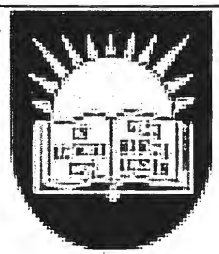

Impact of Foreign Direct Investment on Export growth of the host country: A case study of South Africa

By

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Dedication

This dissertation is dedicated to the late Mr. Wilford. T. Chamangwana. Even though you are no longer here to see what I have grown to become, all I have done in my life, I have done to please you. I know that wherever you are, you are smiling because you have shaped me into the person I am today and I will forever be thankful. May your soul rest in peace daddy.

Abstract

This study attempts to establish the relationship between Foreign Direct Investment and the export growth in South Africa. The link between Foreign Direct Investment and export growth is well documented in the literature and econometric techniques using data from 1978-2010 are utilised to investigate in the case of South Africa. Johansen Co-integration Techniques and the Error Correction Method for long-run and short-run analyses respectively have been applied. After considerable evaluation it is established that indeed Foreign Direct Investment plays an important role in export growth as two equations are estimated, one with the stock of FDI and one without. Results show that when the stock of FDI is added it has supply-increasing effects on exports.

Acronyms and Abbreviations

ADF- Augmented Dickey Fuller

BRIC- Brazil, Russia, India and China

BRICS- Brazil, Russia, India, China and South Africa

BEE- Black Economic Empowerment

B-BBEE- Broad-Based Black Economic Empowerment

BIT- Bilateral Investment Treaties

BTI- Board of Tariffs and Trade

CADF- China-Africa Development Fund

DTA- Double Taxation Agreements

DTI- Department of Trade and Industry

EU- European Union

FDI- Foreign Direct Investment

FOB- Free on Board

GDP- Gross Domestic Product

GEAR- Growth, Employment and Redistribution

GEIS- General Export Incentive Scheme

IIC- International Investment Council

LM- Lagrange Multiplier

MNC- Multi-National Company

MNE- Multi-National Enterprise

MFN- Most Favoured Nation

NICs- Newly Industrialized Countries

PP- Phillips- Perron

SADC- Southern African Development Community

SARB- South African Reserve Bank

TIPS-Trade and Industrial Policy Strategies

US- United States

UK- United Kingdom

UNCTAD- United Nations Conference on Trade and Development

VECM- Vector Error Correction Model

WTO- World Trade Organisation

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CHAPTER ONE

Introduction

1.1 Background information

The effects that inward foreign direct investment (FDI) has on the host country's exports have ignited a lot of debate in literature. The main issue in this debate is how FDI is the channel through which export performance of the host country can be stimulated. According to Klasen *et al* (2008) it is of more advantage for developing countries to export to industrialized countries than to equally underdeveloped countries as it brings in positive attributes which make an economy internationally competitive, an important trading partner and a viable investment destination and therefore boosting up export growth of the host country.

According to Oliveira (2001) FDI has sha[illegible] the recent economic history of most developing countries, especially since the 1980s, where FDI flows to these countries have been focused mainly at export-oriented projects. Gonzalez-Pernia and Pena-Legazkue (2009) give an analysis of export-oriented entrepreneurship for 17 Spanish regions and found out that the Spanish regions which had higher levels of entrepreneurial activity exhibited higher rates of economic growth and moreover export-oriented entrepreneurial activity made an additional positive contribution to regional economic growth in Spain.This has therefore seen developing countries scrambling for foreign investors, liberalizing their trade regimes by moving away from importing-substitution investment regimes to export-promoting development policies. Concurrently, many firms have been implementing a universal tactic with centralized production in one location, design in another, research in another and so on which makes their operations vastly specialized. So with such trends occurring in terms of liberalizing trade and changing firm investment strategies much of the investment that has been required in developing countries in recent years has been investment directed toward the export markets. Most empirical studies according to Oliveira (2001) who gives examples of China, Mexico and Malaysia have proved that these investments directed towards the export markets are highly to create net benefits for the economy of the host country than investments oriented for domestic markets.

