconomic determinants of FDI indicates that FDI inflows are significantly influenced by the level of income, trade openness, skills, regulations and the labour force in the host countries. These factors are the main determinants that play vital roles in affecting the flows of FDI to the country of origin. However, none of these studies have provided a comprehensive framework for most southern African countries including Namibia over a long period of time.

In the third part of the review, the evidence on the direction of causality running between FDI and growth is as well found to be less researched despite its increasing recognition in recent development agendas. In the fourth aspect of the review, literature suggests that FDI has generated beneficial vertical spillover effects. The horizontal spillovers depend on the origin of FDI, and tend to cancel out on the aggregate in the dataset used. Also, this review finds that industry concentration has a negative effect on firm productivity, i.e., that market competition enhances technological progress.

Following this survey of the evidence, the gaps in the literature are highlighted:

- Studies on the effects or rather impact of foreign direct investments has largely been restricted to cross-country studies with very little extension to individual country analysis.

- Research on FDI in Namibia has clearly ignored the potential impact that FDI might have on economic growth and the determinants of FDI flows to the country. Therefore, the need to conduct a comprehensive research on the effects of foreign direct investment on economic growth including determinants of such flows in Namibia is highly motivated.

- Research on the determinants of FDI flows to a host country seems to largely focus on a set of determinant variables specified in the literature as common determinants, However, it should be noted that what is perceived as determinants if FDI in country A, for example, do not necessarily determine FDI inflows to country B. And, therefore, the type of FDI flows to country A maybe not necessarily be the same type of FDI for country B. This means that each individual country may have a different set of determinants specific to host country and the type of FDI across countries may very differ in-terms of resource, market and efficient seeking FDI. Therefore, the need to identify the determinants that are more effective in the case of Namibia and the type of FDI arguably deserves even more attention.

Having recognised these gaps in the FDI literature, especially with regard to single-host country studies for Southern African countries, we have identified the need to conduct a comprehensive FDI study for Namibia. It should be noted that there is no comprehensive study on FDI in Namibia and as such, makes the research a useful contribution to knowledge and literature on FDI. Therefore, a conceptual framework for analysing FDI in terms of its impact on economic growth, including the determinants of FDI inflows and policy regulations for achieving the benefits from FDI in Namibia, is presented in the succeeding chapters.

CHAPTER 3

THE NAMIBIAN ECONOMY: AN OVERVIEW

3.1. INTRODUCTION

Before starting the empirical work in this study, we must take a closer look at the main characteristics of the Namibian economy including the country's historical background and geographical structure. Additionally, the country's historical background sheds light on the regime change during the period covered in the study and creates an understanding on how capital mobility, importantly FDI, has been considered vital for the development of the country. Namibia, is a country in southern Africa whose western border is the Atlantic Ocean. It shares land borders with Angola and Zambia to the north, Botswana to the east and South Africa to the south and east. It gained independence from South Africa on 21 March 1990, following the Namibian War of Independence. Its capital and largest city is Windhoek. Namibia is a member state of the United Nations (UN), the Southern African Development Community (SADC), the African Union (AU), and the Commonwealth of Nations.

The dry lands of Namibia were inhabited since early times by Bushmen, Damara, and Namaqua, and since about the 14th century AD by immigrating Bantu who came with the Bantu expansion. It became a German Imperial protectorate in 1884 and remained a German colony until the end of World War I. In 1920, the League of Nations mandated the country to South Africa, which imposed its laws and, from 1948, its apartheid policy.

Uprisings and demands by African leaders led the UN to assume direct responsibility over the territory. It recognised the South West Africa People's Organisation (SWAPO) as the official representative of the Namibian people in 1973. Namibia, however, remained under South African administration during this time. Following internal violence, South Africa installed an interim administration in Namibia in 1985. Namibia obtained full independence from South Africa in 1990, with the exception of Walvis Bay and the Penguin Islands, which remained under South African control until 1993. Namibia has a population of 2.1 million people and a stable multi-party parliamentary democracy.

Agriculture, herding, tourism and the mining industry – including mining for gem diamonds, uranium, gold, silver, and base metals – form the backbone of Namibia's economy. Deserts occupy much of the country; their dunes take on shapes and colours according to the elements. The country also boasts game-rich grasslands and a semi-arid Central Plateau, large tracts of which are given over to livestock farming.

Given the presence of the arid Namib Desert, it is one of the least densely populated countries in the world. Approximately half the population live below the international poverty line, and the nation has suffered heavily from the effects of HIV/AIDS, with 15% of the adult population infected with HIV in 2007.

This Chapter is divided into four parts following the introduction. Part I: discusses the historical background of Namibia and reviews the geographical areas of the country. Part II: discusses the economic perspective of Namibia, including some recent economic developments in the country. Part III: Discusses the individual domestic sectors of the economy which make the GDP, i.e. primary, secondary and tertiary sectors. Part IV: discusses FDI flows in the world including a perspective on FDI flows to Africa and Namibia. FDI flows to key economic sectors in Namibia are also discussed herein. Part IV also covers a brief comparison of FDI to Namibia and to other Southern African countries. Finally, concluding remarks are offered in Section 3.12.

PART I: THE HISTORICAL PERSPECTIVE AND GEOGRAPHICAL STRUCTURE

3.2. HISTORICAL BACKGROUND

The name of the country is derived from the Namib Desert, considered to be the oldest desert in the world. Before its independence in 1990, the area was known first as German South-West Africa (*Deutsch-Südwestafrika*), then as South-West Africa, reflecting the colonial occupation by the Germans and the South Africans (technically on behalf of the British crown reflecting South Africa's dominion status within the British Empire).

3.2.1. Pre-colonial period

From the late 18th century onwards, Orlam clans from the Cape Colony crossed the Orange River and moved into the area that today is southern Namibia. Their encounters with the nomadic Nama tribes were largely peaceful. The missionaries accompanying the Orlams were well–received by them, the right to use waterholes and grazing was granted against an annual payment. On their way further northwards, however, the Orlams encountered clans of the Herero tribe at Windhoek, Gobabis, and Okahandja which were less accommodating. The Nama-Herero War broke out in 1880, with hostilities ebbing only when Imperial Germany deployed troops to the contested places and cemented the status quobetween Nama, Orlams, and Herero.

The first Europeans to disembark and explore the region were the Portuguese navigators Diogo Cão in 1485 and Bartolomeu Dias in 1486; still the region was not claimed by the Portuguese crown. However, like most of Sub-Saharan Africa, Namibia was not extensively explored by Europeans until the 19th century, when traders and settlers arrived, principally from Germany and Sweden. In the late 19th century Dorsland trekkers crossed the area on their way from the Transvaal to Angola. Some of them settled in Namibia instead of continuing their journey, even more returned to South-West African territory after the Portuguese tried to convert them to Catholicism and forbade their language at schools.

3.2.2. German rule

Namibia became a German colony in 1884 to forestall British encroachment and was known as German South-West Africa (*Deutsch-Südwestafrika*). However, the Palgrave mission by the British governor in Cape Town had determined that only the natural deep-water harbour of Walvis Bay (Walfisch in German, Walvis in Afrikaans, Whale in English) was worth occupying – and this was annexed to the Cape province of British South Africa. From 1904 to 1907, the Herero and the Namaqua took up arms against the Germans and in the subsequent Herero and Namaqua genocide, 10,000 Nama (half the population) and approximately 65,000 Hereros (about 80% of the population) were killed.

The survivors, when finally released from detention, were subjected to a policy of dispossession, deportation, forced labor, racial segregation and discrimination in a system

that in many ways anticipated apartheid. Most Africans were confined to so-called native territories, which later under South African rule post-1949 were turned into "homelands" (Bantustans). Indeed, some historians have speculated that the German genocide in Namibia was a model used by Nazis in the Holocaust, but most scholars say that episode was not especially influential for the Nazis, who were children at the time. However, the father of Luftwaffe commander Hermann Göring was a one-time German colonial governor of Namibia and has a street named after him in Swakopmund. The memory of genocide remains relevant to ethnic identity in independent Namibia and to relations with Germany.

3.2.3. South African rule and the struggle for independence

South Africa occupied the colony in 1915 after defeating the German force during World War I and administered it as a League of Nations mandate territory from 1919. Although the South African government desired to incorporate 'South-West Africa' into its territory, it never officially did so, although it was administered as the de facto 'fifth province', with the white minority having representation in the whites-only Parliament of South Africa, as well as electing their own local administration the SWA Legislative Assembly. The South African government also appointed the SWA administrator, who had extensive powers.

Following the League's supersession by the United Nations in 1946, South Africa refused to surrender its earlier mandate to be replaced by a United Nations Trusteeship agreement, requiring closer international monitoring of the territory's administration (along with a definite independence schedule). The Herero Chief's Council submitted a number of petitions to the UN calling for it to grant Namibia independence during the 1950s. During the 1960s, when European powers granted independence to their colonies and trust territories in Africa, pressure mounted on South Africa to do so in Namibia. In 1966 the International Court of Justice dismissed a complaint brought by Ethiopia and Liberia against South Africa's continued presence in the territory, but the U.N. General Assembly subsequently revoked South Africa's mandate, while in 1971 the International Court of Justice issued an "advisory opinion" declaring South Africa's continued administration to be illegal.

In response to the 1966 ruling by the International Court of Justice, South-West Africa People's Organisation (SWAPO) military wing, People's Liberation Army of Namibia, a guerrilla group began their armed struggle for independence, but it was not until 1988 that

South Africa agreed to end its occupation of Namibia, in accordance with a UN peace plan for the entire region. During the South African occupation of Namibia, white commercial farmers, most of whom came as settlers from South Africa and represented 0.2% of the national population, owned 74% of arable land. Outside the central-southern area of Namibia (known as the "Police Zone" since the German era and which contained the main towns, industries, mines and best arable land), the country was divided into "homelands", the version of South African bantustan applied to Namibia, although only a few were actually established due to non-cooperation by most indigenous Namibians.

After many unsuccessful attempts by the UN to persuade South Africa to agree to the implementation of UN Resolution 435, which had been adopted by the UN Security Council in 1978 as the internationally-agreed decolonisation plan for Namibia, transition to independence finally started in 1988 under the tripartite diplomatic agreement between South Africa, Angola and Cuba, with the USSR and the USA as observers, under which South Africa agreed to withdraw and demobilise its forces in Namibia and Cuba agreed to pull back its troops in southern Angola sent to support the MPLA in its war for control of Angola with UNITA. A combined UN civilian and peace-keeping force under Finnish diplomat Martti Ahtisaari supervised the military withdrawals, return of SWAPO exiles and the holding of Namibia's first-ever one-person one-vote election for a constituent assembly in October 1989. This was won by SWAPO although it did not gain the two-thirds majority it had hoped for; the South African-backed Democratic Turnhalle Alliance (DTA) became the official opposition.

Following the adoption of the Namibian Constitution, including entrenched protection for human rights, compensation for state expropriations of private property, an independent judiciary and an executive presidency (the constituent assembly became the national assembly), the country officially became independent on 21 March 1990. Sam Nujoma was sworn in as the first President of Namibia watched by Nelson Mandela (who had been released from prison shortly beforehand) and representatives from 147 countries, including 20 heads of state. Walvis Bay was ceded to Namibia in 1994 upon the end of Apartheid in South Africa.

3.2.3. After independence

Since independence Namibia has successfully completed the transition from white minority apartheid rule to parliamentary democracy. Multiparty democracy was introduced and has been maintained, with local, regional and national elections held regularly. Several registered political parties are active and represented in the National Assembly, although Swapo Party has won every election since independence. The transition from the 15-year rule of President Sam Nujoma to his successor, Hifikepunye Pohamba in 2005 went smoothly.

Namibian government has promoted a policy of national reconciliation and issued an amnesty for those who had fought on either side during the liberation war. The civil war in Angola had a limited impact on Namibians living in the north of the country. In 1998, Namibia Defence Force (NDF) troops were sent to the Democratic Republic of the Congo as part of a Southern African Development Community (SADC) contingent. In August 1999, a secessionist attempt in the northeastern Caprivi region was successfully quashed.

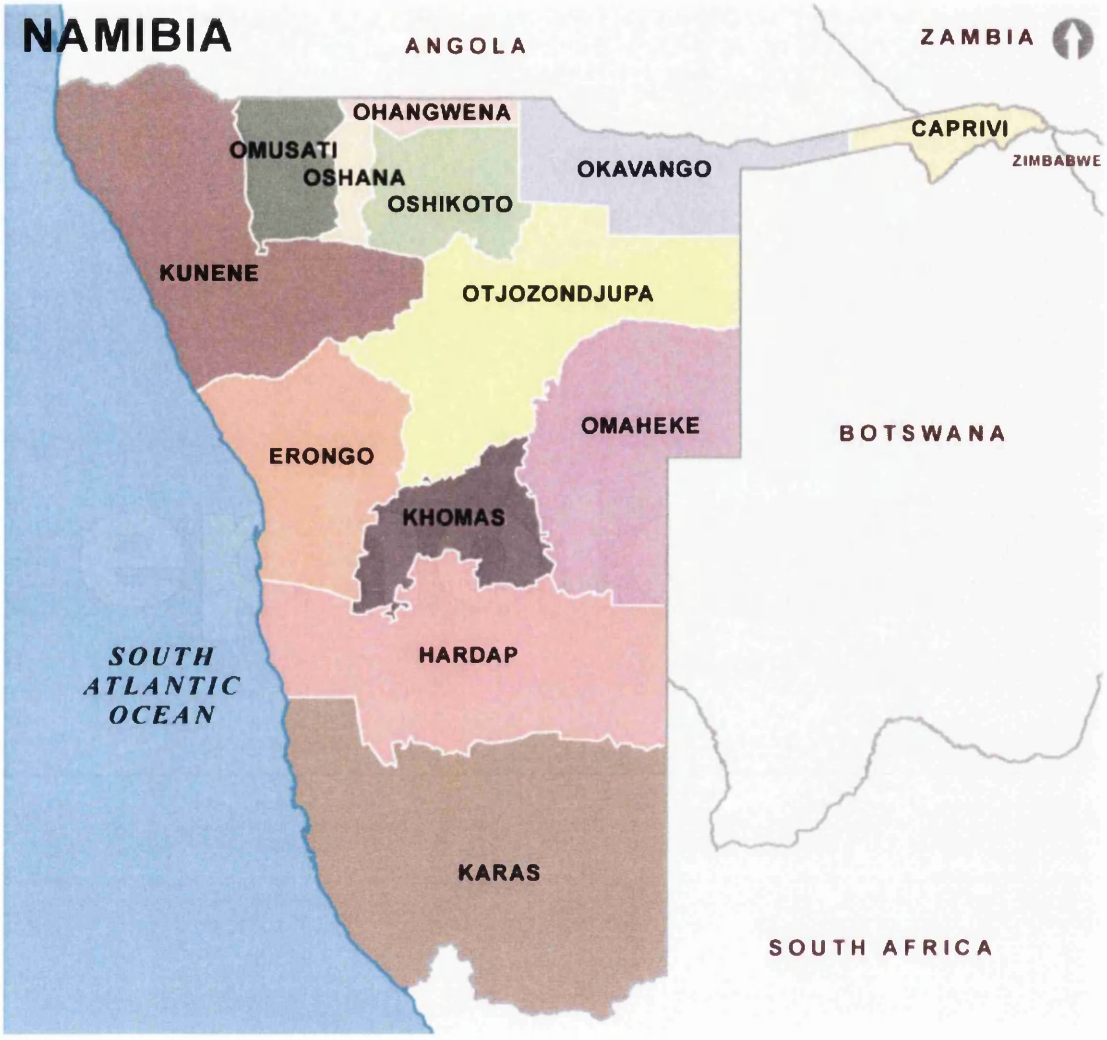
3.3. GEOGRAPHICAL STRUCTURE OF NAMIBIA

The Namib Desert is the namesake of Namibia, and is one of the oldest and driest deserts in the world. Stretching almost the entire length of the Namibian South Atlantic coastline, it's a vast expanse of sparsely populated, starkly brilliant scenery and home to an assortment of uniquely evolved creatures.

At 825,418 km^2 (318,696 sq mi)[19], Namibia is the world's thirty-fourth largest country (after Venezuela). It lies mostly between latitudes 17°and 29°S (a small area is north of 17°), and longitudes 11° and 26°E[20].

[19] "Rank Order – Area". CIA World Fact Book. Retrieved 12 April 2008.
[20] www.wikipedia.org/wiki/namibia

Figure 3.1 Map of Namibia



Namibia is divided into 13 regions and subdivided into 107 constituencies, refer to map above, Figure 3.1. The administrative division of Namibia is Tabled by *Delimitation Commissions* and accepted or declined by the National Assembly. Since state foundation three Delimitation Commissions have been formed, the last one in 2002 under the chairmanship of Peter Shivute[21]. Regional councillors are directly elected through secret ballots (regional elections) by the inhabitants of their constituencies.

[21] Matundu-Tjiparuro, Mae (28 February 2011). "Khomas Region, a constitutional, political and geographical hybrid". *Focus on: Khomas Region*. Supplement to New Era. p. 3.

3.3.1. Geographical areas

The Namibian landscape consists generally of five geographical areas, each with characteristic abiotic conditions and vegetation with some variation within and overlap between them: the Central Plateau, the Namib Desert, the Great Escarpment, the Bushveld, and the Kalahari Desert.

I. Central Plateau

The Central Plateau runs from north to south, bordered by the Skeleton Coast to the northwest, the Namib Desert and its coastal plains to the southwest, the Orange River to the south, and the Kalahari Desert to the east. The Central Plateau is home to the highest point in Namibia at Königstein elevation 2,606 meters (8,550 ft). Within the wide, flat Central Plateau is the majority of Namibia's population and economic activity. Windhoek, the nation's capital, is located here, as well as most of the arable land.

Although arable land accounts for only 1% of Namibia, nearly half of the population is employed in agriculture. The abiotic conditions here are similar to those found along the Escarpment; however the topographic complexity is reduced. Summer temperatures in the area can reach 40 °C (104 °F), and frosts are common in the winter.

II. Namib Desert

The Namib Desert is a broad expanse of hyper-arid gravel plains and dunes that stretches along Namibia's entire coastline. It varies between 100 to many hundreds of kilometres in width. Areas within the Namib include the Skeleton Coast and the Kaokoveld in the north and the extensive Namib Sand Sea along the central coast. The sands that make up the sand sea result from processes of erosion that take place in the Orange River valley and areas further to the south. As sand-laden waters drop their suspended loads into the Atlantic, onshore currents deposit them along the shore.

The prevailing south west winds then pick up and redeposit the sand in the form of massive dunes in the widespread sand sea, forming the largest sand dunes in the world. In areas where the supply of sand is reduced because of the inability of the sand to cross riverbeds, the winds

also scour the land to form large gravel plains. In many areas of the Namib Desert there is little vegetation aside from lichens found in the gravel plains and in dry river beds where plants can access subterranean water.

III. Great Escarpment

The Great Escarpment swiftly rises to over 2,000 meters (6,562 ft). Average temperatures and temperature ranges increase further inland from the cold Atlantic waters, while the lingering coastal fogs slowly diminish. Although the area is rocky with poorly developed soils, it is nonetheless significantly more productive than the Namib Desert. As summer winds are forced over the Escarpment, moisture is extracted as precipitation. The water, along with rapidly changing topography, is responsible for the creation of microhabitats which offer a wide range of organisms, many of them endemic. Vegetation along the escarpment varies in both form and density, with community structure ranging from dense woodlands to more shrubby areas with scattered trees. A number of Acacia species are found here, as well as grasses and other shrubby vegetation.

IV. Bushveld

The Bushveld is found in north eastern Namibia along the Angolan border and in the Caprivi Strip which is the vestige of a narrow corridor demarcated for the German Empire to access the Zambezi River. The area receives a significantly greater amount of precipitation than the rest of the country, averaging around 400 mm (15.7 in) per year. Temperatures are also cooler and more moderate, with approximate seasonal variations of between 10 and 30 °C (50 and 86 °F). The area is generally flat and the soils sandy, limiting their ability to retain water. Located adjacent to the Bushveld in north-central Namibia is one of nature's most spectacular features: the Etosha Pan. For most of the year it is a dry, saline wasteland, but during the wet season, it forms a shallow lake covering more than 6,000 square kilometres (2,317 sq mi).

The area is ecologically important and vital to the huge numbers of birds and animals from the surrounding savannah that gather in the region as summer drought forces them to the scattered waterholes that ring the pan. The Bushveld area has been demarcated by the World Wildlife Fund as part of the Angolan Mopane woodlands ecoregion, which extends north across the Cunene River into neighbouring Angola.

V. Kalahari Desert

The Kalahari Desert is perhaps Namibia's best known geographical feature. Shared with South Africa and Botswana, it has a variety of localized environments ranging from hyper-arid sandy desert, to areas that seem to defy the common definition of desert. One of these areas, known as the Succulent Karoo, is home to over 5,000 species of plants, nearly half of them endemic; fully one third of the world's succulents are found in the Karoo.

The reason behind this high productivity and endemism may be the relatively sTable nature of precipitation. The Karoo apparently does not experience drought on a regular basis, so even though the area is technically desert, regular winter rains provide enough moisture to support the region's interesting plant community. Another feature of the Kalahari, indeed many parts of Namibia, are inselbergs, isolated mountains that create microclimates and habitat for organisms not adapted to life in the surrounding desert matrix.

VI. Coastal Desert

Namibia's Coastal Desert is one of the oldest deserts in the world. Its sand dunes, created by the strong onshore winds, are the highest in the world. The Namib Desert and the Namib-Naukluft National Park are located here. The Namibian coastal deserts are one of the richest sources of diamonds on earth. The area is divided into the northern Skeleton Coast and the southern Diamond Coast. Because of the location of the shoreline— at the point where the Atlantic's cold water reach Africa— there is often extremely dense fog. Sandy beach composes 54% of the shoreline, and mixed sand and rock form another 28%. Only 16% of the total length is rocky shoreline. The coastal plains are "dune fields", gravel plains covered with lichen and some scattered salt pans. Near the coast there are areas where the dunes are vegetated with hammocks. Namibia has rich coastal and marine resources that remain largely unexplored.

VII. Weather and climate

Namibia has more than 300 days of sunshine per year. It is situated at the southern edge of the tropics; the Tropic of Capricorn cuts the country about in half. The winter (June – August) is generally dry, both rainy seasons occur in summer, the small rainy season between

September and November, the big one between February and April. Humidity is low, and average rainfall varies from almost zero in the coastal desert to more than 600 mm in the Caprivi Strip. Rainfall is however highly variable and droughts are common. The last bad rainy season with rainfall far below the annual average occurred in summer 2006/07.

Weather and climate in the coastal area are dominated by the cold, north-flowing Benguela current of the Atlantic Ocean which accounts for very low precipitation (50 mm per year or less), frequent dense fog, and overall lower temperatures than in the rest of the country. In Winter, occasionally a condition known as *Bergwind* occurs, a hot dry wind blowing from the inland to the coast. As the area behind the coast is a desert, these winds can develop into sand storms with sand deposits in the Atlantic Ocean visible on satellite images.

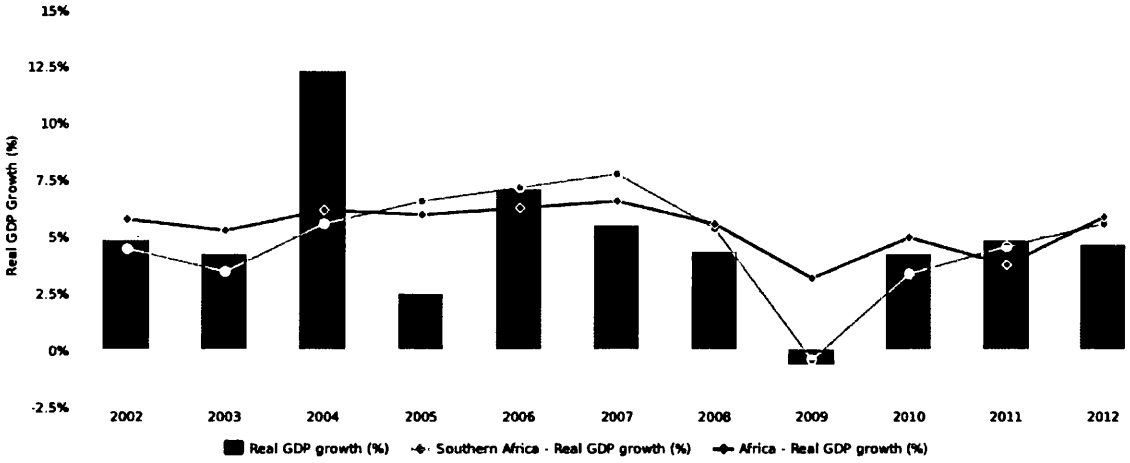
The Central Plateau and Kalahari areas have wide diurnal temperature ranges of up to 30C. *Efundja*, the annual flooding of the northern parts of the country, often causes not only damage to infrastructure but loss of life. The rains that cause these floods originate in Angola, flow into Namibia's Cuvelai basin, and fill the *Oshanas* (Oshiwambo: flood plains) there. The worst floods so far occurred in March 2011 and displaced 21,000 people.

PART II: THE LOCAL ECONOMY AND ECONOMIC DEVELOPMENTS

3.4. THE ECONOMY IN PERSPECTIVE

Having discussed the historical background and geographical structure of the country, it is important to analyse the aspects of the local economy and have an understanding of what the driving forces are behind such an economy importantly in terms of growth over time. Henceforth, the Namibian economy grew by 3.2% in 2010, following a 0.7% contraction in 2009. Growth was due primarily to a rapid recovery in diamond and uranium mining activities, but also to credit extension. The sustained improvement in global demand for mineral products is expected to maintain gross domestic product (GDP) growth in 2011 with a slight rise to 3.8% in 2011, and then a minor drop to 3.6% in 2012, Table (3.1) and (3.2).

Table 3.1. Real GDP comparisons in Namibia, Southern Africa and Africa



Source: IMF and central bureau of statistics data, Bank of Namibia 2011.

Table 3.2 Real GDP Growth in Namibia, 2009 to 2012

	2009	2010	2011	2012
Real GDP growth	-0.7	4.2	4.8	4.6
CPI inflation	8.7	4.5	6.1	5.5
Budget balance % GDP	2.1	-3	-2.3	-1.1
Current account % GDP	1.5	-2.9	-3.5	-3

Source: IMF and central bureau of statistics data, Bank of Namibia 2011.

Outputs in mining recovered as global demand improved, while agricultural outputs recovered due to good weather conditions. The mining industry accounts for some 9 per cent of GDP, and is dominated by diamond extraction, which accounts for roughly 8 per cent of GDP and has made Namibia the world's seventh-largest producer by value in 2005. Although the share of mining in GDP has declined from the 1990 high of 20 per cent, it still accounts for 45 per cent of foreign-exchange earnings and roughly a third of fixed capital formation.

Diamond production rose by 50 per cent on a year on-year basis in the third quarter of 2006, following an expansion of 28.1 per cent in the second quarter of the year. Although receipts for diamond exports declined between the first and second quarter of 2006, they have continued to represent the largest item in total merchandise export earnings, accounting for about 36 per cent. Offshore diamond production in 2006 is estimated to have reached a record one million carats, thanks to the use of advanced marine prospecting and mining technology, whereas the relative share of onshore production is declining. Overall, diamond production

expanded to more than two million carats in 2006 for the first time and was forecast to have increased further in 2007.

Manufacturing, which accounts for 11 per cent of GDP, recorded negative growth in 2005/06, owing to the poor performance of fish processing. Over the past few years, the authorities have been trying to develop the manufacturing sector. The opening of the Ramatex apparel factory (Multinational Company) in Namibia in 2003 was expected to attract new international investments to the Export Processing Zones (EPZ). Namibia, however, has suffered from the phasing-out of the Multi-Fibre Agreement and the number of new jobs for Namibians in the textile industry has been far below expectations. Other large industrial firms, such as dairies, are also suffering from the high value of the currency and competition from South Africa and China.

Manufacturing has not only remained resilient amid the global downturn but also expanded in 2010. However, construction contracted in 2010 driven mainly by the decline in residential building construction, which was caused by the tightening of credit and a high level of household indebtedness.

The share of agriculture in GDP has fallen continually since independence, and currently hovers around 6.8 per cent. This sector is dominated by meat products such as beef, mutton and goat meat. Thanks to record rainfall experienced in 2005 and the following years, agriculture grew by 10 per cent.

Farmers had to postpone the selling of some of their livestock for purposes of restocking after the good rainfall, despite high meat prices. Despite almost unlimited farmland, the country's geological and climatic conditions make it difficult to generate enough income for the 1.2million Namibians who rely on farming for their livelihood and who are mostly living in communal areas. Food demand exceeds supply, with imports of staple food from South Africa and Zambia filling the gap. Poor marketing, the small size of the domestic market, and the inability to add processing value and penetrate foreign markets all act as additional constraints on agricultural development. Meat remains the major export product.

Fishing is also a strong contributor to GDP, accounting for about 5.6 per cent, but it exhibits a strong cyclical pattern since it is influenced by weather conditions, energy prices, and the exchange rate. After two consecutive years of contraction, the sector recovered gradually in 2005/06, although a four-week closed season for hake was imposed in October 2006 for the first time, and a closed area was also introduced, prohibiting vessels from fishing in depths of less than 200 metres. These actions followed from surveys that revealed mixed results. Most fish caught in Namibia are exported to Spain, although efforts are now under way to find new export markets in Asia, especially for species such as abalone. Among services, tourism stands out in terms of contribution to export earnings, although the contribution of government services is much higher. Tourism contributes 3.7 per cent of GDP and 3.7 per cent of total employment, although the indirect contribution (as recorded by the Tourism Satellite Accounts) is estimated to be equivalent to 16 per cent of GDP and 17.7 per cent of total employment.

Growth in Namibia has been driven by exports and private investment in the mineral sector. In 2005, for the third year running, mining investment at N$477 million outstripped government investment by a wide margin. Over the period 2006-08, other significant investments are expected to boost growth, including: the continuous introduction of new technologies for mining diamonds; the development of new uranium mines; and the development of the KuduGas Field and subsequent construction of the gas fired power plant. In tandem with increased investment, imports of capital goods are expected to grow, although their increase will be more than offset by record diamond and uranium exports.

Namibia implemented strong and co-ordinated counter-cyclical fiscal and monetary policies to shield the economy from the effects of the global economic downturn. Fiscal stimulus measures together with the sharp decline in Southern African Customs Union (SACU) receipts may have led to a fiscal deficit of 2.3% of GDP in 2010/11. Namibia is one of the five member states of the SACU. Due to prudent fiscal management during the years immediately prior to the 2009 recession (2005-08), levels of public indebtedness have remained moderate. In 2009/10, total debt stood at 15.1% of GDP, of which 10.9% constituted domestic borrowings, while 3.2% represented foreign borrowing. The Bank of Namibia responded to the crisis by cutting the repo rate by 450 basis points between December 2008 and December 2010, resulting in the rate of 6%. The slowdown in domestic demand, low imported inflation, primarily from South Africa, and a strong currency have led

to a decline in inflation from 8.7% in 2009 to 3.5% in 2010. Inflation was expected to be around 6.1% and 5.5% in 2011 and 2012, respectively.

In the medium term, the main policy challenge will continue to be the need to ensure balance between fostering growth, maintaining fiscal sustainability and a stable currency peg with the South African rand.

The Namibian economic and social environment is overshadowed by massive structural challenges, notably, very high unemployment, heavy reliance on a few mineral products and deficiencies in water and energy infrastructure, which limit growth potential. While public service delivery has improved, more must be done to address both quality and coverage of basic services, particularity in rural areas. Human resource development remains one of the most important long-term investments to ensure sustainable economic growth that will benefit the majority of the population.

China, India and Russia remain the three most important emerging economic partners of Namibia. Emerging economic partnerships can provide better terms of bilateral co-operation compared to traditional partnerships, as well as benefit the local economy through job creation, economic diversification and transfer of technology, even if at a limited level. The main challenge is to negotiate advantageous terms so that the country fully benefits from the expanding trade, and that assistance received is integrated into the long-term national and regional development agenda.

Namibia has experienced several years of moderate economic growth, due mainly to strong performance in diamond production and prudent macroeconomic policies. It's macro-economic policies such as fiscal, monetary and trade policies have generally been supportive of ensuring a staple and improved investment climate for sustained increased economic growth.

However, the Namibian economy is poorly diversified, relying heavily on extractive mining for export earnings and fiscal revenue, and is thus exposed to large and unpredictable fluctuations in commodity prices. Although Namibia has the continent's fifth-highest per capita income and the eleventh-highest Human Development Index, it faces daunting social challenges, including high rates of rural poverty (of about 42 per cent), large income

disparities (the Gini coefficient of 0.6 is among the worst in the world), and a serious HIV/AIDS epidemic. HIV/AIDS prevalence averages 19.7 per cent (2004) and has contributed to reducing life expectancy at birth from 53.9 years in 1970-75 to 48.6 years in 2000-05.

The most damaging structural impact of apartheid in Namibia was to exclude the majority of the people from the productive economy, and this has stifled entrepreneurship and professional development among the black population. Affirmative action and Black Economic Empowerment (BEE) programs have been implemented in an attempt to kick-start a process of accelerated transformation by providing previously disadvantaged groups with the opportunities necessary for them to participate in the country's economic development.

Early indications, unfortunately, are disappointing. Also, it has been alleged that most opportunities – for instance in fishing concessions – have benefited only a small number of well-connected people. In the construction industry, where preferential procurement practices could potentially benefit black contractors, the superior competitiveness of Chinese companies is an additional constraint. This situation is exacerbated by skills shortages. Ten per cent of all positions are either occupied by people who lack the right skills or else remain unfilled, while the unemployment rate is 36.7 per cent (Labour Force Survey, 2004). Despite the high share of expenditure on education, the quality of education is low. The stable and open political environment, sound macroeconomic policies, and favorable growth momentum combine to create a window of opportunity for undertaking the structural reforms necessary to spread the benefits of growth more widely. This will certainly be necessary if recent and forecast short-term GDP growth rates are to be raised in line with the ambitious targets set in Namibia's *Vision 2030*.

3.3.1. Some Recent Economic Developments in Namibia

Namibia's economy is small and closely linked to that of South Africa. The recent acceleration of growth was made possible by increased global demand for minerals, reflected in high international prices for key export commodities such as diamonds, uranium, zinc, copper and gold. The economic structure has remained fairly stable over the past decade, with services contributing some 55 per cent of value added.

The economy is heavily dependent on the extraction and processing of minerals for export. Mining accounts for 8% of GDP, but provides more than 50% of foreign exchange earnings. Rich alluvial diamond deposits make Namibia a primary source for gem-quality diamonds. Namibia is the world's fourth-largest producer of uranium. It also produces large quantities of zinc and is a small producer of gold and other minerals. The mining sector employs only about 3% of the population while about 35-40% of the population depends on subsistence agriculture for its livelihood. Namibia normally imports about 50% of its cereal requirements; in drought years food shortages are a major problem in rural areas. A high per capita GDP, relative to the region, hides one of the world's most unequal income distributions, as shown by Namibia's 70.7 GINI coefficient. The Namibian economy is closely linked to South Africa with the Namibian dollar pegged one-to-one to the South African rand. Until 2010, Namibia drew 40% of its budget revenues from the Southern African Customs Union (SACU).

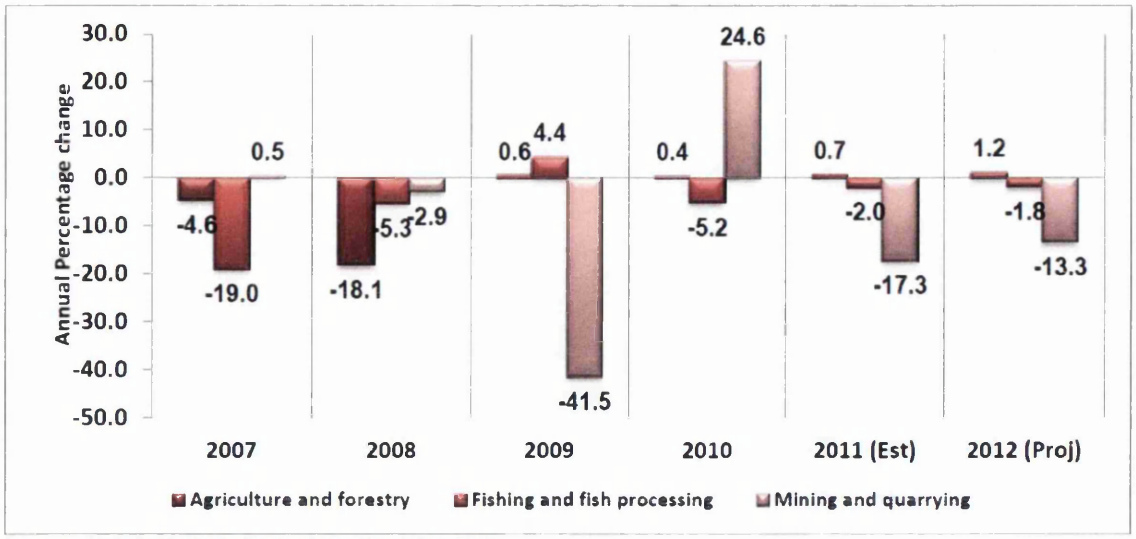
Increased payments from SACU put Namibia's budget into surplus in 2007 for the first time since independence. SACU allotments to Namibia increased in 2009, but will drop for 2010 and 2011 because South Africa went into recession during the global economic crisis, reducing overall SACU income. Increased fish production and mining of zinc, copper, and uranium spurred growth in 2003-08, but growth in recent years was undercut by poor fish catches, a dramatic decline in demand for diamonds, higher costs of producing metals, and the global recession. A rebound in diamond and uranium prices in 2010 provided a significant boost to Namibia's mining sector. Copper mines, which closed in 2008, are slated to reopen in 2011.

PART III: ECONOMIC INDUSTRIES AND INDUSTRY CONTRIBUTIONS TO GROSS DOMESTIC PRODUCT

3.5. PRIMARY INDUSTRIES

Growth in primary industries is estimated to decline by 7.8 per cent in 2011. The decline in 2011, Table 3.3, is mainly attributed to the weakening in the mining sector. The sector is, however, projected to improve in 2012.

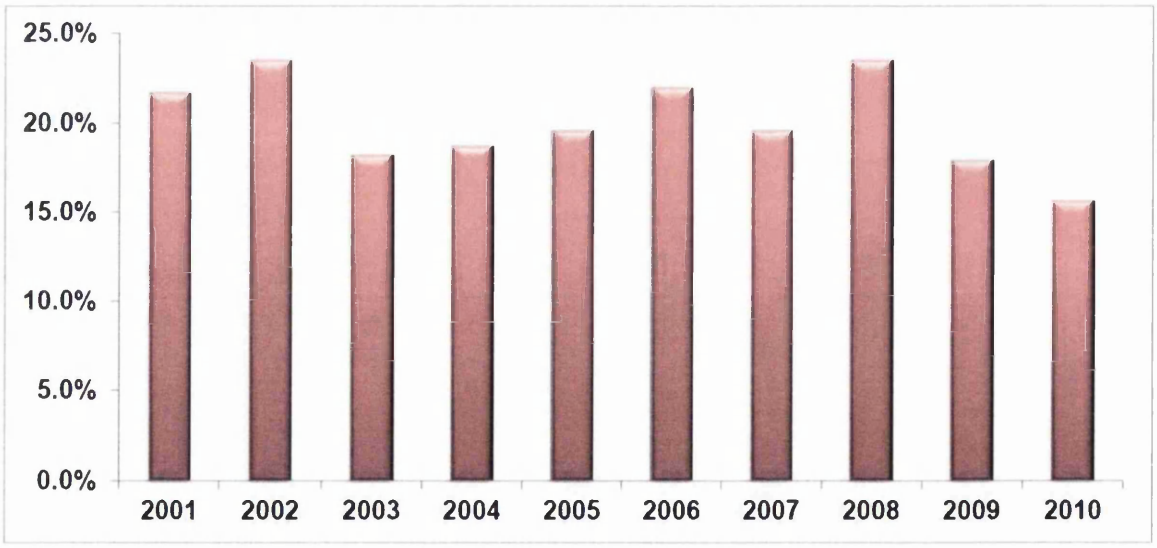
Table 3.3. Growth in Primary Industries, 2007 to 2012



Source: CBS (2007-2010), Bank of Namibia (2011-2012)

The primary industries have contributed 20.0 per cent to GDP on average for the past ten years, making them the second largest contributor after the tertiary industries, Table 3.3. This was driven mainly by the mining industries, notably, diamond mining and the agriculture and forestry industry.

Table 3.4. Primary Industries contribution to GDP



Source: CBS

I. Agriculture and Forestry

The agriculture and forestry industry is forecasted to expand by 1.2 per cent in 2012, after it is estimated to have grown by 0.6 per cent in 2011. The anticipated increased activities in the livestock and crop farming are expected to drive growth in 2012. Live cattle exports slowed down in 2011 due to foot and mouth disease suspicions in Omaheke and Otjozondjupa regions. This setback was, however, offset by an increase in prices, which enticed farmers into selling, thus increasing production. Going forward, it is expected that farmers will restock due to overselling in 2011 and the expected good rainfall in 2012.

The country experienced poor harvest of mahangu as a result of flooding in the north and north-east regions in 2011. On the other hand, production from maize irrigation schemes was not affected by flooding, hence an estimated improvement in total crop production in 2011. Crop production is expected to increase in 2012 due to the expansion of land under irrigation and silos construction in rural areas for mahangu storage. The horticulture industry is expected to improve going forward due to a 35 per cent local promotion regulation set by the government which was increased to 37.5 per cent for 2012 production.

II. Fishing and fish processing on board

The fishing and fish processing on board activities have been recording negative growth rates for the past years. It is estimated that growth in the sector declined by 2.0 per cent during 2011 and it is expected to improve to negative 1.8 per cent in 2012. Total landings improved in 2011 due to good fish resource within the Namibian waters, owing to good fisheries management. Going forward, it is expected that conditions will continue to improve in 2012, assisted by increased fishing quotas for 2012. However, fluctuating exchange rates and increasing oil prices remain major drag for the industry, also the European debt crisis continue to slow down the performance of the industry.

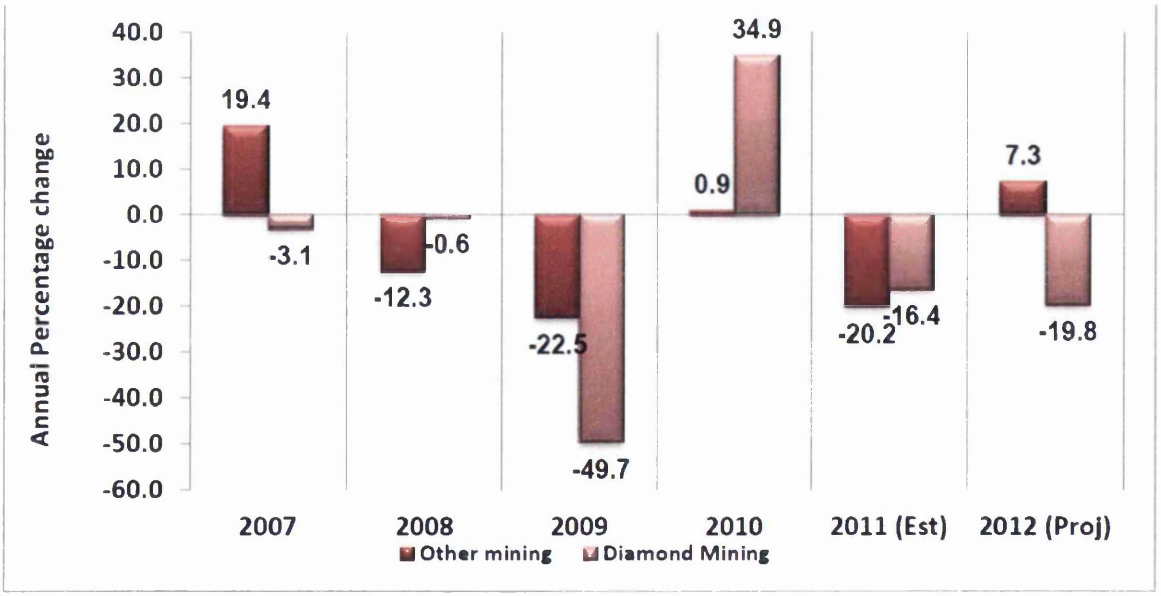
III. Mining and Quarrying

Mining contributed 12.4% to GDP in 2007, of which diamond mining activities represented 5%.[9] Diamond production totalled 1.5 million carats (300 kg) in 2000, generating nearly

$500 million in export earnings. Other important mineral resources are uranium, copper, lead, and zinc. The country also is a source of gold, silver, tin, vanadium, semiprecious gemstones, tantalite, phosphate, sulfur and salt. During the pre-independence period, large areas of Namibia, including off-shore, were leased for oil prospecting. Some natural gas was discovered in 1974 in the Kudu Field off the mouth of the Orange River, but the extent of this find is only now being determined.