Zhang (2007) is of the view that an empirical assessment of the role of foreign direct investment (FDI) in a host country's export performance is significant. FDI promotes exports of host countries by boosting domestic capital for exports, helping transfer of technology and new products for exports, aiding the access to new and large foreign markets, and providing training for the local workforce and upgrading technical and management skills. On the other hand, nonetheless, it is sometimes suggested that FDI may lessen or substitute domestic savings and investment, transfer low level technologies or technology which is inappropriate for the host country's factor magnitude, or target primarily the host country's domestic market and hence not increase exports,

Sharma (2000) views the role of FDI in export promot5ion in the developing countries as debatable and depending vitally on the motive for the investment. If the motive behind FDI is to tap export markets by taking advantage of the country's comparative advantage, it may contribute to export growth. However if the motive on the other hand, is to capture domestic market, that is, the tariff-jumping type of investment, then it may not contribute to export growth (World Bank, 1993). As a consequence, whether FDI contributes to export growth or not depends on the nature of the policy regime used by a host country. More outward oriented regimes promote export-oriented FDI whereas those inward-oriented regimes attract FDI for the purpose of capturing domestic rather than export markets.

Edwards and Lawrence (2006) have explained the trade policy of South Africa to have exercised a key influence on the structure and total trade growth. Duringthe Apartheid period, the protection of tradeextremelyhampered both exports and imports. The South African economy relied on favourable global commodity price trends in order to elude running into an external constraint. South Africa established a relative advantage in capital-intensive primary and manufactured commodities partially, not only due to its natural resource endowments but also due to the form of protection which was mainly disadvantageous to exports of non-commodity manufactured merchandises. High and opaque tariffs extremelyhindered the growth of exports and when the global commodity markets were weak, adding on todecreasing gold exports, thistotally inhibited overall growth and dampened the reaction of exports to the weaker rand in the late 1980s. In addition surcharges were effective in reducing imports.

A further assessment by Edward and Lawrence (2006) is that in the 1990s, trade liberalization found its introduction to the South African context and not only did it enhance a

rise in imports but it also boosted exports, by decreasing both input expenses and the comparativecost-effectiveness of local sales. The progress in non-commodity industrial sectoral exports due to liberalization was essentially faster than sectoral imports. This evidence suggests that additional trade liberalization could well be part of the strategy to enhance export diversification. It points to the importance of policies that afford South African firms with access to inputs at world prices as well as a competitive real exchange rate.

Flatters and Stern (2007) state that irrespective of the extensive economic reorganisation, the performance of the South African exports in the post-Apartheid period is minimal than what might have been anticipated. In the period from 1984 to 1994, the goods exportsdeveloped at a 5.7 percentageregular proportion each year in relation to volume which was somewhatquicker than the 5.6 percentage growth in global exports. The hope was that with the termination of sanctions, the deregulation of trade and former economic control proceduresit would springup a considerable boost to the South Africancomparative and absolute export performance. Nonetheless, as the growth of exports worldwide grew by 6.2 percent each year over the decade since 1994, South Africa'sregularproportion in export growth fell slightly to 5.6 percent a year and its share in worldwide exports fell from 0.7 to 0.5 percent during this phase. The question in place is if this type of performance is basicallyowing to the unsuccessfulstructure of the South African exports. A probable reason they come up with is that for such a performance the South African exports are vastlyconcerted in natural-resource-based products, which faced quitesmall growth in world markets over most of this phase.

1.2 Statement of the problem

Exports have been in the focus of economic literature and policy making for years for the reason of their multi-fold contribution to achieving and maintaining macroeconomic stability, resolving macroeconomic problems, for example, unemployment and trade deficit, accelerating economic growth and increasing the international competitiveness of economies. The elementary rationale which underpins the significance of exports to any economy is economic growth so exports can be viewed as being part of the engine of economic growth. Therefore for policy makers it is important to estimate the impact of the determinants of export performance which have FDI as one of them. Foreign Direct Investments as a determinant of export performance therefore should have a significance on the export performance of the host country. Points which come to mind will be: the significance of

Foreign Direct Investment on the export performance of the host country, given the trends in the FDI flows from the past years to the current year; whether it brings positive or negative attributes with; the solutions that can be found to curb the negative effects and ways to enhance the positive ones.

1.3 Objectives of the study

The primary purpose of this study is to exploreFDI capacity and spill-over effects' contributions on the performance of exports in the South African economy. The specific objectives will be to:

- To asses trends in FDI flows to South Africa from 1978 to 2010,
- Econometrically ascertain the relationship between foreign direct investment and export performance in South Africa,
- Make policy recommendations that the South African policy makers can implement so as to enhance the positive attributions brought by FDI on exports at the same time striving to curb negative impacts of FDI on exports.

1.4 Hypothesis

The hypothesis that this study seeks to test is:

H_0: FDI inflows do not impact positively on the export growth of the South African economy.

H_1: FDI inflows do impact positively on the export growth of South African economy.