Output in the mining and quarrying industry was expected to decline by 17.3 per cent in 2011 and recover slightly to -13.3 per cent in 2012, Table 3.5. Diamond production was affected by industrial actions and diminishing onshore diamond deposits. Consequently, the diamond industry is expected to record declining production going forward. The two copper mines that were amongst those closed late 2008, re-opened in 2011 and started with production early 2011, this bode well for the industry.

Table 3.5. Output in Mining and Quarrying 2007 to 2012



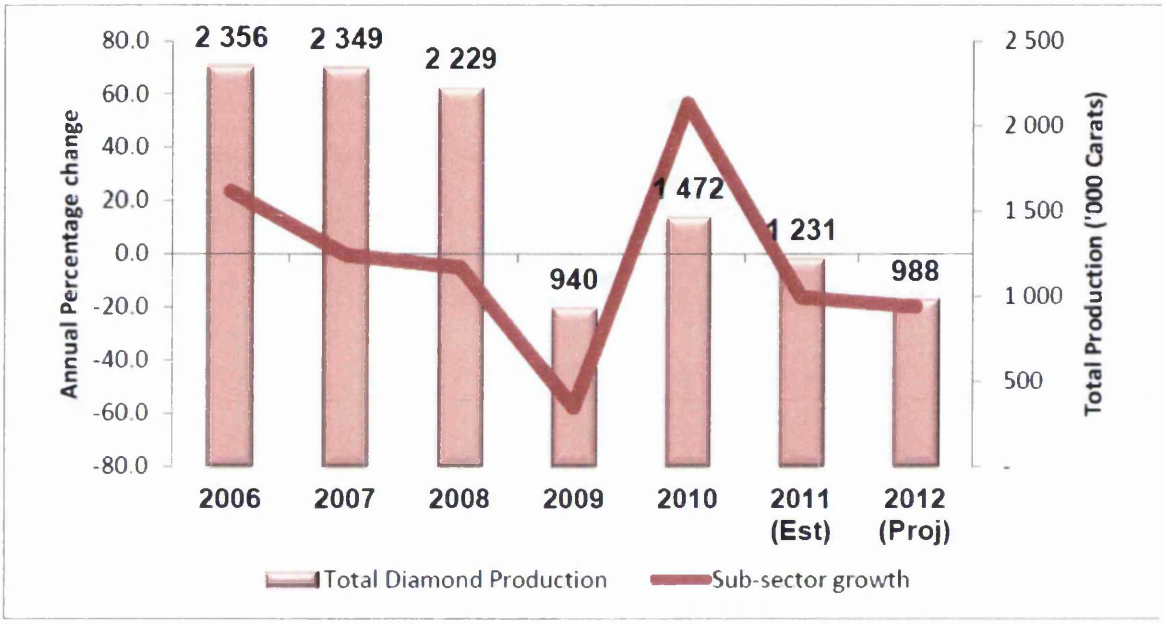
Source: CBS (2007-2010), Bank of Namibia (2011-2012)

IV. Diamond Mining

After a rebound in 2010, diamond mining activities are estimated to decline by 16.4 per cent to 1.23 million carats (Table 3.6) in 2011 and forecasted to contract further by 19.8 per cent during 2012. This decline was mainly caused by the month long strike which led to

production loss of 29 000 carats of diamonds. In addition, maintenance and two fatalities which occurred at the mine earlier this year also contributed to production halts. Furthermore, onshore diamond deposits are diminishing and the land operations mine lifespan is only up to 2015 and the company need to invest over N$ 7.0 billion to extend the mine's lifespan to 2050. The current labour tension, which may scare away skilled employees and uncertainty on global economic recovery, continues to be downside risks.

Table 3.6. Diamond Mining 2006 to 2012

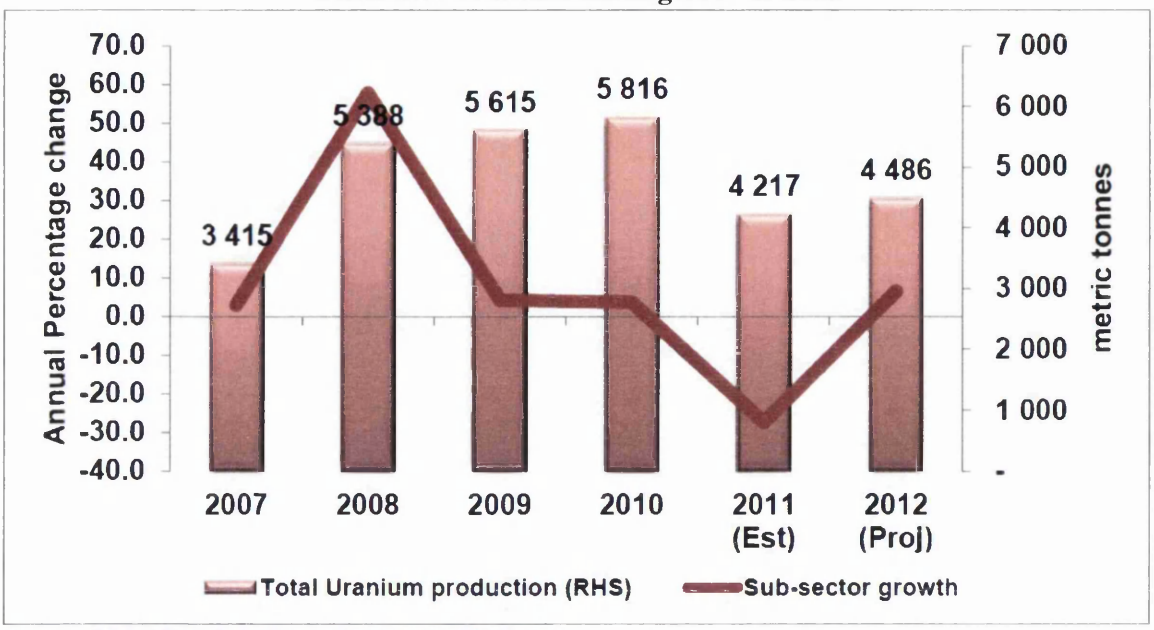


Source: CBS (2007-2010), Bank of Namibia (2011-2012)

Other Mining

Other mining activities are projected to grow by 7.3 per cent in 2012 after it was estimated to have declined by 20.2 per cent 2011. During 2011 uranium production declined by 27.5 per cent to 4,217 metric tonnes and it is expected to increase to 3.486 metric tonnes in 2012, Table 3.7. Uranium mines could not reach production targets due to high rainfall, low uranium prices and industrial actions. Following the Japanese Fukushima Nuclear Power Plant disaster early this year, a few countries have undertaken a preliminary review of their nuclear programs. Almost every country is maintaining its nuclear program apart from Germany which decided to revert back to its previous nuclear power phase out policy. The projected increase in uranium production in 2012 is owed to the Langer Heinrich mine completing its third expansion phase.

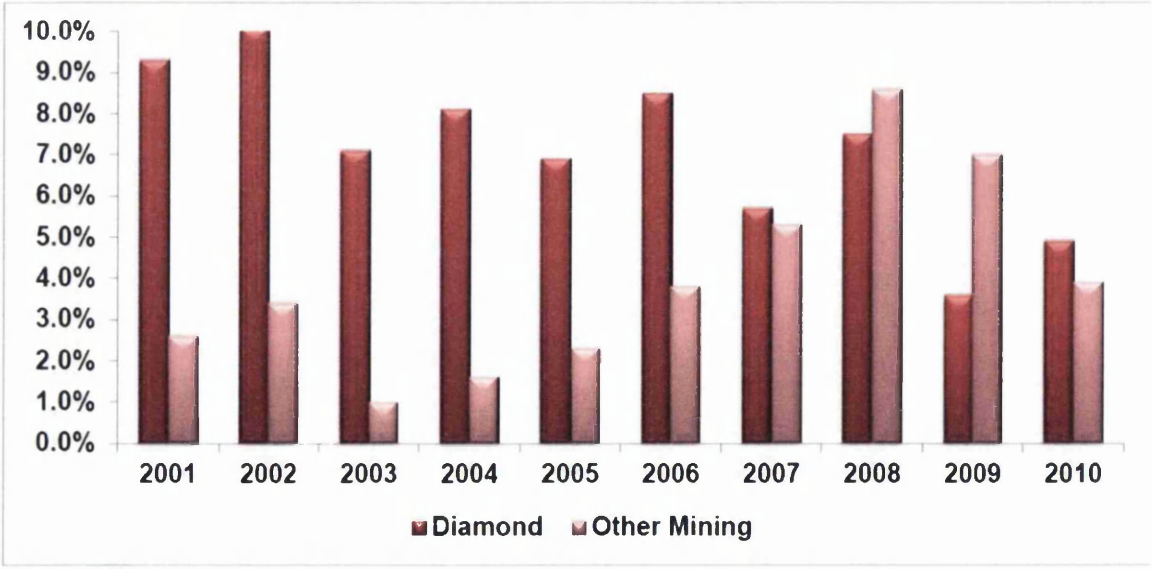
Table 3.7. Uranium Mining 2007 to 2012



Source: CBS (2007-2010), Bank of Namibia (2011-2012)

The copper mines that were closed at the end of 2008, due to global economic meltdown resulting in the collapse of copper prices, re-opened and commenced with production in 2011. Annual copper production for 2011 is estimated at 3,531 tonnes and projected to more than double to 7,500 tonnes in 2012. In addition, zinc production is expected to be sustained.

Table 3.8. Other Mining and Diamond Mining contribution to GDP 2001 to 2010



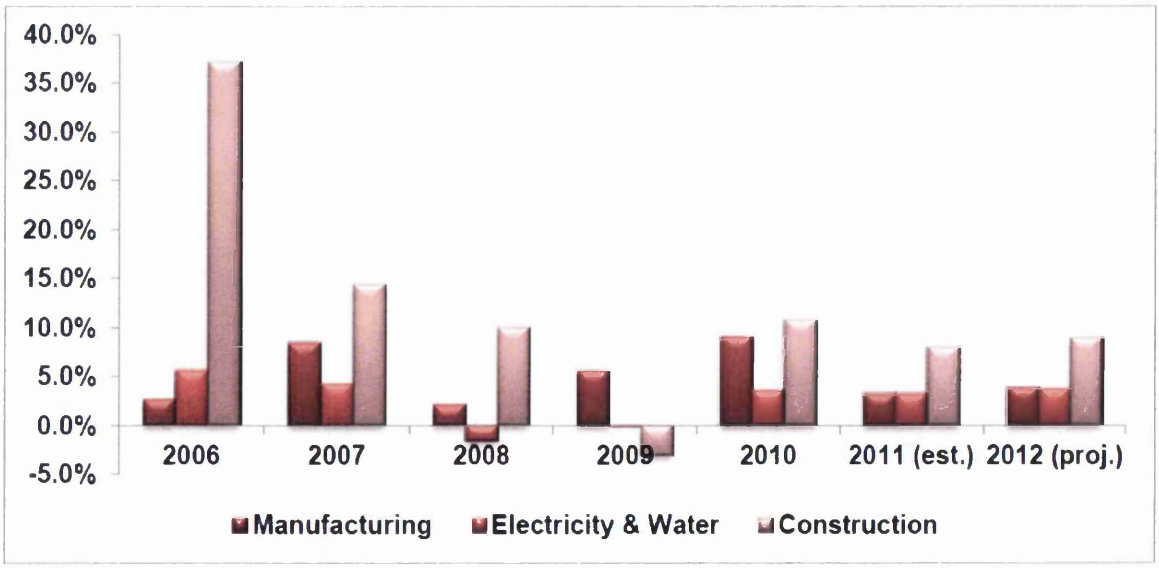
Source: CBS

The contribution to GDP by diamond mining and other mining averaged 7.2 per cent and 3.0 per cent, respectively, during the past ten years. Looking ahead, the diamond mining sector is expected to be overtaken by the other mining sector, particularly, by uranium mining in terms of contribution to GDP. This is also evident in the chart above (Table 3.8), during the past three years other mining has contributed to GDP on average 6.5 per cent when compared to 5.3 per cent from diamond mining, recorded during the same period. The expected growth in uranium production will aid it to surpass the diamond sector as the largest foreign currency earner in the mining industry.

3.6. SECONDARY INDUSTRIES

Real value added in the secondary industries is forecasted to expand by 5.0 per cent in 2012 following an estimated 3.2 per cent for 2011, Table 3.9. The growth is expected to be broad-based, supported by all industries that is, from manufacturing, utility services and increased investment in the construction industry.

Table 3.9. Growth in Secondary Industries (Construction, Water and Electricity and Manufacturing) 2006 to 2012

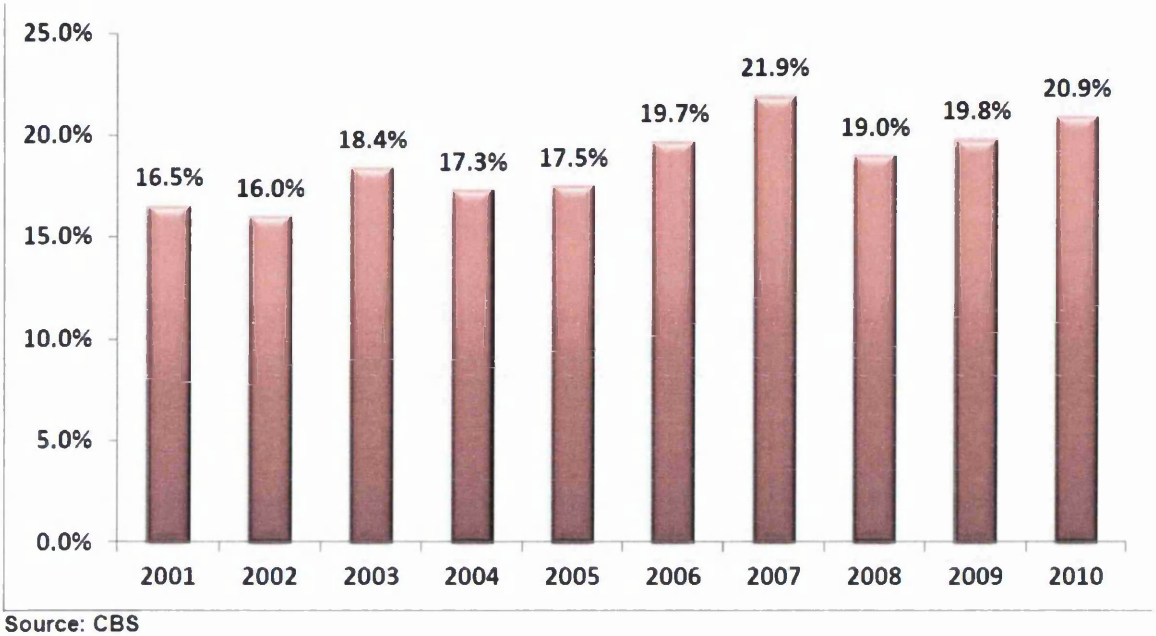


Source: CBS (2005 – 2010) BON (2011-2012)

The secondary industries are made up of the manufacturing, water and electricity and construction industries, which together have contributed on average 18.7 per cent to GDP

over 10 years. The manufacturing industry is the biggest contributor to the secondary industry with 68.8 per cent share followed by the construction with 19.8 per cent and the water and electricity in the third place with 11.5 per cent contribution, Table 3.10.

Table 3.10. Secondary Industries contribution to GDP 2001 to 2010



Source: CBS

I. Manufacturing Industry

In 2000, Namibia's manufacturing sector contributed about 20% of GDP. Namibian manufacturing is inhibited by a small domestic market, dependence on imported goods, limited supply of local capital, widely dispersed population, small skilled labour force and high relative wage rates, and subsidised competition from South Africa.

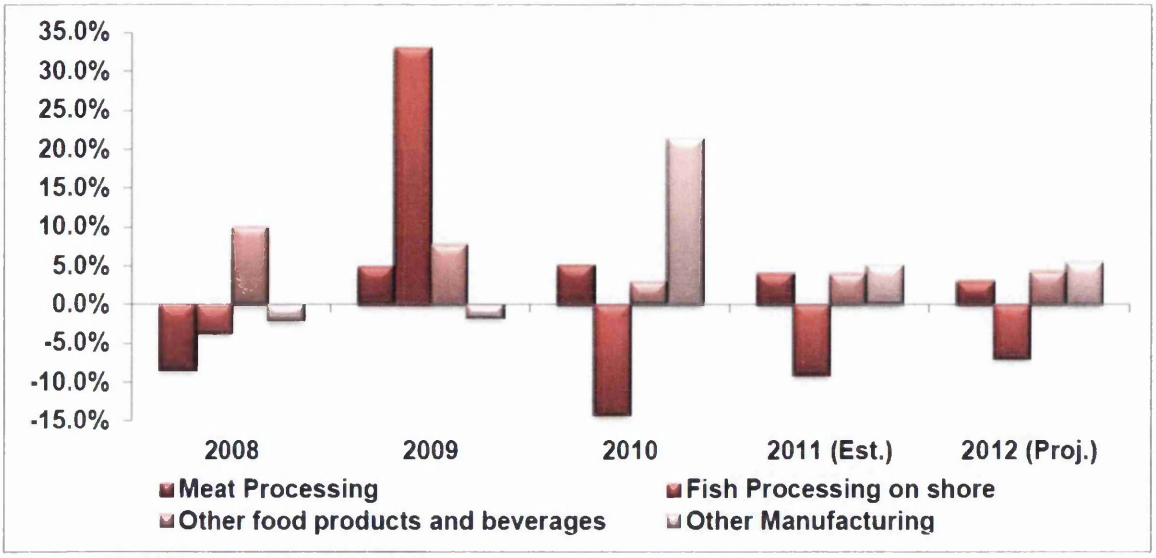
Walvis Bay is a well-developed, deep water port, and Namibia's fishing infrastructure is most heavily concentrated there. The Namibian Government expects Walvis Bay to become an important commercial gateway to the Southern African region. Namibia also boasts world-class civil aviation facilities and an extensive, well-maintained land transportation network. Construction is underway on two new arteries—the Trans-Caprivi Highway and Trans-Kalahari Highway—which will open up the region's access to Walvis Bay. The Walvis Bay Export Processing Zone operates in the key port of Walvis Bay.

Looking forward, the manufacturing industry is expected to expand to 3.9 per cent in 2012 from an estimated slowdown of 3.3 per cent during 2011, Table 3.11, below. The slow growth is attributed partly to the sluggish growth in the minerals production for further value addition as reflected in the primary industries. Furthermore, the slowdown in 2011 is distinctly large when compared to the growth of 9.1 per cent recorded during 2010 owing mostly to a rebound in the mining activities. Looking ahead, the ongoing debt crisis in the advanced economy has a negative impact on the sector, because it has led to uncertainty in the global economic recovery thus dampening demand.

The other food products and beverages sector is expected to expand by 3.3 per cent in 2012, when compared to the estimated growth of 3.0 per cent during 2011. The expected growth will be on the back of increased production of beverages, mainly due to extension and renovations undertaken during the year by the industry. Additionally, the expansion of the pasta plant and wheat milling and the increased production of dairy produce augur well for the sector.

Other manufacturing sector is expected to grow by 5.5 per cent in 2012 and by 5.0 per cent during 2011. The growth is ascribed to the augmented manufacturing of cement, which started production early 2011. This is still the case despite the fact that Ohorongo cement experienced a setback in mid-2011 when Angola banned importation of cement from Namibia. The ban is, however, expected to be lifted by the end of the year. The company has planned to export between 250 000 and 300 000 tonnes of cement to southern Angola. During the year, the factory started already to export to Democratic Republic of Congo, plans are also underway to start exporting to Botswana, Zimbabwe and Zambia. The plant has a capacity of producing 700 000 tonnes of cement per annum. Other challenges that the company is facing is the imports of cheap cement into the country and it is considering approaching the government for infant industry protection.

Table 3.11. Growth in the Secondary Industries (Meat, Fish processing and other Food and Manufacturing) 2008 to 2012



Source: CBS (2005 – 2010) BON (2011-2012)

During 2010, the manufacturing sector has contributed 13.4 per cent or N$ 11 725 million to the current gross domestic product of Namibia. Its total contribution to GDP has averaged 13.2 per cent over the past five years. The 'other manufacturing' sector is the highest contributor to the total manufacturing and to GDP (contributed 7.8 per cent to current GDP in 2010); followed by 'other food products and beverages' sector, figure 3.2.

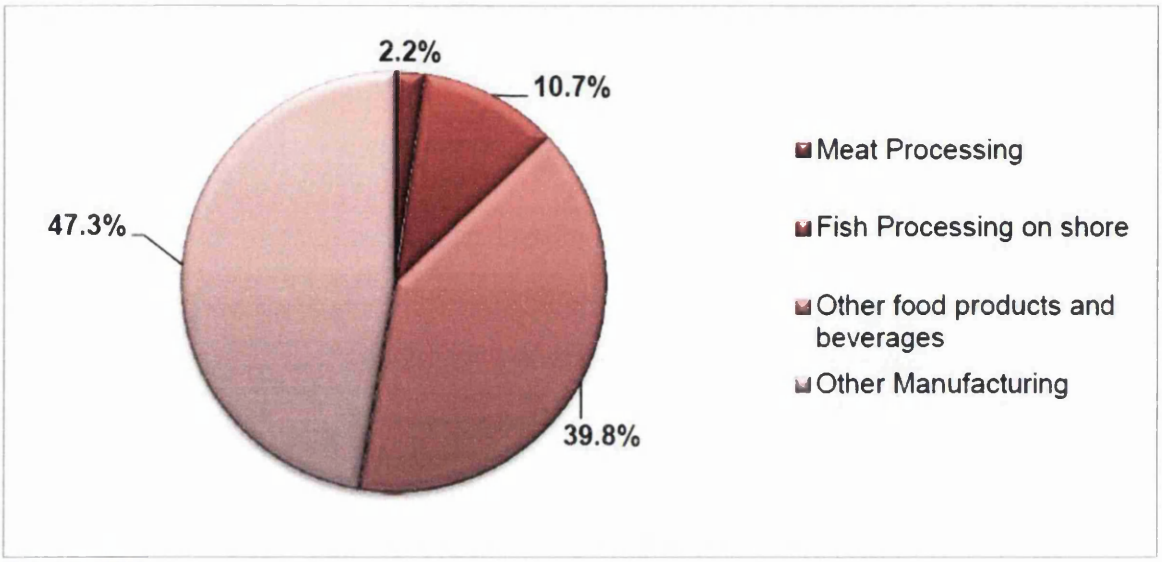
II. Fish Processing on Shore

The clean, cold South Atlantic waters off the coast of Namibia are home to some of the richest fishing grounds in the world, with the *potential* for sustainable yields of 1.5 million metric tonnes per year. Commercial fishing and fish processing is the fastest-growing sector of the Namibian economy in terms of employment, export earnings, and contribution to GDP. The main species found in abundance off Namibia are pilchards (sardines), anchovy, hake, and horse mackerel. There also are smaller but significant quantities of sole, squid, deep-sea crab, rock lobster, and tuna.

At the time of independence, fish stocks had fallen to dangerously low levels, due to the lack of protection and conservation of the fisheries and the over-exploitation of these resources. This trend appears to have been halted and reversed since independence, as the Namibian

Government is now pursuing a conservative resource management policy along with an aggressive fisheries enforcement campaign. The government seeks to develop fish-farming as an alternative.

Figure 3.2. Secondary Industries contribution to GDP 2008 to 2012



Source: CBS

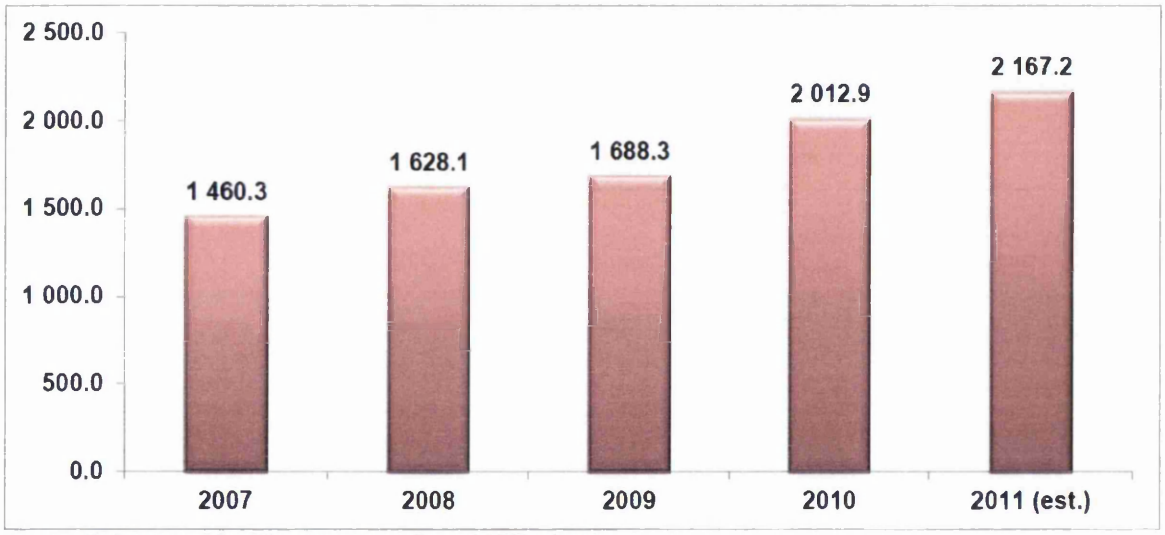
III. Electricity and Water

Electricity and water sector is expected to expand by 3.8 per cent in 2012 after an estimated growth of 3.3 per cent during 2011. The growth in the sector is underpinned by the expected coming on board of Ruacana 4th turbine, which will increase the hydro power generation by an additional 92 megawatts by March 2012. On the other hand, water consumption was subdued due to the slowed activities in the mining industries during 2011. Looking ahead, the sector is, however, expected to improve in line with the economic activities. In particular, electricity and water demand from the mining industry is set to grow by approximately 3 per cent per annum, due to augmented investments in the mining industry. During 2010, the sector grew by 3.5 per cent, an immense improvement when compared to a contraction of 0.1 per cent recorded in 2009.

IV. Construction

Growth in construction sector is expected to grow by 9.0 per cent during 2012 from an estimated expansion of 8.0 per cent in 2011, Table 3.9. The construction sector has registered double digit growth (13.3 per cent) on average during the last ten years and its share as a percentage of GDP has increased, doubled from 2 per cent in 2000 to 4 per cent during 2010. Going forward, the strong growth is underpinned by large spends in housing development, road, water supply and airport development. This is evident in the growth of building plans approved (Table 3.12) reflected in the expected infrastructural development of a shopping mall, hotel and expansion of uranium mines.

Table 3.12. Building Plans Approved during 2007 to 2011



Source: Various municipalities, town councils and BON estimates

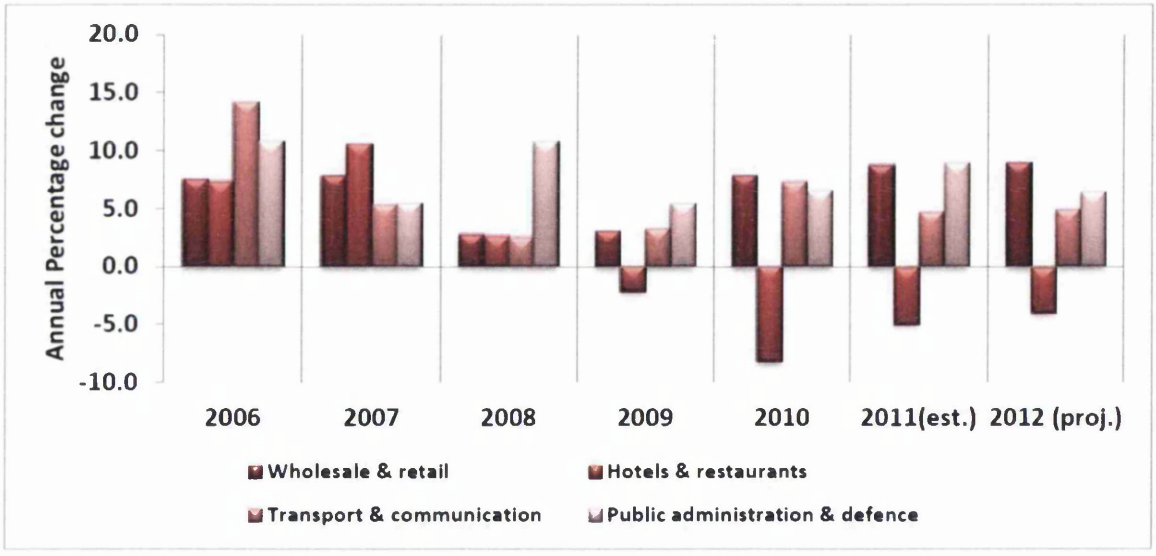
This expectation is also partly supported by the rolling over of the Targeted Intervention Programme for Employment and Economic Growth (TIPEEG). Given the challenges of unemployment and poverty in the country, the government outlined a number of measures to address some of these challenges in the new TIPEEG with a total budget of N$9.0 billion over the MTEF period. The programme is geared towards investment in the agriculture, transport infrastructure, tourism, housing and sanitation and inclusive of public works and the amount allocated is N$13.6 billion. The construction sector plays a major role in any economy, in terms of contribution to employment creation and broad-based economic growth. This is because of the series of backward and forward linkages that the sector has

with other sectors of the economy. Additional sectors such as cement, steel, brick, timber and other building material are dependent on the construction sector.

3.7. TERTIARY INDUSTRIES

The robust growth experienced in the tertiary industries over the last two years is likely to continue in 2012. The industry is projected to expand by 5.7 per cent in 2012, from an estimation of 5.9 per cent in 2011 and 3.9 per cent in 2010, Table 3.13. The optimism for 2011 and 2012 is based mainly on improvements in the Wholesale and Retail Trade, Transport and Communication and the Public Administration category, even though a decline is expected in the hotels and restaurant category within the same period.

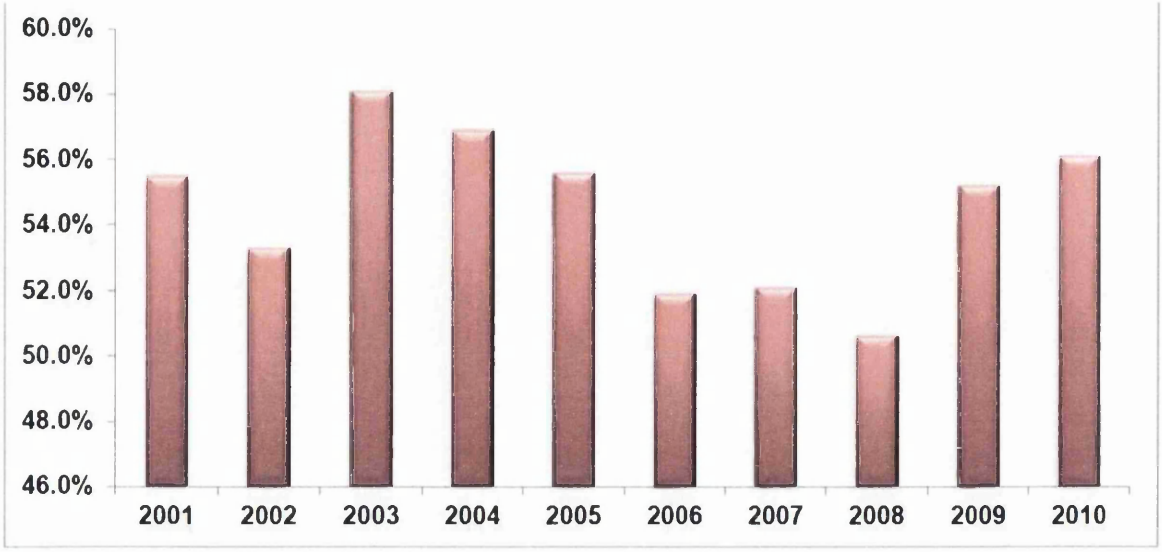
Table 3.13 Growth in Tertiary Industries 2006 to 2011



Source: CBS (2006-2010), Bank of Namibia (2011-2012)

Tertiary industries contribution to GDP has been decelerating and just started to pick up in the last two years, as depicted in (Table 3.14) below. On average, the industries has contributed 53.5 per cent to overall current GDP over the past ten years, owing mainly to wholesale and retail trade, which is the second largest sector in the economy after manufacturing contributing 10.9 per cent, followed by public administration and defence (9.0 percent) and real estate and business activities (8.5 percent) .

Table 3.14. Tertiary Industry contribution to GDP 2001 to 2010



Source: CBS

I. Wholesale and Retail Trade, Repairs

The low interest rates observed over the last three years, continue to benefit the domestic economy by improving consumer appetite and spending. The rise in consumer demand is estimated to increase the Wholesale and Retail Trade, Repairs category to 8.8 per cent in 2011 from 7.9 per cent in 2010. Going forward, the category is projected to grow by 9.0 per cent in 2012. The estimated growth in the retail sector is mainly owing to increments in the salaries of civil servants in 2011 and the favourable interest rates during 2011. The positive effect of the favourable interest rates on the retail sector can be evidenced through credit extension that rose to N$42, 8 billion in 2011 from N$38.5 billion in 2010.

II. Hotels and Restaurants

The category is estimated to have improved from negative 8.2 per cent in 2010 to a contraction of 5.0 per cent in 2011. The sector is projected to improve in 2012 by contracting to 3.0 per cent. The downswing in the sector is chiefly due to uncertainties in the Euro Area, preference of cheaper accommodation due to lower spending power and the fluctuation of the exchange rate.

III. Transport and Communication

The category is estimated to slow down to 3.7 per cent in 2011 from 7.4 per cent in 2010. The lower growth estimated is due to reduction in domestic economic activities, especially in the mining and cement industries and is consistent with the overall performance of the economy. However, going forward the category is projected to increase to 3.9 per cent in 2012. The improvement is due to positive economic outlook expected in 2012 in the mining sector and improvements in the cement manufacturing industry.

IV. Public Administration and Defence

Public Administration and Defence is estimated to expand by 9.0 per cent in 2011, compared to 6.6 per cent in 2010. Furthermore, the category is expected to moderate to 6.5 per cent in 2012. The improvements in Central Government Administrative and Local Government activities are largely, due to expansionary fiscal policy stance envisaged over the MTEF period. Real value added in the Government services is expected to be supported by the expected increase in public employment as per budget. The overall Government employment is estimated to have increased by 8.1 per cent, with 13.4 percent earmarked for the Health sector during 2011/12 fiscal year, this trend is expected to continue.

V. Labour

While many Namibians are economically active in one form or another, the bulk of this activity is in the informal sector, primarily subsistence agriculture. A large number of Namibians seeking jobs in the formal sector are held back due to a lack of necessary skills or training. The government is aggressively pursuing education reform to overcome this problem.

Namibia has a high unemployment rate. "Strict unemployment" (people actively seeking a full time job) stood at 20.2% in 1999, 21.9% in 2002 and spiralled to 29,4 per cent in 2008. Under a broader definition (including people that have given up searching for employment) unemployment rose from 36.7% in 2004 to 51.2% in 2008. This estimate considers people in the informal economy as employed. 72% of jobless people have been unemployed for two

years or more. Labour and Social Welfare Minister Immanuel Ngatjizeko praised the 2008 study as "by far superior in scope and quality to any that has been available previously", but its methodology has also received criticism.

PART IV: AN OVERVIEW OF FOREIGN DIRECT INVESTMENT FLOWS

Since the early 1980s, and particularly beginning in 1990, there has been a rapid expansion in FDI as commercial bank lending dried up following the 1988 debt crisis, aid fell, and privatisation presented major investment opportunities (Sumner 2005). Cross-border mergers and acquisitions played a major role in the boom, accounting for half or more of the total FDI flows in the 1990s. And although a third of total flows to developing countries went to Latin America and the Caribbean, Africa captured just 7 per cent. In dollar terms these values to developing countries are little, but taken as percentages of annual investment (gross capital formation) or FDI stock/GDP they are significant in many countries because of the small size of their economies.

Foreign direct investment has grown dramatically in the past 20 years, exceeding the growth of world production and the growth of international trade. Although most FDI flows are within the developed world, FDI flows have become increasingly significant for many developing countries. Today, FDI typically accounts for more than 60% of private capital flows to the developing world ([Carkovic and Levine, 2005] and [World Bank, 2006]). This world-wide explosion of FDI has been accompanied by a shift in emphasis among policymakers in developing countries to attract more foreign capital. Most countries have reduced barriers to FDI and many aggressively offered tax incentives and subsidies, believing that FDI promotes growth. FDI recorded a level of $916.8 billion in 2005 compared to about $660 billion in 2003. This growth in FDI has been influenced by cross-border mergers and acquisitions and vigorous activities by collective investment funds.

FDI inflows to industrialised countries in 2005 rose by 37 percent to $542, or 54 percent of the world total. Among the industrialized countries the major recipients of FDI were the UK $108 billion, US $99 billion, France $64 billion, Netherlands $44 billion, and Canada $34

billion. Among developing countries, China $72 billion, and Hong Kong $36, topped the list, followed by Singapore $20, Mexico $18 and Brazil $6.

The major recipients have been countries with Purchasing Power Parity (PPP) per capita income over $25,000. Among the developing countries with PPP per capita income of $12,000, excluding China, Brazil, and Mexico, only a few have attracted any significant amounts of FDI. For example, in South Asia, India, Pakistan, and Bangladesh received $6.6, $2.2, $.7 billion, respectively. Overall, in South Asia in 2005 FDI inflow was $9.8 billion and outflow was $1.5 billion. FDI flows by region are listed in Table 3.15.

Table 3.15. FDI flows by region, 2004 to 2005 (estimates in billions of dollars)

Regions	Inflows		Outflows	
	2004	2005	2004	2005
Developed countries	386	542	686	646
Developing countries	274	334	130	133
Africa	18	31	3	3
Latin America/Carib	100	101	35	37
Asia/Oceania	156	200	92	93
South-east Europe/CIS	40	40	12	13

Sources: UNCTAD.

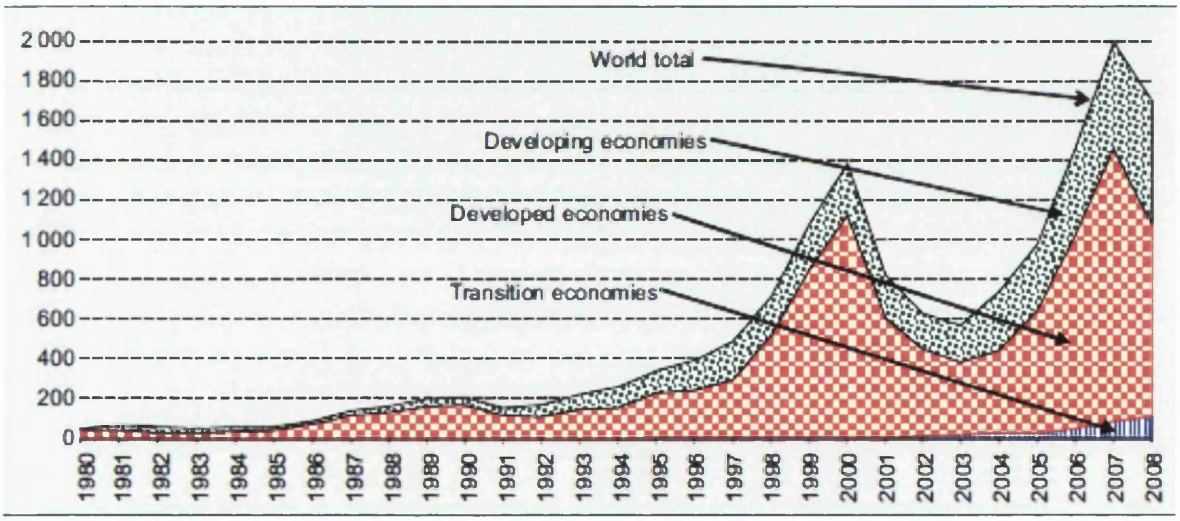
The most important impact of FDI flows has been in the service sectors and the exploitation of natural resources. Table 3.15, 2004–2005 data, shows all regions experienced a rise in the level of FDI inflows. The outflows, especially from the developing countries, have been rising and significant.

This growth as discussed above was caused by an increase in mergers and acquisitions among OECD countries as well as by policy initiatives aimed at deepening regional integrity (OECD, 2004). As this trend gained force, policymakers in host countries started to ask a question: "What implications would these FDIs have on our country's long-term economic growth? " Whereas the traditional theory had it that "FDI could become the engine of growth

for host countries through the transfer and diffusion of knowledge", there is now an increasing need to assess this claim by conducting empirical studies.

Turmoil in the financial markets and the worldwide economic downturn progressively affected global FDI in 2008 and in the first half of 2009. After uninterrupted growth in FDI activity in the period 2003–2007, global FDI inflows fell by 14% in 2008 to $1,697 billion, from a record high of $1,979 billion in 2007 (Table 3.16). While the 2008 level was the second highest in history, FDI flows began gradually declining over the course of that year. In the first half of 2009, FDI flows fell at an accelerated rate. The pattern of FDI flows has varied by groups of economies. FDI inflows and outflows of developed countries plunged in 2008, with inflows declining by 29%, to $962 billion, and outflows by 17%, to $1,507 billion.

Table 3.16. A comparison of FDI flows



Source: UNCTAD FDI/TNC database (www.unctad.org/fdistatistics) and UNCTAD Secretariat estimates.

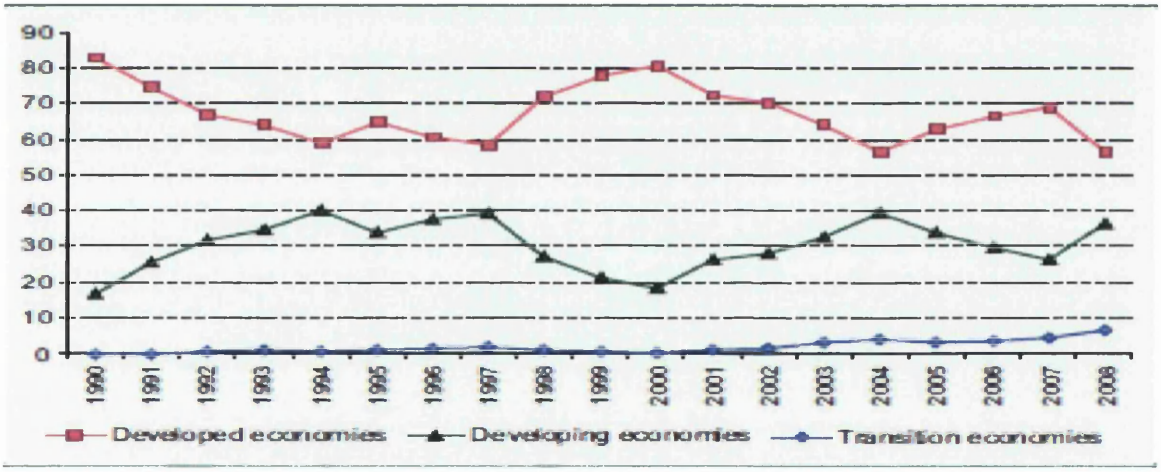
FDI flows fell further as the financial crisis entered a tumultuous new phase in September 2008, following the collapse of Lehman Brothers (one of the largest financial institutions in the United States), and as major developed economies fell into, or approached, economic recession. In the first half of 2009, developed countries' FDI inflows are estimated to have dropped by another 30–50% compared with the second half of 2008. In contrast, developing and transition economies saw FDI inflows rise in 2008 to record levels for both, with their shares in global FDI inflows growing to 37% and 7%, respectively, from 27% and 5% in the

previous year (Table 3.17 below). The combined share was 43%, close to the record share attained in 1982 and 2004, which demonstrates the increasing importance of these economies as hosts for FDI during the crisis – at least in 2008.

Their inflows, however, started to decline in late 2008 as the economic downturn in major export markets began to seriously affect their economies, and as the risk premiums of their sovereign and corporate debt sharply increased. Thus the downturn in FDI inflows into developing and transition economies began almost one year after it had started in developed countries.

This reflects the time lag associated with the initial economic downturn and consequent slump in demand in developed-country markets, which are important destinations for goods produced by developing-country and transition-economy firms.

Table 3.17. FDI Inflows to Developing, Developed and Transition economies, 1990 to 2008



Source: UNCTAD FDI/TNC database (www.unctad.org/fdistatistics) and UNCTAD secretariat estimates.

Foreign direct investment (FDI) has been one of the defining characteristics of the world economy during the last two decades. Some developing economies have emerged as major recipients of FDI flows in recent years, while many others have attempted to attract such flows, often by offering fiscal and financial incentives to foreign investors.

Firstly, a vast majority of existing empirical studies indicate that FDI does make a positive contribution to both income growth and factor productivity in host economies. FDI tends to "crowd in" domestic investment, as the creation of complementary activities outweighs the displacement of domestic competitors.

Similarly, in the North-South context the relationship between FDI and trade is more one of complementarity than of substitution, owing to backward and forward linkages. Second, host countries will not be able to capture the full benefits associated with FDI until they reach a certain threshold level in terms of educational attainment, provision of infrastructure services, local technological capabilities and the development of local financial markets. The results of recent empirical studies based on microeconomic (firm or plant-level) data indicate that the "spillover" effect of FDI on the productivity growth of local firms does not occur automatically, highlighting the complex nature of interactions between multinational companies (MNC) affiliates and local firms.

Third, the role of FDI in development goes beyond the traditional areas of growth, trade and technology transfer to cover emerging areas of policy concern, such as mergers and acquisitions, privatisation, corporate governance and "policy competition" (JBICI, 2002).

Foreign direct investment as a means of economic growth has also been welcomed by most African nations in recent times. Liberalization of investment regulations has been undertaken to facilitate the smooth flow of FDI into these economies. Foreign investors have been granted substantial incentives for investment in the African nations. The region has witnessed improved economic performance since the middle of the 1990s. Off late FDI flow into Africa has diversified from the natural resource sector to the manufacturing sector and services industry as well. Africa it seems is slowly but steadily approaching the path of long run growth and development.

3.8. FOREIGN DIRECT INVESTMENTS FLOWS TO AFRICA

On 2nd April 2008 UNCTAD released the "World Investment Directory: Africa" in Ghana. As per the data released by UNCTAD, Africa has recorded a robust growth in FDI flow in the recent times. The FDI inflows to Africa stood at US$36 billion in the year 2006 from a

meager $2.4 billion in the year 1985. The FDI flow was projected to stay at around US$36 billion for 2007. FDI inflows into Africa for the year 2006 were equal to around one-fifth of the area's formation of gross fixed capital. Inward FDI in Africa climbed to US$315 billion in the year 2006 from $42 billion in the year 1985.

The surge in FDI inflows for the African subcontinent in the time period from 2001 to 2007 can be explained by the twin factors of upwardly mobile commodity prices and a favourable investment climate. The African nations backed FDI investment efforts by policy reforms along with amendments in the laws on natural resource exploitation.

International communities have pledged an increased aid for many African nations. International donors are keen to support Africa's regional development initiatives, provide increased market access to it and further its infrastructure development initiatives among other things. All these are components of FDI. It is interesting to note that the increasing FDI flows into Africa in the recent times have not however led to any increment in Africa's share of world FDI. African FDI inflows stagnated at around 3% in the period from 2000 to 2006. In particular it was 2.7% for the year 2006. As per data available in 2006 the lion's share of the FDI flow were accounted for by Africa's biggest natural resource producers like Angola, South Africa and Nigeria and the sub region of North Africa.

Nigeria and South Africa together roped in 37% of Inward FDI flow for the African subcontinent in 2006. The interesting phenomenon was that both the countries witnessed an increasing share of inward FDI inflow in the primary sector coupled with a declining share of FDI in their manufacturing sector. Most of the African nations in this period were characterized by this trend. Only a handful of African countries witnessed an increased FDI inflow into manufacturing sector in the same reference period.

FDI flows to the continent continued to be highly concentrated in only a few countries during 2008, marked by particularly strong growth in flows to West Africa. Countries such as Ghana and Guinea saw their annual inflows more than double, to well above $1 billion each. In Southern Africa, the increase in inward FDI was almost entirely due to the strong performance of Angola and South Africa. Central Africa and East Africa also posted growth in inflows, but at a much slower pace. Bucking this upward trend, in North Africa there were

declines in inflows to Egypt (even after the $15 billion purchase of OCI Cement Group by Lafarge SA), the Libyan Arab Jamahiriya and Morocco (WIR, 2009).

Most of the FDI flows into Africa over the years have come from developed countries. In recent times developing nations have also pitched in with FDIs. However, as of now they constitute a small portion of the total FDI inflow into Africa. In this regard particular mention may be made of transnational corporations originating from Africa and Asia.

In 2006 United Arab Emirates accounted for 70% of the inflow of FDI into Tunisia. As observed by UNCTAD, the incidence of policy changes for promulgating a favorable FDI environment in the African region has substantially increased since the beginning of the 1990s. UNCTAD observed 57 such changes in 2006 out of which 49 were customized to favor inward FDI. At the global level African nations signed double taxation treaties as well as bilateral investment treaties to promote a conducive, transparent investment climate. In 2006 African nations had signed 438 double taxation treaties and 687 bilateral investment treaties to this effect. More than 70 % of these deals were struck with developed nations.

The main factors motivating FDI into Africa in recent decades appear to have been the availability of natural resources in the host countries (*e.g.* investment in the oil industries of Nigeria and Angola, Diamonds in Namibia) and, to a lesser extent, the size of the domestic economy. The reasons for the lack of FDI flows in most other African countries are most likely the same factors that have contributed to a generally low rate of private investment to GDP across the continent. Studies have attributed this to the fact that, while gross returns on investment can be very high in Africa, the effect is more than counterbalanced by high taxes and a significant risk of capital losses. As for the risk factors, analysts now agree that three of them may be particularly relevant: macroeconomic instability; loss of assets due to non-enforceability of contracts; and physical destruction caused by armed conflicts.

The second of these may be particularly discouraging to foreign investors, since they are generally excluded from the informal networks of agreements and enforcement that develop in the absence of a transparent judicial system. Several other factors holding back FDI have been proposed in recent studies, notably the perceived sustainability of national economic

policies, poor quality of public services and closed trade regimes[22]. Even where the obstacles to FDI seem impossible to overcome, investors may have powerful incentives to adopt a wait and see attitude. FDI contains an important irreversible element, so where investors' risk perception is heightened the inducement would have to be massive to make them undertake FDI as opposed to deferring their decision.

This problem is compounded where a deficit of democracy, or of other kinds of political legitimacy, makes the system of government prone to sudden changes. Finally, a lack of effective regional trade integration efforts has been singled out as a factor. Due to this, national markets remained small and grew at a modest pace (and, in some cases, they even contracted).

A few countries have, however, been able to attract FDI, apparently by virtue of the quality of their domestic business climates. It has been argued that countries such as Mozambique, Namibia, Senegal and Mali in the late 1990s became perceived as having a relatively benign investment environment. This seems to have resulted primarily from government policies toward trade liberalisation; the launch of privatisation programmes; modernising investment codes and adopting international FDI agreements; developing a few priority projects of wider economic impact; and, finally, engaging in high-profile publicity efforts, aimed at informing investors of these improvements(OECD, 2002).

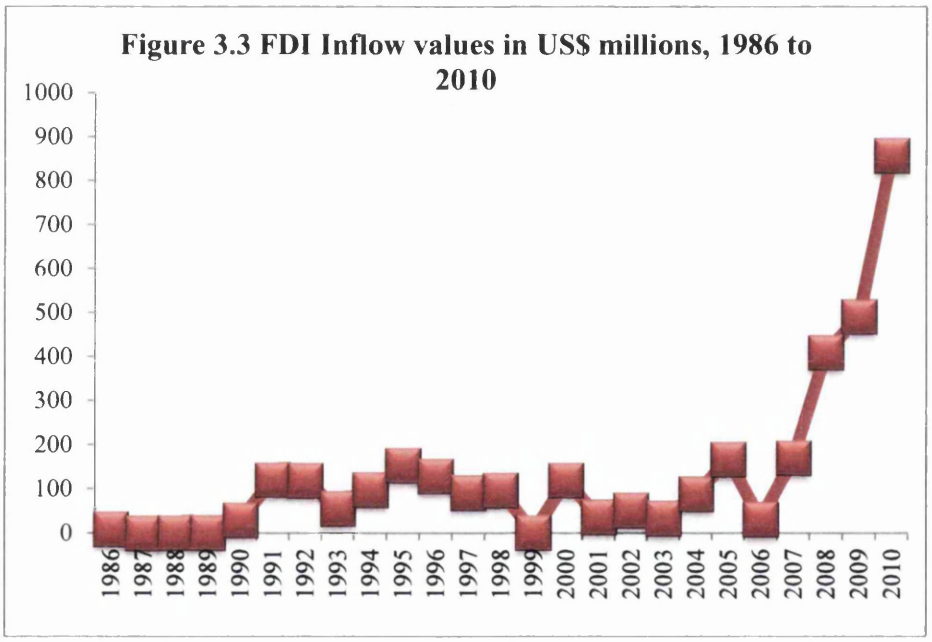
3.9. FOREIGN DIRECT INVESTMENT FLOWS TO NAMIBIA

Foreign Direct Investment, mostly South African, has historically played an important role in Namibia. In addition, there is significant UK and US investment in mining. Five international oil and gas distribution companies operate in Namibia. After gaining independence in 1990, Namibia opened its borders to FDI. In December 1990, foreign investment legislation was liberalized. In April 1993, Namibia announced a program of private-sector investment incentives that included lower taxes, grants, and development loans. However, it did not receive large FDI inflows till the late 1990s. In 1994, the government created an export processing zone at Walvis Bay. The Offshore Development Company (ODC) established

[22] See, for example, D. Dollar and W. Easterly (1998), "The Search for the Key: Aid, Investment and Policies in Africa", World Bank Working Paper.

under the Export Processing Zone (EPZ) Act is responsible for the promotion, marketing, monitoring and co-ordination of all export processing zone activities and the provision of services to EPZ enterprises. Namibia's goal is to create an infrastructure that will serve as a re-export centre for southern Africa, including Angola, South Africa, Zimbabwe, and Botswana. Namibia did not receive any substantial FDI inflows till around 1997.

Annual foreign direct investment (FDI) inflows to Namibia peaked at $153.4 million in 2000, up from $84 million in 1997. According to UNCTAD, Namibia was the ninth largest recipient of foreign direct investment in Africa in 1997. It is also ranked among the top 10 African countries for being successful in attracting Foreign Direct Investment, as well as being among the top 10 African countries with the best Foreign Direct Investment strategy. Namibia's effort at attracting FDI has been quite substantial rising from an average of 13.1 % during 1995-99 and hitting a peak at 51% in 2001. In 2004, Namibia has seen a decline in FDI to 38.6 % before rising incredibly in 2007.



Source: UNCTAD and BON 2010

In 2001, FDI inflow decreased to $99.2 million. Net FDI inflows in 2004 were estimated at about $78 million, or about 2.3% of GDP, but FDI flows have been erratic in recent years, falling from a high of $118 million in 2000 to a range from $33 million to $51 million in the intervening years, Figure 3.3. The total foreign direct investment in Namibia as a % of GDP increased from 17.8 % in 1998 to over 25 % in 2003. This is high when compared to

neighbouring countries such as South Africa, Swaziland, Zimbabwe and Zambia but below that of Botswana. Foreign direct investment can still be considered as a key for Namibia's economic development. The recent investment opportunities by the Malaysia Textile Company, RAMATEX and Scorpion Zinc Mine show that there is attractiveness in terms of the incentives and policies offered by the government in providing a conducive environment for increased foreign direct investment.

In 2005 it was classified as a low FDI potential/high FDI performance country by UNCTAD, meaning that it has had to overcome significant limitations with respect to a small domestic market, skilled labour shortages, and critical infrastructure challenges to perform above potential. Namibia's FDI as a ratio of gross fixed capital formation is higher than the average for Southern Africa, Africa and the developing economies (Slyvanus, I. 2006).

Foreign investors are increasingly growing fond of Namibia with direct inflows rising by nearly 150 per cent from 2005 to 2010. According to the 2011 World Investment Report of the United Nations Conference on Trade and Development, foreign direct investment (FDI) in 2010 reached US$858 million, or about N$5,7 billion dollars. FDI into Namibia has mostly followed an upward curve for the past five years: US$348 million (2005), US$387 million (2006), US$733 million (2007), US$720 million (2008) and US$516 million (2009). On the other hand, FDI outflows from Namibia have been dropping steadily from US$13 million in 2005 to US$4 million in 2010. For Africa as a whole, FDI fell by nine per cent from 2009 to 2010, to settle at US$55 billion.

UNCTAD estimates that in 2009, FDI stocks were equivalent to 42 % of GDP, and FDI inflows represented 25 % of Gross fixed capital formation, Table 3.18. Namibia saw a relatively steep decline in FDI in 2009 as compared to 2008 and 2007. The Bank of Namibia (BoN) asserts the 2009 decline came from a sharp decrease in investments in Namibian equities from abroad.

Table 3.18 FDI Inflows to Namibia, 2007 to 2010

Year	USD (Millions)	FDI as % of GDP	FDI as % of Gross Fixed Capital Formation
2007	733	43.6	35.3
2008	720	39.3	33.9
2009	516	42.4	25.1
2010 (1st 3 Quarters)	631	-	-

Source: UNCTAD and BON 2010.

According to the Ministry of Trade and Industry (MTI), the major contributor to the 2009 FDI total was N$2.5 billion investment (over 50% of the FDI inflows) to finance the construction of the Ohorongo Cement Factory. Through the first three quarters of 2010 there was a relative rebound in FDI, although foreign investments in Namibian equities were still weak. The MTI states there has been an uptick in investments in manufacturing and construction in 2010 totalling approximately N$1.5 billion (USD $220 million) and N$1.7 billion (USD $250 million) respectively. Reinvested earnings were a strong source of FDI during the first three quarters of 2010 as was borrowing by Namibian companies from foreign parent companies (reflected primarily as "other capital" in BON statistics).

In Southern Africa, it decreased by 24 per cent. South Africa and Angola were particularly hard hit, with FDI declining by over 70% and 15% respectively. Historically the bulk of FDI into Namibia comes from African investors. From 1991 to 1993, the country's FDI averaged US$98 per year. Of this, US$78.4 or 80 per cent came from Africa. Between 2006 and 2008, Namibia's FDI averaged US$653.4 per year. Again about 80 per cent, or US$522.7, was African investments.

The country enjoys great political stability and significant mining resources. Although officially the country welcomes foreign investment, the government favours investors who form partnerships with local companies. Moreover, the expropriation of white-owned farms is a serious deterrent. The mining sector attracts most of the foreign investment. The main investor countries are South Africa, Great Britain, the USA and Germany.

While these are relatively good by regional standards, Namibia aspires to compete with the most dynamic emerging markets, which usually perform much better. Namibia was deemed one of the "front runners" -- a developing country that stands out for its success in attracting relatively high and growing levels of foreign direct investment (FDI) in per capita terms -- by the UN Conference on Trade and Development (UNCTAD) in its *World Investment Report 1998.*

Even though FDI inflows are commendable, there is still a need to attract more FDI. A recent report showed that countries who attracted more FDI from Africa are countries with tangible assets such as natural and mineral resources as well as large markets. About 65 % of total FDI inflows to Africa are concentrated in big economies such as South Africa and Nigeria. But where does it leave a small economy such as Namibia with huge natural resources and a small population? A World Bank report stated that such countries can attract FDI by putting in place a favourable business environment. This seem to be the case for Namibia where it was at the top of the list in 29 African countries with a good business climate, suggesting that Namibia can actually become competitive internationally and attract FDI on a sustainable basis.

3.9.1. Dimensions of FDI in Key Economic Sectors in Namibia

In this Section, we outline an overview of FDI flows in relevance to the key economic sectors of Namibia. Notably, the levels of domestic savings, capital formation and private sector investment were relatively low and insufficient to serve as meaningful drivers of economic growth and development at independence in Namibia. To fill this gap, FDI became one of the most important sources. The country's objective was to increase the level of foreign capital inflows, liberalization of trade and investment regime. In the early 1990's the government undertook a number of policies and regulations for attracting foreign direct-investment (FDI) into the country and improve business environment. This regulations were again later reviewed in 2008 due to the disappointing outcome of the Export Processing Zone (EPZ). Namibia has been performing relatively well in comparison to a number of other countries in the region in terms of FDI inflows.

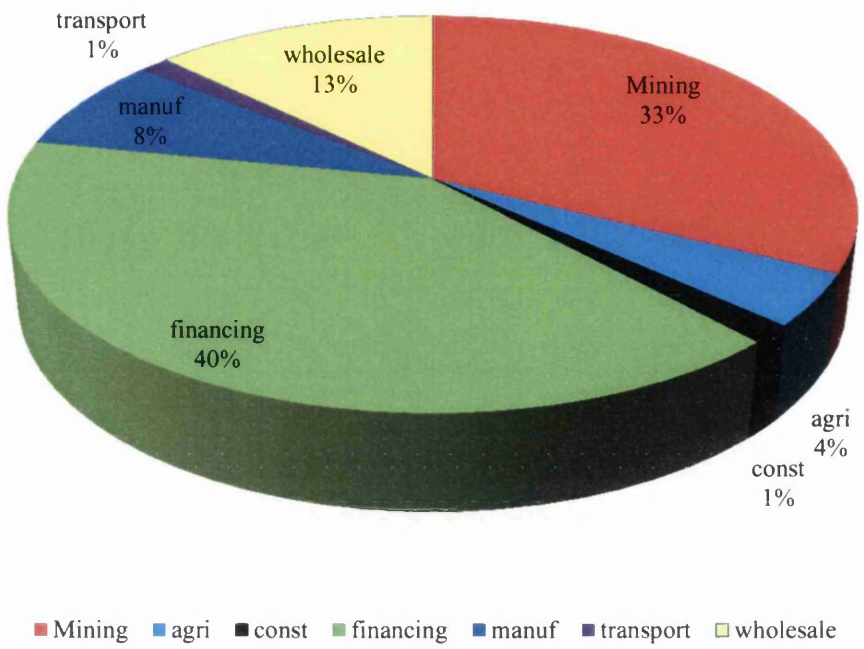
In 2009, Namibia had one of the lowest credit risk ratings in Africa, partially due to the highly competitive incentive regimes that the government has put in place to mobilise FDI

and make doing business in Namibia attractive. Incentives, which apply equally to domestic and foreign investors, aim to create employment, develop industry and increase exports. There is no requirement for local participation in foreign investments, but the government actively encourages partnerships with historically disadvantaged Namibians. While Namibian companies are generally open to foreign investment, private domestic and foreign investments in state-owned enterprises are limited to joint partnerships. Exports are dominated by unprocessed primary commodities such as minerals, meat and fish. In contrast, imports mainly comprise of manufactured goods and consumer goods. Namibia is the fourth-largest exporter of non-fuel minerals in Africa, the world's fifth-largest producer of uranium, and the producer of large quantities of lead, zinc, tin, silver, and tungsten. More than half of the income generated by the mining industry consists of diamond exports, followed by uranium.

FDI flows to Namibia have been erratic in recent years, falling from a high of $382 million in 2001 to $182 million in 2003 before beginning to rise again. However, FDI to Namibia has been heavily biased toward the mining sector, which attracted two-thirds of investment during 2003-06. Foreign direct investment (FDI) inflow totalled US$746.4 million in 2008, with the finance and mining industries receiving the largest portions of FDI in Namibia. Net FDI inflows were about $342.4 million in 2006 (World Bank 2008f), or 5.2% of GDP (by comparison, Sub-Saharan Africa received inflows of 2.1% of GDP in 2006).

In manufacturing sector, most FDI from East Asia has been directed toward taking advantage of spare quota under the textile and apparel trade regime. Gross fixed capital formation was about 30% of GDP in 2007. Although Namibia's FDI figures are relatively competitive by regional standards, the country aspires to compete with the most dynamic emerging markets, which usually perform much better.

Figure 3.4 Average FDI inflows to each Sector, 1990 to 2009



Sectoral composition of foreign direct investment in Namibia has traditionally concentrated in the mining sector. Figure 3.4, reveals a tremendous shift from FDI in the mining sector to FDI in the financing sector. This shows that although the mining sector still remains important, both financing and wholesale are transforming to be key sectors for FDI. Namibia has also seen an increase of FDI in the manufacturing sector although minimal as compared to the major sectors but with vast effects on growth. According to the most recently available analytical data, this sector accounts for 33% enterprises and 40% of manufacturing employment[23]. Manufacturers are still clustered in the Khomas region that incorporates Windhoek, despite government's policy objectives to decentralize industrial activity. The retail sector is very central and important to the Namibian economy in terms of its contribution to the GDP, where it is second to the mining sector, as well as in terms of job creation, where it is second only to the public sector, employing over 33,000 people. It is also true that the development of the sustainable industrial or manufacturing sector is greatly dependent on the existence of a supportive local retail sector, which is ready to absorb the locally produced goods.

[23] MTI, Report on the Survey of Manufacturing Industries, 2003.

The evidence shows that FDI in Namibia is increasingly diversifying. In the period 1990-2009, Figure 3.1, on average 40% of FDI stock in Namibia was in the financing sector, 33% in mining, with 4% and 8% in agriculture and manufacturing respectively. This figures show that Namibia has seen a diversion of FDI flows from the mining sector to the financing sector. Interestingly, no serious reform of the financial sector was needed post-independence, since the sector historically has been market-driven. However, one could explain the vast increase in FDI flows to the financing sector as down to the new Banking Institution Act of 1998 which replaced the old regulatory regime inherited from South Africa post independance. The Act is based on international supervisory practices and banking standards, and empowers the Bank of Namibia with more effective regulatory power. And as such, this has led to a more efficient financial system.

In addition, in 1992 the Namibian Stock Exchange was established, with a large portion of market capitalisation being comprised of dual-listed South African companies. Furthermore, although FDI Stock flows to the agricultural sector on average were 1% during this period, the sector has recorded strong sector growth in 2005, driven by improvement in the livestock industry. Moreover, annual growth in the sector is highly volatile because of regional and local droughts and also inadequate technologies used in the sector. FDI stock flows in the construction sector has significantly declined since 2004, this is clearly represented by the 1% on average of stock during this period. The transport sector with 1% of FDI stock raises the need for investors in this sector i.e. transport and infrastructure are core determinants of attracting FDI in Namibia and since 2008 has been one of the main focus of the government in terms of policy. This shows how Namibia has begun to bridge the savings-investment gap to sustain its industries and maintain economic growth.

Namibia has a lot of potential to attract foreign investment. Although the rising trend of FDI reflects the success of policy, institutions, low levels of corruption and good infrastructure, however, FDI inflows are considerably hindered by the supply of water and electricity and attainable labor force. For example, in the mining sector, shortages of water and electricity are attributed by the spatial remote distribution of mines within the country. In the manufacturing sector, all previous priority areas, notably the construction industry and transport, accounted for steeply decreasing shares in overall FDI stocks. The data situation leaves much to be desired when it comes to FDI in financing. This is mainly because booming FDI stocks in the financing sector are largely confined to all specified category in

this sector. Presumably, FDI in this category is heavily concentrated in information and communication services.

The changing composition of FDI in Namibia matters as various arguments suggest that the growth effects of FDI should be sector-specific. In particular, the potential for productivity enhancing spillovers is widely believed to differ across sectors. According to Alfaro (2003), FDI-related transfers of technology and knowledge primarily occur in the manufacturing sector. Arguably, it is mainly in manufacturing that foreign investors use intermediate inputs intensively which creates positive externalities and allows local producers to draw on a larger variety of inputs and, thereby, increase their productivity (Rodriguez-Clare, 1996). However, in Namibia transfers of technology and knowledge occur mainly in the mining sector as opposed to manufacturing. Aykut and Sayek (2007) suspect that technology and knowledge spillovers in manufacturing are most likely if FDI is motivated by efficiency-seeking reasons, unless FDI is located in enclaves such as export- processing zones.

However, FDI in Namibia is mainly motivated by resource- seeking rather than efficiency-seeking reasons. Resource-seeking FDI in the mining sector often takes place in economic enclaves that are largely isolated from the local economy. Positive growth effects of FDI in the primary sector, for example, agriculture may be compromised in other ways, too. FDI in the agricultural sector tends to be volatile; it is sensitive to international commodity prices and often financed through inter-company loans rather than equity[24]. According to Lensink and Morrissey (2006), the volatility of FDI has a negative impact on growth. Furthermore, large-scale FDI for resource-seeking reasons may give rise to Dutch disease effects and encourage unproductive activities such as rent seeking.

The increasing tradability of services such as financing and wholesale sectors notwithstanding, the bulk of FDI in this sector still appears to be market-seeking. The superior market power of Foreign Service providers, whose entry into the host country is often through mergers and acquisitions rather than Greenfield FDI, has ''significant crowding-out potential[25]''. Moreover, linkages with the local economy may remain weak even for FDI in tradable services. Given that the growth effects of FDI are likely to be sector-

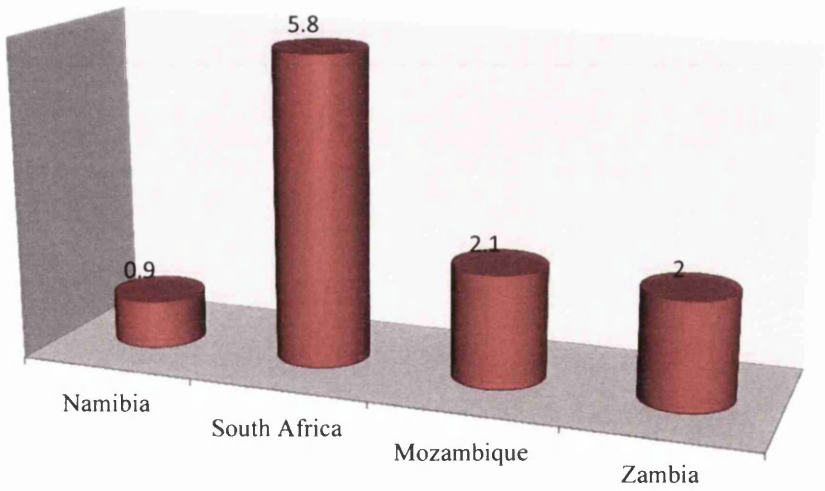
[24] See Aykut & Sayek (2007) and World Bank (2005).
[25] See Aykut & Sayek (2007)

specific it is fairly surprising that almost all empirical studies use aggregate data and ignore the composition of FDI.

3.10. A COMPARISON OF FDI FLOWS TO SOUTHERN AFRICAN COUNTRIES

In 2011, Namibia pulled US$900 million in FDI approximately N$7,4 billion in local currency. Namibia received 26 per cent more investment flows in 2011 compared to 2010. Table 3.19, shows Namibia as one of the four biggest recipient of FDI inflows into the Southern African region, with South Africa receiving US$5,8 billion, Mozambique US$2,1 billion and Zambia nearly US$2 billion, respectively.

Table 3.19. FDI Inflows (US$ Billions) to the four largest recipiants in Southern Africa, 2011



According to the World Investment Report 2012 of the United Nations Conference on Trade and Development (UNCTAD), Namibia's FDI inflows have been growing steadily since 2006, Table 3.2. Namibia's FDI inward stock, or its accumulated FDI, by the end of 2011 stood at US$4,7 billion, approximately N$39 billion. In contrast, its FDI outward stock, was US$29 million. Namibia's FDI inward stock dropped from US$2,1 billion in 1990 to US$1,3 billion in 2000, before rising to US$4,7 billion last year. In 2011, South Africa led with

nearly US$130 billion in Inward FDI, followed by Zambia with nearly US$13 billion, Table 3.20.

Table 3.20. Inward Foreign Direct Investment Stock to SADC, 2002 to 2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Angola	13257	11987	13437	12133	12095	11202	12881	15086	11859	6273
Botswana	854	1167	982	806	805	1046	885	1405	660	1088
DRC	816	974	984	908	801	1521	2521	3058	3994	5590
Lesotho	385	427	480	537	629	735	934	1075	1129	1181
Malawi	390	410	562	767	1017	1315	2584	821	961	939
Mauritius	690	752	763	805	910	1249	1632	1880	2310	2583
Mozambique	1852	2189	2442	2630	2789	3216	3808	4522	5311	7404
Namibia	1822	2952	4120	2453	2786	3854	3543	3132	5334	4670
Seychelles	628	686	723	809	955	1194	1323	1442	1602	1745
South Africa	30604	46869	64451	78986	87765	110415	67987	117434	153133	129890
Swaziland	607	721	930	786	831	889	542	809	978	881
Tanzania	2939	3590	3954	4439	4827	5950	6240	6655	7089	7825
Zambia	4341	4688	5052	5409	6025	7604	6634	9221	10951	12932
Zimbabwe	1268	1272	1280	1383	1423	1492	1544	1649	1814	2201

Source: UNCTADstat 2011, figures are in US$ millions.

FDI inflows into Africa fell in 2011 for the third consecutive year but could more than double by 2014, as stronger economic growth, ongoing reforms and high commodity prices improve investor perceptions.

The decline in investment, from US$43,1 billion in 2010 to US$42,7 billion in 2011, was largely due to reduced inflows to North Africa as social and political unrest in Egypt and Libya deterred investors, the report said. Africa's share of global FDI also dropped from 3,3 per cent in 2010 to 2.8 per cent in 2011. However, inflows to sub-Saharan Africa jumped 25 per cent to US$36,9 billion in 2011, close to its peak of US$37,3 billion in 2008, as commodity-rich countries in west and central Africa saw a rise in new projects.

Africa's FDI prospects for 2012 have been seen to be promising and forecast average flows of between US$55 billion and US$65 billion in 2012. This figure is projected to grow to US$70-US$85 billion in 2013 and US$75-US$100 billion in 2013. Inflows to Africa are expected to recover as a result of stronger economic growth, ongoing economic reforms and high commodity prices, as well as improving investor perceptions of the continent, mainly from other emerging markets. In 2011 FDI inflows from developing economies into Africa (US$45,5 billion), outstripped those from developed economies (US$43,2 billion).

In terms of green field projects, which account for over 90 per cent of total FDI, the largest developing economy investors in 2011 were India, South Africa, China, Korea and Mauritius. Africa's emerging middle class has also spurred the growth of FDI in the services sector, though FDI to the extractive industries tends to attract more attention or investors rather. North Africa, traditionally been the recipient of a third of inward FDI to Africa, and the rest of the continent. However, inflows to the region halved to US$7,69 billion in 2011, dwarfed by the US$16,1 billion investors poured into west Africa and the US$8,53 billion into central Africa.

Commodity-rich countries, such as Nigeria, Ghana, Congo, Equatorial Guinea and the Democratic Republic of Congo, attracted the bulk of FDI in their respective regions. Nigeria, Africa's top oil producer and most populous nation, received inflows of US$ 8,92 billion, representing a fifth of all flows to the continent. However, it is expected that new oil and gas producing countries such as Ghana, where commercial oil production started in December 2010, and Mozambique, where major discoveries of gas reserves are expected to transform the economy, should experience strong FDI growth in the future.

3.11 CONCLUSION

The Chapter covered a review of Namibia's historical background and the geographical structure of the country. It further presents an overview of the Namibian economy and gives an in- depth insight of all industries in Namibia and their overall contributions GDP. It discusses FDI in the key economic sectors in Namibia and a comparison of FDI inflows to Southern African countries. The Chapter also gives an overview of FDI flows to developing countries and the African region. The Namibian economy continues to be categorized as "moderately free." Earlier reforms have enabled the economy to continue modest economic growth. Aided by a stable regulatory environment and a relatively high degree of openness to global trade, annual economic growth has averaged about 4% over the past five years.

Global economic trends such as rising commodity prices, surging demand for commodities by emerging economies and spiralling global demand for energy has resulted in strong investor interest in Namibia's uranium, diamond and copper mining sectors. Uranium is set to overtake diamonds as Namibia's largest foreign currency earner. Given Namibia only

managed to secure independence from South Africa in 1990, the country continues to do well in ramping up FDI and positive expectations for its agriculture, herding, tourism and mining sectors. It is then necessary to conduct empirical investigation for the economic impact of these flows on the Namibian economy.

CHAPTER 4

WHAT ARE THE DETERMINANTS OF FOREIGN DIRECT INVESTMENT IN NAMIBIA?

4.1. INTRODUCTION

In the previous chapter we discussed FDI flows to Namibia. In this chapter we look at the determinants of such flows in the case of Namibia. FDI as a means of economic growth has been welcomed by most African nations in the recent times. Considerable liberalisation of the prevalent investment regulations has been undertaken to facilitate the smooth flow of FDI into these economies. As a result, foreign investors have been granted substantial incentives for investment in many countries. The region has witnessed improved economic performance since the middle of the 1990s. Africa for example, backed FDI investment efforts by adopting policy reforms along with amendments in the laws on natural resource exploitation. Off late, FDI flow into Africa has diversified from the natural resource sector to the manufacturing sector and services industry as well.

The surge in FDI inflows for the African subcontinent can be explained by the twin factors of upwardly mobile commodity prices and a favourable investment climate. However, the main factors motivating FDI into Africa in recent decades appear to have been the availability of natural resources in the host countries (*e.g.* investment in the oil industries of Nigeria and Angola, Diamonds in Namibia) and, to a lesser extent, the size of the domestic economy (OECD, 2002). A few countries have, been able to attract FDI, by virtue of the quality of their domestic business climates. It has been argued that countries such as Mozambique, Namibia, Senegal and Mali in the late 1990s became perceived as having a relatively benign investment environment. This seems to have resulted primarily from government policies toward trade liberalisation; the launch of privatisation programmes; modernising investment codes and adopting international FDI agreements; developing a few priority projects of wider economic impact; and, finally, engaging in high-profile publicity efforts, aimed at informing investors of these improvements (OECD, 2002).

Although, there is an extensive literature on the determinants of FDI to developing countries, to the best of my knowledge there is no published empirical study on FDI that focuses exclusively on Namibia. There is an important need to study FDI and its determinants in the case of Namibia. Why? Firstly, the government has been committed to stimulating economic growth and employment through attracting foreign investment since attaining its independence in 1990. Secondly, Namibia receives on average 2.61% of GDP per year in FDI. In 2010, FDI to Namibia as a percentage of GDP was 7.15 second to Hong Kong SAR, China who received 22.78% of their GDP in FDI compared to other countries[26].

In this light, the objective of this study is to analyse potential determinants of FDI in Namibia over a period covering 1980 to 2009, which is notably the era pre and post-independence. The aim is to answer the question: why FDI goes to Namibia. And, once the determinants considered are applicable to Namibia; are the results consistent and robust using post-independence data? Finally, what type of FDI goes to Namibia? To the extent that FDI to Africa is driven by different factors, determinants or policies that have been successful in other countries and regions may not equally determine or be successful in Namibia.

The research methodology adopted in this chapter extends the existing literature in two aspects. Firstly the chapter offers a single-country specific analysis of the issue, secondly the dataset allows for the testing of the extent to which the determinants of FDI identified in the literature explain the variation in FDI for Namibia. Hence, compared to the level of generalisation in the literature, results in this chapter are more precise and address the specific concerns with regard to the determinants of FDI. Second, the chapter uses a co-integration technique based on the autoregressive distributed lag approach (ARDL) developed by Pesaran and Shin (1996, 1997) which is proven to perform better than other conventional co-integration techniques, in particular in small samples as is the case for Namibia. The first stage of the analysis considers a time period which covers both the pre and post- independence era. The second stage of this analysis carries out a robustness check on the consistency of results and allows for the inclusion of other determinants in the literature by employing a dataset covering the post- independence era, 1990 to 2009.

[26] www.theglobaleconomy.com/Namibia/indicators.

The rest of the Chapter is structured into six sections. Following the introduction, Section 4.2 presents the econometric model of the study and describes the data. Section 4.3 discusses the methodology and Section 4.4 interprets and discusses in detail the empirical findings thereof. In Section 4.5 the study presents the empirics outlining the specifications employed in the analyses of robustness checks and those allowing for inclusion of other determinants in the literature as mentioned above, it also discusses the robustness results obtained. And finally, Section 4.6 concludes.

4.2. MODEL SPECIFICATION AND DATA DISCUSSION

In the literature review, Chapter 2, the determinant variables thought to be linked to FDI flows are the size and growth potential of the host market, economic stability (exchange rate valuation), the degree of openness of the host economy, and income level, as well as the quality of institutions, level of development, political stability and the clustering effects. The literature has identified clustering effects: foreign firms appear to gather together either due to linkages among projects or due to herding as a larger existing FDI stock is regarded as a signal of a benign business climate for foreign investors. Therefore, having considered the literature on determinants of FDI the study has outlined what might be possible determinants in the case of Namibia in Table 4.1. Although, the literature has identified varies institutional/qualitative variables such as judicial independence, legal system efficiency, and financial depth as important in such an analysis, in this study we include only a subset due to data limitations.

Notably, in this section, a detailed specification of the variables considered as possible determinants and the model used in the empirical investigation of the determinants of FDI in Namibia are discussed herein, including the sources of data used.

4.2.1. Model

To empirically investigate the determinants of FDI in Namibia, the demand for inward direct investment equation is used to build upon the benchmark model developed by Sawkut et al. (2008) and following recent empirical work, particularly Oladipo[27] et al. (2010). We adopt

[27] The International Journal of Business and Finance Research, Vol. 4, No. 4, pp. 75-88, 2010

the following reduced form specification to determine variables that attract inward direct investment;

$$lnFDI_t = f(lnGDP_t, lnGFCFt, Openness_t, X_t) \quad (4.1)$$

Where, $lnFDI_t$ is the natural log of FDI Stock at time (t), t is used to index time. The stock of FDI stands for the degree of clustering as stated in the literature, and $lnGDP$ is the log of real GDP per capita. $lnGFCF_t$ is the log of real gross fixed capital formation representing domestic investment in the country. Openness is foreign trade (exports plus imports) as a share of GDP[28]. X_t includes the key variables for the two specifications outlined below and those used in Section 4.6. These are $lnINFRA_t$ (infrastructure), which is the log of telephones per 100 inhabitants and $lnLABOUR_t$ which denotes availability of the labour force in the country. $MKTsize_t$ is the log of the total population in the country. INT is the interest rates and finally, inflation. Therefore, to assess the determinants of FDI, the econometric version of the models to be used in the two specifications for robustness and model uncertainty take the following forms and the variables are as described above:

Model 1: $$lnFDI_{1t} = c_{10} + c_{11}lnGDP_t + c_{12}lnGFCF_t + c_{13}OPEN_t + c_{14}\,lnLABOUR_t + e_{1t} \quad (4.2)$$

Model 2: $$lnFDI_{2t} = c_{20} + c_{21}lnGDP_t + c_{22}lnGFCF_t + c_{23}OPEN_t + c_{24}\,lnMKTsize_t + e_{2t} \quad (4.3)$$

4.2.2. Data Sources

The data used in this study is obtained from various sources. The data for GDP per capita, FDI Stock and gross fixed capital formation for the period post-independence (1990 to 2009), was sourced from the Bank of Namibia (2010). The data for FDI stock prior to 1990 was sourced from UNCTAD Stat (2010). Furthermore, gross fixed capital formation and GDP per capita pre-independence (1980-1989) were obtained from the African Development Indicators (2011) database. The labour force, inflation and population data were also obtained

[28] The study has also considered the log of openness, of which no significant changes in the results were found. However, the choice of estimating openness as a ratio is consistent with leading work on FDI, for example, Asiedu (2002), Botric et al. (2005), Globerman (2002), Blin et al. (2009) and Nunnenkamp (2008).

from African Development Indicators (ADI). Real interest rates, infrastructure (telephone lines per 100 inhabitants) and Openness data was sourced from World Development Indicators (2010). It should be noted that data pre-independence could not be obtained from the Bank of Namibia and hence the use of varied relevant sources. Table 4.2(a) and (b), Appendix IV, gives descriptive summary statistics of the variables included in the models.

4.2.3. Variables Description

In this Chapter, the variables selected for the study have been decided by taking into consideration the relationship and importance of the variable in the context of the Namibian economy and the availability of adequate data to enable the process of undertaking an empirical study, and hence, chosen the following set of possible determinants of FDI, Table 4.1.

Table 4.1: Possible FDI Determinants in Namibia

Variable	Type of FDI	Expected effect
GDP per capita	Market seeking	Positive
Population	Market seeking	Positive
Labor Force	Resource/asset seeking	Positive
Infrastructure	Resource/asset seeking	Positive
Openness	Efficiency seeking	Positive
Inflation	Efficiency seeking	Negative
Interest Rates	Efficiency seeking	Positive

Source: Author and Botric et al. (2005).

The following variables were considered for the main results of the study:

- **GDP,** Real gross domestic product is known to be a determinant of foreign direct investments in the FDI literature[29]. The study utilises real GDP per capita in Namibian Dollars to measure the income level. Countries with higher per capita GDP are more likely to receive larger amount of FDI compared to others. As income grows, its cyclical component should have a positive effect on the amount of FDI inflows in the country. Moreover, higher income denotes better business environment, better education and wealthy citizens.

[29] See Globerman (2002), Benassy-Quere et al. (2007) and Sawkut (2008) for examples of studies that used GDP per capita as a determinant of FDI rather than considering growth in their studies.

Investment in capital-scarce countries is expected to yield higher return indicating an inverse relationship between the levels of GDP and FDI. At the same time, in case of the market-seeking FDI, there could be a positive relationship between the income level and the FDI, since the investor predominate intention is to substitute for exports. A high income means a greater demand for goods and services, which attracts market-seeking FDI. On the other hand, it may also mean a high wage rate, which may deter labor-seeking FDI. With increase in GDP, it is expected that companies abroad will like to be part of the success story and start putting money in such an economy. Similarly for an increase in openness, as the trade with other country increases, any country is able to attract more money as investment.

- Openness **(OPEN)** of the economy is one of the traditional variables for explaining the FDI movements. It is defined as the trade (import plus export) share of the GDP. The expected effects may differ by the type of investment regarding local market or export orientation, the host country's foreign exchange control laws and applied capital taxation. However, we expect that the openness will indicate also the level of integration of the local economy into the regional economic flows. Therefore, the openness should have positive influence on the FDI.

- Labor force **(LABOR)** is defined as the number of people ages 15 and older who meet the International Labour Organization definition of the economically active population; all people who supply labour for the production of goods and services during a specified period. Since Namibia is relatively less developed with small markets, we expect that one of the relevant motives for the foreign investors could be abundance of inexpensive labor. We expect initially that a large labor force should increase the inflow of FDI. However, this might not be the case if FDI is directed predominately in service sector were demand for labor force is fewer in numbers then in other sectors such as mining and agriculture. Consequently, there could also be a negative relationship between FDI and labor force.