1.5 Justification of the study

The study will be an important supply of information for policy makers in international trade as they need such information for them to formulate policies. Policy makers require information on the particular factors that affect exports in all countries. Therefore, by explaining FDI, which is one of the determinants of exports, in the South Africa context, this study will assist policy makers to devise compelling policies. With South Africa also recently integrating into BRIC to form the now BRICS around April 2011, the study would also be of relevance to show how this integration will affect South Africa's export growth through changes which it will bring about in terms of FDI inflows.

South African policy makers have been concerned by exports which they view as important to the economy's economic growth. According to Agasha (2008) export growth has various determinants, for instance, the price of the exports, Gross Domestic Product, the terms of

trade used by an economy and Foreign Direct Investment. Whilst most of the determinants' relationship with export growth is not complex, on another hand FDI is a bit complex as it has supply volume-accumulative effects and Foreign Direct Investment-specific effects. The former are the ones more linked with increasing the export supply potential, whilst the latter effects mainly improve the local firms due to the advantages of being more advanced of the multinational firms. So these effects of FDI can be confusing and hence the results obtained in this study will be a useful guide to policy makers to insinuate what contribution FDI really has on South African export performance.

1.6 Organization of the study

This study is divided into six chapters. Following this introductory chapter, chapter two will look at the background and overview of Trade regime history in South Africa, inflows of FDI and the performance of exports in the South Africa context. Chapter three focuses on the literature review which is in two parts, that is, the theoretical and the empirical literature. Chapter four will cover the research methodology and analytical framework which includes model specification, data sources and definition of variables. Estimation and empirical analysis of results will be dealt with in chapter five whilst chapter six concludes the study by providing implications of the results, a general summary of the study, limitations and policy recommendations.

CHAPTER 2

Background and overview of FDI and export trends in South Africa

2.1 Introduction

The purpose of this chapter is to give an overview of the transformation in the trade regimes, the FDI inflow and export growth trends in South Africa. To this end, this chapter is sub-divided into six segments. The first section introduces the chapter. It is followed by section 2.2 which gives brief explanations as to the meaning of FDI, its benefits and costs and general importance. Section 2.3 discusses the trade regimes that have been in use in South Africa during the apartheid and post-apartheid eras. Following is section 2.4 giving a review of the volumes of FDI inflows, whilst section 2.5 gives a review of the export performance in South Africa and lastly section 2.6 ends the chapter with concluding remarks to serve as a summary to it.

2.2 Meaning of FDI, its general importance, benefits and costs

Foreign Direct Investment (FDI) can be simply explained as a procedure wherecitizens of one nation, the home country, attain possession of externalassets with intention to control the manufacture, circulation and additionalundertakings of a firm in another nation, the host country. A lot of authors have proposed various definitions of FDI and just to mention a few: Hines (1993) has defined FDI as happening when a firm finances directly in production amenities in a country and upholdsgovernance over the venture. Bjorvatn (2006) explains Foreign Direct Investment as a deal that is completed to attain a long term interest in anoverseas firm with the determination to have an activesay in its running. Asafo-Adjei (2007) cites Eatwell, Milgate and Newman (1987) to have defined FDI as the act of acquiring assets, which could be financial, for example bonds and equity shares or the proprietorship of production resources like factories and land, outside one's home country.

The initial point to this whole issue under discussion here is the question why firms embark on investment overseas to produce the same goods as they produce at home. Blomstrom (1996) takes the answer to this question formulated by Kindleberger (1969) as follows: "For direct investment to thrive there must be some imperfection in markets for goods or factors, including among the latter technology, or some interference in competition by government or by firms, which separates markets." Therefore, to be able to invest in production in foreign markets, a firm must own some asset, for instance, product and process technology or

management and marketing skills that can be utilised profitably in the foreign firm. This means that companies investing in a foreign country signify a unique kind of venture and the distinctive qualities are crucial when analyzing the impact of foreign direct investment on host countries.

The entry of a multinational corporation (MNC) signifies something more than a simple import of capital into a host country. So this difference is mainly important for developing countries, where domestic firms are usually rather small, weak, and technologically backward. Developing and developed countries also differ in aspects such as market size, measure of protection, and availability of skills. The entry of MNC subsidiaries into less developed economies may hence have effects, both positive and negative, as FDI is just like any other form of investment and these are summarised briefly below.

FDI provides capital which is usually missing in the host country and is suitable for economic development and the foreign corporations create new jobs for the local workforce which brings about new know-how and managerial skills for the workforce. The FDI recipient economy trains employees in the course of operating the new business, so that is how human capital is developed. New technologies which are usually not in the host country are also brought about by FDI. However, it is very important to evaluate the definite uses of the different technologies in the host country. The technology has to be applicable to the hosting nation's business division beyond the particular enterprise receiving it which makes the overall level of technology in the host nation's business sector of significance.