- Population as a measure of the size of the host market **(MKTsize),** also represents the host country's economic conditions and the potential demand for their output as well, is an important element in FDI decision-makings. Moreover Scaperlanda and Mauer

(1969) argued that FDI responds positively to the market size 'once it reaches a threshold level that is large enough to allow economies of scale and efficient utilization of resources'. The importance of the market size has been confirmed in many previous empirical studies (Kravis and Lipsey, 1982; Schneider and Frey, 1985 and among others).

The following additional variables were used in the Robustness analysis of the study including those mentioned above:

- Infrastructure **(INFRA)** is defined as the number of telephone lines per 100 inhabitants. This indicator is judged as relevant proxy for availability of quality infrastructure to foreign investors. The variable could also be used as a proxy of the relationship between FDI and technology transfer, since it might represent the preconditions for the technology transfer. We expect a positive relationship between the two variables.

- **INFLATION,** One of the factors affecting investor's yield is the rate of inflation. A high return on yields promotes FDI. The growth of prices of products the investor has invested in should be positively associated with FDI. However, very high inflation rates or volatile inflation can be judged as impediment to the FDI, since it is a clear sign of macroeconomic instability. Therefore, the expected sign on the inflation rate is not ex ante determined (Botric et al., 2006).

- Interest rates **(INT),** is interest rate after adjusting for inflation is a good measure and affecting variable for FDI inflow in any country. The reason being that an investor will look for cheaper funding options as well as higher returns on the money invested in other country. This simply means that if the interest rates that can be earned are higher and the interest rate at which the funds can be borrowed in other country is relatively lower will attract FDI inflow to the country.

Furthermore, we employ a dummy variable to capture the post-independence effect in 1990, where policy changes might have affected FDI inflows to large-scale. The value of the dummy variable is taken "0" for years before independence and "1" after independence.

4.3. ECONOMETRIC METHODOLOGY

The empirical analysis on the determinants of FDI in Namibia relies on co-integration analysis. In this Section, we present the methodological approach. We first discuss the issue of unit roots followed by a discussion of the ARDL technique.

4.3.1. Stationarity and Unit Root tests

One of the most important issues to consider for modelling time series data, prior to applying co-integration analysis, is to test for non-stationarity of the data. The importance of testing for a unit root in time series data arises from the fact that we firstly need to identify the integration properties of the time series. Stationarity means that the fundamental form of the data generating process remains the same over time. Using non-stationary data can produce spurious regressions, where "significant" results obtained from this regression can be worthless in reality and yield nonsense regression. A series is said to be stationary when it has constant mean and variance as well as declining auto-covariances for each lag. However, if the series are found non-stationary, the estimated regression will lead to invalidity of the standard assumptions, which means that both t-ratio and F-test obtained from this regression will not follow their standard distribution.

Importantly, is should be noted that the empirical analysis used in this research does not require the pre-testing step for unit roots in the series. However, it is well argued that in the presence of I(2) variables the computed F-statistics provided by Pesaran *et al.* (2001) are no more valid because they are based on the assumption that the variables are I(0) or I(1); therefore, the implementation of unit root tests in the ARDL procedure might still be necessary in order to ensure that none of the variables is integrated of order 2 or beyond (Ouattara, 2004).

In order to investigate the stationary status of each series used in this thesis, several approaches were followed. Observing the line graph of the series can be one way to determine the stationarity status of a variable, where the series is said to be stationary if the graph revolves around one mean. However, this is not enough to detect a unit root since deterministic trends can yield time series plots that closely resemble those from non-stationary models having a stochastic trend. Therefore, standard unit root tests have to be

conducted to infer the number of unit roots in each variable. And hence, in this study, the Generalised Dickey-Fuller, the Augmented Dickey Fuller and the Phillips-Perron tests were employed in the testing of unit roots.

4.3.2. The Augmented Dickey Fuller (ADF), Dickey-Fuller Generalised Least Squares (DF-GLS) and Phillips-Perron (PP) tests

First, the time series property of each variable is investigated under a univariate analysis by implementing the ADF (Augmented Dickey- Fuller) test for the unit root (nonstationarity) (following Dickey and Fuller 1981, Fuller 1996). Likewise, as mentioned above, the PP (Phillips-Perron) test is also implemented (following Phillips 1986, Phillips & Perron 1988, Perron 1989) and DF-GLS (following Elliot *et al.*1996). It should be noted that the PP unit root tests differ from the ADF tests mainly in how they deal with serial correlation and heteroskedasticity in the errors. In particular, where the ADF tests use a parametric auto-regression to approximate the ARMA structure of the errors in the test regression, the PP tests ignore any serial correlation in the test regressions.

Second, if these tests confirm stationarity in time series data of each variable, equation (4.4) to (4.7) are estimated appropriately by the Ordinary Least Square (OLS) method. Otherwise, its application leads to misleading inferences in the presence of spurious correlation (Granger & Newbold 1974). The ADF and PP tests are conducted with and without a deterministic trend (t) for each of the series. Both the ADF and PP unit root tests are for the null hypothesis that a time series Y_t has a unit root and is I(1) . The general form of ADF test is estimated by the following regression:

$$\Delta Y_t=\alpha_0+\alpha_1 Y_{t-1}+ \sum_{t=1}^{n} \alpha \Delta Y_i+e_t \quad (4.4)$$

$$\Delta Y_t=\alpha_0+\alpha_1 Y_{t-1}+ \sum_{t=1}^{n} \alpha \Delta Y_i+\varphi_t+e_t \quad (4.5)$$

Where, Y is a time series, t is a linear time trend, Δ is first difference operator, α is a constant, n is the optimum number of lags in the dependent variable and e is a random error term. The Philip-Perron (PP) equation is thus:

$$\Delta Y_t=\alpha_0+\alpha_1 Y_{t-1}+ e_t \quad (4.6)$$

We also applied a more efficient univariate DF-GLS test for autoregressive unit root[30], estimated by:

$$\Delta Y_t^{\mu}=\alpha_0+\alpha_1 Y_{t-1}^{\mu}+ \sum_{t=1}^{n} \alpha \Delta Y_i^{\mu}+e_t \quad (4.7)$$

Elliot et al. (1996) enhance the power of ADF test by de-trending criteria and DF-GLS test is based on null hypothesis, $H_o:\alpha=0$, in the regression of variable Y_t. Where Y_t^{μ} is the GLS de-trended time series. The test is a simple modification of the conventional augmented Dickey-Fuller (ADF) *t*-test as it applies generalized least squares (GLS) de-trending prior to running the ADF test regression. Compared with the ADF tests, the DF-GLS test has the best overall performance in terms of sample size and power.

Two hypotheses are proposed here; (1)Y_t is stationary about a linear time trend (2) it is stationary with a non-zero mean, but with no linear time trend. Considering the alternative hypothesis, the DF-GLS test is performed by first estimating the intercept and trend utilizing the generalized least square technique.

Third, in the event of the non-stationarity of each variable, the co-integrating relationship among variables (tendency for variables to move together in the long-run) is studied by bounds testing (or autoregressive distributed lag (ARDL)) co-integration procedure developed by (Pesaran et.al, 2001) to analyse the long-run relationships and dynamic interactions among the variables of interest.

The basic idea behind co-integration is that if two or more series move together in the long-run, even though the series themselves are trended, the difference between them is stationary, and it is possible to regard these series to have a long-run equilibrium relationship. A detailed analysis of this technique is discussed in Section II, 4.3.3.

[30] Elliot, G., T.J. Rothenberg and J.H. Stock, 1996. Efficient tests for an autoregressive unit root. Econometrica, 64: 813-36.

4.3.3. Co-integration Concept

Co-integration methods are considered one of the main improvements in modelling economic time series (see Leybourne, Newbold, Vougas and Kim (2002) and Cook and Vougas (2007). The concept of co-integration was first developed by Engle and Granger (1987) and then modified by Stock and Watson (1988), Johansen (1988) and Johansen and Juselius (1990) and later by Pesaran et al. (2001). The concept of co-integration allows us to describe the existence of an equilibrium, or stationary, relationship among two or more time series, each of which is individually non-stationary, Banerjee et al. (1993). A series is said to be integrated if it accumulates some past effects; such as a series is non-stationary because its future path depends upon all such past influences, and is not tied to some mean to which it must eventually return.

Various previous studies have employed Johansen's co-integrating technique to determine the long- term relationships between various variables of interest. In fact, this remains the technique of choice by those who argue that it is the most accurate methods to apply to I(1) variables. Recently, an emerging body of work led by Pesaran and Shin (1996); Pesaran and Pesaran (1997); and Pesaran *et al.* (2001) has introduced an alternative and a new version of the co-integration techniques known as the 'Autoregressive Distributed Lag' or ARDL bound test. It is argued that ARDL has a number of advantages over the conventional Johansen co-integration techniques. The advantages of the ARDL technique in detail are discussed in the proceeding section.

4.3.4. The ARDL, Bound co-integration Technique

In this section we highlight the advantages of the ARDL and discuss the steps involved in implementing the ARDL technique in the analysis. Firstly, the advantages of the ARDL technique are that it has good small sample properties for determining co-integration relationships (Ghatak and Siddiki 2001), while the Johansen co-integration techniques require large data samples for the purposes of validity. The ARDL technique is relatively more efficient in small or finite samples.

Secondly, the ARDL is applicable irrespective of whether the regressors in the model are purely I(0), purely I(1) or mutually co-integrated. Thirdly, as opposed to the Johansen's

technique, it allows the co-integration relationship to be estimated by OLS once the lag order of the model is identified. Fourthly, the bounds testing procedure does not require the pre-testing of the variables included in the model for unit roots unlike other techniques such as the Johansen approach.

Fifthly, Johansen also has difficulties in deciding the number of endogenous and exogenous variables to be included, the treatment of deterministic elements, as well as the order of VAR and the optimal number of lags to be specified. The ARDL is useful because it avoids this problem.

Furthermore, with a small data sample, it is important to consider the delicateness of choosing lag length that is sufficiently large to mitigate the residual serial correlation problem and at the same time, sufficiently small such that the conditional ECM is not unduly over-parametrised, particularly in view of limited time series data[31]. In addition, while the conventional co-integration method estimates the long run relationships within a context of a system of equations, the ARDL method employs only a single reduced form equation (Pesaran and Shin, 1995).

Finally, the error correction model (ECM) can be derived from ARDL through a simple linear transformation (Banerjee et al., 1993). ECM integrates short-run adjustments with long-run equilibrium without losing long-run information.

In view of the advantages of the ARDL and having considered the size of the dataset studied in the context of the Namibian economy including the integrated order of the regressors, we have therefore chosen to employ the ARDL technique to ensure robustness in our findings.

Steps in implementing the ARDL technique:

In this sub-section we discuss the several steps followed in implementing the ARDL technique. Importantly, the ARDL approach to co-integration involves estimating the conditional error correction version of the ARDL model for FDI Stock and its relationship

[31] See Pesaran *et al.* (2001).

with various determinants. The unrestricted error correction representation of the two ARDL model specification used in the study is given by:

Model 1: $\Delta lnFDI_{1t} = c_{10} + \delta_{11} lnFDI_{t-1} + \delta_{12} lnGDP_{t-1} + \delta_{13} lnGFCF_{t-1} + \delta_{14} Openness_{t-1} + \delta_{15} lnLabors_{t-1} + \sum_{i=1}^{p} \phi i1\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi 1i\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i1\, \Delta lnGFCF_{t-l} + \sum_{m=1}^{q} \lambda i1\, \Delta Openness_{t-m} + \sum_{e=1}^{q} \infty i1\, \Delta lnLabor_{t-e} + e_{1t}$ (4.8)

Model 2: $\Delta lnFDI_{2t} = c_{0} + \delta_{21} lnFDI_{t-1} + \delta_{22} lnGDP_{t-1} + \delta_{23} lnGFCF_{t-1} + \delta_{24} Openness_{t-1} + \delta_{25} lnMKTsize_{t-1} + \sum_{i=1}^{p} \phi i2\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i2\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i2\, \Delta lnGFCF_{t-l} + \sum_{m=1}^{q} \lambda i2\, \Delta Openness_{t-m} + \sum_{e=1}^{q} \infty i2\, \Delta lnMktsize_{t-e} + e_{2t}$ (4.9)

- **Step One:** we estimate equation (4.8 and 4.9), where δ_{i1} and δ_{i2} are the long run multipliers, c_{10} and c_{20} is the drift and e_{1t} and e_{2t} are white noise errors, by ordinary least squares (OLS). This is in order to test for the existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged levels of the variables in each model, i.e. the null hypothesis of no co-integration H_N: $\delta_{11} = \delta_{12} = \delta_{13} = \delta_{14} = \delta_{15} = 0$ is tested against the alternative H_A: $\delta_{11} \neq \delta_{12} \neq \delta_{13} \neq \delta_{14} \neq \delta_{15} \neq 0$ for model (1) for instance..

Two asymptotic critical values bounds provide a test for co-integration when the independent variables are I(d) (where $0 \leq d \leq 1$): a lower value assuming the regressors are I(0) and an upper value assuming purely I(1) regressors. The approximate critical values for the F-test are obtained from Pesaran (1997). If the F-statistic is above the upper critical value, the null hypothesis of no long-run relationship can be rejected irrespective of the orders of integration for the time series. Conversely, if the test statistic falls below the lower critical value the null hypothesis cannot be rejected. Finally, if the statistic falls between the lower and upper critical values, the result is inconclusive and depends on whether the underlying variables are I(1) or I(0). If the order of integration of a variable is greater than two, then the underlying assumption of the ARDL is violated.

- **Step Two:** Once co-integration is established in step one a conditional long-run ARDL model is then estimated. This step includes selecting the order of the distributed lag on the dependent variable and the regressors using information

criterions. The order of the distributed lag on the dependant variable and the regressors can be selected using either the Akaike Information Criterion (AIC) or Shwarz Bayesian Criterion (SBC). However, depending on Monte Carlo evidence, Pesaran and Smith (1998) found that SBC is preferable to AIC, as it is a parsimonious model that selects the smallest possible lag length, while AIC selects the maximum relevant lag length. In this study we use SBC as a lag selection criterion. The conditional ARDL (p, q^1, q^2, q^3,q^4)[32] long-run model for $lnGDP_t$ based on the ARDL model selected by SBC is estimated as:

Model 1: $lnFDI_{1t} = c_{10} + \sum_{i=1}^{p} \phi i1\, \Delta lnFDI_{t-i} + \sum_{i=0}^{q1} \theta_{11}\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q2} \theta_{12}\, \Delta lnGFCF_{t-i}$
$+ \sum_{i=0}^{q3} \theta_{13}\, \Delta Openness_{t-i} + \sum_{i=0}^{q4} \theta_{14}\, \Delta lnLabor_{t-i} + e_{1t}$ (4.10)

Model 2: $lnFDI_{2t} = c_0 + \sum_{i=1}^{p} \phi i2\, \Delta lnFDI_{t-i} + \sum_{i=0}^{q1} \theta_{21}\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q2} \theta_{22}\, \Delta lnGFCF_{t-i}$
$+ \sum_{i=0}^{q3} \theta_{23}\, \Delta Openness_{t-i} + \sum_{i=0}^{q4} \theta_{24}\, \Delta lnMktsize_{t-i} + e_{2t}$ (4.11)

This gives inferences of the coefficients and inferences on their values. Where, all variables are as previously defined. This involves selecting the orders of the ARDL (p, q^1,q^2,q^3,q^4) model in the five variables using selection criterions.

- **Step Three:** In the third and final step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

Model 1: $\Delta lnFDI_{1t} = c_{10} + \sum_{i=1}^{p} \phi i1\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i1\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i1\, \Delta lnGFCF_{t-l}$
$+ \sum_{m=1}^{q} \lambda i1\, \Delta Openness_{t-m} + \sum_{e=1}^{q} \infty i1\, \Delta lnLabor_{t-e} + \pi ecm_{1t-1} + e_{1t}$ (4.12)

Model 2: $\Delta lnFDI_{2t} = c_{20} + \sum_{i=1}^{p} \phi i2\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i2\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i2\, \Delta lnGFCF_{t-l}$
$+ \sum_{m=1}^{q} \lambda i2\, \Delta Openness_{t-m} + \sum_{e=1}^{q} \infty i2\, \Delta lnMktsize_{t-e} + \pi ecm_{2t-1} + e_{2t}$ (4.13)

Here ϕ, ϖ, φ, λ, and ∞ are the short-run dynamic coefficients of the model's convergence to equilibrium and π is the speed of adjustment.

[32] This represent the order of the lags in the ARDL model.

4.4. EMPIRICAL RESULTS AND DISCUSSIONS

4.4.1. Stationarity and Unit Root Test Results

In the first step of our analysis, it is crucial to ascertain the integrational properties of the data series to ensure that all the variables satisfy the underlying assumption of the ARDL methodology before proceeding to the estimation stage. To investigate the unit root properties of the variables we apply the ADF, PP and DF-GLS test. In the estimation we consider only a constant without a time trend since a plot of the variables against time did not indicate the presence of a deterministic trend in the variables[33]. Table 4.3 presents the Unit Root results.

Table 4.3. Unit Root test Results

	ADF unit root test		PP unit root test		DF-GLS unit root test		
Variable	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Conclusion**
***ln*FDI**	-0.847	-4.2**	-1.354	-18.591**	-0.163	-4.374**	I(1)
***ln*GDP**	0.453	-3.779**	-0.050	-21.562**	0.106	-3.788**	I(1)
***ln*GFCF**	0.196	-4.229**	0.023	-30.430**	0.03	-4.919**	I(1)
Openness	-1.474	-6.543**	-2.174	-33.435**	-0.702	-6.658**	I(1)
***ln*LABOUR**	-3.150**		-7.677***		-4.226***		I(0)
***ln*MKTsize**	-3.639***		-6.598***		-4.842***		I(0)

[*** &** denotes the rejection of the null at 1% and 5% significance level. This also denotes the acceptance of the null at both the 1 and 5% significance level for the DF-GLS unit root test.] ADF up to 4 lags were used.

We find that we are unable to reject the unit root hypothesis at the conventional levels of significance for FDI, GDP, GFCF and Openness when we conduct the test on the levels of each of the variables. Therefore, the variables have been differenced once to check for their stationarity. At first differencing, the calculated tests statistics clearly reject the null hypothesis of a unit root in all three tests. These tests decisively confirm stationarity of the variables at first differencing under constant, at the 1% and 5% significance levels, and depict the same order of integration, I(1) behaviour, for GDP per capita , FDI stock, gross capital formation and Openness. The results also show labour force and infrastructure variables to be stationary in levels. Therefore, depicting the same order of integration of an I(0) behaviour

[33] The DF-GLS has substantially improved power when an unknown trend or mean is present, and therefore, should the plot against time fail to recognise a trend the DF-GLS is powerful enough to cater for such and ensure robustness of results. And, DF-GLS is a more efficient univariate test for autoregressive unit root, Elliot et al. (1996).

for the two variables. Moreover, the three test have shown consistency in the findings of the order of integration for all variables. From these findings, we conclude that the order of integration of the variables in our study, are less (zero) or equal to one implying that the underlying assumption for applying the ARDL methodology is satisfied. Thus, we can proceed ahead to check for the existence of the long-run relationship.

4.4.2. Results Based on Bounds test for co-integration

Since the study aims to detect the short-run as well as the long-run relationships between FDI, and its determinants in the specified models, we employed the ARDL technique. In the first step of the ARDL analysis, we tested for the presence of long-run relationships using equation (4.8) and (4.9). Unless series are cointegrated, there is no equilibrium relationship between variables and inference is futile.

Therefore, following Pesaran *et al.* (1997), an OLS regression was estimated for the first differences part of these equations and then tested for the joint significance of the parameters of the lagged level variables when added to the first regression. The F-statistic tests the joint null hypothesis that the coefficients of the lagged level variables are zero (i.e. no long-run relationship exists between them). Since the observations are annual, we chose 2 lags as the maximum order of lags as suggested by Pesaran and Shin (1990) and Narayan (2004), and estimate for the period 1980 to 2009. Table 4.4, reports the results of the calculated F-statistics where log of FDI Stock variable is considered as a dependent variable (normalised) in the ARDL regressions.

Table 4.4: Results from Bounds tests on equations (4.8) and (4.9)

	Lags	F-stat	Outcome
1.F(*lnFDI*| *lnGDP*, *ln*GFCF, OPEN, *ln*LABOR)	2	10.84***	co-integration
2.F(*ln*FDI| *ln*GDP, *ln*GFCF, OPEN, *ln*MKTsize)	2	7.93***	co-integration

Notes: Asymptotic critical value bounds are obtained from Pesaran and Pesaran 1997; Table CI in appendix, Case III: unrestricted intercept and no trend for k=5; lower bound I(0)=3.41 and upper bound I(1)=4.68. *** denotes significance at the 1% significance level.

The calculated F-statistics for the co-integration test, Table 4.4, show that the F-Statistic for k=5 in both specifications is higher than the lower bound value of 3.41 and also higher than the upper bound value of 4.68 at the 1% significance value. Thus, the null hypotheses of no

co-integration can be rejected, implying long-run co-integration relationships exists amongst the variables.

And, hence, the variables in Table 4.4, can be treated as the long-run forcing variables for the explanation of FDI stock. Once we established that a long-run co-integration relationship exists, we estimated equations (4.10) and (4.11). For the model selection criteria we chose Shwarz Bayesion Criterion (SBC) following Pesaran and Smith (1998). Table 4.5 tabulates the estimates of the long-run coefficients.

Table 4.5. Estimates of the Long-run coefficients based on based on ARDL models by SBC

Dependent variable is: *ln*FDI		
Long-run coefficients	**Model 1** ARDL(1,0,0,0,0)	**Model 2** ARDL(1,0,0,0,0)
***ln*GDP**	5.712***	5.69***
***ln*GFCF**	-1.56***	-1.59**
OPEN	0.004	0.01
***ln*LABOR**	3.55***	
***ln*MKTsize**		4.89***
cons	-46.51***	-34.89***
[***,**&* denotes significance at the 1, 5 and 10% significance level.]		

Table 4.5, summarises results for the long-run co-efficient estimates for the two specifications. The estimated coefficients of the long-run relationship show that the level of income (GDP per capita) has a very high significant impact on FDI Stock in both specifications[34]. It is positive and has a significant effect on FDI. This is particularly true in that the horizontal FDI (i.e. FDI seeking a base to produce for the domestic market in the host country) is attracted to countries in which real income level is relatively high. This is because high GDP per capita reflects both high purchasing power of consumers and high real wages. The results show that gross fixed capital formation which measures domestic investment in the country is significant but has a negative sign. Moreover, labour force is positive and

[34] The study also incorporated a dummy to measure the independence regime change however, this was found to be negative and insignificant and therefore dropped from the estimation.

significant, which means it has had an influence in attracting FDI in Namibia i.e. labour force determines FDI flows to the country.

Furthermore, openness has a positive sign but is insignificant in the case of Namibia. Interestingly, the same is confirmed in the second specification, Model (2), with a positive sign on openness and again insignificant. The literature suggests that economies open to international trade receive relatively higher share of the FDI (for instance they pursue policies that are more attractive to foreign investors). However, the finding of an insignificant result could be explained by the fact that although the Namibian economy is very open and dependent on international trade, exports of goods and services averaged 50% of GDP over 2003 to 2007 and imports averaged 54 %. Namibia lacks, to some degree, the kind of diversified structure that is critical for a small open economy.

Export diversification in Namibia is constrained by a trade policy structure that discriminates against exports and favours capital-intensive sectors over labour-intensive ones and large over small firms. Namibia's trade regime policy is determined at the regional level (SACU) rather than international. However, since independence in 1990, the Namibian government has worked hard at removing imposed trade restriction and capital control as part of its governmental policies. As such, there is the possibility that in the future trade openness could become a significant determinant of FDI flows to Namibia. This is because of the major changes in the diversified structure seen especially since 2007 onwards.

The results of the second specification confirm a finding of a negative and significant result on the coefficient of gross fixed capital formation such as that found in the first specification. According to the literature domestic investment in the host country determines FDI in that it creates new business start-ups that could supply products and services required by foreign investors. Domestic investments also leads to investment in new technology which improves the quality and quantity of local products to meet foreign firms' standards. Therefore, the negative relation between FDI and domestic investment suggests that (1) Namibia perhaps needs to build this capacity to increase FDI flows to the country; (2) that there is a possibility of crowding out effects, which could reveal that the inflow of FDI has not actually created business opportunities for local investors and, instead, replaced them. This finding is consistent with Kokko (1996) and Aitken and Harrison (1999). Furthermore, the results

confirm that market size is a determinant of FDI. Indeed, the results show market size to be positive and highly significant and consistent with the literature.

Overall, the results suggest that the determinants of FDI in Namibia are labour force, market size and GDP per capita. Furthermore, these findings have shown that market-seeking and efficiency-seeking FDI types might be other reasons why investors choose to invest in Namibia and not only resource-seeking FDI. The confirmation of a market-seeking FDI type is an interesting find when one takes into consideration the fact that Namibia is relatively small in terms of population (market) size relative to its geographical size. These findings are found to be consistent with previous work done on the determinants of FDI, such as in Botric et al. (2005).

Table 4.6: ARDL Estimated Short-run Error Correction Model (ECM)

	Model 1	Model 2
ΔlnGDP	3.504**	3.281***
ΔlnGFCF	-0.943**	-0.911**
ΔOPEN	0.002	0.004*
ΔLABOR	3.371**	
ΔMKTsize		2.811**
CONS	-28.07**	-20.04**
ecm(-1)	-.601**	-.575**
R	0.743	0.851
F-stat	10.742[.002]	5.212[.008]
DW-statistic	2.397	2.089

Note: The SBC is used to select the optimum number of lag in the ARDL model, order of ARDL is specified in Table 4.5. Δ is first difference of the variables.

The results of the short-run dynamic coefficients associated with the long-run relationships obtained from estimating the ECM equations (4.12) and (4.13) are given in Table 4.6. The error correction term (ECT) indicates the speed of the equilibrium restoring adjustment in the dynamic model. The ECT coefficient shows how quickly/slowly variables return to equilibrium and it should have a statistically significant coefficient with a negative sign. The signs of the short-run dynamic impacts are maintained to the long-run. Moreover, the variables found to be determinants of foreign investors in Namibia are significant at 1% and 5% level of significance, with large impacts on FDI Stock in both the short-run and long-run ensuring that long run equilibrium can be attained in the both models. With reference to the

FDI theory, these results prove that GDP per capita, labour force, market size can improve both short-term and long-term rates of FDI Stock in Namibia.

In the first specification, Model 1, the error correction coefficient (ect_{t-1}), estimated -0.60 (0.007) is highly significant, has the correct sign and imply a fairly high speed of adjustment to equilibrium after a shock. Approximately over 60% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year. Bannerjee *et al.*(1998) holds that a highly significant error correction term is proof of the existence of a stable long-term relationship. The fact that the coefficient of the error correction term is highly significant, further confirms our finding of the existence of a long run relationship among the variables in this model. The R^2 of 74%, model (1), suggest that the error correction model fit the data well. Furthermore, it is also important to note that the underlying error correction model passes the standard diagnostic tests.

Moreover, the significance of the short-run dynamic coefficients associated with the long run relationship can be confirmed when we change the specification as predicted in model (2). The Table 4.8, shows that the expected negative signs of ECT are highly significant. The estimated ECT_{t-1} is equal to -0.57. This means that the adjustment takes place relatively quickly, i.e. the speed of adjustment is relatively high in both specifications.

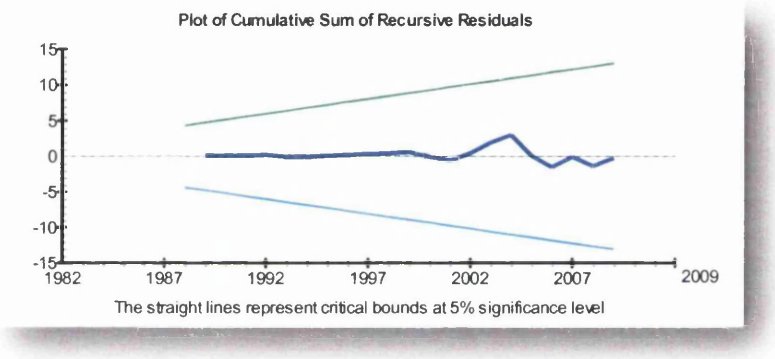
4.4.3. Diagnostic and Stability Tests

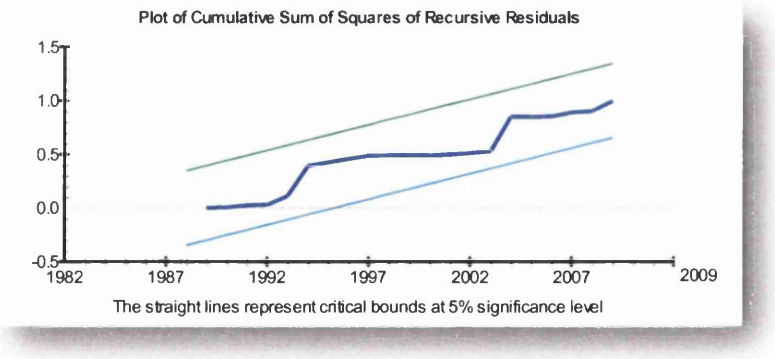
Diagnostic tests for serial correlation, normality, functional form, heteroscedasticity and structural stability of the models are presented Table 4.11, (Appendix V). This tests show that all models generally pass the diagnostic tests in the first stage where there is no evidence of autocorrelation and the models pass the test for normality.

To complement this study it is important to investigate whether the long run and short run relationships found are stable for the entire period of study. For this purpose, one needs to test for parameter stability. The tests for stability used are based on the cumulative (CUSUM) and the cumulative sum of squares (CUSUMSQ) tests proposed by Brown et al. (1975). Unlike the chow test, that requires break point(s) to be specified, the CUSUM, tests can be used even if we do not know the structural break point.

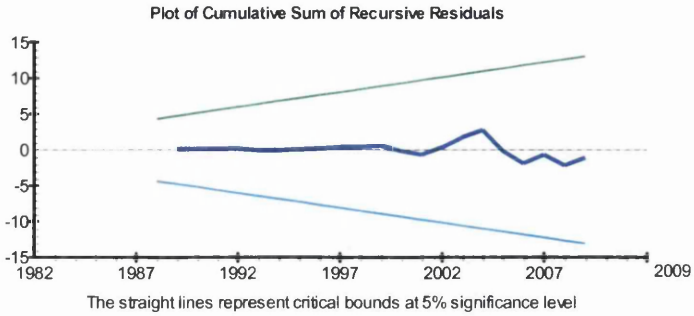
The CUSUM test uses the cumulative sum of recursive residuals based on the first 'n' observations and is updated recursively and plotted against break point. The CUSUMSQ makes use of the squared recursive residuals and follows the same procedure. If the plot of the CUSUM and CUSUMSQ stays within the 5% critical bound the null hypothesis that all coefficients are stable cannot be rejected. If however, either of the parallel lines are crossed then the null hypothesis (of parameter stability) is rejected at the 5% significance level.

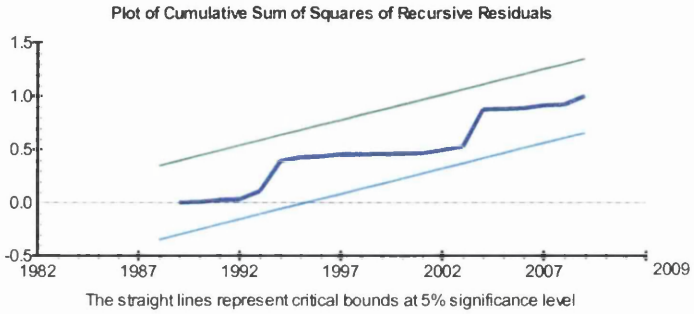
Figure 4.2. Plots of CUSUM and CUSUMQ Statistics for Coefficients Stability tests for Model (1) and (2).





Model (2)





The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) plots (Figure 4.2.) from a recursive estimation of the model lie within the 5% critical bound thus indicating stability in the coefficients over the main period of study .i.e. they do not suffer from any structural breaks.

4.5. ROBUSTNESS

In this section we aim to check Robustness on our analysis discussed in Section 4.3. Using data for the time period 1990 to 2009, we consider the variables noted as the determinants of FDI in Namibia in Section 4.4 and check for consistency in the results obtained in the section. Furthermore, we added varied specifications not only to allow for a more degrees of freedom and to ensure that the analysis where not only driven by one specification but also considered

other determined variables in the literature. The robustness checks are done on the era post-independence; this is notably the period in which the Namibian government reformed policies and regimes to attract FDI. It should be noted that pre-independence the country has seen political unrest due to the apartheid regime reigning at the time. This meant Namibia was seen as an unfavourable investment environment by investors which led to low FDI flows to the country during this era. In addition, as there was no stable government in Namibia it meant there were no policies or rather weak policies in place to create a benign investment environment for investors to attract FDI. Also there we no sufficient measures in place to remove trade restrictions and capital controls.

Therefore, the post-independence period has been the period in which the Namibian government made it a priority to create a benign favourable investment environment through policies and regulations to attract FDI and remove restrictions that could inhibit trade openness and investment to the country. Namibia has since seen a vast increase in FDI inflows. It is in this light that we expect to find not only consistency in the results, but also the determinants to be more consistent with the literature in terms of significance and signs. Furthermore, the availability of the data post-independence could be a limitation but it should be noted that Namibia is a young democratic country and only obtained its independence since 1990, hence, the short time-span.

4.5.1. Model Specifications and Estimation

We briefly outline the six specifications to be considered here in this section. We also include the equation for the three stages of the ARDL methodology applicable to the six specifications without going in as much detail as discussed in Section 4.4.

I. Model

For the robustness check and assessing consistency in results we consider six different models, again following previous work in the literature and Oladipo et al. (2010). The six specification considered here are to ensure that variables considered as determinants studied

in Section 4.5 are investigated for consistency in the results obtained therein[35]. The additional three specifications include variables that are perceived as determinants of FDI in the literature overall. The six specification take the following form[36]:

Model 3: $lnFDI_{3t}= c_{30} + c_{31}lnGDP_t+ c_{32}lnGFCF_t + c_{33}Inflation_t + e_{3t}$ (4.14)

Model 4: $lnFDI_{4t}= c_{40} + c_{41}lnGDP_t+ c_{42}lnGFCF_t + c_{43}INFRA_t + e_{4t}$ (4.15)

Model 5: $lnFDI_{5t}= c_{50} + c_{51}lnGDP_t+ c_{52}lnGFCF_t + c_{53}INT_t + e_{5t}$ (4.16)

Model 6: $lnFDI_{6t}= c_{60} + c_{61}lnGDP_t+ c_{62}lnGFCF_t + c_{63}OPEN_t + e_{6t}$ (4.17)

Model 7: $lnFDI_{7t}=c_{70}+c_{71}lnGDP_t+c_{72}lnGFCF_t+c_{73}ln\text{LABOR}_t+e_{7t}$ (4.18)

Model 8: $lnFDI_{8t}=c_{80}+c_{81}lnGDP_t+c_{82}lnGFCF_t+c_{83}lnMKTsize_t+ e_{8t}$ (4.19)

II. Estimation

We employ the same estimation technique as discussed in Section 4.4 and suggested by Pesaran and Smith (1998). This is to ensure a consistency in the methodologies employed in the study and allows for a comparison of results. Therefore, we only specify the representation of the specification of the three stages of the ARDL estimation for the six specifications considered in this section[37].

The unrestricted error correction representation of the six ARDL model specification are given by:

Model 3: $\Delta lnFDI_{3t} = c_{30} + \delta_{31}lnFDI_{t\text{-}1} + \delta_{32}lnGDP_{t\text{-}1} + \delta_{33}lnGFCF_{t\text{-}1} + \delta_{34}Inflation_{t\text{-}1} + \sum_{i=1}^{p} \phi i3\, \Delta lnFDI_{t\text{-}i} + \sum_{j=1}^{q} \varpi i3\, \Delta lnGDP_{t\text{-}j} + \sum_{l=1}^{q} \varphi i3\, \Delta lnGFCF_{t\text{-}l} + \sum_{p=1}^{q} \gamma i3\, \Delta Inflation_{t\text{-}p} + e_{3t}$

[35] It should be noted that the ARDL methodology employed will not allow estimation of models with more than four variables since there are not enough observations in the robustness dataset used, therefore, we estimate variables studied in Section 4.5 as separate or rather individual specifications.

[36] The variables considered in the six specification have been explained in detail in Section 4.3 and to avoid repetition are therefore not discussed here.

[37] For a detailed discussion of the ARDL estimation technique please refer to Section 4.4 of the Chapter.

(4.20)

Model 4: $\Delta lnFDI_{4t} = c_{40} + \delta_{41} lnFDI_{t-1} + \delta_{42} lnGDP_{t-1} + \delta_{43} lnGFCF_{t-1} + \delta_{44}$INFRAt-1 $+ \sum_{i=1}^{p} \phi i4\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i4\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i4\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i4\, \Delta INFR_{t-p} + e_{4t}$

(4.21)

Model 5: $\Delta lnFDI_{5t} = c_{50} + \delta_{51} lnFDI_{t-1} + \delta_{52} lnGDP_{t-1} + \delta_{53} lnGFCF_{t-1} + \delta_{54} INT_{t-1} + \sum_{i=1}^{p} \phi i5\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i5\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i5\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i5\, \Delta INT_{t-p} + e_{5t}$

(4.22)

Model 6: $\Delta lnFDI_{6t} = c_{60} + \delta_{61} lnFDI_{t-1} + \delta_{62} lnGDP_{t-1} + \delta_{63} lnGFCF_{t-1} + \delta_{64} OPEN_{t-1} + \sum_{i=1}^{p} \phi i6\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i6\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i6\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i6\, \Delta OPEN_{t-p} + e_{6t}$

(4.23)

Model 7: $\Delta lnFDI_{7t} = c_{70} + \delta_{71} lnFDI_{t-1} + \delta_{72} lnGDP_{t-1} + \delta_{73} lnGFCF_{t-1} + \delta_{74} lnLABOR_{t-1} + \sum_{i=1}^{p} \phi i7\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i7\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i7\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i7\, \Delta lnLABOR_{t-p} + e_{7t}$

(4.24)

Model 8: $\Delta lnFDI_{8t} = c_{80} + \delta_{81} lnFDI_{t-1} + \delta_{82} lnGDP_{t-1} + \delta_{83} lnGFCF_{t-1} + \delta_{84} lnMKTsize_{t-1} + \sum_{i=1}^{p} \phi i8\, \Delta lnFDI_{t-i} + \sum_{j=1}^{q} \varpi i8\, \Delta lnGDP_{t-j} + \sum_{l=1}^{q} \varphi i8\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i8\, \Delta lnMKTsize_{t-p} + e_{8t}$

(4.25)

Once co-integration is established the conditional ARDL (p ,q^1, q^2, q^3) long-run model for lnGDP$_t$ based on the ARDL model selected by SBC can be estimated as:

Model 3: lnFDI$_{3t}$=c$_0$+ $\sum_{i=1}^{p} \theta_{31}\, lnFDI_{t-i}$+ $\sum_{i=0}^{q1} \theta_{12}\, lnGDP_{t-i}$+$\sum_{i=0}^{q2} \theta_{13}\, lnGFCF_{t-i}$ $+ \sum_{i=0}^{q3} \theta_{14}\, Inflation_{t-i}$+e$_{4t}$

(4.26)

Model 4: $lnFDI_{4t}$=c_{40}+$\sum_{i=1}^{p} \theta_{41}\, lnFDI_{t-i}$+$\sum_{i=0}^{q1} \theta_{42}\, lnGDP_{t-i}$+$\sum_{i=0}^{q2} \theta_{43}\, lnGFCF_{t-i}$ $+ \sum_{i=0}^{q3} \theta_{44}\, INFRA_{t-i}$+$e_{4t}$

(4.27)

Model 5: $lnFDI_{5t}=c_{50}+\sum_{i=1}^{p}\theta_{51}\ ln\text{FDI}_{t-i}+\sum_{i=0}^{q1}\theta_{52}\ lnGDP_{t-i}+\sum_{i=0}^{q2}\theta_{53}\ lnGFCF_{t-i}$
$+\sum_{i=0}^{q3}\theta_{54}\ INT_{-i}+e_{5t}$ (4.28)

Model 6: $lnFDI_{6t}=c_{60}+\sum_{i=1}^{p}\theta_{61}\ ln\text{FDI}_{t-i}+\sum_{i=0}^{q1}\theta_{62}\ lnGDP_{t-i}+\sum_{i=0}^{q2}\theta_{63}\ lnGFCF_{t-i}+\ \sum_{i=0}^{q3}\theta_{64}\ OPEN_{t-i}+e_{6t}$ (4.29)

Model 7: $lnFDI_{7t}=c_{0}+\sum_{i=1}^{p}\theta_{71}\ ln\text{FDI}_{t-i}+\sum_{i=0}^{q1}\theta_{72}\ lnGDP_{t-i}+\sum_{i=0}^{q2}\theta_{73}\ lnGFCF_{t-i}$
$\sum_{i=0}^{q3}\theta_{74}\ LABOR_{t-i}+e_{7t}$ (4.30)

Model 8: $lnFDI_{8t}=c_{80}+\sum_{i=1}^{p}\theta_{81}\ ln\text{FDI}_{t-i}+\sum_{i=0}^{q1}\theta_{82}\ lnGDP_{t-i}+\sum_{i=0}^{q2}\theta_{83}\ lnGFCF_{t-i}$
$+\ \sum_{i=0}^{q3}\theta_{84}\ MKTsize_{t-i}+e_{8t}$ (4.31)

The short-run dynamic parameters are obtained by estimating the following error correction models associated with the long-run estimates:

Model 3: $\Delta lnFDI_{3t}=\alpha+\sum_{i=1}^{p}\phi i3\ \Delta ln\text{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i3\ \Delta ln\text{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i3\ \Delta lnGFCF_{t-l}+$
$\sum_{p=1}^{q}\gamma i3\ \Delta Inflation_{t-p}+\pi\text{ecm}_{3t-1}+e_{3t}$ (4.32)

Model 4: $\Delta lnFDI_{4t}=\alpha+\sum_{i=1}^{p}\phi i4\ \Delta ln\text{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i4\ \Delta ln\text{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i4\ \Delta lnGF_{t-l}+$
$\sum_{p=1}^{q}\gamma i4\ \Delta INFRA_{t-p}+\pi\text{ecm}_{4t-1}+e_{4t}$ (4.33)

Model 5: $\Delta lnFDI_{5t}=\alpha+\sum_{i=1}^{p}\phi i5\ \Delta ln\text{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i5\ \Delta ln\text{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i5\ \Delta lnGFCF_{t-l}+$
$\sum_{p=1}^{q}\gamma i5\ \Delta INT_{t-p}+\pi\text{ecm}_{5t-1}+e_{5t}$ (4.34)

Model 6: $\Delta lnFDI_{6t}=\alpha+\sum_{i=1}^{p}\phi i6\ \Delta ln\text{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i6\ \Delta ln\text{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i6\ \Delta lnGFCF_{t-l}+$
$\sum_{p=1}^{q}\gamma i6\ \Delta OPEN_{t-p}+\pi\text{ecm}_{6t-1}+e_{6t}$ (4.35)

Model 7: $\Delta lnFDI_{7t}=\alpha+\sum_{i=1}^{p}\phi i7\ \Delta ln\text{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i7\ \Delta ln\text{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i7\ \Delta lnGFCF_{t-l}+$
$\sum_{p=1}^{q}\gamma i7\Delta\text{LABOR}_{t-p}+\pi\text{ecm}_{7t-1}+e7_{t}$ (4.36)

Model 8: $\Delta lnFDI_{8t}=\alpha+\sum_{i=1}^{p}\phi i8\,\Delta ln\mathrm{FDI}_{t-i}+\sum_{j=1}^{q}\varpi i8\,\Delta ln\mathrm{GDP}_{t-j}+\sum_{l=1}^{q}\varphi i8\,\Delta lnGFCF_{t-l}+$

$\sum_{p=1}^{q}\gamma i8\,\Delta MKTsize_{t-p}+\pi\mathrm{ecm}_{8t-1}+e_{8t}$ (4.37)

With ϕ, ϖ, φ and γ as the short-run dynamic coefficients of the model's convergence to equilibrium and π is the speed of adjustment.

4.5.2. ROBUSTNESS RESULTS

I. Unit root Test Results

Table 4.7, Appendix V, summarises the results of the ADF, PP and DF-GLS unit root tests[38] for the period covering 1990 to 2009. The results in this table show that all variables are integrated of order one or less. The variables not stationary in levels have been differenced once to check their stationarity. Clearly, all three tests decisively confirm stationarity of each variable at first differencing under constant, and depict the same order of integration, I(1) behaviour, for FDI Stock, GDP per capita , gross capital formation, Openness, INFRA and I(0) for Inflation and Interest rates.

II. Bounds test for co-integration Results

In the first step of the ARDL analysis, we tested for the presence of long-run relationships using equations (4.20) to (4.25)[39]. The lag selection and information criterion in the robustness section are the same as those employed and discussed in Section 4.4 to maintain consistency in the study. Table 4.12, reports the results of the calculated F-statistics where log of FDI Stock variable is considered as a dependent variable (normalised) in the ARDL regressions.

[38] Again, we did not consider the use of a trend as no evidence of such was found when investigating the data.

[39] Equation (4.25) found no co-integration with regard to the 'market size' specification post-independence, this could imply that after independence the market size was not preliminary a determined of FDI, judging from the size of the population in Namibia one could agree to some degree with such a finding. Pre independence, section 4.4, we found 'market size' to be a determined of FDI in Namibia this could very well be explained by the fact that Namibia was a province of South Africa during this period, this implies that for foreign investors the market size was not only limited to Namibia but both countries because they were one country in the Apartheid era and could very well explain the finding of a co-integrating relationship in this era.

Table 4.8: Results from Bounds tests on equations (4.20) to (4.24)

	Lags	F-stat	Outcome
3. F(*lnFDI*|*lnGDP*, *ln*GFCF, INFLATION)	2	10.84***	co-integration
4. F(*lnFDI*|*lnGDP*, *ln*GFCF, *ln*INFRA)	2	4.75**	co-integration
4. F(*ln*FDI| *ln*GDP, *ln*GFCF, INT)	2	3.36**	inconclusive
6. F(*ln*FDI| *ln*GDP, *ln*GFCF, OPEN)	2	4.15**	co-integration
7. F(*ln*FDI| *ln*GDP, *ln*GFCF, *ln*LABOR)	2	2.93**	inconclusive

Notes: Asymptotic critical value bounds are obtained from Pesaran and Pesaran 1997; Table CI in appendix, Case III: unrestricted intercept and no trend for k=4; lower bound I(0)=2.86 and upper bound I(1)=4.01 at 5%. ***&** denotes significance at 1% and 5% level.

The calculated F-statistics for the co-integration test, column(a) Table 4.8, show that the F-Statistic for the three specifications; Model (1), (2) and (4); with k=4 is higher than the upper bound critical value of 4.01 at the 5% value of significance. Thus, the null hypotheses of no co-integration are rejected, implying long-run co-integration relationships amongst the variables in the models. However, we also found an inconclusive case for model (3) and model (7). Following, Bahmani-Oksoee and Nasir (2004), in the case of an inconclusive decision ECM is used to determine the long run relationship in the model. Therefore, the variables in Table 4.8, can be treated as the long-run forcing variables for the explanation of FDI Stock in the period covering 1990 to 2009.

Having established a long-run co-integration relationship, equations (4.26) to (4.31) were estimated for the five specifications. The estimates of the long-run coefficients obtained by normalizing on real GDP per capita (t), in the long run are reported in Table 4.9, as follows:

Table 4.9: Estimates of the Long-run coefficients based on ARDL models selected By Schwarz Bayesian Criterion

	Model 3	Model 4	Model 5	Model 6	Model 7
Long-run coefficients	ARDL(1,0,0,1)	ARDL(1,0,0,1)	ARDL(1,0,0,1)	ARDL(1,0,0,0)	ARDL(1,0,0,0)
***ln*GDP**	7.32***	9.56***	7.02***	8.29***	6.52**
***ln*GFCF**	-0.56*	-1.83**	-0.15*	-0.79**	-1.61**
INFLATION	-0.04**				
***ln*INFRA**		1.81**			
INT			0.05**		
OPEN				0.003	
***ln*LABOUR**					3.64**
cons	-36.24***	-33.18***	-40.03***	-41.27**	-28.05***

[***,**&* denotes significance at the 1, 5 and 10% significance level]. Dependant variables is *ln*FDI[40].

Table 4.9, summarises results for the long-run co-efficient estimates for the five specifications. In these specifications we have considered additional important variables in the theory of FDI determinants. These are inflation, interest rates and the measure of infrastructure. In the first specification, Model 1, for the period 1990 to 2009; results are robust and consistent with our findings in regard to the 1980 to 2009 period. Results show that GDP per capita is positive and highly significant. The estimated coefficients gross fixed capital formation again is found to be negative and significant across all specifications considered here in Section 4.6. Again, showing consistency with the results obtained for these variables in Section 4.5. The inflation variable is significant and has the expected sign. This implies that macroeconomic stability is an important determinant of FDI flows to Namibia.

The second specification considers the quality of infrastructure in Namibia. The results show that infrastructure is significant and has a positive sign. This might suggest that the quality of infrastructure, for example, telecommunication and internet network which are important to foreign firms are up to standard in Namibia. And, prove to be favourable to foreign investors.

In the third specification we considered interest rates as a determinant of FDI and found a positive significant relationship at the 10% significance level. The result is consistent with the literature which states that a relatively high interest rate in a host country has a positive

[40] Note: critical values for ARDL long and short-run estimates are generated on screen and hence, not repeated here.

impact on inward FDI, Gross and Trevino (1996). Therefore, this suggests that Namibia's interest rates have been successful in attracting FDI. Following on, from our results in Table 4.9, openness has again yielded a positive sign but insignificant relationship in terms of FDI in Namibia.

For the specification with labour force, we find that although the coefficient for labour is positive it is however insignificant in the era post-independence. It is important to understand that during the apartheid system (post- independence) there where restrictions on black and coloured people in particular, which restricted their movement within and outside the country. Therefore, post-independence era brought about an opportunity for skilled black force to migrate. At the time, Namibia also experienced a large number of whites, Afrikaaners, leaving the country due to uncertainties that came with the end of the apartheid era and the new government. These created a gap in the work force and therefore could explain the mixed result obtained in this section.

In addition, an insignificant result might have been led by the short data span available post-independence. This result however does show consistency in the positive relationship between labour force and FDI found in Section 4.4 although of course insignificant post-independence.

Table 4.10:ARDL Estimated Short-run Error Correction Model (ECM)

	Model 3	Model 4	Model 5	Model 6	Model7
Δ*ln*GDP	6.06**	9.28***	6.29**	6.67**	5.55**
Δ*ln*GFCF	-0.46**	-1.77**	-0.14*	-0.63*	-1.37*
ΔInflation	-0.03**				
ΔINFRA		1.01*			
ΔINT			0.026**		
ΔOPEN				0.002	
Δ*ln*LABOR					3.10*
CONS	-29.476**	-32.19**	-38.58***	- 33.20**	-23.89**
ect(-1)	-0.82***	-0.97***	-0.896***	-0.80***	-0.85**
R	0.61	0.50	0.61	0.678	0.689
F-stat	5.506[.007]	4.376[.008]	6.528[.004]	4.06[.010]	4.316[.008]
DW-statistic	2.04	2.248	2.327	2.13	2.18

Note: The SBC is used to select the optimum number of lag in the ARDL model, order of ARDL is specified in table 4.11, Appendix IV. for all five models. Δ is first difference of the variables.

The results of the short-run dynamic coefficients associated with the long-run relationships obtained from estimating the ECM equation (4.32) to (4.37) are given in Table 4.10. As mentioned in Section 4.5 the error correction term indicates the speed of the equilibrium restoring adjustment in the dynamic model. The signs of the short-run dynamic impacts are maintained to the long-run. Moreover, FDI Stock is highly significant at 1% and has large impacts on growth in both the short-run and long-run and ensures that long run equilibrium can be attained. With reference to the FDI literature, these results prove that the additional determinants used in this section for robustness check and consistency has shown to improve both short-term and long-term rates of foreign investors in Namibia.

The error correction coefficient (ect_{t-1}), estimated in all specifications are negative and highly significant at the 1% level of significance. This implies a fairly high speed of adjustment to equilibrium after a shock. The R^2 values for all models, suggest that the error correction model fit the data well. It is also important to note that the underlying error correction models pass the standard diagnostic tests once again.

In short, the results have shown consistency in the findings of a negative and significant result for gross fixed capital formation throughout the study. This confirms the conclusion that in the case of Namibia, gross fixed capital formation is not a determinant of FDI, but having been found significant, this could well become a determinant of FDI in the future. GDP per capita, infrastructure, inflation and interest rates are all highly significant have the correct signs consistent with the literature on FDI and its determinants. This Section has also provided consistency in the results obtained in Section 4.4, in finding a positive but rather insignificant relation between openness and FDI in the case of Namibia.

Furthermore, diagnostic tests for serial correlation, normality, functional form, heteroscedasticity and structural stability of the models are presented in Appendix IV, Figures 4.3. This tests show that all models pass the diagnostic tests in the first stage where there is no evidence of autocorrelation and the models pass the test for normality.

4.6. CONCLUSION

This Chapter analysed the determinants of FDI to Namibia during 1980 to 2009, and examined the type of FDI in the country. The chapter has employed a bounds testing (ARDL) approach to co-integration to examine the long run and short run relationships between foreign direct investment and its determinants using Namibia as the case study.

The results indicate that Namibia's potential market size, interest rates, initial level of income, labour force, availability of quality infrastructure and inflation are important determinants of FDI flows. Our results suggest that there exist significant positive relationship between FDI and its determinants except in the case where a negative relationship is expected such as with Inflation. The bounds test suggested that the variables of interest in the FDI models framework are bound together in the long-run. The results indicate that Inflation, Initial level of a country's income, Infrastructure and Interest rates are significant determinants of FDI in Namibia.

The findings also show that Openness is positive but not significant in our case and that in the future a significant relationship is much likely to be achieved. Domestic Investment measured by gross fixed capital formation is confirmed in all specification and further confirmed by the robustness results that it is not a positive determinant of FDI in the case of Namibia. This result on openness and investment is explained by the fact that Namibia's existing institutional setups for export and investment promotion are considered weak and relatively ineffective. The Ministry of Trade and Industry (MTI) units responsible for the delivery of these services are currently lacking a number of the criteria for a successful export and investment support function. The associated equilibrium correction was also significant confirming the existence of long-run relationships. The equilibrium correction is fairly fast and is restored by the first quarter of the year.

In addition we tried to determine the nature and type of FDI flows to Namibia. The analysis shows that market-seeking determinants of FDI (GDP per capita, Market Size) have shown positive effects in all different specifications as expected. The resource-seeking determinants of FDI (labour force and infrastructure) also have positive effects. Efficiency-seeking determinants openness, interest rates and inflation have the expected effects. Therefore, we

can conclude that FDI in Namibia is not only resource seeking but that Namibia has also seen an increase in Market-seeking and Efficiency-seeking foreign investors.

APPENDIX IV

Table 4.2(a): Descriptive statistics of the variables used in Benchmark Models, 1980-2009.

	lnFDI	*lnGDP*	*lnGFCF*	*Openness*	*lnMKTsize*	*lnLABOR*
Mean	22.665	9.8462	22.313	108.40	7.3577	13.1192
Median	22.492	9.8211	22.306	106.87	7.3947	13.1770
Maximum	24.292	10.093	23.229	153.74	7.7152	13.6016
Minimum	21.133	9.6860	21.523	66.633	6.9205	12.5845
Std. dev	0.8973	0.1135	0.5349	21.137	0.2571	0.3333
Skewness	0.3830	.99218	0 .1572	0.2039	-.2944	-.1907
Kurtosis	2.3047	2.9551	1.9015	2.6526	1.7409	1.7623

Table 4.2(b): Descriptive statistics of the variables used in Benchmark Models, 1990-2009.

	*ln*FDI	*ln*GDP	*ln*GFCF	*INFRA*	*OPEN*	*Inflation*	*Interest rates*	*lnLABOR*	MKTsize
Mean	23.0871	9.8409	22.5937	1.7174	97.6694	9.6086	6.294	6.3815	7.5127
Median	22.7576	9.8341	22.5951	1.8029	97.9156	9.2548	4.4505	6.3808	7.5354
Maximum	24.2928	10.093	23.269	1.9342	113.872	26.72	17.914	6.6627	7.7151
Minimum	22.097	9.686	21.748	1.3192	84.107	1.01	-9.0287	6.1	7.2547
Std. dev	0.7542	0.1246	0.4373	0.2056	7.9554	4.8897	6.4389	0.1713	0.1423
Skewness	0.4619	0.5278	-0.0711	-0.803	0.3931	1.1302	-0.2736	0.045	-0.308
Kurtosis	1.576	2.0225	2.1394	2.0765	2.6079	4.7075	2.8126	1.8064	1.8778

Table 4.7. ROBUSTNESS, Unit Root test Results (1990 to 2009)

	ADF unit root test		PP unit root test		DF-GLS unit root test		
Variable	Level	First Difference	Level	First Difference	Level	First Difference	Conclusion
*ln*FDI	-0.358	-3.424***	-0.943	-14.646**	-2.178	-3.692**	I(1)
*ln*GDP	-0.453	-4.354***	-0.143	-22.14**	-1.941	-4.51***	I(1)
*ln*GFCF	0.089	-6.081***	0.571	-22.70**	-4.96***	-	I(1)
Inflation	-3.660***	-	-16.04**	-	-3.731**		I(0)
Openness	-1.198	-4.11***	-2.624	-21.396**	-2.388	-4.26***	I(1)
INT	-4.370**	-	-13.32**		-3.83***	-	I(0)
*ln*INFRA	-2.143	-3.59**	-1.863	-17.96***	-0.770	-4.88***	I(1)
*ln*LABOR	-0.108	-1.398	-0.034	-6.002	-2.912*	-	I(0)
*ln*MKTsize	-11.6***	-	-0.766	-3.758	-4.23***	-	I(0)

[*** &** denotes the rejection of the null for the ADF and PP unit root tests at 1% and 5% significance level. This also denotes the acceptance of the null at both the 1 and 5% significance level for the DF-GLS unit root test.]

Table (4.11) Autoregressive Distributed Lag Estimates (ARDL) ,for Model (1) to (7)

Model 1: ARDL(1,0,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDI(-1)	.42548	.19531	2.1785[.040]
LNGDP	3.2817	1.4621	2.2446[.035]
LNGFCF	-.91097	.48824	-1.8658[.075]
TRADE	.0040177	.0060128	.66819[.511]
LNPOP	2.8107	1.2168	2.3099[.030]
CONS	-20.0442	8.7432	-2.2925[.031]

R-Squared .91459 R-Bar-Squared .89603
S.E. of Regression .27868 F-stat. F(5, 23) 49.2609[.000]
Mean of Dependent Variable 22.7181 S.D. of Dependent Variable .86426
Residual Sum of Squares 1.7862 Equation Log-likelihood -.73469
Akaike Info. Criterion -6.7347 Schwarz Bayesian Criterion -10.8366
DW-statistic 1.4628 Durbin's h-statistic *NONE*

Diagnostic Tests

* Test Statistics *	LM Version	*	F Version
* A:Serial Correlation	*CHSQ(1)= 3.5728[.059]	*	F(1, 22)= 3.0913[.093]
* B:Functional Form	*CHSQ(1)= 1.3127[.252]	*	F(1, 22)= 1.0430[.318]
* C:Normality	*CHSQ(2)= .75099[.687]	*	Not applicable
* D:Heteroscedasticity	*CHSQ(1)= .63189[.427]	*	F(1, 27)= .60141[.445]

Model 2: ARDL(1,0,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDI(-1)	.39653	.20643	1.9209[.067]
LNGDP	3.5036	1.5412	2.2733[.033]
LNGFCF	-.94343	.50436	-1.8706[.074]
TRADE	.0022614	.0056685	.39894[.694]
LNLABOR	2.1415	.93552	2.2891[.032]
CONS	-28.0691	11.6928	-2.4006[.025]

R-Squared .91431 R-Bar-Squared .89568
S.E. of Regression .27915 F-stat. F(5, 23) 49.0792[.000]
Mean of Dependent Variable 22.7181 S.D. of Dependent Variable .86426
Residual Sum of Squares 1.7922 Equation Log-likelihood -.78366
Akaike Info. Criterion -6.7837 Schwarz Bayesian Criterion -10.8855
DW-statistic 1.4645 Durbin's h-statistic *NONE*

Diagnostic Tests

****

* Test Statistics * LM Version * F Version

****

* A:Serial Correlation*CHSQ(1)= 3.6455[.056]*F(1, 22)= 3.1632[.089]

* B:Functional Form *CHSQ(1)= .52763[.468]*F(1, 22)= .40769[.530]

* C:Normality *CHSQ(2)= .81279[.666]* Not applicable

* D:Heteroscedasticity*CHSQ(1)= .63341[.426]*F(1, 27)= .60289[.444]

Model 3: ARDL(0,0,1,1) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP	4.7585	1.3273	4.3384[.001]
LNINV	-.95091	.46750	-2.0341[.065]
LNINV(-1)	.70207	.31033	2.2624[.043]
INFLATION	-.036013	.0076814	-4.6884[.001]
INFLATION(-1)	-.024919	.0088553	-2.8140[.016]
CONS	-27.4762	4.5809	-4.9232[.000]

****

R-Squared	.96033	R-Bar-Squared	.94380
S.E. of Regression	.18064	F-stat. F(5, 12)	58.0948[.000]
Mean of Dependent Variable	23.1590	S.D. of Dependent Variable	.76195
Residual Sum of Squares	.39156	Equation Log-likelihood	8.9110
Akaike Info. Criterion	2.9110	Schwarz Bayesian Criterion	.23990
DW-statistic	1.9795		

****

Diagnostic Tests

****

* Test Statistics * LM Version * F Version

****

* A:Serial Correlation*CHSQ(1)= .11710[.732]*F(1, 11)= .072030[.793]

* B:Functional Form *CHSQ(1)= 3.2248[.073]*F(1, 11)= 2.4008[.150]

* C:Normality *CHSQ(2)= 1.4868[.475]* Not applicable

* D:Heteroscedasticity*CHSQ(1)= .27541[.600]*F(1, 16)= .24862[.625]

****

Model 4: ARDL(2,0,0,0) selected based on Schwarz Bayesian Criterion

****

Dependent variable is LNFDISTCK

18 observations used for estimation from 1992 to 2009

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDISTCK(-1)	.31482	.26365	1.1941[.256]

LNFDISTCK(-2)	-.63049	.21736	-2.9007[.013]
LNGDP	10.2769	2.8403	3.6182[.004]
LNINV	-1.1325	.78226	-1.4477[.173]
LNTELE	.67781	.85774	.79023[.445]
CONS	-46.7697	11.8731	-3.9391[.002]

R-Squared	.92874	R-Bar-Squared	.89906
S.E. of Regression	.24209	F-stat. F(5, 12)	31.2818[.000]
Mean of Dependent Variable	23.1590	S.D. of Dependent Variable	.76195
Residual Sum of Squares	.70327	Equation Log-likelihood	3.6406
Akaike Info. Criterion	-2.3594	Schwarz Bayesian Criterion	-4.0305
DW-statistic	2.2476		

Diagnostic Tests

* Test Statistics *	LM Version	*	F Version
* A:Serial Correlation*	CHSQ(1)= .97136[.324]*	F(1, 11)=	.62747[.445]
* B:Functional Form *	CHSQ(1)= .61659[.432]*	F(1, 11)=	.39017[.545]
* C:Normality *	CHSQ(2)= 3.3440[.188]*	Not applicable	
* D:Heteroscedasticity*	CHSQ(1)= .60812[.435]*	F(1, 16)=	.55945[.465]

Model 5: ARDL(2,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDISTCK(-1)	.33778	.22344	1.5118[.156]
LNFDISTCK(-2)	-.53531	.21239	-2.5204[.027]
LNGDP	9.1203	2.4228	3.7643[.003]
LNINV	-.67817	.46598	-1.4553[.171]
INTEREST	.017549	.011116	1.5788[.140]
CONS	-47.2453	11.0187	-4.2877[.001]

R-Squared	.93793	R-Bar-Squared	.91207
S.E. of Regression	.22595	F-stat. F(5, 12)	36.2656[.000]
Mean of Dependent Variable	23.1590	S.D. of Dependent Variable	.76195
Residual Sum of Squares	.61262	Equation Log-likelihood	4.8826
Akaike Info. Criterion	-1.1174	Schwarz Bayesian Criterion	-3.7886
DW-statistic	2.3270		

Diagnostic Tests

* Test Statistics *	LM Version	*	F Version
* A:Serial Correlation*	CHSQ(1)= 1.1595[.282]*	F(1, 11)=	.75740[.403]
* B:Functional Form *	CHSQ(1)= .28989[.590]*	F(1, 11)=	.18005[.680]

```
* C:Normality      *CHSQ( 2)= .36616[.833]*      Not applicable
* D:Heteroscedasticity*CHSQ( 1)= .15294[.696]*F( 1, 16)= .13711[.716]
********************************************************************************
```

Model 6: ARDL(2,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDISTCK(-1)	.41162	.23920	1.7208[.111]
LNFDISTCK(-2)	-.70679	.20157	-3.5064[.004]
LNGDP	9.2508	2.6641	3.4724[.005]
LNINV	-.69917	.52518	-1.3313[.208]
OPEN	.0050911	.015195	.33505[.743]
CONS	-46.2357	12.9330	-3.5750[.004]

```
********************************************************************************
R-Squared                      .92573  R-Bar-Squared            .89479
S.E. of Regression             .24715  F-stat.  F( 5, 12)  29.9152[.000]
Mean of Dependent Variable   23.1590  S.D. of Dependent Variable   .76195
Residual Sum of Squares        .73301  Equation Log-likelihood     3.2678
Akaike Info. Criterion        -2.7322  Schwarz Bayesian Criterion  -4.4033
DW-statistic                   2.1295
********************************************************************************
                    Diagnostic Tests
********************************************************************************
*  Test Statistics *      LM Version      *      F Version
********************************************************************************
* A:Serial Correlation*CHSQ( 1)= .23028[.631]*F( 1, 11)= .14255[.713]
* B:Functional Form  *CHSQ( 1)= 2.1061[.147]*F( 1, 11)= 1.4576[.253]
* C:Normality       *CHSQ( 2)= 1.4511[.484]*      Not applicable
* D:Heteroscedasticity*CHSQ( 1)= 1.4245[.233]*F( 1, 16)= 1.3751[.258]
********************************************************************************
```

Model 7: ARDL(2,0,0,0) selected based on Schwarz Bayesian Criterion

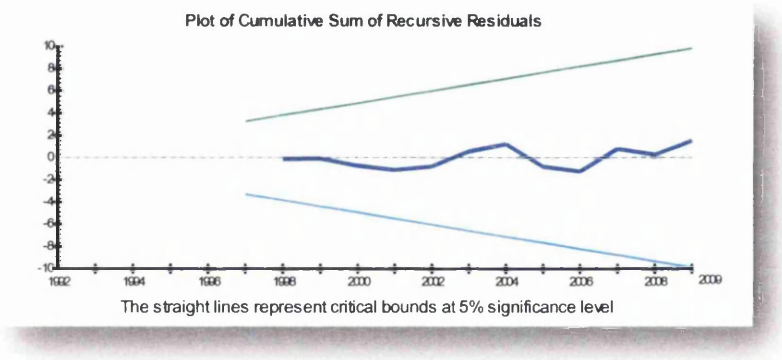
Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNFDISTCK(-1)	.36591	.24308	1.5053[.158]
LNFDISTCK(-2)	-.65319	.20945	-3.1186[.009]
LNGDP	8.8417	2.6968	3.2786[.007]
LNINV	-1.0533	.74237	-1.4189[.181]
LNLABOR	1.4006	1.9334	.72442[.483]
CONS	-42.8151	13.7085	-3.1232[.009]

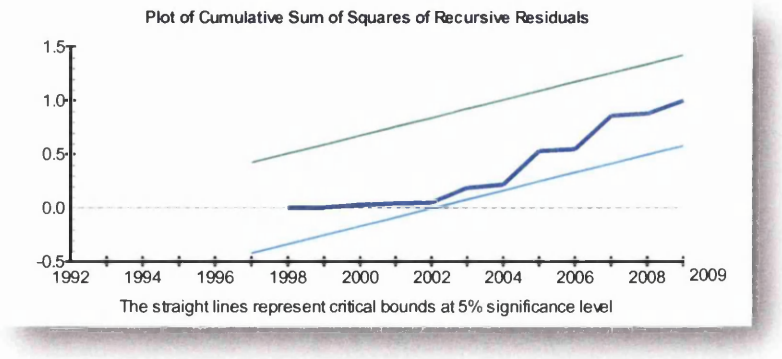
```
********************************************************************************
R-Squared                      .92818  R-Bar-Squared            .89825
S.E. of Regression             .24305  F-stat.  F( 5, 12)  31.0158[.000]
Mean of Dependent Variable   23.1590  S.D. of Dependent Variable   .76195
Residual Sum of Squares        .70886  Equation Log-likelihood     3.5693
Akaike Info. Criterion        -2.4307  Schwarz Bayesian Criterion  -4.1018
```

```
DW-statistic            2.1812
*****************************************************************************
                    Diagnostic Tests
*****************************************************************************
*  Test Statistics *       LM Version       *       F Version
*****************************************************************************
* A:Serial Correlation*CHSQ(  1)=  .35361[.552]*F(  1,  11)=  .22043[.648]
* B:Functional Form   *CHSQ(  1)=  1.4059[.236]*F(  1,  11)=  .93195[.355]
* C:Normality         *CHSQ(  2)=  3.9740[.137]*      Not applicable
* D:Heteroscedasticity*CHSQ(  1)=  .58190[.446]*F(  1,  16)=  .53453[.475]
*****************************************************************************
```

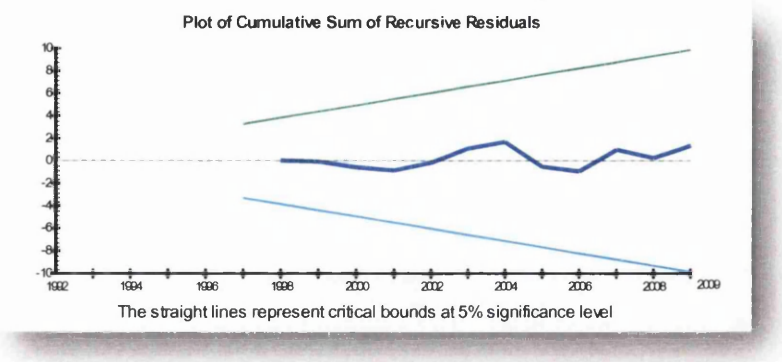
Figure 4.3.
Plots of CUSUM and CUSUMQ Statistics for Coefficients Stability tests for Model (3), (4), (5) and (6)

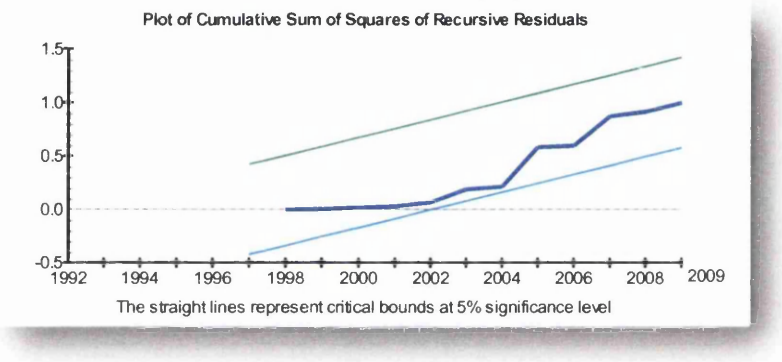
Model 3



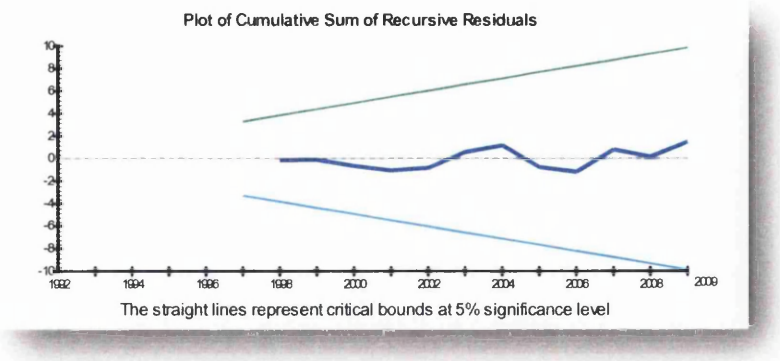


Model 4


Plot of Cumulative Sum of Recursive Residuals
10
8
6
4
2
0
-2
-4
-6
-8
-10
1992
1994
1996
1998
2000
2002
2004
2006
2008
2009
The straight lines represent critical bounds at 5% significance level


Plot of Cumulative Sum of Squares of Recursive Residuals
1.5
1.0
0.5
0.0
-0.5
1992
1994
1996
1998
2000
2002
2004
2006
2008
2009
The straight lines represent critical bounds at 5% significance level

Model 5


Plot of Cumulative Sum of Recursive Residuals
10
8
6
4
2
0
-2
-4
-6
-8
-10
1992
1994
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2000
2002
2004
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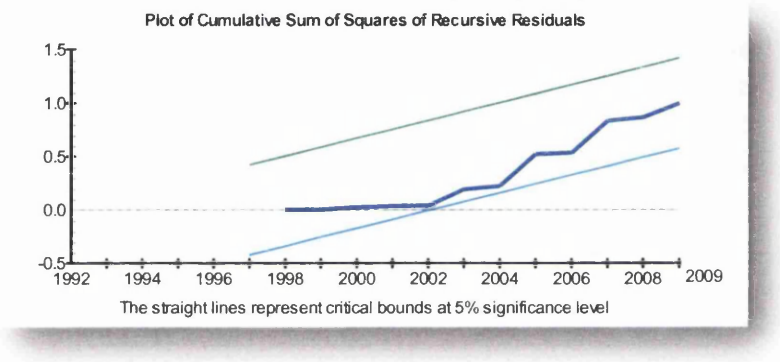
2008
2009
The straight lines represent critical bounds at 5% significance level


Plot of Cumulative Sum of Squares of Recursive Residuals
1.5
1.0
0.5
0.0
-0.5
1992
1994
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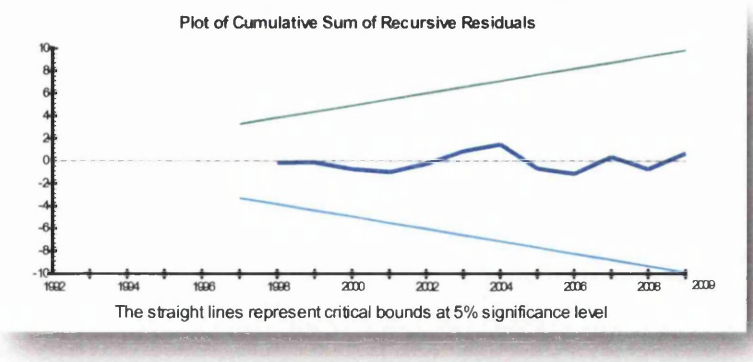
2006
2008
2009
The straight lines represent critical bounds at 5% significance level

Model 6


Plot of Cumulative Sum of Recursive Residuals
10
8
6
4
2
0
-2
-4
-6
-8
-10
1992
1994
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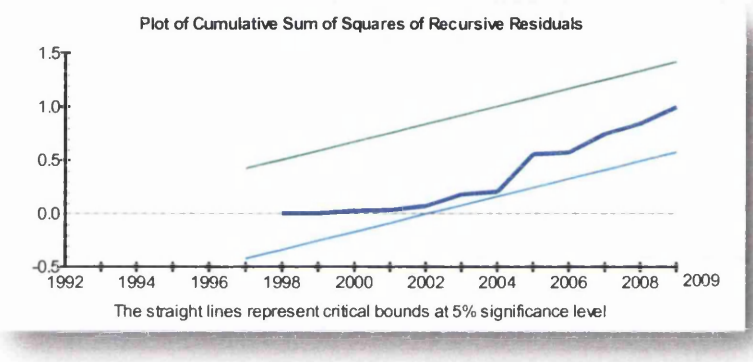
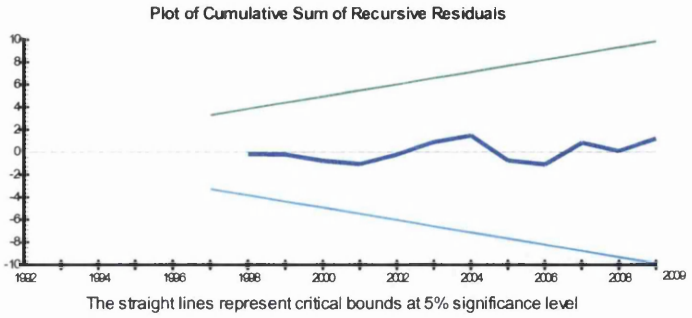
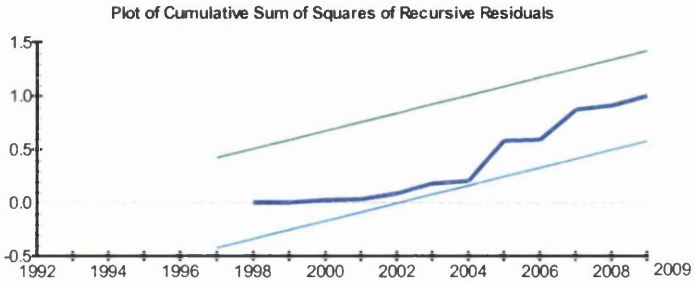
The straight lines represent critical bounds at 5% significance level


Plot of Cumulative Sum of Squares of Recursive Residuals
1.5
1.0
0.5
0.0
-0.5
1992
1994
1996
1998
2000
2002
2004
2006
2008
2009
The straight lines represent critical bounds at 5% significance level

Model 7



The straight lines represent critical bounds at 5% significance level



The straight lines represent critical bounds at 5% significance level

CHAPTER 5

AN EMPIRICAL INVESTIGATION OF THE FDI AND GROWTH RELATIONSHIP IN NAMIBIAN MACROECONOMIC TIME-SERIES

5.1. INTRODUCTION

As mentioned in the previous chapter, the increase in FDI inflow in the early 1990's led to remarkable economic growth and attention was placed on the relationship between FDI and economic growth in developing countries. Developing countries all over the world strive to draw foreign direct investment by introducing regulatory reforms, and provision of more incentives for foreign investors as compared to domestic investors. Henceforth, it becomes imperative to analyse the relation between FDI and economic growth of the host country, and to assess the effect of FDI on economic growth of the host economy.

More recently, following the impressive surge in FDI flows into several developing and emerging economies, there has been renewed interest in empirical analysis of the FDI-growth nexus. Such interest has also been stimulated by this new developments in growth theory. FDI, which provides a channel for knowledge acquisition and dissemination, can therefore act as an engine of growth for the recipient economy. Furthermore, FDI tends to be less volatile than other capital flows, thereby exerting durable positive effects on growth (see, for example, Lipsey, 2000, and Reisen and Soto, 2001).

Following this line of argument, in this Chapter we investigate the relationship between FDI and economic growth in Namibia. In Particular, we employ co-integration test under a linear framework and articulate the robustness of the findings by a method of constructing different specifications of the main model. Thereby, changing specification of the main model allows us to investigate consistency in the effects of FDI on growth when we add investment, Openness, inflation, and human capital within the main specification. The use of the different specification approach is to see whether the results remain consistent i.e. that results are not driven by the choice of a certain specification. Furthermore, we aim not only to investigate a symmetric long–run relationship, and as such, this chapter makes further steps to investigate

the potential asymmetric relationship between FDI and economic growth. Most studies assume that this potential relationship may be represented as a symmetric linear combination of non-stationary stochastic regressors. Only a very few papers have paid attention to the case of non-linear dynamics in the variables, where the series under consideration might be linked in an asymmetric relationship. More specifically, in the presence of nonlinearities, the response of economic growth to positive shocks in the flows of FDI level may be different from the response to negative shocks. If no asymmetries are found then we can conclude that the linear framework assumed is indeed valid and robust.

The structure of the rest of the Chapter is as follows: Section 5.2 briefly discusses the benchmark models in the study and data description. Section 5.3, presents in detail empirical methodologies employed in the Chapter. It also outlines the unit root tests and procedures undertaken. Also, this section explains and presents the linear ARDL co-integration technique in order to determine the long-run drivers of economic growth in the presence of foreign investors. The error correction model was applied to determine the short-run and long-run relationships between FDI and Economic growth. Furthermore, a Granger Causality test is performed and discussed therein. The second part of the methodology presents the asymmetric ARDL co-integration technique. Section 5.4. Presents the empirical findings based on these methodologies. It further discusses Stability and Diagnostic tests therein. Finally, Section 5.5. Presents concluding remarks.

5.2. MODEL AND DATA DESCRIPTION

This section specifies the model used in the empirical investigation of the relationship between FDI and Growth in Namibia using both the linear and asymmetric specifications. It also presents the dataset used in the empirical analysis.

5.2.1. Model Description

To empirically investigate the relationship between FDI and economic growth, the following equation is used to built upon the linear benchmark growth model following Barro (2001) and Sala-i-Martin (1995):

$$ln\text{GDP}_t = f(lnFDI_t, ln\text{GFCF}_t, X_t) \quad (5.1)$$

Where, $lnFDI_t$ is the natural log of FDI Stock at time (t), t is used to index time and $lnGDP_t$ is the log of real GDP per capita[41]. $lnGFCF_t$ is the log of real gross fixed capital formation representing domestic investment in the country. Openness is foreign trade (exports plus imports) as share of GDP. X_t includes a set of control variables. This control variables are important in the FDI and growth literature and therefore are introduced individually in each of the specification below. These variables are human capital stock which is secondary completion of the total population, openness (OPEN), which is the percentage share of exports plus imports in GDP, and inflation. e_t is the white noise error term.

To intensively explore the FDI and economic growth relationship, we utilise different alternative specifications in which we add human capital, openness and inflation as individual models. Similarly, Alyson (1983) argues on theoretical and empirical grounds that log-linear form provides more reliable and comprehensive results than the latter one.

Having reviewed the literature in Chapter 2, foreign direct investment stimulated economic growth and therefore a catalyst for development in the host country. Thus, the econometric version of the four different specifications that will be used in this context to address to some extent model uncertainty and robustness take the following forms:

Model 1: $lnGDP_{1t} = c_{10} + c_{11}lnFDI_t + c_{12}lnGFCF_t + e_{1t}$

Model 2: $lnGDP_{2t} = c_{20} + c_{21}lnFDI_t + c_{22}lnGFCF_t + c_{23}OPENt + e_{2t}$

Model 3: $lnGDP_{3t} = c_{30} + c_{31}lnFDI_t + c_{32}lnGFCF_t + c_{33}Inflation_t + e_{3t}$

Model 4: $lnGDP_{4t} = c_{40} + c_{41}lnFDI_t + c_{42}lnGFCF_t + c_{43}HC_t + e_{4t}$

(5.2)

Furthermore, the chapter extends on the linear framework to account for asymmetries in the relationship between FDI and economic growth. To investigate this asymmetry, we build

[41] See for example, Nunnenkamp et al. (2008) Blin et al. (2009) for studies that have used GDP per capita as a proxy for economic growth.

upon the growth model in equation (5.1) by decomposing log of FDI stock into positive and negative series, therefore the reduced specification takes the form:

$$lnGDP_t = f(lnFDI_t^+, lnFDI_t^-, lnGFCF_t, X_t) \quad (5.3)$$

Where, $lnFDI_t^+$ and $lnFDI_t^-$ are partial sum processes of positive and negative changes in $lnFDI_t$.

Thus, the econometric version of the asymmetric models that will be used in the four assymetric specifications take the following forms:

Model 1: $lnGDP_{1t} = c_{10} + c_{11}^+ lnFDI_t^+ + c_{11}^- lnFDI_t^- + c_{12} lnGFCF_t + e_{1t}$

Model 2: $lnGDP_{2t} = c_{20} + c_{21}^+ lnFDI_t^+ + c_{21}^- lnFDI_t^- + c_{22} lnGFCF_t + c_{23} Open_t + e_{2t}$

Model 3: $lnGDP_{3t} = c_{30} + c_{31}^+ lnFDI_t^+ + c_{31}^- lnFDI_t^- + c_{32} lnGFCF_t + c_{33} Inflation_t + e_{3t}$

Model 4: $lnGDP_{4t} = c_{40} + c_{41}^+ lnFDI_t^+ + c_{41}^- lnFDI_t^- + c_{42} lnGFCF_t + c_{43} HC_t + e_{4t}$ (5.4)

FDI affects growth directly, by increasing domestic capital in the recipient economy, and indirectly by inducing human capital development and promoting technological upgrading, De Mello (1999). Therefore, investments (both foreign and domestic) are expected to rise as countries pass through higher stages of development and experience faster growth rates. Theory states that trade, especially exports, may increase competition, permit the realization of comparative advantage, enable countries to purchase goods from abroad and provide opportunities to gain access to new technology as well as managerial skills.

Addingly, openness to international financial flows can raise productivity growth. According to, Aryeetey (2005), for a developing country openness of international trade may bring about the upgrading of skills through the importation or adoption of superior production technology and innovation. Exporters learn or adopt better and highly developed production technology and innovation, either through intensive international markets competition or act as subcontractors to foreign business concerns.

The review on the literature in chapter 2, stated that FDI has a positive effect on growth when the host country has a certain level of skills, especially those required by foreign firms, and that in a host country with low levels of skills the effect on growth is negative. Furthermore, FDI is linked to growth when controlling inflation and government size. Low inflation is taken to be a sign of internal economic stability in the host country Akinboade *et al.* (2006). High inflation indicates the inability of the government to balance its budget and the failure of the central bank to conduct appropriate monetary policy.

5.2.2. Data Sources and Description

The data used for the investigation is annual and covers the period from 1980 to 2009[42]. Detailed information on FDI stock where obtained from the Bank of Namibia, 2010. This study use FDI Stock, although it should be noted that to this point, economists have been conditioned to think of investment as a flow, such a measure makes it difficult to determine the total impact of FDI. This is due to a recurring theme in the literature that emphasizes FDI as a conduit for the transfer of knowledge-based assets. While flow measurements will capture a portion of the transfer of these assets that occur in the beginnings stages of the parent-subsidiary relationship, the use of flow data implicitly assumes that any FDI growth effects are limited to the period in which the investment is made. Foreign parents transfer a wealth of assets not capable of being priced and not constricted to the time period in which the initial investment takes place. A one-time investment by a foreign firm tells nothing about the operations of the domestic firm. Further, the flow of benefits may or may not be reflected in the value of the investment. Consequently, a stock measure is best suited to capturing the immeasurable and perpetual flow of these intangibles.

In addition, the use of flow is not consistent with the theory of FDI and the coefficients are unlikely to be of the proper magnitude[43]. Other advantages in working on stocks rather than flows are that foreign investors decide on the worldwide allocation of output, hence on capital stocks. Furthermore, stocks account for foreign direct investment being financed through local capital markets, hence it is a better measure of capital ownership (Devereux and Griffith, 2002). Finally, FDI Stocks are also known to be less affected by potential

[42] To capture the effect of pre and post-independence regime on FDI and Growth, a dummy variable was considered and however found to be highly insignificant and irrelevant, and hence dropped from the estimation and specification of the models.

[43] For example, See Ford et al. (2008).

endogeneity biases, in that stocks are much less volatile than flows which are sometimes dependent on one or two large takeovers, especially in relatively small countries[44] .

Gross Domestic Product per capita in local currency and real gross fixed capital formation (GFCF) were obtained from the Bank of Namibia (2010). Inflation, measured as the percentage of change in the GDP deflator and used as a proxy for macroeconomic stability, was taken from WDI (2010). Openness to international trade was proxied by the average of the sum of exports plus imports to total output (GDP), also from WDI (2010). Human capital stock used is secondary school completion rates for the entire population, constructed by Barro and Lee (2010). Table 5.1, Appendix V, presents descriptive statistics of the variables used.

5.3. ECONOMETRIC METHODOLOGY

The implications of the time series properties as suggested by economic theory on the relationship between FDI and real GDP per capita, is that a linear combination of the two series tends to be stationary. Once, the co-integrating property is known, FDI and Growth can be considered to be generated by an error correction model in which the change of one of the series is explained in terms of lag of the difference between the series. If the relevant variables are found to co-integrate, the impact of FDI on growth can therefore be deemed permanent.

5.3.1. Unit Root tests and The Linear ARDL, Bound co-integration Technique

This Chapter employs the Augmented Dickey Fuller, Dickey Fuller Generalized Least Squared and Phillips-Perron unit root tests to determine the order of integration of the variables of interest. This tests are discussed in detail in Section 4.4 of Chapter 4, and therefore, not discussed herein to avoid repetition. The unit root tests are carried out to determine the order of integration of the variables. Once the order of integration of the variables under study is confirmed, we proceed with the ARDL bounds test.

For the long run relationship analysis, autoregressive distributed lag (ARDL) approach to co-integration is applied[45]. The ARDL bounds testing approach to co-integration has numerous

[44] See, Benassy-Quere et al. (2007).

advantages over the other co-integration methods[46]. As discussed in the previous Chapter, the ARDL has been proven to perform better for finite or small sample sizes (Pesaran and Shin 1999); hence, this makes it a good choice for our sample of 30 annual observations than other co-integration methods. The long run and short-run parameters of the model are estimated simultaneously with simple modification. In addition, the ARDL approach corrects the problem of serial correlation and therefore endogenity is less of a problem by augmentation of the order of the regressors, Pesaran and Shin (1999).

The ARDL approach to co-integration involves estimating the conditional error correction version of the ARDL model for real GDP per capita and its relationship with FDI stock. The unrestricted error correction representation of the four ARDL model specification is given by:

$$\textbf{Model 1: } \Delta lnGDP_{1t} = c_{10} + \delta_{11} lnGDP_{t-1} + \delta_{12} lnFDI_{t-1} + \delta_{13} lnGFCF_{t-1} + \sum_{i=1}^{p} \phi i1\, \Delta lnGDP_{t-i} + \sum_{j=1}^{q} \varpi i1\, \Delta lnFDI_{t-j} + \sum_{l=1}^{q} \varphi i1\, \Delta lnGFCF_{t-l} + e_{1t} \quad (5.5)$$

$$\textbf{Model 2: } \Delta lnGDP_{2t} = c_{20} + \delta_{21} lnGDP_{t-1} + \delta_{22} lnFDI_{t-1} + \delta_{23} lnGFCF_{t-1} + \delta_{24} OPEN_{t-1} + \sum_{i=1}^{p} \phi i2\, \Delta lnGDP_{t-i} + \sum_{j=1}^{q} \varpi i2\, \Delta lnFDI_{t-j} + \sum_{l=1}^{q} \varphi i2\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i2\, \Delta Trade_{t-p} + e_{2t} \quad (5.6)$$

$$\textbf{Model 3: } \Delta lnGDP_{3t} = c_{30} + \delta_{31} lnGDP_{t-1} + \delta_{32} lnFDI_{t-1} + \delta_{33} lnGFCF_{t-1} + \delta_{34} Inflation_{t-1} + \sum_{i=1}^{p} \phi i3\, \Delta lnGDP_{t-i} + \sum_{j=1}^{q} \varpi i3\, \Delta lnFDI_{t-j} + \sum_{l=1}^{q} \varphi i3\, \Delta lnGFCF_{t-l} + \sum_{s=1}^{q} \gamma i3\, \Delta Inflation_{t-s} + e_{3t} \quad (5.7)$$

$$\textbf{Model 4: } \Delta lnGDP_{4t} = c_{40} + \delta_{41} lnGDP_{t-1} + \delta_{42} lnFDI_{t-1} + \delta_{43} lnGFCF_{t-1} + \delta_{44} HC_{t-1} + \sum_{i=1}^{p} \phi i4\, \Delta lnGDP_{t-i} + \sum_{j=1}^{q} \varpi i4\, \Delta lnFDI_{t-j} + \sum_{l=1}^{q} \varphi i4\, \Delta lnGFCF_{t-l} + \sum_{u=1}^{q} \gamma i4\, \Delta HC_{t-u} + e_{4t} \quad (5.8)$$

We estimate equation (5.5) to (5. 8) to test for the existence of a long-run relationship among the variables. The steps employed in implementing the ARDL are outlined in detail in Chapter 4, Section 4.5. Having followed the steps aforesaid and once co-integration is

[45] See Chapter 4, section 4.4 for detailed description of the methodology.
[46] Section 4.4, (Chapter 4), discusses advantages of the ARDL technique in detail.

established, the conditional ARDL (p, q^1, q^2, q^3)[47] long-run model for $lnGDP_t$ can be estimated as:

***Model* 1**: $lnGDP_{1t}=c_{10}+\sum_{i=1}^{p}\theta_{11}\,lnGDP_{t-i}+\sum_{i=0}^{q1}\theta_{12}\,lnFDI_{t-i}+\sum_{i=0}^{q2}\theta_{13}\,lnGFCF_{t-i}+e_{1t}$ (5.9)

***Model* 2**: $lnGDP_{2t}=c_{20}+\sum_{i=1}^{p}\theta_{21}\,lnGDP_{t-i}+\sum_{i=0}^{q1}\theta_{22}\,lnFDI_{t-i}+\sum_{i=0}^{q2}\theta 2_3\,lnGFCF_{t-i}$
$+\sum_{i=0}^{q3}\theta_{24}\,Trade_{t-i}+e_{2t}$ (5.10)

***Model* 3**:$lnGDP_{3t}=c_{30}+\sum_{i=1}^{p}\theta_{31}\,lnGDP_{t-i}+\sum_{i=0}^{q1}\theta_{32}\,lnFDI_{t-i}+\sum_{i=0}^{q2}\theta_{33}\,lnGFCF_{t-i}$
$+\sum_{i=0}^{q3}\theta_{34}\,Inflation_{t-i}+e_{3t}$ (5.11)

***Model* 4**: $lnGDP_{4t}=c_{40}+\sum_{i=1}^{p}\theta_{41}\,lnGDP_{t-i}+\sum_{i=0}^{q1}\theta_{42}\,lnFDI_{t-i}+\sum_{i=0}^{q2}\theta_{43}\,lnGFCF_{t-i}$
$+\sum_{i=0}^{q3}\theta_{44}\,HC_{t-i}+e_{4t}$ (5.12)

Finally, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates as follows:

***Model* 1**: $\Delta lnGDP_{1t}=\alpha_1+\sum_{i=1}^{p}\phi i1\,\Delta lnGDP_{t-i}+\sum_{j=1}^{q}\varpi i1\,\Delta lnFDI_{t-j}+\sum_{l=1}^{q}\varphi i1\,\Delta lnGFCF_{t-l}+\pi_1 ecm_{t-1}+e_{1t}$ (5.13)

***Model* 2**: $\Delta lnGDP_{2t}=\alpha_2+\sum_{i=1}^{p}\phi i2\,\Delta lnGDP_{t-i}+\sum_{j=1}^{q}\varpi i2\,\Delta lnFDI_{t-j}+\sum_{l=1}^{q}\varphi i2\,\Delta lnGFCF_{t-l}+\sum_{p=1}^{q}\gamma i2\,\Delta Trade_{t-p}+\pi_2 ecm_{t-1}+e_{2t}$ (5.14)

***Model* 3**: $\Delta lnGDP_{3t}=\alpha_3+\sum_{i=1}^{p}\phi i3\,\Delta lnGDP_{t-i}+\sum_{j=1}^{q}\varpi i3\,\Delta lnFDI_{t-j}+\sum_{l=1}^{q}\varphi i3\,\Delta lnGFCF_{t-l}+\sum_{s=1}^{q}\gamma i3\,\Delta Inflation_{t-s}+\pi_3 ecm_{t-1}+e_{3t}$ (5.15)

***Model* 4**: $\Delta lnGDP_{4t}=\alpha_4+\sum_{i=1}^{p}\phi i4\,\Delta lnGDP_{t-i}+\sum_{j=1}^{q}\varpi i4\,\Delta lnFDI_{t-j}+\sum_{l=1}^{q}\varphi i\,4\Delta lnGFCF_{t-l}+\sum_{u=1}^{q}\gamma i4\,\Delta HC_{t-u}+\pi_4 ecm_{t-1}+e_{4t}$ (5.16)

[47] This is the number of lags to be considered in order to capture the data generating process in a general to specific framework.

The lagged residual term or error term ($\pi_i ecm_{t-1}$), (i=1, 2...4), in equation (5.13) to (5.16) indicates the changes in dependant variable. These changes are not only due to the two levels of disequilibrium in the co-integration association but also in the other explanatory variables which points to the convergence of the dependant variable from short to long run equilibrium relationship (Masih and Masih, 1996). In such a situation, the error correction term causes the dependent variable to converge to the long span of time for stable equilibrium caused by the variations in the independent variables.

5.3.2. Granger Causality

The existent of long run relationship does no tell us the direction of causality, therefore, we analyse the causal sense between FDI and growth. FDI on average has an impact on growth in the Granger-Causal sense, Hansen (2007). Economists have developed a number of techniques for analyzing the causal relationships between time series. Some of the most popular methods are based on the concept of Granger causality, that is, the idea that a variable X causes another variable Y, if by incorporating the past history of X one can improve a prediction of Y over a prediction based solely on the history of Y alone. The notion of Granger causality is based on a criterion of incremental forecasting value[48]. By testing for Granger causality, it is possible to refute claims of econometric exogeneity. Therefore, tests for Granger causality are valuable tools in the empirical analysis of economic variables or processes rather. Tests for Granger causality are useful in that they offer qualitative characterizations of the relationships under study. Tests for mutual Granger causality or feedback are also important because if X Granger causes Y and Y Granger causes X, inconsistent parameter estimates will be obtained in fitting one-way distributed lag models (Schwert, 1979).

In this light, it is important to investigate the casual linkage in the FDI-growth nexus and determine the direction of such a causality, should one exist. In order to test for direct causality between FDI and economic growth, the study performs a Granger causality test using the following equations:

$$ln\text{GDP}_t=\gamma+\sum_{i=1}^{k}\alpha_i ln\text{GDP}_{t-i}+\sum_{i=1}^{k}\beta_i\, ln\text{FDI}_{t-i}+u_t \qquad (5.17)$$

[48] See Freeman 1983.

$$lnFDI_t=\phi+\sum_{i=1}^{k}\partial_i lnGDP_{t-i}+\sum_{i=1}^{k}\lambda_i lnFDI_{t-i}+\eta_t \quad (5.18)$$

Where $lnGDP_t$ and $lnFDI_t$ are stationary time series sequences, γ and ϕ are the respective intercepts, u_t and η_t are white noise error terms, and k is the maximum lag length used in each time series. According to Granger (1988) a significant error correction term indicates long-run Granger causality. The optimum lag length is identified using Hsiao's (1981) sequential procedure, which is based on Granger's definition of causality and Akaike's (1969, 1970) minimum final prediction error criterion. If H_0: in equation (5.17) $\sum_{i=1}^{k}\beta_i$ is significantly different from zero, then we conclude that FDI Granger causes GDP. Separately, if $\sum_{i=1}^{k}\partial_i$ in equation (5.18) is significantly different from zero, then we conclude that GDP Granger causes FDI. Granger causality in both directions is, of course, a possibility.

However, if long-run causality does not exist, the following formulation in first difference form is needed in testing the hypotheses of causality in the short-run:

$$\Delta lnGDP_t=\gamma+\sum_{i=1}^{k}\alpha_i\Delta lnGDP_{t-i}+\sum_{i=1}^{k}\beta_i\Delta lnFDI_{t-i}+u_t \quad (5.19)$$

$$\Delta lnFDI_t=\phi+\sum_{i=1}^{k}\partial_i\Delta lnGDP_{t-i}+\sum_{i=1}^{k}\lambda_i\Delta lnFDI_{t-i}+\eta_t \quad (5.20)$$

Failing to reject the H_0: $\beta_{i=1}=\beta_{i=2}=....\beta_{i=k}=0$ implies that FDI do not Granger cause GDP. Likewise, failing to reject the H_0: $\partial_{i=1}=\partial_{i=2}=....\partial_{i=k}=0$ suggests that GDP do not Granger cause FDI.

5.4. An asymmetric ARDL co-integration technique

Most of the previous works investigating the co-integration relationship between FDI and economic growth have focused on the use of the linear ARDL approach by Pesaran and Shin (1996). This framework assumes that the adjustment mechanism of the ECT (error correction term) is symmetric, which means that the adjustment coefficients to the equilibrium level are the same for both positive and negative values of the residual obtained from the long-run relationship. This indicates that the speed of adjustment of growth indicator, used in our

analysis, is the same no matter if the shocks to FDI flows are positive or negative. The issue is that the linear ARDL co-integration test employed in Section 5.3 might be invalid if the adjustments to equilibrium appeared to be asymmetric.

To be able to handle these problems a few methods have been put forward. One approach is to test if asymmetric co-integration is present. Granger & Yoon (2002) and Schorderet (2003) were among the first to bring forward the idea that the co-integration relationship can be defined by the positive and negative components in the underlying variables, an effect that Granger & Yoon (2002) name *"hidden co-integration"*. To analyse asymmetric price transmission, assuming an asymmetric relationship means a great advantage if the relationship, de facto is asymmetric as this procedure incorporates possible asymmetries in the co-integration test which eliminates the risk of biased results. In the proposed method by Shin et al. (2009) the co-integration test is made in the regression with the upper and lower bound F-test and W-test proposed by Pesaran et al. (2001). This means that it is possible to avoid the problems with co-integration test using the linear ARDL bounds testing, Johansen or Engle & Granger when asymmetries are present.

In this Section, we redress the empirical validity of the relationship between FDI and economic growth using an asymmetric co-integration model. The existing literature concerning asymmetry is dominated by three regime-switching models. First, the threshold ECM (Balke and Fomby, 1997) where regime shifts are triggered by the level of observed variables in relation to an unobserved threshold. Second, the Markov-switching ECM (Psaradakis et al., 2004) in which the regime shifts evolve according to a Markov chain. And third, the smooth transition regression ECM (Kapetanios et al., 2006), which Granger and Yoon (2002) introduced the term "hidden co-integration". According to them, two time series have hidden co-integration if their positive and negative components are cointegrated with each other. They showed that, standard linear (symmetric) co-integration is a special case of hidden co-integration and hidden co-integration is simple case of nonlinear co-integration. Schorderet (2003), proposed a bivariate asymmetric cointegrating regression to analyze hidden co-integration where only one component of each series appears in the cointegrating relationship.

In a more recent paper, Shin et al. (2011) developed an asymmetric ARDL co-integration methodology, which uses positive and negative partial sum decompositions, allowing for the

detection of asymmetric effects both in the long- and the short-run. Actually, the specification of the asymmetric ARDL allows the joint analysis of the issues of non-stationarity and nonlinearity in the context of an unrestricted error correction model.

As suggested in Section 5.1, the symmetric linear combination of non-stationary stochastic regressors might be overly restrictive. To address this issue, the study adapts an asymmetric co-integrating ARDL model proposed by Shin et al. (2009[49], 2011). The asymmetric nonlinear ARDL model (NARDL) applied in this Chapter is a relatively new technique. It is an asymmetric expansion of the linear ARDL model employed in Section 5.3, which performs better for determining co-integration in small samples. It detects non-linearities focusing on the long-run and short-run asymmetries among economic variables. Therefore, following Shin et al. (2011), the following nonlinear asymmetric cointegrating regression is considered:

$$y_t=\beta^+ x_t^+ + \beta^- x_t^- + u_t, \tag{5.21}$$

where β^+ and β^- are the associated long-run parameters and x_t is a k×1 vector of regressors decomposed as:

$$x_t=x_0+x_t^+ + x_t^- \tag{5.22}$$

where, x_t^+ and x_t^- are partial sum processes of positive and negative changes in x_t:

$$x_t^+ = \sum_{j=1}^{t} \Delta x_t^+ = \sum_{j=1}^{t} max\,(\Delta x_j, 0) \text{ and } x_t^- = \sum_{j=1}^{t} \Delta x_i^- = \sum_{j=1}^{t} min\,(\Delta x_j, 0) \tag{5.23}$$

By associating Eq. (5.21) to the ARDL(p, q) case, we obtain the following asymmetric error correction model (AECM)[50]:

$$\Delta y_t = \rho y_{t-1} + \theta^+ x_{t-1}^+ + \theta^- x_{t-1}^- + \sum_{j=1}^{p-1} \varphi_j \Delta y_{t-j} + \sum_{j=0}^{q} (\pi_j^+ \Delta x_{t-j}^+ + \pi_j^- \Delta x_{t-j}^-) + e_t, \text{ for } j = 1.., q \tag{5.24}$$

where $\theta^+ = -\rho\beta^+$ and $\theta^- = -\rho\beta^-$.

[49] Time series econometrics; using microfit 5, 2009.
[50] Extensive derivation of the model can be found in Shin et al. (2011).

To allow for asymmetries, the simple specification of the AECM for the four models can be presented as follows[51]:

Model 1: $\Delta lnGDP_{1t} = c_{10} + \delta_{11} lnGDP_{t-1} + \delta_{12}^{+} lnFDI_{t-1}^{+} + \delta_{12}^{-} lnFDI_{t-1}^{-} + \delta_{13} lnGFCF_{t-1} + \sum_{i=1}^{p} \phi i1\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \varpi i1^{+} \Delta ln\mathrm{FDI}_{t-j}^{+} + \sum_{i=0}^{q} \varpi i1^{-} \Delta ln\mathrm{FDI}_{t-j}^{-} + \sum_{l=1}^{q} \varphi i1\, \Delta lnGFCF_{t-l} + e_{1t}$ (5.25)

Model 2: $\Delta lnGDP_{2t} = c_{20} + \delta_{21} lnGDP_{t-1} + \delta_{21}^{+} lnFDI_{t-1}^{+} + \delta_{22}^{-} lnFDI_{t-1}^{-} + \delta_{23} lnGFCF_{t-1} + \delta_{24} OPEN_{t-1} + \sum_{i=1}^{p} \phi i2\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \varpi i2^{+} \Delta ln\mathrm{FDI}_{t-j}^{+} + \sum_{i=0}^{q} \varpi i2^{-} \Delta ln\mathrm{FDI}_{t-j}^{-} + \sum_{l=1}^{q} \varphi i2\, \Delta lnGFCF_{t-l} + \sum_{p=1}^{q} \gamma i2\, \Delta Trade_{t-p} + e_{2t}$ (5.26)

Model 3: $\Delta lnGDP_{3t} = c_{30} + \delta_{31} lnGDP_{t-1} + \delta_{32}^{+} lnFDI_{t-1}^{+} + \delta_{32}^{-} lnFDI_{t-1}^{-} + \delta_{33} lnGFCF_{t-1} + \delta_{34} Inflation_{t-1} + \sum_{i=1}^{p} \phi i3\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \varpi i3^{+} \Delta ln\mathrm{FDI}_{t-j}^{+} + \sum_{i=0}^{q} \varpi i3^{-} \Delta ln\mathrm{FDI}_{t-j}^{-} + \sum_{l=1}^{q} \varphi i3\, \Delta lnGFCF_{t-l} + \sum_{s=1}^{q} \gamma i3\, \Delta Inflation_{t-s} + e_{3t}$ (5.27)

Model 4: $\Delta lnGDP_{4t} = c_{40} + \delta_{41} lnGDP_{t-1} + \delta_{42}^{+} lnFDI_{t-1}^{+} + \delta_{42}^{-} lnFDI_{t-1}^{-} + \delta_{43} lnGFCF_{t-1} + \delta_{44} HC_{t-1} + \sum_{i=1}^{p} \phi i4\, \Delta lnGDP_{t-i} + \sum_{i=0}^{q} \varpi i\, 4^{+} \Delta ln\mathrm{FDI}_{t-j}^{+} + \sum_{i=0}^{q} \varpi i4^{-} \Delta ln\mathrm{FDI}_{t-j}^{-} + \sum_{l=1}^{q} \varphi i4\, \Delta lnGFCF_{t-l} + \sum_{u=1}^{q} \gamma i4\, \Delta HC_{t-u} + e_{4t}$ (5.28)

Equation (5.24), opens the possibility that the process being modelled may exhibit asymmetries in both the short and long-run, only in the long-run or only in the short-run. The first part of the equation represents the long-run relationship which can be evaluated by bounds testing, the second part contains the lags of the asymmetric FDI in first differences – it is on this part of the equation that short-run asymmetry is tested on.

The asymmetric ARDL analysis follows four steps; namely, step one concerns the estimation of model (5.25 to 5.28) which can be estimated by standard OLS. Step two is the establishment of the long-run relationship between the levels of the variables y_t, x_t^{+}, x_t^{-}, by means of a modified F-test, while using the bounds-testing procedure advanced by Pesaran et al. (2001) and Shin et al. (2011), which refers to the joint null, $\rho = \theta^{+} = \theta^{-} = 0$ in Eq. (5.25 to 5.28). In step three, using the Wald test, we examine for: long-run symmetry where, $\theta = \theta^{+} =$

[51] For a more extensive derivation of the linear ARDL procedure see Chapter 4, Section 4.3.4.

θ^-, and short-run symmetry which can take one of the following forms (i) $\pi_i^+ = \pi_i^-$ for all i $=1,\ldots,q$ or (ii) $\sum_{i=0}^{q} \pi_i^+ = \sum_{i=0}^{q} \pi_i^-$. Finally, in step four we use the asymmetric ARDL models (5.25 to 5.28) to derive the asymmetric cumulative dynamic multiplier effects of a unit change in x_t^+ and x_t^-, respectively, on y_t:

$$m_h^+ = \sum_{j=0}^{h} \frac{\partial yt+j}{\partial xt+}, m_h^- = \sum_{j=0}^{h} \frac{\partial yt+j}{\partial xt-}, \; h = 0, 1, 2..... \quad (5.30)$$

Note that as h$\rightarrow\infty$, then $m_h^+ \rightarrow \beta^+$ and $m_h^- \rightarrow \beta^-$, where β^+ and β^- are the asymmetric long-run coefficients calculated as $\beta^+ = -\theta^+/\rho$ and $\beta^- = -\theta^-/\rho$ respectively.

5.5. EMPIRICAL RESULTS AND DISCUSSIONS

5.5.1. Stationarity and Unit Root

Before we proceed to the application of the ARDL approach, it is appropriate that all series be tested for stationarity. Chapter 4.4. Provides a discussion on the importance of testing for unit roots and the methodological procedure in detail. Moreover, we utilise the following tests; the ADF, PP and DF-GLS to determine the order of integration of the variables[52]. The results of the unit root tests are reported in Table 5.2.

Table 5.2. Unit Root test Results

	ADF unit root test		PP unit root test		DF-GLS unit root test		
Variable	**Level**	**First Difference**	**Level**	**First Difference**	**Level**	**First Difference**	**Conclusion**
***ln*FDI**	0.453	-3.779**	-0.050	-21.562 **	0.106	-4.374**	I(1)
***ln*GDP**	-0.847	-4.2**	-1.354	-15.591**	-0.163	-3.788**	I(1)
***ln*GFCF**	0.196	-5.229**	0.023	-30.430**	0.003	-4.919**	I(1)
Openness	-1.474	-5.543**	-2.174	-33.435**	-0.702	-6.658**	I(1)
inflation	- 4.703**		-23.535**		-4.679**		I(0)
HC	-5.818**		-6.555***		-1.980**		I(0)

[*** &** denotes the rejection of the null at 1% and 5% significance level. This also denotes the acceptance of the null at both the 1 and 5% significance level for the DF-GLS unit root test.] ADF up to 4 lags were used.

[52] The unit root test employed in this chapter are the same as the ones we employ in chapter 4. We aim to have consistency in the methodologies employed across the thesis.

The results show that we are unable to reject the unit root hypothesis at the conventional levels of significance for FDI Stock, GDP per capita, GFCF and Openness when we conduct the test on the levels of each of the variables. After having differenced the variables once to check for their stationarity, we clearly reject the null hypothesis of a unit root in all three tests. These tests decisively confirm stationarity of the variables at first differencing under a constant, at the 1% and 5% significance levels, and depict the same order of integration, I(1) behaviour. The results show that inflation and human capital 'skills' variables to be stationary in levels. Therefore, depicting the same order of integration, I(0). Important, the unit root tests employed have shown consistency in determining the order of integration for all variables. Having confirmed the variables to be either I(0) and I(1), we can then proceed to ARDL testing.

5.5.2. Results Based on the linear ARDL Bounds test for co-integration

The study aims to detect the long-run as well as the short-run relationships between FDI, economic growth and other relevant variables as specified in the models. Therefore, we employed the ARDL technique. As a first step of the ARDL analysis, we test for the presence of long-run relationships using equation (5.5) to (5.8). As suggested by Pesaran and Shin (1990) and Narayan (2004), since the observations are annual, we choose 2 lags as the maximum order of lags in the ARDL and estimate for the period 1980 to 2009.

As per the methodology discussed in Chapter 4 (Section 4.3), an OLS regression was estimated for the first differences part of this equations and then test for the joint significance of the parameters of the lagged level variables when added to the first regression. Table 5.3, reports the results of the calculated F-statistics where log of GDP per capita variable is considered as a dependent variable in the ARDL-OLS regressions.

Table 5.3: Results from Linear ARDL Bounds tests on equations (5.5) to (5.8)

	Lags	F-stat	Outcome
1.F(*ln*GDP| *ln*FDI, *ln*GFCF)	2	4.53**	co-integration
2.F(*ln*GDP| *ln*FDI, *ln*GFCF, OPEN)	2	3.93**	co-integration
3.F(*ln*GDP| *ln*FDI, *ln*GFCF, INFLATION)	2	3.81**	co-integration
4.F(*ln*GDP| *ln*FDI, *ln*GFCF, HC)	2	3.66**	co-integration

Notes: Asymptotic critical value bounds are obtained from Pesaran and Pesaran 1997; Table CI in appendix, Case III: unrestricted intercept and no trend for k=3; lower bound I(0)=3.23 and upper bound I(1)=4.35. k=4; lower bound I(0)=2.45 and upper bound I(1)=3.52. ** & * denotes significance at 5% & 10% level.

The calculated F-statistics for the co-integration test, Table 5.3, shows that the F-Statistic for Model 1 with k=3 (k is the number of variables in the equation) is higher than the lower bound value of 3.23 and also higher than the upper bound value of 4.35 at the 5% significance value. The F-statistic for Models 2, 3 and 4 with k=4 is higher than the upper bound critical value of 3.52. Thus, the null hypotheses of no co-integration are rejected, implying a long-run co-integration relationship amongst the variables in the models. And, hence, the variables in Table 5.3, can be treated as the long-run forcing variables for the explanation of real GDP per capita.

Once we established that a long-run co-integration relationship exists, equations (5.13) to (5.16) were estimated for the four linear specifications. We considered three model selection criteria the Akaike Informatin criterion (AIC), Schwarz Bayesian Criterion (SBC) and Hann-Quinn Criterion (HQC), reported in Table 5.6 a & b. (Appendix V), and a selection of maximum lags of 2. The point estimates are very similar but, the estimated standard errors obtained using the model selected by the AIC are considerably smaller given the much higher order ARDL model selected by the AIC[53]. And, therefore, the findings in our study are discussed based on the AIC model estimates. The estimates of the long-run coefficients for both the AIC and SBC obtained are tabulated in Table 5.4.

The results show that FDI exerts a positive effect on GDP per capita. The effect of foreign direct investment stock is highly significant on economic growth in all four specifications. This means that even when we change the specification of the main model, FDI has a sizable and significant effect on GDP in Namibia i.e. the relationship between the two variables remain consistent. Gross fixed capital formation across all specifications is found to be significant and positive. This is because the presence of foreign investors in the country also leads to the expansion of local businesses, new businesses start-ups, to supply goods and services to the FDI Company. Therefore, FDI will lead to a rise in domestic investment which would have a positive impact on economic growth. The results confirm that the presence of FDI improves gross fixed capital formation.

[53] Note: HQC results are identical to AIC and hence, not tabulated in Table 5.4.

Table 5.4: Estimates of the Long-run coefficients based on ARDL models selected By AIC and SBC

Dependent variable is lnGDP

	Model 1		Model 2		Model 3		Model 4	
Long-run coefficients	**AIC-ARDL (1,0,2)**	**SBC-ARDL (1,0,0)**	**AIC -ARDL (1,2,2,0)**	**SBC-ARDL (1,2,2,0)**	**AIC –ARDL (2,0,0,1)**	**SBC-ARDL (1,0,0,0)**	**AIC- ARDL (1,2,2,0)**	**SBC-ARDL (1,0,0,0)**
lnFDIstck	0.104** (2.94)	0.139** (2.31)	0.149** (4.97)	0.149** (4.97)	0.114** (1.96)	0.13** (2.02)	.110** (5.25)	.121** (2.56)
lnGFCF	0.140** (3.09)	0.101 (1.43)	0.144** (4.09)	0.144** (4.09)	0.150** (2.03)	0.108 (1.39)	.188** (4.63)	.170** (1.83)
OPEN			0.003** (2.50)	0.003** (2.50)				
Inflation					-0.012* (-1.68)	-.005 (-0.91)		
HC							-.023** (-2.44)	-.019 (-0.90)
Cons	4.381** (5.24)	4.449** (3.97)	2.99** (3.53)	2.99** (3.53)	4.074** (3.06)	4.537** (3.75)	3.481** (5.71)	3.556** (2.56)

** Denotes significance at the 5% level and * denotes significance at the 10% level of significance. Numbers inside the parenthesis are the absolute value of t-ratios.

The results show trade openness to be positive and significant, model (2). We can infer from our results in the second specification that trade liberalisation in the Namibian economy has encouraged the positive relationship between FDI and economic growth and thus support the proposition that foreign investors are more likely to invest in countries that have opened up their economy. The results for the third specification show that inflation is significant and has the expected sign. Recent estimates have shown declines in the annual inflation in Namibia. This suggests that Namibia is a country with macroeconomic stability making it a favourable host economy for foreign investors. And, macroeconomic stability impacts on growth, therefore, enabling the country to benefit from FDI. This result is consistent with the literature and importantly, the relationship between FDI and economic growth also remains consistent in this model.

Furthermore, in the fourth specification we introduced human capital 'skills'. Again, the aim is to check if the relationship between FDI and growth remains positive and significant when skills are incorporated in the model. And also, to investigate the significance of skills 'human capital' in the study of FDI in the context of Namibia. The literature states that the level of skills or rather education attainment in a host country has proven to be attractive to foreign investors. Intrinsically, the results show that the relationship between FDI and economic growth remains positive and significant in model 4. However, the 'skills' (human capital) variable was found to be significant but has the wrong sign. The finding of such a significant but negative coefficient for 'skills' in the context of Namibia can be explained by several factors. Firstly, it is important to take the regime change into perspective. Prior independence, education for the black community was limited and there where restrictions in place in regards to further and higher education. With a population of approximately 75% affected by education restrictions, it is apparent to obtain a negative coefficient of skills.

Secondly, after the regime change, education was made available and accessible and barriers removed and thus has seen Namibia ranked as being amongst the highest on the continent in literacy levels, 85% of people aged 15 and above being literate. However, this levels are based on primary skills which are not sufficient to enhance growth from FDI especially with efficiency seeking investors. Therefore, due to the history behind the education system it is unambiguously

that Namibia has a distinct shortage of skilled labour mainly in infrastructure, technology and financial sectors. And, as such, the scarcity of labour with relevant skills in jobs created by multi-national enterprises would inevitably result in a negative coefficient on human capital 'skills'.

To date, Namibia has seen a vast increase in enrolment not only in primary and secondary education, but in further and higher education since post-independence. There, has been an increase in programs at University and other tertiary institutions that cover the skill base required by foreign investors. Namibia has also seen an increase in training and scholarships from foreign investors funding candidates to pursue studies relevant to their needs. And, hence the improvements in human capital might not have been covered by the dataset studied due to the short time span. Therefore, in the future a positive and significant effect on growth is likely to be achieved with possible increases in FDI flows.

Table 5.5: ARDL Estimated Short-run Error Correction Model (ECM)

	Model 1	Model 2	Model 3	Model 4
ΔlnFDISTCK	0.034***	0.048***	-0.294*	0.041**
ΔlnFDISTCK$_1$		-0.050**	0.024**	-0.038**
ΔlnGFCF	-0.010	-0.048*	0.031**	-0.005
ΔlnGFCF$_1$	-0.072**	-0.127***		-0.111***
ΔOPEN		0.001**		
ΔInflation			-0.001*	
ΔHC				-0.014*
CONS	1.439**	1.340**	0.847**	2.126***
ecm(-1)	-0.328***	-0.448***	-0.208***	-0.611***
R	0.612	0.735	0.620	0.699
F-stat	5.665[.000]	5.795[.000]	5.843[.001]	7.345[.000]
DW-statistic	2.098[54]	1.462	2.111	1.580

Note: The AIC is used to select the optimum number of lag in the ARDL model, order of ARDL is specified in table 5.6. for all four models. Δ is first difference of the variables.

The results of the short-run dynamics are presented in Table 5.5. The error correction term indicates the speed of the equilibrium restoring adjustment in the dynamic model. The error

[54] The DW statistic are all approximately 2 and therefore suggest that autocorrelation may not be a problem. See for example, the following published papers with similar reporting's of the DW-Statistic; Ma et al. (2010), Adam (2009), Shahbaz et al. (2010), Blin et al. (2009) and Liu (2009).

correction term (ECT) coefficient shows how quickly/slowly variables return to equilibrium and it should have a statistically significant coefficient with a negative sign. Moreover, FDI Stock is highly significant at 1% and has large impacts on growth in both the short-run and long-run and ensures that long run equilibrium can be attained.

In the main specification, model (1), the error correction coefficient (ect_{t-1}) estimated -0.328 is highly significant, has the correct sign and implies a fair speed of adjustment to equilibrium after a shock. The coefficient on the error correction term shows that about a third of the previous period's error is corrected for in the current period. Approximately 33% of disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

Again, the significance of the short-run dynamic coefficients associated with the long run relationship can be confirmed when we change the specification of the main model as predicted in model (2), (3) and (4). The estimated coefficient of the ECT_{t-1} term are equal to -.045, -0.21 and -0.61 for models (2), (3) and (4) respectively, suggesting that deviation from the long-term GDP path is corrected by 45% in model (2), 21% in model (3) and 61% in model (4). This means that the adjustment takes place relatively quickly, i.e. the speed of adjustment is relatively quicker especially in model (4) and (2).

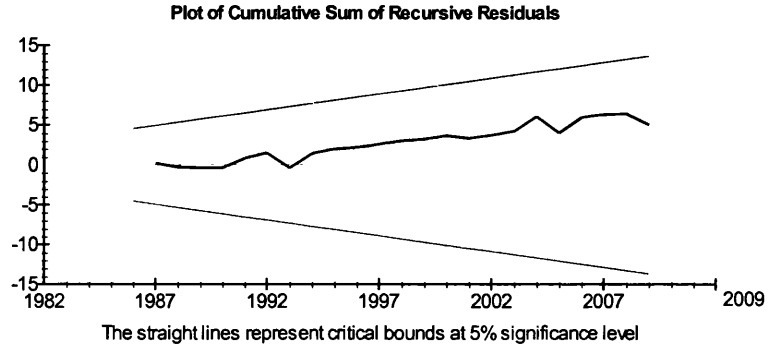
Therefore, this confirms our finding of the existence of a long run relationship among the variables in this model. The R^2 of 61%, model (1) and 74%, 62%, 70% respectively for model (2) to (4), which suggests that the error correction models fit the data well. It is also important to note that the underlying error correction model passes the standard diagnostic tests.

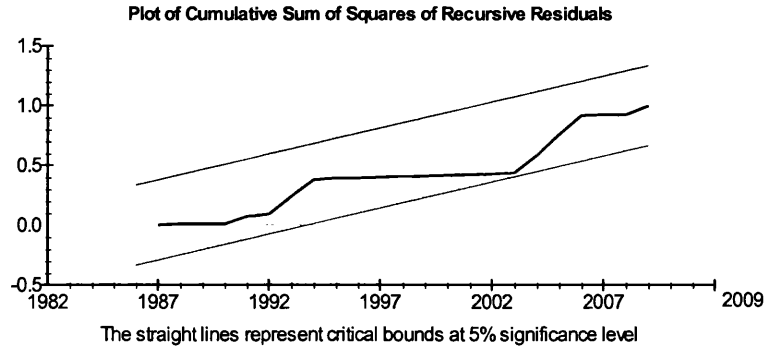
5.5.3. Diagnostic and Stability Tests

Diagnostic tests for serial correlation, normality, functional form, heteroscedasticity and structural stability of the models are presented in appendix V, Table 5.6. These tests show that all models generally pass the diagnostic tests.

To complement this study it is important to investigate whether the long run and short run relationships found are stable for the entire period of study. The tests carried out for this purpose are discussed in detail in Chapter 4. The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) plots (Figure 5.1) indicate stability in the coefficients over the main period of study .i.e. they do not suffer from any structural breaks. Similar results were found when the test was applied to the other three models (Figure 5.2, appendix V).

Figure 5.1
Plots of CUSUM and CUSUMQ Statistics for Coefficients Stability tests, Model (1)





5.5.4 Granger Causality Results

To study the long-run causal relation between FDI and GDP per capita, the study employed the Granger causality test to determine the direction of the linkage and to confirm Granger feedback between the variables under study. Given that studies on FDI have shown a positive impact on

growth, it is important to investigate the direction of causality, i.e. whether causality runs from FDI to growth or vice versa. The phenomenon of causality is very important to policy makers as this ensures that policy targets and reforms put in place are correct and focus on the right matter. To check for this relationship, Granger causality tests were run covering two different lag structures, Table 5.7. Using a lag length of 2 for the Granger test corresponds to a reasonable time over which one of the variables could help predict the other and literature suggest using two lags for annual data.

Table 5.7. Pair-wise Granger Causality Tests

	Number of Lags (Number of Observations)	
Null Hypothesis	**1 (29)**	**2 (28)**
GDP ⇒ FDI	0.8864	1.1817
FDI ⇒ GDP	9.5497***	3.6811**

*** Denotes significance at the 1% level and ** denotes significance at the 5% level of significance.

It is evident that the null hypothesis (long-run causality) outlined in Section 5.3.2 for the first pair cannot be rejected GDP does not granger cause FDI. However, for the second pair, the null hypothesis can be rejected. The results suggest a unidirectional causation from FDI to GDP per capita. This confirms that Namibia's capacity to progress on economic development will depend largely on the country's performance in attracting foreign direct investment. Such a result might imply that FDI stock causes economic growth due to FDI related spill-over effects usually generated by the presence of foreign investors[55].

5.5.5. Results Based on Asymmetric ARDL co-integration

In this Section, we extend our research taking into account the possibility of having an asymmetric co-integration relationship among the variables. To examine the potential asymmetric co-integration relationship between FDI and economic growth, we employ Shin et al. (2011) approach discussed in Section 5.4. If evidence of asymmetric co-integration is found,

[55] The study has also carried out short-run causality as outlined in Section 5.3.2, but found no short-run causality running in either direction. This findings are consistent with Herzer (2006), who found similar results for Columbia, Zambia, Sri Lanka and Egypt.

we will then continue our estimation by verifying and testing the appropriateness of the asymmetric model using the Wald test. Furthermore, if short run and long run asymmetries are found, we then proceed with the analysis by estimating the ECM including the adjustment coefficients to allow for asymmetric adjustments.

Firstly, equations (5.11 to 5.14) are estimated and Table (5.8) reports the results of the unrestricted asymmetric ARDL regression for the four models. It should be noted that in order to select the final ARDL specification, the study followed the general-to-specific approach. The preferred specification, is chosen by starting with max p = max q = 2 and dropping all insignificant stationary regressors. The inclusion of insignificant lags, in practise, is likely to lead to inaccuracies in the estimation and may introduce noise into the dynamic multipliers. For co-integration to exist under the framework of an asymmetric ARDL model, the F-statistic should be greater than the upper bound level. As seen, the results show no co-integration was found in the asymmetric specification of all four models. Therefore, this suggests that the linear specification employed in Section 5.3.1, are indeed correctly specified.

Table 5.8: Results from the ARDL test for co-integration in the nonlinear specification. Asymmetric ARDL models.

Dependent variable ΔlnGDP	F-Stat	Outcome
1.F(*ln*GDP| *ln*FDI$^+$, *ln*FDI$^-$, *ln*GFCF)	3.62	**No Asymmetric co-integration**
2.F(*ln*GDP| *ln*FDI$^+$, *ln*FDI$^-$, *ln*GFCF, OPEN)	2.60	**No Asymmetric co-integration**
3.F(*ln*GDP| *ln*FDI$^+$, *ln*FDI$^-$, *ln*GFCF, INFLATION)	3.48	**No Asymmetric co-integration**
4.F(*ln*GDP| *ln*FDI$^+$, *ln*FDI$^-$, *ln*GFCF, HC)	2.71	**No Asymmetric co-integration**

Notes: F-statistic is the PSS F-statistic testing the null hypothesis $\rho = \theta = 0$ and $\rho = \theta^+ = \theta^- = 0$ respectively. H_o: no co-integration. * denotes significance at the 5% level. Case III: unrestricted intercept and no trend for k=3; lower bound I(0)=2.850 and upper bound I(1)=4.05. k=4; lower bound I(0)=2.65 and upper bound I(1)=3.81.

This is an important result which suggests that an asymmetric model is not appropriate and that a linear model is indeed a more suitable specification and is correctly specified for the study. In the present case, the models show no presence of asymmetries.

As the study found no asymmetric co-integration, we cannot proceed further to verify the appropriateness of the asymmetric models using Wald test or estimate the magnitude of these short-run and long-run asymmetric effects. In such a case, it can therefore be concluded that economic growth responds symmetrically to the changes in FDI and other variables, where the adjustment speed to the new equilibrium at period t is the same for both positive and negative changes.

5.5. CONCLUSION

The objective of this Chapter was to study the impact of FDI on economic growth in Namibia and investigate as to whether we could find consistency in the findings of a positive relationship between FDI and growth. Whilst considering local factors such as the levels of domestic investment, human capital, inflation and international trade openness. This empirical exercise was carried out by applying a linear bounds testing (ARDL) approach to co-integration to examine the long run and short run relationships between foreign direct investment and economic growth. The use of the different specifications made it possible to capture the simultaneous impacts of the various host country (Namibia) factors on the relationship between FDI and economic growth.

The results suggest that there exist a significant positive relationship between FDI and economic growth. The bounds test shows that the variables of interest in the growth models framework are bound together in the long-run. The results confirm consistency and robustness in the relationship between FDI and economic growth in the different specification employed. We find that local factors are indeed important in the FDI-growth nexus and contributed significantly to the effects on growth from FDI. The results show that FDI is an important component of economic growth and development in Namibia.

In addition, the associated equilibrium correction for all models were all statistically significant. Therefore, confirming the existence of a long-run relationship. The equilibrium correction is fairly fast and is restored back to equilibrium after a shock.

Finally, the study extended upon the linear framework to allow for the detection of asymmetric effects both in the short and long-run. By taking into account the asymmetric effects of positive and negative changes in FDI on economic growth, this study goes further than previous research which adheres to a linear paradigm. The linear paradigm reflects the assumption that positive and negative variations of FDI have symmetrical effects on economic growth. In accord, the results obtained confirm that this do indeed behave this way.

Based on the asymmetric ARDL approach we can conclude that, that there is no evidence of asymmetric pattern in the relationship between FDI and economic growth. Therefore, the responsiveness of economic growth to FDI flow variations is linear.

APPENDIX V

Table 5.1: Descriptive statistics of the variables used in Benchmark Models

	lnGDP	*lnFDI*	*lnGFCF*	*OPEN*	*Inflation*	*HC*
Mean	9.8462	22.665	22.313	105.40	10.686	12.987
Median	9.8211	22.492	22.306	105.87	10.036	14.000
Maximum	10.093	24.292	23.229	153.74	25.720	15.900
Minimum	9.6860	21.133	21.523	65.633	0.4656	7.5000
Std. dev	0.1135	0.8973	0.5349	21.137	5.3702	2.8379
Skewness	.99218	0.3830	0 .1572	0.2039	0.7685	-.5606
Kurtosis	2.9551	2.3047	1.9015	2.6526	3.4771	1.8592

Table (5.6.a) Autoregressive Distributed Lag Estimates (ARDL) selected using Schwarz Bayesian Criterion for Model (1), (2), (3) and (4)

Model 1:ARDL(1,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.78316	.069449	11.2768[.000]
LNFDISTCK	.030171	.010203	2.9570[.007]
LNGFCF	.021852	.017589	1.2424[.226]
CONS	.96468	.49315	1.9562[.062]

R-Squared	.96142	R-Bar-Squared	.95660
S.E. of Regression	.024360	F-stat.F(3,24)	199.3847[.000]
Mean of Dependent Variable	9.8429	S.D. of Dependent Variable	.11693
Residual Sum of Squares	.014241	Equation Log-likelihood	65.4430
Akaike Info. Criterion	62.4430	Schwarz Bayesian Criterion	59.7786
DW-statistic	2.2521	Durbin's h-statistic	-.71720[.473]

****
Diagnostic Tests
****
* Test Statistics * LM Version * F Version
****
* A:Serial Correlation*CHSQ(1)= 1.8418[.175]*F(1, 23)= 1.6195[.216]
* B:Functional Form *CHSQ(1)= 1.1383[.286]*F(1, 23)= .97468[.334]
* C:Normality *CHSQ(2)= .59117[.744]* Not applicable
* D:HeteroHCedasticity*CHSQ(1)= .18549[.667]*F(1, 26)= .17339[.681]
****

Model 2:ARDL(1,2,2,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.55164	.085364	5.4623[.000]
LNFDISTCK	.047600	.015333	3.1044[.006]
LNFDISTCK(-1)	-.030616	.021444	-1.4277[.170]
LNFDISTCK(-2)	.050024	.019357	2.5843[.018]
LNGFCF	-.048408	.035221	-1.3744[.185]
LNGFCF(-1)	-.014015	.036167	-.38752[.703]

LNGFCF(-2)	.12710	.036251	3.5061[.002]
OPEN	.0011734	.4966E-3	2.3629[.029]
CONS	1.3395	.51756	2.5880[.018]

R-Squared	.97879	R-Bar-Squared	.96986
S.E. of Regression	.020302	F-stat. F(8, 19)	109.5858[.000]
Mean of Dependent Variable	9.8429	S.D. of Dependent Variable	.11693
Residual Sum of Squares	.0078314	Equation Log-likelihood	74.8152
Akaike Info. Criterion	65.8152	Schwarz Bayesian Criterion	59.8203
DW-statistic	1.4624	Durbin's h-statistic	1.5943[.111]

Diagnostic Tests

* Test Statistics *	LM Version	*	F Version

* A:Serial Correlation*CHSQ(1)= 1.1901[.275]*F(1, 18)= .79899[.383]
* B:Functional Form *CHSQ(1)= 5.2885[.012]*F(1, 18)= 5.2135[.035]
* C:Normality *CHSQ(2)= .080424[.961]* Not applicable
* D:HeteroHCedasticity*CHSQ(1)= 5.3502[.021]*F(1, 26)= 5.1415[.020]

Model 3: ARDL(1,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.80215	.071597	11.2036[.000]
LNFDISTCK	.025821	.010986	2.3503[.028]
LNGFCF	.021376	.017554	1.2177[.236]
INFLATION	-.9049E-3	.8590E-3	-1.0534[.303]
CONS	.89766	.49612	1.8093[.083]

R-Squared	.96320	R-Bar-Squared	.95680
S.E. of Regression	.024304	F-stat. F(4, 23)	150.4998[.000]
Mean of Dependent Variable	9.8429	S.D. of Dependent Variable	.11693
Residual Sum of Squares	.013586	Equation Log-likelihood	67.1027
Akaike Info. Criterion	62.1027	Schwarz Bayesian Criterion	55.7722
DW-statistic	2.4220	Durbin's h-statistic	-1.2065[.228]

Diagnostic Tests

* Test Statistics *	LM Version	*	F Version

* A:Serial Correlation*CHSQ(1)= 3.5285[.060]*F(1, 22)= 3.1721[.089]
* B:Functional Form *CHSQ(1)= 1.0854[.297]*F(1, 22)= .88720[.356]
* C:Normality *CHSQ(2)= .67275[.714]* Not applicable
* D:HeteroHCedasticity*CHSQ(1)= .40536[.524]*F(1, 26)= .38194[.542]

Model 4: ARDL(1,0,0,0) selected based on Schwarz Bayesian Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.71079	.12631	5.6275[.000]
LNFDISTCK	.035033	.012497	2.8033[.010]
LNGFCF	.049137	.043395	1.1323[.269]
HC	-.0053794	.0078041	-.68931[.498]
CONS	1.0283	.50710	2.0278[.054]

R-Squared	.96221	R-Bar-Squared	.95563
S.E. of Regression	.024630	F-stat. F(4, 23)	145.3871[.000]
Mean of Dependent Variable	9.8429	S.D. of Dependent Variable	.11693
Residual Sum of Squares	.013953	Equation Log-likelihood	65.7293
Akaike Info. Criterion	61.7293	Schwarz Bayesian Criterion	55.3987
DW-statistic	2.2223	Durbin's h-statistic	-.79063[.429]

```
**************************************************************************
                        Diagnostic Tests
**************************************************************************
*  Test Statistics *          LM Version      *      F Version
**************************************************************************
* A:Serial Correlation*CHSQ( 1)= 1.5493[.213]*F( 1, 22)= 1.2886[.269]
* B:Functional Form  *CHSQ( 1)= 1.1971[.274]*F( 1, 22)= .98257[.332]
* C:Normality        *CHSQ( 2)= 1.0486[.592]*      Not applicable
* D:HeteroHCedasticity*CHSQ( 1)= .0096317[.922]*F( 1, 26)= .0089468[.925]
```

Table (5.6.b) Autoregressive Distributed Lag Estimates (ARDL) selected using Akaike Information Criterion for Model (1), (2), (3) and (4)

Model 1: ARDL(1,0,2) selected based on Akaike Information Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.67160	.082381	5.1524[.000]
LNFDISTCK	.03416	.009747	3.5050[.002]
LNGFCF	-.01046	.030661	-.34124[.736]
LNGFCF(-1)	-.01569	.039747	-.39480[.697]
LNGFCF(-2)	.07206	.034189	2.1075[.047]
CONS	1.4388	.51036	2.8193[.010]

R-Squared	.96889	R-Bar-Squared	.96182
S.E. of Regression	.022849	F-stat. F(5, 22)	137.0293[.000]
Mean of Dependent Variable	9.8429	S.D. of Dependent Variable	.11693
Residual Sum of Squares	.011486	Equation Log-likelihood	69.4538
Akaike Info. Criterion	63.4538	Schwarz Bayesian Criterion	59.4572
DW-statistic	2.0984	Durbin's h-statistic	-.28933[.772]

```
**************************************************************************
                        Diagnostic Tests
**************************************************************************
*  Test Statistics *      LM Version      *      F Version       *
**************************************************************************
* A:Serial Correlation*CHSQ( 1)= 1.1807[.277]*F( 1, 21)= .92450[.347]*
*                    *                   *                    *
* B:Functional Form  *CHSQ( 1)= .59246[.441]*F( 1, 21)= .45395[.508]*
*                    *                   *                    *
* C:Normality        *CHSQ( 2)= .84648[.655]*      Not applicable      *
*                    *                   *                    *
* D:HeteroHCedasticity*CHSQ( 1)= 7.5424[.006]*F( 1, 26)= 9.5858[.005]*
**************************************************************************
```

Model 2: ARDL(1,2,2,0) selected based on Akaike Information Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]

LNGDP(-1)	.55164	.085364	5.4623[.000]
LNFDISTCK	.047600	.015333	3.1044[.006]
LNFDISTCK(-1)	-.030616	.021444	-1.4277[.170]
LNFDISTCK(-2)	.050024	.019357	2.5843[.018]
LNGFCF	-.048408	.035221	-1.3744[.185]
LNGFCF(-1)	-.014015	.036167	-.38752[.703]
LNGFCF(-2)	.12710	.036251	3.5061[.002]
OPEN	.00117	.4966E-3	2.3629[.029]
CONS	1.3395	.51756	2.5880[.018]

R-Squared .97879 R-Bar-Squared .96986
S.E. of Regression .020302 F-stat. F(8, 19) 109.5858[.000]
Mean of Dependent Variable 9.8429 S.D. of Dependent Variable .11693
Residual Sum of Squares .0078314 Equation Log-likelihood 74.8152
Akaike Info. Criterion 65.8152 Schwarz Bayesian Criterion 59.8203
DW-statistic 1.4624 Durbin's h-statistic 1.5943[.111]

****

Diagnostic Tests

****

* Test Statistics *	LM Version *	F Version *

****

* A:Serial Correlation*CHSQ(1)= 1.1901[.275]*F(1, 18)= .79899[.383]*
* B:Functional Form *CHSQ(1)= 5.2885[.012]*F(1, 18)= 5.2135[.035]*
* C:Normality *CHSQ(2)= .080424[.961]* Not applicable *
* D:HeteroHCedasticity*CHSQ(1)= 5.3502[.021]*F(1, 26)= 5.1415[.020]*

Model 3: ARDL(2,0,0,1) selected based on Akaike Information Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.49830	.20150	2.4729[.022]
LNGDP(-2)	.29385	.18859	1.5581[.134]
LNFDISTCK	.02363	.010785	2.1908[.040]
LNGFCF	.031215	.017455	1.7883[.088]
INFLATION	-.001175	.8301E-3	-1.4152[.172]
INFLATION(-1)	-.001419	.7713E-3	-1.8398[.080]
CONS	.84674	.49195	1.7212[.100]

****

R-Squared .96953 R-Bar-Squared .96082
S.E. of Regression .023146 F-stat. F(6, 21) 111.3547[.000]
Mean of Dependent Variable 9.8429 S.D. of Dependent Variable .11693
Residual Sum of Squares .011250 Equation Log-likelihood 69.7438
Akaike Info. Criterion 62.7438 Schwarz Bayesian Criterion 55.0810

DW-statistic 2.1106

****

Diagnostic Tests

* Test Statistics * LM Version * F Version *

****

* A:Serial Correlation*CHSQ(1)= 1.4320[.231]*F(1, 20)= 1.0780[.312]*

* * * *

* B:Functional Form *CHSQ(1)= .33643[.562]*F(1, 20)= .24323[.627]*

* * * *

* C:Normality *CHSQ(2)= 1.1715[.557]* Not applicable *

* * * *

* D:HeteroHCedasticity*CHSQ(1)= .0011839[.973]*F(1, 26)= .0010994[.974]*

Model 4: ARDL(1,2,2,0) selected based on Akaike Information Criterion

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
LNGDP(-1)	.38925	.16723	2.3277[.031]
LNFDISTCK	.04064	.016029	2.5352[.020]
LNFDISTCK(-1)	-.01175	.024030	-.48907[.630]
LNFDISTCK(-2)	.03843	.019388	1.9823[.062]
LNGFCF	-.00459	.046201	-.09934[.922]
LNGFCF(-1)	.00816	.040729	.20024[.843]
LNGFCF(-2)	.11103	.037404	2.9684[.008]
HC	-.01411	.0087480	-1.6134[.123]
CONS	2.1258	.57706	3.6838[.002]

R-Squared .97586 R-Bar-Squared .96570

S.E. of Regression .021657 F-stat. F(8, 19) 95.0119[.000]

Mean of Dependent Variable 9.8429 S.D. of Dependent Variable .11693

Residual Sum of Squares .0089118 Equation Log-likelihood 73.0058

Akaike Info. Criterion 64.0058 Schwarz Bayesian Criterion 55.0109

DW-statistic 1.5796 Durbin's h-statistic 2.3876[.017]

****

Diagnostic Tests

****

* Test Statistics * LM Version * F Version *

****

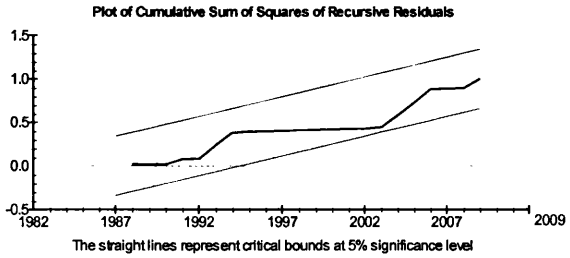
* A:Serial Correlation*CHSQ(1)= .21530[.643]*F(1, 18)= .13948[.713]*

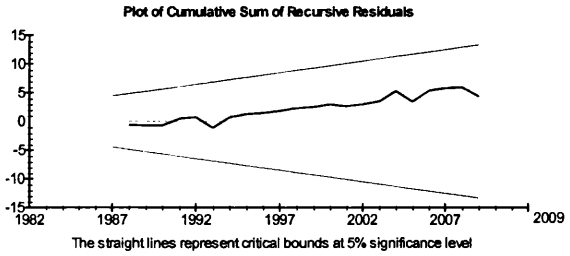
* B:Functional Form *CHSQ(1)= 5.2552[.004]*F(1, 18)= 7.5257[.013]*

* C:Normality *CHSQ(2)= 4.7403[.093]* Not applicable *

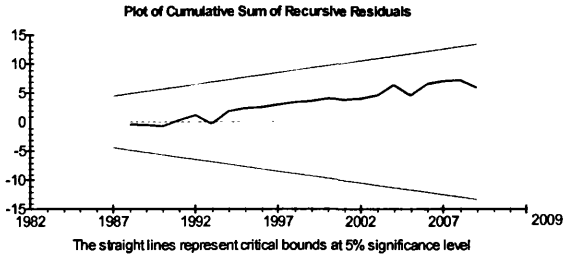
* D:HeteroHCedasticity*CHSQ(1)= 3.9517[.047]*F(1, 26)= 4.2724[.049]*

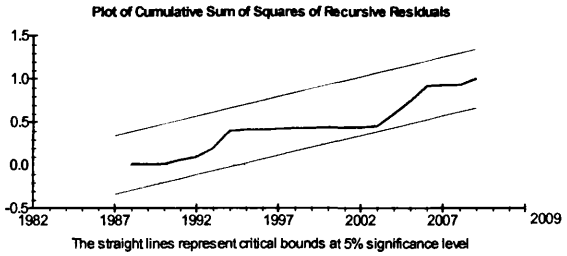
Figure 5.2.
Plots of CUSUM and CUSUMQ Statistics for Coefficients Stability tests for Model (2),(3) and (4)
Model 2



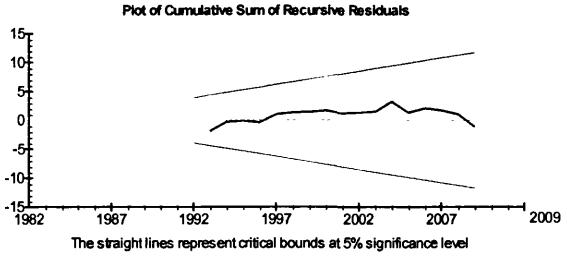


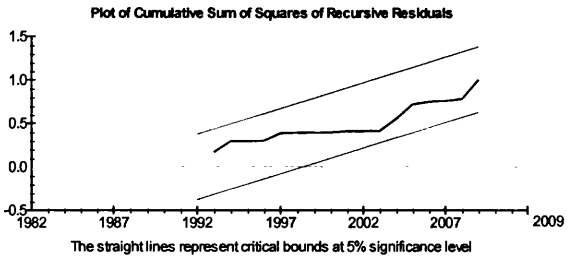
Model 3





Model 4




Plot of Cumulative Sum of Squares of Recursive Residuals
1.5
1.0
0.5
0.0
-0.5
1982
1987
1992
1997
2002
2007
2009
The straight lines represent critical bounds at 5% significance level

CHAPTER 6

SECTOR LEVEL FDI AND ECONOMIC GROWTH: A PANEL CO-INTEGRATION AND CAUSALITY ANALYSIS

6.1. INTRODUCTION

In light of the expected benefits of FDI, Chapter 5 studied the effects of aggregate FDI flows on economic growth in Namibia. As mentioned in Chapter 5, it is clear that FDI in Namibia has yielded positive effects on economic growth. The efforts made by the Namibian Government in passing regulations and offering incentives to attract FDI in key economic sectors vital to the development of the country has been beneficial to the country. Therefore, in light of what has been discussed in Chapter 3 Part VI, i.e. certain sectors attract more FDI than others, it is important to study the sectoral impact of FDI on growth. This is important when one considers that some countries, through special incentives, target or contemplate targeting certain types of FDI over others. Simply put, one question to answer is whether the type of FDI matters for the potential benefits derived from the form of this particular capital form to materialise. The type of FDI and its structural composition matter as much for economic growth (Chakraborty and Nunnenkamp (2008)). Others suspect that the type of FDI and its structural composition matter at least as much for economic growth effects as does the overall volume of inward FDI (Agrawal & Shahani, 2005; Enderwick, 2005).

The objective of this chapter is to examine an empirical relationship between sector-level foreign direct investment (FDI) and economic growth using a panel cointegrating technique over the period 1990 to 2009, which is notably the post-independence era in Namibia[56]. Importantly, it allows us to test for sector-specific effects of FDI, and it avoids biased results due to inappropriate pooling of heterogeneous sectors (Blonigen & Wang, 2004).

[56] The period considered here covers the era post-independence for two reasons, Firstly, it is the era in which Namibia has seen a vast increase in FDI to the country, Secondly and more importantly, it is also the period of which such sector FDI data is available.

We test the hypothesis of a cointegrating relationship between sectoral FDI and economic growth. We implement this analysis by using panel co-integration techniques that accounts for both a homogeneous and heterogeneous case. According to the literature, if two series are cointegrated, then there exists a causal relationship in at least one direction. In this view, the study further employs an Engle Granger panel causality test to determine which way causality runs overall between sector FDI and sectoral GDP per capita. By employing panel unit root, co-integration, and causality methods we increase the statistical power of the empirical analysis. The panel data methods have greater statistical power than tests based on time series analysis since they combine information from the cross-sectional dimension in addition to the time period. The study uses data for seven key economic sectors as defined by the Bank of Namibia (Table 6.1). This analysis provides a broader picture of the relevant sectors, mainly, influenced by foreign presence in the country. Furthermore, having considered the number of observation per sector after 5-year averaging, annual observations rather than the long time-averages typical of the literature are used in this study, such as in Herzer and Vollmer (2011).

The rest of the chapter is structured as follows. Section 6.2, outlines the model specification used in the study and describes the data analysed. The empirical methodology is presented in Section 6.3. Section 6.4, presents the empirical results and discusses their implications. Finally, Section 6.5, concludes.

6.2. THE DATA AND MODEL

6.2.1. Empirical Specification

In view of the above discussion, the linear growth function is specified as follows:

$$ln\text{GDP}_{it} = \alpha_{it} + \lambda ln\text{FDI}_{i,t} + \Omega ln\text{GFCF}_{i,t} + X_{i,t}\acute{o} + \xi_t + \eta_i + \varepsilon_{it} \qquad (6.1)$$

$$i = 1, \ldots..\text{N}; \quad t = 2, \ldots..\text{T}.$$

Where, $ln\text{GDP}_{it}$ is the logarithm of real GDP per capita in sector i, $ln\text{FDI}_{i,t}$ is the log of sector-specific FDI stock, and log of gross fixed capital formation is presented by $ln\text{GFCF}_{i,t}$. The impact sector FDI on economic growth is expected to be positive. Fixed effects across sectors

and time are taken into account and denoted by η_i and ξ_t respectively. ε_{it} is the i.i.d. idiosyncratic error term. $X_{i,t}\acute{o}$ include variables identified in the literature as important correlates of growth in developing countries. This are log of government consumption, (*ln*Gov.cons), which is considered as an indicator of government size, inflation, human capital, HC, which is measured using secondary school completion rates for the entire population and FINDEV which is an indicator for financial development in the country measured by m_2 (as a percentage of GDP). And, finally, OPEN which is foreign trade (exports plus imports) as share of GDP.

Foreign presence in the key economic sectors is an important factor in the development of the local economy. An increase in FDI may boost job creation within these sectors and spillover within the domestic market and communities therefore leading to economic development i.e infrastructure and labour mobility. The expected sign on the gross capital formation is expected to be positive because existing plant facilities may prove attractive to foreign investors, since minimal construction would be necessary prior to initiation of business activities. In addition, the presence of foreign investors in these sectors also leads to the expansion of local businesses, new businesses start-ups, to supply goods and services to the FDI Company. Therefore, a rise in domestic investment would have a positive impact on economic growth.

We use four different specifications for the empirical investigation for three reasons: firstly, by experimenting with four models allows us to ensure that the results are not driven by the choice of specification. Secondly, this allows the study to analyze the impact of sector FDI on growth whilst adding an additional variable identified in the literature as important and vital to the study. Thirdly, the methodology used to analyze these models does not allow for inclusion of more than four variables within a regression and therefore employing different specification allows for the inclusion of vital variables to the study.

Therefore, FINDEV variable is added to assess the role of local financial development on FDI's impact on growth. Further additional specifications are elaborated by adding a regression with human capital which measures the growth enhancing effect of total human capital, and finally, to capture the importance of trade openness in the context of FDI in developing countries we

include a variable OPEN. Therefore, the model specification with regard to human capital, local financial development and to capture the degree of economic openness, are respectively:

$$lnGDP_{1it}=\alpha_{1it}+\lambda_1 lnFDI_{i,t}+\Omega_1 lnGFCF_{i,t}+\Pi FINDEV_{i,t}+\xi_{1t}+\eta_i+\varepsilon_{1it} \quad (6.2)$$

$$lnGDP_{2it}=\alpha_{2it}+\lambda_2 lnFDI_{i,t}+\Omega_2 lnGFCF_{i,t}+\Psi HC_{i,t}+\xi_{2t}+\eta_i+\varepsilon_{2it} \quad (6.3)$$

$$lnGDP_{3it}=\alpha_{3it}+\lambda_3 lnFDI_{i,t}+\Omega_3 lnGFCF_{i,t}+\psi Open_{i,t}+\xi_{3t}+\eta_i+\varepsilon_{3it} \quad (6.4)$$

6.2.2. Data

The data used for the estimation of the effects of sector-wise FDI on growth in Namibia consists of 7 sectors covering a period over 1990 – 2009. The observations for each sector are in real values and consists of annual observations. Detailed information on FDI stock flows by sector were obtained from the Bank of Namibia, 2010. Unfortunately, data on FDI inflows to the key sectors is not available. Therefore, due to data limitations we use FDI Stock flows rather than FDI inflows[57]. Real Gross Domestic Product per capita in local currency by sector and gross fixed capital formation (GFCF) by sector were obtained from the Bank of Namibia (2010).

Inflation, measured as a percentage change in the GDP deflator and used as a proxy for macroeconomic stability, was taken from WDI (2010)[58] . Openness to international trade was proxied by the average of the sum of exports plus imports to total output (GDP), also from WDI (2010)[59]. It captures the trade policy. Human capital was measured using secondary school completion rates for the entire population, taken from Barro and Lee (2010) dataset. Government consumption data, from WDI (2010), details central government consumption in constant local

[57] See Nunnenkamp et al (2008), Wang et al. (2009), Khan et al. (2011), Tiwari et al. (2010) and Herzer (2011) for an example of studies tha have used FDI Stock and GDP per capita as a measure of economic growth in Panels. Also refer to Chapter 5, section 5.2.2, for a thorough discussion on the use of stocks in the Thesis rather than inflows.

[58] As mention earlier in Chapter 5, it was only in 1993 that the central statistics Office (CSO) in Namibia calculated a CPI but only covering Windhoek, the capital city. Currently, weights from the completed Namibia Household and Income Expenditure Survey(HIES) of 1993/94 are used to create a nationally representative CPI for the country, as such, this new CPI does not cover the entire period of study in this Chapter.

[59] It should be noted that we do not measure openness within each sector, because in a sector such as construction for example, data for exports required to calculate the proxy of openness could not be obtained.

currency values. Local financial development, m_2 (as a percent of GDP), is taken from WDI (2010) database.

Table 6.1, shows a detailed description of the industries listed in the sectors studied. Table 6.2, Appendix VI, presents descriptive statistics for growth, FDI data and variables included in the study. In short, the descriptive statistics show that the variables under study are found to be normally distributed and ensured in the study. The standard deviations are low compared to the mean, showing a small coefficient of variation. The range of variation between maximum and minimum is also reasonable. However, for trade openness and inflation the range between maximum and minimum is large and can be explained by more open trade policies and high inflation experienced and introduced in the early 2000's.

Table 6.1 Disaggregated Sectors

List of Selected Industries	
Broad Sector	Included Industries
Mining	Mining and quarrying
Agriculture	Agriculture, hunting, forestry and fishing
Financing	Financing, real estate and business services
Construction	Construction
Transport	Transport, storage and communications
Wholesale	Wholesale and retail trade and restaurants and Hotels
Manufacturing	Manufacturing

6.3. THE EMPIRICAL METHODOLODY

As mentioned in Section 6.1, this study utilises panel unit root, co-integration and causality analyses in order to examine the relationship between sector-level FDI and economic growth. These tests, that originally were applied and developed for time series, have been successfully adapted to the case of panel data. Panel co-integration techniques account for the non-stationary nature of the data and explicitly consider the dynamic structure implicit in the model. This permits the study to obtain long-run relations without neglecting the short-run adjustment process and correcting for possible endogeneity problems. In addition, the combination of time

series properties and estimation techniques with the information contained in a panel of data are possible using tests for co-integration in panels.

Hence, the use of panel co-integration tests allow us to gain power by exploiting cross sectional information and taking into account the degree of heterogeneity in the cross-section dynamics. By employing panel co-integration technique, we overcome the problem of sizeable data sets combining into meaningful estimations the information given by time series and cross-sector analysis. The main advantage of this methodology is that it overcomes the problem of the non-stationarity usually found in economic variables. The most common way to deal with this problem has been to take first differences. However, this filter removes from the variables an important part of the long-run information. Consequently, an alternative and more efficient way to estimate economic long-run relationships in panels is to use the recent tests for panel unit roots and co-integration.

We apply a variety of panel unit root and co-integration tests. Many recent studies rely on panel unit root tests in order to increase the statistical power of their empirical findings. In this respect, the panel unit root tests developed by Levin *et al.* (2002, henceforth LLC) and Im *et al.* (2003, henceforth IPS) are widely utilised in panel co-integration studies. Hence, we employ both the LLC and IPS unit root tests. The advantage of using both this tests, are that they have high power in balanced panels. However, the strong assumption of homogeneity in LLC test is difficult to satisfy due to the fact that cross-sectional units may have a different speed of adjustment process to the long-run equilibrium. Therefore, using the IPS relaxes this assumption. IPS proposed a panel unit root tests which allows for heterogeneity across all cross-sectional units.

In the long-run analysis, we test for the null of no-co-integration in homogeneous panels using the Kao (1999) tests. Kao and Chiang (2000) recommend the fully modified (FM) estimator of Phillips and Hansen (1990) and the dynamic ordinary least squares (DOLS) estimator as proposed by Saikkonen (1991) and Stock and Watson (1993). The latter has better properties and both correct for possible problems of endogeneity and autocorrelation. They also show that the estimators are asymptotically normally distributed with zero means. Kao and Chiang (1997) proposed a parametric DOLS based panel estimator pooled along the within-dimension, and

showed that it had the same asymptotic distribution as the panel FMOLS estimator studied by Pedroni (1996).

Kao and Chiang (2000) also studied the small-sample properties of the panel DOLS t-statistic and compared it to a version of the adjusted-FM t-statistic that employed a first-stage OLS estimate of the cointegrating vector for the required adjustment term. In a series of Monte Carlo simulations, they found that the panel DOLS t-statistic had smaller size distortions than this form of the adjusted-FM t-statistic and suitable, and hence, suitable to the dataset used in this study.

However a potential problem with this estimator could be that it assumes homogeneous β, which is the slope coefficient across units. The relationship between investment, both foreign and domestic, and economic growth in developing countries is highly heterogeneous and that estimation methods which assume homogeneity across units can yield misleading results, Nair-Reichert (2000). To allow the slope coefficients to vary across sectors, we also employ the mean group estimator suggested by Pesaran and Smith (1995). In this case, the mean group estimator (henceforth MG) consists in estimating the N separate regressions based on equation (6.1) and then in calculating the coefficients as un-weighted means of the estimated coefficients for the individual sectors.

In this Chapter, the empirical modelling framework consists of four steps. Firstly, stationarity properties of the variables are investigated using panel unit root tests. Secondly, the co-integration relationship is tested, followed by estimating the long-run co-integration parameters. Finally, a causal relationship among the variables is examined based on a panel vector error correction model.

6.3.1. Panel Unit Root Tests

To examine the unit root properties of the variables in the study, we first use the panel unit root test of Levin et al[60]. This test is based on the following ADF-type regression:

[60] Levin, A., Lin, C.F., Chu, C.-S.J: Unit root test in Panel data: asymptotic and finite sample properties. J. Econom. 108, 1-24(2002).

$$\Delta x_{it} = z_{it}\gamma_i + \rho x_{it-1} + \sum_{j=1}^{ki} \varpi ij\Delta\, x_{it-j} + eit,\ i = 1, 2, \ldots, N,\ t = 1, 2, \ldots, T, \qquad (6.5)$$

where k_i is the lag length, z_{it} is a vector of deterministic terms, such as fixed effects or fixed effects plus individual trends, and γ_i is the corresponding vector of coefficients. As can be seen from equation (6.5), the LLC unit root test pools the autoregressive coefficients across the cross-section units during the unit root test and thus restricts the first-order autoregressive parameters to be the same for all countries, $\rho_i = \rho$.

Accordingly, the null hypothesis is that all time series have a unit root, H_0: $\rho = 0$, while the alternative hypothesis is that no series contains a unit root, H_1: $\rho = \rho i < 0$, that is, all are (trend) stationary. To conduct the LLC-test statistic, the following steps are performed. The first is to obtain the residuals, $e\hat{}it$, from individual regressions of Δx_{it} on its lagged values (and on z_{it}),

$$\Delta x_{it} = + \sum_{j=1}^{ki} \Omega 1ij\Delta\, x_{it-j} + z_{it}\gamma_i + e_{it}\,, \qquad (6.6)$$

Second, x_{it-1} is regressed on the lagged values of Δx_{it} (and on z_{it}) to obtain $\hat{}v_{it-1}$, that is, the residuals of this regression, $x_{it} = \sum_{j=1}^{ki} \Omega 2ij\Delta\, x_{it-j} + z_{it}\gamma_i + v_{it}$. In the third step, $\hat{}e_{it}$ is regressed on $\hat{}v_{it-1}$, $\hat{}e_{it} = \delta\hat{}v_{it-1} + \xi_{it}$. The standard error, δ_{ei}^2 , of this regression is then used to normalize the residuals $\hat{}e_{it}$ and $\hat{}v_{it-1}$ (to control for heterogeneity in the variances of the series), $\tilde{}e_{it} = \hat{}e_{it}/\delta_{ei}^2$, $\tilde{}v_{it-1} = \hat{}v_{it-1}/.\ \delta_{ei}^2$. Finally, ρ is estimated from a regression of $\tilde{}e_{it}$ on $\tilde{}v_{it-1}$, $\tilde{}e_{it} = \rho\tilde{}v_{it-1} + \xi_{it}$.

The conventional t-statistic for the autoregressive coefficient ρ has a standard normal limiting distribution if the underlying model does not include fixed effects and individual time trends (z_{it}). Otherwise, this statistic has to be corrected using the first and second moments tabulated by Levin et al. (2002) and the ratio of the long-run variance to the short-run variance, which accounts for the nuisance parameters present in the specification. The limiting distribution of this corrected statistic is normal as $N \to \infty$ and $T \to \infty$.

However, the LLC test procedure assumes cross-sectional independence and thus may lead to spurious inferences if the errors, ε_{it}, are not independent across i. Therefore, we also use the Im, Pesaran, and Shin (2007) panel unit root test, which is commonly known as IPS. The IPS allows for heterogeneous coefficient of x_{it-1}, this is the coefficient regressed on the lagged values of Δx_{it}, equation (6.6). The IPS static was based on averaging individual Augmented Dickey-Fuller unit root test (t_i). IPS panel unit root test is given by:

$$t_{IPS} = \sqrt{N}\,\frac{(\bar{t}\tau - E[ti|\rho i=0])}{\sqrt{var[ti|\rho i=0]}} \rightarrow N(0,1) \qquad (6.7)$$

where $\tau = N^{-1}\sum_{i=1}^{N} t_i$. The moments of $E[ti \mid \rho i = 0]$ and var$[ti \mid \rho i = 0]$ are obtained by Monte Carlo simulation and tabulated in IPS. IPS and LLC have lower size distortions compared to other tests i.e. they have high power in samples with small N relative to T, hence, suitable for the dataset used in our analysis.

6.3.2. Panel Co-integration test

There is a close analogy between panel co-integration tests and panel unit root tests. Some of the tests are based on group-mean estimates, others on pooled estimates. Some take into account cross-sectional dependencies, while others do not. We will apply two representative (bundles of) panel co-integration tests: the very popular Pedroni (2004) test(s) for panel co-integration and the formerly heavily applied test by Kao (1999)[61]. The tests assume as null and alternatives hypotheses that either *all* the relationships are not cointegrated or *all* the relationships are cointegrated.

i) Kao's Co-integration Test

Concerning the long-run analysis, we will first apply the panel co-integration tests and estimation procedures for homogeneous panels. In this framework, that means that we allow for fixed specific effects for each sector but restrict the slope coefficients to be equal for all the members

[61] A comprehensive survey on panel co-integration tests is provided by Breitung (2005).

of the panel. Kao (1999) proposed DF -type panel co-integration tests based on the OLS residuals from the homogeneous panel regression.

To ascertain that the regression of the model is not spurious, the results of panel co-integration tests need to be checked prior to the regression. Consider the following system of cointegrated regressions;

$$y_{it} = \alpha_i + \beta x_{it} + \mu_{it}, \qquad i=1,\ldots,N,\ t=1,\ldots,T \tag{6.8}$$

$$x_{it} = x_{it-1} + e_{it}, \tag{6.9}$$

where α_i are individual constant terms, β is the slope parameter, μ_{it} are stationary disturbance terms and finally, by construction y_{it} and x_{it} are integrated processes of order one for all i[62]. The zero mean innovation vector $w_{it} = (\mu_{it}, e_{it})$ satisfies;

$$\frac{1}{\sqrt{T}} \sum_{t=1}^{Tr} w_{it} \Rightarrow B_i(\Omega) \quad \text{for all } i \text{ as } T \to \infty \tag{6.10}$$

where $B_i(\Omega)$ is a vector Brownian motion with asymptotic covariance Ω. Under the assumptions that the process w_{it} is independent across i, i.e. $E(w_{it} w_{js}') = 0$ for all $i \neq j$ and for all t, s, that x_{it} are not cointegrated, i.e Ω is non-singular, and using Phillips and Moon's (1999) sequential limit theory in which $T \to \infty$ first followed by $N \to \infty$, Kao (1999) derives two types of panel co-integration tests. The first is a Dickey–Fuller (DF) type test and the second is an Augmented-Dickey–Fuller (ADF) type test. Both tests can be calculated from[63]:

$$\Delta\mu_{it} = \rho\, \mu_{it-1} + \sum_{j=1}^{p} \theta_j \Delta\mu_{it-j} + v_{it} \tag{6.11}$$

where the residuals μ_{it} are obtained from Eq. (6.8). The following specification of null and alternative hypotheses is used,

[62] More regressors can be included in the Eq. (6.9) as well as trend variables.
[63] In the case of DF tests all $\theta_j = 0$.

$$H_0 : \rho = 1, H_A : \rho < 1 \qquad (6.12)$$

Kao (1999) proposes four DF-type statistics. The first two DF statistics are based on assuming strict exogeneity of the regressors with respect to the errors in the equation, while the remaining two allow for endogeneity of the regressors. In addition Kao (1999) proposes an ADF test statistic[64]. Finally the DF statistics, which allow for endogeneity, and the ADF statistic involve deriving some nuisance parameters from the long-run conditional variances Ω . The asymptotic distributions of all tests converge to a standard normal distribution $N(0, 1)$ as $T \rightarrow \infty$ and $N \rightarrow \infty$.

ii) Pedroni's Cointergration Test

We further test panel co-integration for linear combinations of non-stationary variables. The assumption of homogeneity among cross-sectional units may be too strong or rather limiting i.e. see Kao (1999), therefore, we further test the hypothesis of co-integration by employing Pedroni's (1999, 2004) co-integration test, which offers some flexibility as it allows for heterogeneity in the long run cointegating vectors. This test is considered more powerful than conventional methods. Pedroni (2004), technique accounts for cross-sectional dependence by including time specific effects.

Since the Pedroni panel co-integration test is residual-based, it can be regarded as a panel equivalent of the Engle-Granger test for co-integration commonly applied in time series analysis. Pedroni proposes seven tests, of which three are group-mean tests and the remaining four are pooled tests (with the respective differing alternative hypotheses). A detailed discussion of each individual test statistic is outside the scope of this chapter and we refer the reader to Pedroni's (2004) original article for further details. Similarly as in the of the Johansen test for co-integration, short-run parameters and country specific deterministic trends are filtered out in two first stage regressions.

Therefore, by filtering short-run parameters and country specific deterministic trends in two first stage regressions, the Pedroni test allows for country-specific short-run effects and different lag-

[64] Refer to Kao (1999, pp. 6–11) on how to compute the statistics.

lengths in the test-regressions (in contrast to Kao, 1999). In general, it can be regarded as a sign of robustness if several of the different test statistics lead to the same test decision, because evidence based on Monte Carlo simulations has shown that the various test statistics perform differently depending on the panel dimension and the assumed data generating process (Hossfeld, 2010).

In line with the two-step strategy proposed by Engle and Granger (1987), Pedroni extends it to panels and uses the ADF and PP principles[65]. The procedures make use of the residuals from the long-run regression of the following form:

$$y_{it} = \alpha_i + \delta_{it} + \theta_t + \beta_{1i} x_{1it} + \ldots + \beta_{si} x_{sit} + e_{it} \qquad (6.13)$$

where (i=1,...,N) and (t=1,...,T) are the number of cross-section units and time observations respectively, and S is the number of regressors. This can be seen as a fixed effects model where α_i, λ_{it} and θ_t represent individual specific effect, individual specific linear trend, and common time effect, respectively. The coefficients β_{si} are allowed to be heterogeneous. The first category of tests uses the specification in (6.12) of null and alternative hypotheses while the second category uses:

$$H_0 : \rho_i = 1, H_A : \rho_i < 1 \text{ for all } i. \qquad (6.14)$$

Two types of seven tests are suggested by Pedroni to examine whether the error process of the estimated equation is stationary. The first four statistics are based on within-dimension approach, including panel v-statistic, panel ρ-statistic, panel PP-statistic, and panel ADF-statistic. These statistics restrict autoregressive parameter to be the same across all cross sections on the estimated residuals. The next three statistics are based on between-dimension approach, including group ρ-statistic, group PP-statistic and group ADF-statistic. These statistics allow autoregressive parameter to vary over the cross section, based on estimators that simply average the individually estimated coefficients for each member. All seven tests are distributed as being asymptotically standard normal. The panel v-statistics is a right-sided test where large positive

[65] Refer to Pedroni (1999) for the ADF and PP principles referred to here.

values reject the null of no co-integration. The remaining statistics diverge to negative infinitely, which means that large negative values reject the null.

6.3.3. Testing for long-run Relationship[66]

i) DOLS Estimation

To estimate the long-run effect of sectoral FDI on economic growth, we firstly, apply the panel co-integration estimation procedure for the homogeneous case estimated by using Dynamic Ordinary Least Squares (DOLS) estimator developed by Kao and Chiang (2000). In this framework, we allow for fixed specific effects for each sector but restrict the slope coefficients to be equal for all the units of the panel. The hypothesis imposed here is that all the sectors share the same coeffiecients for each of the explanatory variables. This estimator is asymptotically unbiased and normally distributed, therefore, even in the presence of endogeneous regressors it allows us to control for the endogeneity of sectoral FDI. Adding the numbers of leads(-k) and lags (k) reduces the bias of DOLS substancially. The lag structure of both the DOLS are determined primarily on the basis of the Akaike information criterion with the maximum lag length being 2. The within-dimension based DOLS model for equation (6.1) following Kao and Chiang (2000) is;

$$ln\text{GDP}_{it} = \alpha_i + \delta_{it} + \beta\, ln\text{FDI}_{it} + \sum_{j=-k}^{k} \Phi_{it} \Delta ln\text{FDI}_{it\text{-}j} + e_{it} \qquad (6.15)$$

we restrict the β parameters to be the same for all the sectors in the panel, that is,

$\beta_{11} = \beta_{12} = \ldots = \beta_{1N}$, $\beta_{21} = \beta_{22} = \ldots = \beta_{2N}$, etc.

Where Φ_{it} are coefficients of current, lead and lag differences, which account for possible serial correlation and endogeneity of the regressor(s), thus yielding unbiased estimates. Coeeficients of these terms capture the short-run dynamics. We allow heterogeneous short-run dynamics (i.e. Φ_{it}

[66] To avoid biases from the fixed effects and lagged dependant variable being correlated the study could have considered dynamic panel models, but given the nature of our dataset - N small and T large - it was not possible to carry out such an estimation.

differ across *i*). Thus, an important feature of the DOLS procedure is that it generates unbiased estimates for variables that cointegrate even with endogenous regressors. Consequently, in contrast to cross-section and conventional panel approaches, the approach does not require exogeneity assumptions nor does it require the use of instruments. In addition, panel DOLS estimator is super consistent under co-integration, and is robust to the omission of variables that do not form part of the cointegrating relationship.

The within estimator for β is calculated as,

$$B_{DOLS} = N^{-1}\sum_{i=1}^{N} \beta^{*}_{\mathrm{Di}} \tag{6.16}$$

the associated *t*-statistic for the within-dimension estimator can be constructed as;

$$t^{*}_{D} = N^{-1/2}\sum_{i=1}^{N} t_{\beta \mathrm{Di}} \tag{6.17}$$

t^{*}_{D} is the corresponding *t*-statistic of β_{DOLS} (D = 1, 2) and β^{*}_{Di} is the conventional time-series DOLS estimator applied to the i^{th} unit of the panel.

A particular weakness of using the DOLS is that the slope coefficients are homogeneous across the cross-sectional units. However, pooling assumption, if not true, can result in a serious bias in both static and dynamic panels (Asteriou and Hall, 2007). According to the literature sector-wise FDI is known to be heterogeneous across sectors. Therefore due to the heterogeneity of the sectors involved in the analysis, the homogeneous analysis may introduce too strong restrictions in the parameters, not necessarily supported by the data, and hence, the heterogeneous analysis should be carried out (Camarero et al., 2003). Non- significant parameters may be the consequence of large discrepancies between the different sectors in the cross-sections. To ensure we carry out the correct specification for the model, we test for the equality of variances between groups, using a test statistic suggested by Levene (1960). The test computes Levene's original statistic along with two reformulations by Brown and Forsythe to provide robust tests for the equality of variances. Moreover, this study also used the mean-group (MG) estimation proposed by Pesaran and Smith (1995).

ii) Mean Group Estimation

The mean-group (MG) estimator allows for heterogeneous slopes across panel units. The MG estimator provides consistent estimates of the parameter averages. Moreover, the procedure is most robust in samples with T large and small N, whereas the pooled mean group (PMG) is more suitable for Large N small T datasets. Therefore, making this procedure more appropriate for this study which uses relatively a small N and large T. The MG estimator seems to be more consistent under the assumption that both slope and intercepts are allowed to vary across unit, while pooled mean group estimator (PMG) is consistent under the assumption of long-run slope homogeneity.

The MG estimators have three key advantages over other commonly used estimators in the literature. Compared to the static fixed-effects estimator, the MG estimator allows for dynamics while the static fixed-effects model do not. In comparison to the dynamic fixed-effects estimator, the MG estimator allows the short-run dynamics (shocks) and error variances to differ across cross-sections. Another pertinent advantage is that the underlying auto-regressive distributed lag (ARDL) structure dispenses with the importance of the unit root pretesting of the variables in question.

As long as there is a unique vector which defines the long-run relationship among our variables of interest, it is of no consequence if the variables are either I(1), or I(0) since the MG estimates of an ARDL specification will yield consistent estimates. The MG estimator derives the long-run parameters for the panel from an average of the long-run parameters from ARDL models for individual units. From equation (6.1), the main model can be equivalently written in the error correction representation to disentangle long-run and short-run developments. The ARDL is specified as follows:

$$\Delta lnGDP_{it} = c_{0i} + c_{1i}t + \delta_i lnGDP_{i,t-1} + \delta_i lnFDI_{i,t-1} + \delta_i lnGFCF_{i,t-1} + \sum_{k=1}^{p} \phi ik\, \Delta lnGDP_{i,t-k} + \sum_{k=0}^{q} \varpi ik\, \Delta lnFDI_{i,t-k} + \sum_{k=0}^{q} \varphi ik\, \Delta lnGFCF_{i,t-k} + e_{it} \quad (6.18)$$

Where - $\frac{\beta i}{\delta i} = \theta_i$ stands for the long-run elasticity of FDI with respect to per capita GDP in each sector. The MG procedure runs separate estimations for all seven sectors and the averages the estimated coefficients across sectors. In, particular, we have for the long-run elasticity $\frac{1}{7}\sum_{i=1}^{7}\theta i = \theta_{MG}$.

Pesaran and Smith (1995) have noted that as $T \rightarrow \infty$, MG yields a consistent estimator of βi. They suggest a mean group estimator of β by taking the average of β_i across *i*. The MG estimator for the null $\beta = 1$ against the alternative $\beta \neq 1$ is given by:

$$\beta_{MG} = N^{-1}\sum_{i=1}^{N}\beta_i \qquad (6.19)$$

The MG estimator accounts for correlation across panel members (cross-sectional dependence). To test for the presence of cross-sectional dependence, we carry out Breush-Pagan LM test under the null hypothesis of cross sectional dependence.

6.3.4. Causality Test

This study also uses panel causality test to investigate the direction of causality. Since the co-integration analysis discussed in Section 6.3.3, cannot determine the direction of causality, it is common to investigate causal interactions among the variables once co-integration is established[67]. The advantage of this method is to identify the direction of causality between the variables under consideration. There are three different kinds of causality tests. Namely, Granger causality test, multivariate causality test and Granger causality test within vector autoregressive (VAR)[68].

As proposed by Engle and Granger (1987), inferences from a causality test based on a vector auto-regression (VAR) model in first differences will be misleading when the variables are cointegrated. To overcome this problem Nazlioglu et al. (2011) proposed estimating a vector error correction model (VECM) by augmenting the VAR model with one-lagged error correction

[67] For a detailed discussion on the meaning of causality in econometrics, see Chapter 6, Section 6.3.3.
[68] See for instance, Erjavec and Cota (2003).

term. The VECM results are used to distinguish the short-run and long-run Granger causality. The panel VECM takes the following form to investigate causal linkages in a panel data[69]:

$$\Delta lnGDP_{it} = \alpha_{0i} + \sum_{k=1}^{k} \alpha_{1ik} \Delta lnGDP_{it-k} + \sum_{k=1}^{k} \alpha_{2ik} \Delta lnFDI_{it-k} + \varphi_{1i}\acute{\varepsilon}_{it-1} + u_{1it} \quad (6.20)$$

$$\Delta lnFDI_{it} = b_{0i} + \sum_{k=1}^{k} b_{1ik} \Delta lnFDI_{it-k} + \sum_{k=1}^{k} b_{2ik} \Delta lnGDP_{it-k} + \varphi_{2i}\acute{\varepsilon}_{it-1} + u_{2it} \quad (6.21)$$

where k refers to the optimal lag length(s) and $\acute{\varepsilon}_{it}$ is the residual from panel DOLS estimation of : $lnGDP_{it} = \alpha_{it} + \lambda lnFDI_{i,t} + \xi_t + \eta_i + \varepsilon_{it}$; where $i = 1, \ldots..N$; $t = 2, \ldots..T$. The decision for the optimal lag length for this model rests on the comparison of regression results with alternative lag structures. This specification for Granger causality allows one to investigate both the short-run and long-run causality.

The long-run causality is examined by statistical significance of the t-statistics on the error correction parameter φ. The two coefficients φ_{1i} and φ_{2i} represent speeds of adjustment along the long-run equilibrium path; while φ_{1i} can be interpreted as displaying the long-run effects of sector-level FDI stocks on economic growth, φ_{2i} can be taken to imply the long-run effects of economic growth on FDI. Therefore, the statistical significance of φ_{1i} implies that sector-level FDI is Granger cause of economic growth in the long-run, hence movements along this path are considered permanent.

The short-run causality, for example, from FDI to GDP is tested with a Wald test by imposing $\alpha_{2ik} = 0$. Furthermore, we also perform a strong Granger causality testing the joint hypotheses of H_0: $\varphi_{1i} = \alpha_{1ik} = \alpha_{2ik} = 0$; in equation (6.20) and H_0: $\varphi_{2i} = b_{1ik} = b_{2ik} = 0$ in equation (6.21). This joint test indicates which variables bear the burden of short-run adjustment re-establish long-run equilibrium, following a shock to the system (Asafu-Adjaye, 2000). If there is no causality in either direction, the neutrality hypothesis holds.

[69] See Apergis and Payne, 2009.

6.4. EMPIRICAL RESULTS

The time series properties of the variables are tested using both IPS and LLC test. Once stationarity in variables is confirmed, a co-integration test is then performed using both Kao (1999) and Pedroni (1999). Our long run equations are estimated using Dynamic Ordinary Least squares (DOLS) and the Mean Group estimation (MG) techniques. The DOLS estimation involves regressing leads and lags of the first differences of any I(1) variables. Thus, we use two lags and one lead for the DOLS estimation[70], the essence of incorporating the associated lags and leads is to obviate simultaneity bias and small sample bias inherent among regressors. The presence of cross sectional dependence is tested using the Breusch-Pagan statistic for cross-sectional independence in the residuals of a fixed effect regression. The equality of variances across sectors is further tested using Brown and Forsythe (1974) robust variance test. This cross-sectional dependence, if found, is corrected for in the MG estimation.

6.4.1. Panel Unit root Test

To establish the presence of cointegration we need to ensure stationarity for the panel variables. Having analysed the data there is no evidence of a trend in the series. Hence, we only include a constant deterministic term. We first apply LLC unit root test followed by IPS unit root test as specified in the empirical methodology section of the Chapter. IPS tests the unit root null against a more general alternative of a heterogeneous autoregressive coefficient.

The panel unit root test results are tabulated in Table (6.3). The test results are reported in levels and first differences. Both the LLC and IPS test statistics are unable to reject the null hypothesis that the variables of interest have a unit root in levels. However, the test statistics for the first differences strongly reject the null hypothesis at 5% level of significance, which imply that the variables are stationary in the first difference form.

[70] DOLS uses leads and lagged differences of the regressor to control for the endogenous feedback effect, see Kao and Chiang (2000) for further details.

Table 6.3: Panel unit-root Tests

		Level		First Difference		
Variables	**Deterministic terms**	**LLC**	**IPS**	**LLC**	**IPS**	**Conclusion**
$lnGDP_{it}$	Intercept	1.877	3.998	-9.3565***	-8.3748***	I(1)
$lnFDI_{it}$	Intercept	-0.236	-0.160	-6.9672***	-8.1527***	I(1)
$lnGFCF_{it}$	Intercept	-3.017	-0.523	-15.161***	-8.8742***	I(1)
$Open_{it}$	Intercept	-0.548	1.219	8.1535***	-6.7676***	I(1)
$HCit$	Intercept	-2.090	-1.960	-4.2567***	-3.1254***	I(1)
$Inflation_{it}$	Intercept	-2.590	-2.728	-4.2860***	-6.0842***	I(1)
$Findev_{it}$	Intercept	-0.8943	-2.970	-3.0894***	-6.7025***	I(1)
$lnGov.Cons_{it}$	Intercept	-1.7626	-0.6312	-3.7626***	-3.0002***	I(1)

Δ is the First Difference operator. Numbers in *** & ** indicate significance level at the 1% and 5% level. Newey-West bandwidth selection with Bartlett Kernel was used for the LLC test. The maximum lag length is 2 lags chosen automatically using Akaike Information Criterion to determine the optimal lag length.

The results provide strong evidence regarding the series that they are all individually integrated of order one, I(1). Therefore, indicating a possible long-run co-integration relation among these variables. Thereby, the next step is an investigation of the co-integration properties of the variables.

6.4.2. Panel Cointergration test Results

With confirmation on the integrated order of the variables of interest. We proceed to estimate the long-run relations among the variables. Therefore, having confirmed that the variables are of the same order, I(1), the question is whether they might or might not be cointegrated. To analyse the existence of the long-run equilibrium relationship among the variables in question, we conduct the panel co-integration tests techniques developed by Pedroni (1999, 2004) and Kao (1999). These techniques are a significant improvement over the conventional co-integration tests applied on a single series.

Results for the panel co-integration tests are presented in Table 4. Kao's ADF statistics rejects the null of no co-integration in all four model specifications at the 1% level of significance. This result is further confirmed by Pedroni's seven test statistics. Pedroni (1999) residual-based

technique allows for cointegrating vectors of differencing magnitudes between categories and also allows for fixed and time effects, Basu, et al. (2003).

In the presence of cointegrating relation, the residuals are expected to be stationary. A positive value for the first statistic and large negative values for the remaining six statistics allows the rejection of the null of no co-integration. Panel rho and panel PP are assumed to be most reliable tests of co-integration [Maeso-Fernandez, et al. (2006)]. Most of the statistics including both panel rho and panel PP for all different model specifications suggest rejection of the null at the 1% level. The study, therefore, concludes that sector level FDI and economic growth are cointegrated in the long-run. Put differently, sector level FDI and economic growth in Namibia is positively associated with each other.

Table 6.4: Panel Co-integration Results

	Model 1	**Model 2**	**Model 3**	**Model 4**	
	*ln*GDP *ln*FDI *ln*GFCF	*ln*GDP *ln*FDI *ln*GFCF OPEN	*ln*GDP *ln*FDI *ln*GFCF HC	*ln*GDP *ln*FDI *ln*GFCF FINDEVS	
Panel A.					
Pedroni					
	within-dimension				
Panel v-stat	2.9171***	-0.9258	3.4761***	-0.3414	
Panel ρ-stat	-5.4193***	-3.4303***	-3.2627***	-3.1201***	
Panel PP-Statistic	-10.6950***	-10.5017***	-10.7284***	-8.3617***	
Panel ADF-Statistic	-10.1947***	-10.1104***	-6.6381***	-8.0747***	
	between-dimension				
Group ρ-stat	-2.5132**	-0.9178*	-0.9107*	-0.8514*	
Group PP-Statistic	-9.0430***	-6.9893***	-11.1487***	-6.8224***	
Group ADF-Statistic	-6.8557***	-6.2867***	-6.5471***	-6.1468***	
Panel B.					
Kao					
ADF	-5.0197***	-5.1978***	-4.9881***	-8.2906***	

* The null hypothesis of no co-integration is tested. *, ** & *** indicate the parameters that are significant at 10%, 5%, 1% probability level respectively. The test were carried out using automatic lag length selection based in AIC with a maximum lag of 4. Newey-West automatic bandwidth selection and Bartlett Kernel was used in both test.

If compared with the homogeneous co-integration (Kao) test results, the heterogeneous analysis (Pedroni) which allows for a less restricted testing approach and use a more powerful test, similarly, confirms the finding of a cointegrating relationship in the model specifications outlined in Section 6.2.

6.3.3. Panel Long run relationship Results

To estimate the long-run effect of sector level FDI on economic growth, the study employs the Dynamic Ordinary Least Squares (DOLS) estimator. This estimator assumes homogeneity of slopes among sectors, and hence, could be a potential limitation. Therefore, to ensure robustness of this conclusion the study has also employed the mean group (MG) estimator. This estimator (MG) allows for the slope coefficients to vary across sectors. The results of the estimation procedures are presented in Table (6.5).

The DOLS estimates for the coefficients in the four specifications are reported in the first four columns. The results show that the coefficient on FDI in the first specification, model (1), is highly significant and positive. More precisely, the elasticity of GDP per capita with respect to sector FDI is estimated to be 0.1850. The finding of a positive and significant relationship between sector FDI and economic growth (GDP per capita) is consistent throughout, even when changing the main model specification to allow for the presence of trade openness, human capital and financial development, columns (ii) to (iv). The gross fixed capital formation is also highly significant and positive across all specifications and also consistent with the results obtained using aggregate FDI data in Chapter 5.

The DOLS estimates for model (2), with human capital 'skills', shows consistency of a positive and highly significant relationship between sector FDI and GDP per capita. Furthermore, the question of interest in this specification is the significance of the human capital 'skills' coefficient, are skills vital in the study of FDI and economic growth?. The results show the coefficient to be highly significant but negative. This result is consistent with the findings we obtained in Chapter 5. This means that even if we use aggregate data or sector wise FDI data

'skills' education attainment in Namibia remains to be negative although significant. Therefore, the reasons outlined in Chapter 5, Section 5.5, are indeed key in justifying this find.

The DOLS estimates in model (3) and (4), (see column (iii) and column (iv) respectively), show that the relationship between sector FDI and economic growth remains consistent. In the third specification, financial development coefficient is positive and significant. A developed financial system is required to achieve growth and benefits from technology spill over's brought forth by the presence of foreign investors. This results highlights an important achievement for the Namibian government in having worked hard in improving the financial development of the country since attaining independence in 1990. In the fourth specification, the results show trade openness to be positive and significant, this is consistent with the finding in Section 5.5.

Table 6.5. Long-run Estimation Results

Dependant variable: *ln*GDP per capita										
	DOLS					**Mean Group**				
Coefficients	(i)	(ii)	(iii)	(iv)	with controls (v)	(i)	(ii)	(iii)	(iv)	with controls (v)
***ln*FDI**	.1850*** (8.08)	.1846*** (8.02)	.1855*** (8.63)	.1862*** (8.84)	.1852*** (9.58)	.0529** (2.07)	.0378* (1.63)	.0561** (2.42)	.0475** (2.20)	.0344* (1.70)
***ln*GFCF**	.1514*** (3.55)	.1161* (1.77)	.1616*** (3.57)	.1398*** (3.54)	.1102* (1.66)	.2138*** (3.35)	.1570** (1.93)	.2161*** (3.02)	.1775*** (3.32)	.1137 (1.15)
HC		-.129*** (-2.73)			.2112*** (4.42)		-.0382* (-1.64)			-.0536* (-1.57)
FINDEV			.0231*** (4.11)		.0383*** (6.16)			.1645* (1.83)		.0020* (1.70)
OPEN				.0052*** (2.93)	.0005 (0.29)				.0031* (1.89)	.0045** (1.92)
Inflation					-.0010 (-0.18)					-.0094*** (-6.24)
***ln*Gov.cons**					-.3107* (-1.54)					.6482*** (4.91)
Constant						16.45*** (11.78)	16.31*** (8.47)	16.46*** (11.82)	16.58*** (15.28)	9.0028*** (2.76)

Note: t-statistics in parentheses. The DOLS regression was estimated with two lags one lead. Number of observations 140. ***, ** & * indicate level of significance at the 1%, 5% and 10% respectively.

As further robustness check, in column (v), we estimate a variant of the model by including inflation and government consumption. The results show that FDI has a positive and significant effect on growth at the 1% significance level. Again confirming consistency in the finding of a positive and significant relationship between sector FDI and economic growth. This robustness check confirms consistency in the finding of a similar result obtained in the previous chapter. The additional variable added to column (v), government consumption, has the correct sign and is significant at the 10% level. The coefficient of inflation is negative as expected in the literature on FDI.

The MG estimation support the findings obtained DOLS of a positive and highly significant relationship between sector level FDI and economic growth in all the specifications outlined in section 3. We also found consistency in the findings of the significance of the other variables considered in the different specifications. Interestingly controlling for heterogeneity of slopes across units has not mended the results found in DOLS on the long-run relations between the variables. From the heterogeneous panel results we can now confirm consistency and robustness in our findings. The consistency in the findings across both estimation techniques, suggest that the use of DOLS could have very well been appropriate for the study and would not have been a limitation with regard to its assumption of homogeneity. In summary, one can conclude that the positive long-run relation between sector level FDI and GDP per capita is robust to different estimation techniques.

Furthermore, we have formally tested the restriction of homogeneous slope parameters against the alternative of heterogeneous ones, in the case of the traditional specification, using a Likelihood Ratio-type test suggested by Levene (1960). The test displays Levene's statistic (W0) and two statistics proposed by Brown and Forsythe that replace the mean in Levene's formula with alternative location estimators.

The first alternative (W50) replaces the mean with the median. The second alternative replaces the mean with the 10 percent trimmed mean (W10). In conclusion the hypothesis of homogeneity is accepted, Table 6.6.; Appendix VI. And, the null hypothesis of cross-sectional dependence

was tested using Breush-Pagan LM test, the hypotheses of cross-sectional dependence is accepted, Table 6.6., Appendix VI.

6.4.4. Panel Causality Test Results

Table 6.8, presents the results from panel Granger causality analysis. The panel causality technique combines more infromation compared to the time series causality approaches employed in Chapter 5. And hence, allows us to investigate causality linkage between FDI and GDP per capita in a both short-run and long-run context. Moreover, the results provide evidence that there is short-run causality running from economic growth to FDI. The short-run causality analysis indicates uni-directional causal linkages among sector-level FDI and economic growth. Therefore, this implies that GDP per capita has a predictive power to forecast FDI. This means that economic growth attracts foreign investments in the short-run, however, the presence of FDI accelerates growth in the long-run as the results in Table 6.8 suggests.

Table 6.8: Results of Panel Causality Tests

Dependant Variable	**Sort-run causality**		**Long-run causality**	**Joint (Short run/Long run)**	
	$\Delta ln GDP_{it}$	$\Delta ln FDI_{it}$	*ECT*	$\Delta ln GDP_{it}$, *ECT*	$\Delta ln FDI_{it}$,ECT
Δln**GDP**$_{it}$		F=0.20	.9247***		F=24.00***
Δln**FDI**$_{it}$	F=30.01***		-.0197	F=4.29**	

***& ** indicate statistical significance at the 1% and 5% level of significance.

φ is statistically significant in the first equation (6.20), but not significant in the second (6.21), therefore sector level FDI does cause economic growth in the long-run, hence a uni-directional causality running from FDI to GDP per capita in the long-run. This study provides support for the feedback hypothesis. The results from panel causality analysis are rather similar from those by the time series approaches in Chapter 5, employed using aggregate FDI. The strong causality test for both equations show statistically significant coefficients, and the two variables are jointly significant at the 1% and 5% level.

The causal relationship in the long-run has been confirmed in Chapter 5 whereby FDI leads economic growth. The result of this study also confirms a joint casual linkage between GDP per capita and FDI. Importantly, this study confims that in either the short or long-run there is some sort of uni-directional causality running from either direction. In Namibia, FDI has remarkably increased and divesified among sectors, which leads to higher integration between FDI and economic growth. Therefore, this confirms the consistent find of a causal link between the two variables both in Chapter 5 and 6.

6.5. CONCLUSION

Since independence there have been reforms of investment policies and trade systems in Namibia which have seen a substantial increase in FDI flows to the country. At the same time the composition and type of FDI has changed considerably. The mining sector has always enjoyed attracting varying FDI inflows. From the early 2000, Namibia has seen a shift in the industries in which foreign firms were active compared to pre-independence period, which involved mostly the exploitation of minerals in the mining sector, towards manufacturing, agriculture, financing and high technology. Governments began to ease restrictions on FDI and increasingly offer incentives in an effort to attract investment. While FDI in Namibia continues to be resource-seeking, its market-seeking orientation has increased in the aftermath of economic reforms port-independence.

We assessed the growth implication of FDI in Namibia using sector specific FDI data and applying a panel co-integration technique over the period 1990-2009. We found that sector-wise FDI and GDP per capita are cointegrated. The DOLS and MG estimates suggest that at sector level, FDI is positively related to economic growth. The Granger causality tests point to feedback effects between sector level FDI and GDP per capita both in the long-run and short-run. In the short-run an evidence of uni-directional causality running from GDP per capita to FDI is observed. However, the impact of FDI in inducing economic growth is relatively stronger in the long-run as confirmed in both Chapter 5 and Chapter 6 of the thesis. Furthermore, we found

evidence of bi-directional causality running between FDI and GDP per capita in the joint hypothesis.

The results are robust to firstly: using advance panel econometric techniques mentioned above and secondly, to the inclusion of other growth determinants, such as lagged initial GDP per capita, human capital measures, financial development, government consumption, trade openness and inflation. Results on Namibia are in line with the findings of cross-sector studies according to which the growth implications of FDI are shaped by various factors- including absorptive capacity and local skills, technological spillovers and linkages between foreign and local firms, and local export orientation- all of which differ across sectors in the host economy.

This work suggests that foreign investment to key economic sectors is beneficial to the Namibian economy. A priori, this might suggest differentiated efforts towards attracting different forms of FDI flows and even negative incentives to certain types, in particular investment in natural resources. However, evidence that countries might want to target certain sectors needs to be weighed against bureaucratic costs and increased potential for the corruption of differentiated schemes. The economic nature of the host country is also an important determinant.

APENNDIX VI

Table 6.2: SUMMARY STATISTICS

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP per Capita	140	21.76305	0.6425139	19.95755	22.77713
FDI Stock	140	20.03218	1.928344	15.47326	23.61543
GFCF	140	19.7467	1.123142	16.52356	21.97888
Gov. Consumption	140	16.88652	0.2036348	16.33892	18.23484
Openness	140	96.65405	14.61319	66.6328	120.9677
Inflation	140	9.608866	5.761576	1.007268	26.71946
HC	140	14.65	1.327967	11.7	15.9
FINDEV	140	36.19729	4.050308	24.7199	42.53998

Table 6.6: Test of Cross-Sectional Dependence : Correlation matrix of residuals

	__e1	__e2	__e3	__e4	__e5	__e6	__e7
__e1	1.0000						
__e2	0.3088	1.0000					
__e3	0.1347	-0.5112	1.0000				
__e4	0.0791	-0.6058	0.7066	1.0000			
__e5	0.2486	0.3624	0.0028	0.0394	1.0000		
__e6	0.1602	-0.5207	0.7937	0.7189	0.0811	1.0000	
__e7	0.1013	-0.5948	0.4926	0.8377	0.0354	0.5595	1.0000

Breusch-Pagan LM test of independence: chi2(21) = 90.296, Pr = 0.0000
Based on 20 complete observations over panel units.

Table 6.7: Test of Homogeneity across groups

W0 = 4.8661101 df(6, 133) **Pr > F = 0.00015896**

W50 = 3.5543165 df(6, 133) **Pr > F = 0.00268917**

W10 = 4.6526635 df(6, 133) **Pr > F = 0.00025167**

*** The Null Hypothesis that the variances are equal is rejected.**

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

7.1 INTRODUCTION

The empirical analysis, presented in this thesis, has contributed to the relatively limited work on foreign direct investments in Namibia, especially in the topic of the impact of FDI on economic growth. We have offered to develop a comprehensive investigation, concerning the relationship between FDI and economic growth, sector-wise FDI and economic growth, as well as the macroeconomic determinants of FDI and the type of FDI. This Chapter summarises the main aspects of the thesis, and identifies the main methods used in our investigation, highlighting the key findings of the empirical analysis.

The purpose of this research was to shed light on the determinants and effects of FDI flows to a developing country. This area of research has become the focus of scholarly attention during the last two decades, as these flows play a significant role in many developing countries. Only a few studies have investigated the impact of FDI on economic growth in a single country context, and there is no empirical study exclusively devoted to the Namibian case. Therefore, the research has contributed to some extend in filling the gap in the existing literature on the relationship between FDI and economic growth, as well as the determinants of FDI by studying the macroeconomic determinants that affect the movement of FDI flows to Namibia.

This Chapter is organised as follows. Section 7.2 presents a brief overview of the accomplishments of each objective that this research aims to implement in every chapter through this thesis. Section 7.3 provides the major findings of each chapter through dividing the main aspects into three parts, based on the objectives of this thesis. The main policy implications and recommendations are discussed in Section 7.4. Finally, limitations and directions for future research, related to our main topics, are suggested in Section 7.5.

7.2 Accomplishments of the Main Thesis Objectives

As mentioned in Chapter 1, the present thesis has aimed at providing empirical analysis on the relationship between FDI and economic growth of a developing country and various aspects related to the economics of FDI in a host country, Namibia. These aspects are discussed in detail in the previous Chapters of the thesis. The analysis made for each aspect is based on time series econometric analysis and panel time series, using advanced co-integration techniques. We started by investigating the macroeconomic determinants of FDI flows to Namibia and also studied the type of FDI to the country. We then continued the analysis by studying the relationship between FDI and economic growth including a study of the casual link and direction of causality between FDI and economic growth. A more detailed analysis was conducted to point out the relationship between sector-wise FDI in key economic sectors in Namibia a variety of macroeconomic indicators in the later chapters. Before summarising the major finding of each chapter, Table 7.1 shows how this research meets the main objectives and questions established in Chapter 1.

Table 7.1: Accomplishments of the Research Objectives

Research Objectives	Accomplishments
Objective 1: Provide a comprehensive review of the literature related to the main aspects of our area of research, and classify the main studies concerning the study of FDI	This objective was achieved in **Chapter 2**, where this Chapter discusses the theoretical models traditionally outlined in the literature on FDI and economic growth. **Chapter 2,** further achieves this objective by summarising and classifying major studies on FDI with special focus on the work concerning the impact of FDI on economic growth.
Objective 2: Provide an overview on Namibia and its economy with a focus on the key economic sectors.	This objective is accomplished in **Chapter 3**, where we provide a detailed discussion on the geography and landscape of the country, and provide a comprehensive historical summary and regimes. A perspective of the economy is discussed, including the key economic sectors and their contributions to

	GDP as well as FDI in these sectors with an overall comparison to other African countries, especially SADC.
Objective 3: Investigate the macroeconomic determinants of FDI flows to Namibia and type of FDI, for instance, resource seeking, asset seeking or efficiency seeking types of FDI. And, to investigate the significance of this determinants after the regime i.e. post-independence. Has political stability (independence) brought about an increase in FDI?	We have achieved this objective by employing a co-integration analysis in **Chapter 4**. The analysis was carried out in two parts, firstly, we considered a dataset that covered the entire period pre and post independence. The second part focuses only on post-independence era. We used different tests for unit roots to confirm the order of integration of the variables considered. We employed an autoregressive distributed lag bounds co-integration technique to examine the determinants of FDI and type of FDI that flows to Namibia.
Objective 4: Develop an investigation of the impact of FDI on economic growth in Namibia.	We have investigated this matter by using aggregate FDI and specifying four different models. This specifications were carried out to ensure that the relationship between FDI and economic growth remains consistent when other macroeconomic indicators are included in the investigations. This was done to also ensure robustness in the findings. And, where the long-run relationship is estimated along with the short-run dynamics in this chapter. This is achieved in **Chapter 5**, and more details about the findings will be presented in the following section.

Objective 5: Examine for the presence of potential asymmetric co-integration relationship between FDI and economic growth in Namibia.	This test was undertaken in **Section 5.4, Chapter 5** by applying the Shin *et* al. (2011) approach which extends on the linear ARDL bounds testing discussed in **Section 4.4, Chapter 4**.
Objective 6: Investigate the casual link between FDI and economic growth	The sixth objective was achieved in **Section 5.3, Chapter 5**. We employ and Engle and Granger (1987) causality test a causal relationship and the direction of causality between FDI and economic growth or vice versa. And more details about the findings will be presented in the following section.
Objective 7: Investigate the relationship between FDI and economic growth using sector-wise FDI in key economic sectors in Namibia.	This objective is achieved in **Chapter 6**. Here we use sector-wise FDI to analyse a co-integration relationship between FDI and growth in a panel setting of seven key economic sectors. We used both heterogenous and homogenous panel co-integration techniques. And followed by a panel causality test were the long-run, short-run and joint causality hypotheses are tested.
Objective 8: Summarise and evaluate the main findings of the research, draw the conclusions of these findings, and identify the directions of future research in this field.	This objective is achieved in the present sections of this Chapter, where **Chapter 7** evaluates the research conclusions and identify suggestions for further future research.

7.3 Summary of Major Findings

The key purpose of this thesis was to study the relationship between foreign direct investments and economic growth, as well as identifying main macroeconomic determinants of these flows.

The start point of this thesis was presented in Chapter 1 in which we presented the background of the research problem and introduce the main motivations for conducting this research. The main objectives and the importance of the study on foreign direct investments, particularly in a recipient developing country such as Namibia, are also identified in this Chapter. In Chapters 2, and 3, we reviewed the relevant literature and introduced a detailed background on Namibia and the country's economy.

In order to achieve the main aims of this research[71], we have investigated this topic from different aspects based on co-integration framework. The following chapters contain the empirical investigation. In the current section we provide a general summary of the results obtained from our empirical analysis chapters which specifically aim at achieving our main objectives. Therefore, we have divided these summaries into three subsections as follows:

7.3.1 Macroeconomic Determinants of Foreign Direct Investments:

In Chapter 4, we investigated the potential determinants of FDI in Namibia under the framework of a time-series model over a period covering 1980 to 2009, which is notably the era pre and post-independence. The chapter employed a co-integration technique based on the autoregressive distributed lag approach (ARDL) developed by Pesaran and Shin (1996, 1997) which is proven to perform better than other conventional co-integration techniques, in particular in small samples, to find out the main macroeconomic determinants that affect foreign direct investment flows to Namibia. The first stage of the analysis considered a time period which covers both the pre and post- independence era. The second stage of this analysis carried out a robustness check on the consistency of results and allowed for the inclusion of other determinants in the literature by employing a dataset covering the post- independence era, 1990 to 2009.

The main finding generally has indicated that there is a long-run stable equilibrium relationship among FDI and determinants considered in the Chapter. According to the ARDL framework foreign direct investment flows to Namibia are determined by labour force, market size and GDP

[71] As stated in Table 7.1, Section 7.2.

per capita. The bounds test used in the ARDL indicated that FDI to Namibia is co-integrated with market size, interest rates, initial level of income, labour force, providing enabling environment through the provision of infrastructural facilities, and inflation are important determinants of FDI flows.

The findings also show that although Openness is positive but not significant in our case and that in the future a significant relationship is much likely to be achieved. Domestic Investment measured by gross fixed capital formation is confirmed in all specification and further confirmed by the robustness results that it is not a determinant of FDI in the case of Namibia. This result on openness and investment is explained by the fact that Namibia's existing institutional setups for export and investment promotion are considered weak and relatively ineffective. The Ministry of Trade and Industry (MTI) units responsible for the delivery of these services are currently lacking a number of the criteria for a successful export and investment support function. Although Namibia is an open economy, trade integration is heavily focused at regional level as opposed to global intergration. A host economy with global trade intergration is of key interest to foreign investors, and hence, leads to increases in FDI inflows. The associated equilibrium correction was also significant confirming the existence of long-run relationships. The equilibrium correction is fairly fast and is restored back to its cointegrating equilibrium after a shock

Finally, the findings of the study have shown that market-seeking and efficiency-seeking might be other reasons why investors choose to invest in Namibia and not only resource-seeking FDI. Therefore, FDI in Namibia is not only resource seeking but that Namibia has also seen an increase in Market-seeking and Efficiency-seeking foreign investors.

7.3.2 Foreign Direct Investments and Economic Growth:

Chapter 5, has examined the relationship between FDI and economic growth in Namibia. The study achieved the main objective regarding the impact of FDI on economic growth in Namibia covering the period from 1980 to 2009. This objective was achieved by employing co-integration test under a linear framework and articulate the robustness of the findings by a method of

constructing different specifications of the main model. The different specifications of the model included domestic investment, Openness, inflation, and human capital. The analysis in Chapter 5 aimed to detect the short-run as well as the long-run relationships between FDI, economic growth and other relevant variables in the specified models through employing the relatively new Autoregressive Distributive Lag (ARDL) technique. We extended the traditional co-integration analysis by testing for the presence of potential asymmetric co-integration relationship between FDI and economic growth, using Shin et al. (2011) framework. Finally, the study carried out a Granger causality test to determine the direction of the linkage and to confirm Granger feedback between the variables under study, if any.

The findings found a long-run co-integration relationship. This means that even when we changed the specification of the main model, FDI had a sizable and significant effect on GDP per capita in Namibia. The effect of foreign direct investment stock was highly significant on economic growth. This coincides with the theory that FDI is a growth enhancing factor. The study interestingly found human capital coefficient measured by secondary school completion rates to be significant but negative in the FDI-growth nexus in the case of Namibia. However, the negative relationship in the context of Namibia can be explained by the quality of the human capital. Moreover, Namibia has a distinct shortage of skilled labour mainly in the infrastructure, technology and financial sectors. With a literacy rate which is among the highest on the continent, 85% of people aged 15 and above being literate, there is still scarcity of skills. This is because literacy are based on primary skills whereas foreign firms require skilled labour. Therefore, not sufficient to enhance growth from FDI in Namibia, however, this a similar find to cases in other developing countries.

With regards to the speed of adjustment obtained in the ECM estimates, they were found to have a fairly high speed of adjustment to equilibrium after a shock. Which implies that economic growth indicator is relatively quick in restoring to equilibrium after a shock. Bannerjee et al. (1998) holds that a highly significant error correction term is proof of the existence of a stable long-term relationship. This results also confirmed all models to have passed the diagnostic tests in the first stage where there is no evidence of autocorrelation and the models passes the test for

normality. In addition, the long run and short run relationships were found to be stable for the entire period of study.

In the second empirical analysis of the chapter, we used Shin et. al (2011) test to examine potential long-run asymmetric co-integration relationship between FDI and economic growth. The study failed to detect asymmetric co-integration between FDI and economic growth as reported for in the four models. In short, no asymmetric adjustments were found. This strongly confirmed that a linear framework employed in the first part of the empirical analysis in Chapter 5 was more appropriate in the case of Namibia. Therefore economic growth responds symmetrically to the changes in FDI and other variables, where the adjustment speed to the new equilibrium at each time period is the same for both positive and negative changes. The findings showed that causality between foreign direct investment and economic growth as measured by GDP per capita in Namibia is Granger caused by FDI. This confirms that Namibia's capacity to progress on economic development will depend largely on the country's performance in attracting foreign direct investment.

7.3.3 Sector- wise Foreign Direct Investments and Economic growth:

The third analytical aspect of this thesis was to investigate empirically the impact of FDI on economic growth using sector FDI from key economic sectors, Table 6.1, mainly influenced by foreign presence in the Namibia. The objective here was to see if a consistent positive relationship between FDI and economic growth is to hold when we use sector level FDI rather than aggregate FDI data. This was carried out by testing the hypothesis of a co-integrating relationship between sector-level FDI and economic growth under the framework of a panel model over the period 1990 to 2009, which is notably the post-independence era in Namibia. We implemented the analysis by using panel co-integration techniques that account for both a homogeneous and heterogeneous case in order to derive strong positive evidence between sectoral FDI and economic growth. In the Chapter, the restriction of homogeneous slope parameters against the alternative of heterogeneous ones, in the case of the traditional specification, was tested using a Likelihood Ratio-type test suggested by Levene (1960). Furthermore, the null hypothesis of cross-sectional dependence was tested using Breush-Pagan

LM test. We extended Engle-Granger (1987) causality test by estimating a vector error correction model (VECM) by augmenting the VAR model with one-lagged error correction term to test for causality and the direction in which it runs overall between sector FDI and GDP per capita.

The findings suggest a positive and significant long-run relationship between sector level FDI and economic growth. In both the homogenous and heterogenous estimation, the results were similar in all four specifications. To sum up, the positive long-run relation between sector level FDI and GDP per capita was found to be robust to different estimation techniques. The panels were found to have equal variances, homegeniety, and to be cross sectional dependent, and hence used the MG estimator to correct for such a cross section dependence between panels. The results found the causal linkages among FDI and economic growth to be uni-directional in both the short-run and long-run. This relationship runs from FDI to economic growth in the long-run and from economic growth to FDI in the short-run. This means FDI is attracted by economic growth in the short-run, the influx of FDI then this further accelerates economic growth, hence the causal linkage running from FDI to GDP per capita in the long run.

7.4 Policy Implications and Recommendations

This research has developed a comprehensive investigation concerning foreign direct investments and its effect on economic growth as well as the macroeconomic determinants of FDI flows to Namibia. The results highlight a number of key issues that would help policymakers to introduce a legislation and conducive environment that should be aimed at increasing FDI flows to Namibia to all economic sectors. The main policy implications and recommendations that can be drawn from our empirical evidence are summarised in the following points:

- Namibia's policy of opening up to FDI has indeed produced quantitatively measurable benefits in terms of economic growth and development. Therefore, strategic policies should be put in place that aim at attracting new flows of FDI, foreign firms, with spillover effects and productivity enhancement, inorder to facilitate growth, promote

employment and thus income growth. The government should also aim to get the most benefits from foreign investors within its borders by striving to foster the development of existing foreign-owned affiliates located in the country. Foreign companies continue to invest in countries where they have a presence in addition to the attraction of other foreign entities to an established market that already caters for foreign investors. Therefore, by fostering development of existing foreign affiliates shows having an established market for foreign investors and leads to substantial FDI inflows.

- From the findings, it is viable to encourage the differentiation of FDI promotion policies in Namibia based on the principle that different policy instruments apply to different foreign investor's strategies. The government may emphasise a well-functioning infrastructure and low cost production factors in order to attract foreign investors pursuing global strategies. Conversely, the Namibian government may point to a lucrative national market to catch the interest of foreign investors following a strategy of local responsiveness. It may be feasible to follow such a ''dual'' FDI promotion policy, thereby attracting foreign investors with different strategies and yielding different local linkage effects. This creates a more balanced economy which prevents dependence on any particular sector(s) in the economy and stabilisers economic fluctuations i.e. diversified industries bring new money into an economy.

- The Government should consider putting in place measures to ensure FDI is not only towards exploitation of raw materials but may follow a policy that sees downstream industrial creation such as in South Africa, who have a similar case interms of FDI that exploits raw materials but have seen a large creation of downstream industries.

- Although FDI has played an important role in Namibia, the findings also suggest local conditions matter and can enhance the extent to which FDI benefits materialise. Trade liberalization and macroeconomic stability, namely inflation and the development of financial institutions remains important in Namibia for attracting more FDI. Therefore, the government should seek to improve domestic conditions, which should have the dual

effect of attracting foreign investment that enables the economy to maximise the benefits of such foreign investment.

- The study has shown Namibia to have successful at attracting FDI and has seen significant FDI flows, it should direct these into value-addition of local resources, such as agricultural products (for example leather industry), fish processing, minerals processing and possibly forestry and furniture production.

- The findings from the empirical work carried out on the determinants chapter, highlights the importance of labour force in determining FDI flows. Therefore, the Namibian government will need to reform the labour sector to ensure increased productivity and availability of labour.

- In addition, trade openness in Namibia has been found to have a significant effect on growth with relation to FDI. Thus implies that the trade liberalisation of the economy and export promotion put in place since independence has been positive and in the right direction, and therefore, Namibia should continue improvement on these reforms to increase FDI and to ensure the country benefits from opening its economy to global trade.

- It is also crucial that the Namibian government formulates policies that improve local skills and build up its human resource capabilities. The current Employment Bill passed by the Namibian Government in March 2010, which is in the right direction, should incorporate a training scheme focusing on human resource development. This is necessary to raise not only the volume but also the quality and sophistication of the FDI that the country could attract. If Namibia where to rely exclusively on low-cost-low skill labour or natural resources, as is the case, it will find it difficult to induce FDI into high value-added industries and may suffer slower economic growth.

- Namibia should resist additional conditionalities that come with FDI and instead set their own conditions in the form of performance requirements, such as job creation and skill transfers.

- FDI should be directed towards those sectors where it may be useful without undermining local industries.

- Furthermore, Namibia needs to devise strategies to retain savings as the basis for domestic capital accumulation.

- The Namibian government should aim to attract the kind of manufacturing investment that provides technology, skills and market access. Attracting this kind of FDI will be particularly important now, as trade liberalisation has exposed domestic enterprises to international competition. Many of them have found adjustment difficult with lagging skills, technology and competitiveness. They only have a limited ability to gear up to world competition by upgrading these factors on their own, and as such, attracting this kind of FDI would be vital.

Some other policies:

- In addition, another important policy to recommend, is that government should work at avoiding imposing a tax incentive system that is complex and non-transparent, importantly to avoid an incentive system or legislation that would yield revenue losses for the government.

- By focusing on specific regions, Namibia's FDI policy can contribute to growing income disparity between the regions especially east and north east of the country where foreign investors are non-existent. As compared to the south, south west and coastal regions. The Namibian government should reduce these income disparity by attracting FDI to those regions through increases in the availability and quality of infrastructure.

7.5. Limitations and Further research

Our study expends the scale of the research on the relationships of FDI and economic growth in Namibia. However, there are still some limitations in this study. One big issue is that the study is restricted by the data availability. The sample size of our model is relatively limited. From 1980 to 2009, only 30 annual observations for each variable are taken into the system, which constrains the degree of freedom in the estimation when taking account of the number of variables and lags. Technically, the problem of small sample would affect the accuracy of our results. Furthermore, data from some variables that we are interested in are not available. For example, we could not find the data for FDI inflows prior to independence and have to compensate with FDI Stock in our system. Also more information is needed to capture the effect of foreign direct investments. If more observation can be obtained and variables can be measured more precisely, the results from the framework we established would be more malleable.

We also were unable to include taxes and tariffs, as a key determinant of FDI flows to Namibia, since there is no data available for this variable, especially prior to 1994. From the theoretical point of view, the labour costs is a relevant determinant of FDI however, such data for Namibia is not available. The availability of annual data on all required series might provide a better investigation of the effects of FDI on economic growth and its determinants.

The present investigation examines the effect of FDI on GDP per capita as well as the main determinants of FDI flows, based on time series analysis and standard co-integration approaches. In addition, the economic impact of FDI could be ascertained by establishing a panel analysis using cross country evidence in order to combine features of both time series and cross-section data, which can better detect and measure more effects that cannot sometimes be captured by time series analysis. Also, a cross-country study would allow us to make a comparison on the impacts of FDI, to other Southern African countries.

The investigation further examines the effects of sector-wise FDI on GDP per capita using data of FDI within each of the key economic sectors in Namibia. Based on our analysis, further research at a micro-level would be beneficial to understand the effects of FDI within each industry, but such data at industry level is difficult to obtain for the required series and in some

cases not available as yet. The availability of such data could provide a better investigation of the effects of FDI in each of the key economic sectors and also would give an analysis on what sectors require better policies and incentives to attract FDI.

In addition to further research, it would be benefial to include inequality coefficient and democracy dummies to study the effect of FDI on growth. Finally, another consideration for future work would be to study the concept of FDI and the resource curse in Namibia.

Despite these limitations, since this is the first study to investigate the relationship between FDI and economic growth in Namibia and at a comprehensive country analysis, the research is expected to contribute to the literature on FDI effectiveness in Namibia and in developing host countries in general.

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