FDI beneficially provides better access to foreign markets as the foreign corporations can provide useful contacts for their domestic subcontractors which also makes the economy more competitive in the International market. A further advantage as noted by Asafo-Adjei (2007) is that flows of FDI do not create debt and therefore they are anideal financing system for the exterior current account deficits, particularly in the developing nations where these accounts can be huge and continual.

Foreign Direct Investment however is not only said to affect the host country positively, negative effects are also noted. The "crowding out" effect can be seen to occur when the foreign corporations target the domestic market and the domestic corporations fail to compete with these superior foreign firms. The foreign firms can also buy local companies so as to shut them down and gain monopoly, raise prices then extract extreme profits thereby

eliminating any potential of FDI benefits. It also can lead to loss of jobs for the local workforce. Another negative effect to note is that if the foreign firms make use of their usual suppliers it will lead to increased imports yet the target to increase economic growth is to have more of exports than imports. Decapitalization arises due to FDI in some instances if foreign-owned companies become established and more profitable. The reason is that, once the firms finish their projects they repatriate their profits back to their countries. So the local currency is converted to their home-country currency and that is how capital leaves the host country which might also be a strain on the balance of payments.

New production facilities set up are also said to lead to environmental degradation at times. According to Asafo-Adjei (2007) MNEs try to locate polluting facilities where environmental controls are the weakest and most developing countries have very few environmental regulations, so it may lead to terrible accidents and great environmental harm caused by the MNEs. FDI also can cause social discomfort as MNEs have a tendency of exerting too much power over public goods once they become monopolies. Examples of public goods are water and electricity. So if these are exploited the public can retaliate and protest which leads to a hostile business environment and political instability which can also lead to a politically unstable situation.

Seeing that the nature of FDI is two-sided, that is, having pros and cons, it's important to analyse the impact it will have in a specific economy as it might have different effects in different economies. Sharma (2000) brings out the role of FDI in promoting exports in developing countries as controversial as it depends on the motive of the investment. Investment motives to capture the domestic market will not give any contribution to growth of exports, whilst investment motives that take advantage of the host country's comparative advantage, tap exports and hence, contribute to growth of exports.

Asafo-Adjei (2007) asserts that at the top of the agenda for developing countries is attracting FDI as it has become one of the most key sources of development and economic growth and to do so there are policies which a country can utilise. These include the general economic policies which increase locational advantages, national FDI policies which reduce investors' transaction costs and international FDI policies which deal with agreements on foreign investments. General economic policies strive to improve the economy's essentials like market size, availability of skilled labour and infrastructure, whilst national FDI policies operate at the domestic level regulating entry and exit of FDI in conjunction with the

establishment of incentives and limitations on operations of MNEs in different sectors in the economy. International FDI policies function on an international level dealing with agreement issues pertaining to FDI treatment in a particular region.

Given the different policies that an economy can use so as to attract FDI, it means different economies will use different policies as long as they work for them. Additionally, adapting from a 1993 World Bank report, the nature of the policy regime in use in a country is of utmost importance as all these policies, (be it a general economic policy, a national FDI policy or an international FDI policy), have a nature. And hence as a consequence, whether FDI contributes to export growth or not depends on the nature of the policy regime used by an economy. Policies can be inward-oriented or outward-oriented. An inward-oriented policy is said to attract FDI mainly to capture domestic markets rather than export markets, whilst an outward-oriented one encourages export oriented FDI which means a boost in the host country's exports. This therefore makes it very important to review upon the nature of policy regimes that have been implemented in the South African economy in previous periods and currently.

2.3 Review of South Africa's Trade Policy

Tsikata (1999) begins with a brief account of the South African trade regime that was present during the 1980s and explains it as having been branded by extreme protection around huge tariff rates, import surcharges, formula duties and direct built control. The policy of trade in South Africa was traditionallychannelled by three values. Import-substituting industrialization that confined small businesses was the first. Second was the expansion of strategic industries in oil, arms and coal as worldwide opposition and segregation towards South Africa enlarged because of its Apartheid policy. Third was the intentional expansion of exports in relation with mining through upstream mineral beneficiation policy which added value to South Africa's mineral natural resources products through further processing.

The new South African government having inherited an economy that came from a recession of three-and-a-half-years that followed almost two decades of decline,it gave immediatesignificance after the April 1994 elections the challenge of withdrawing the country's declining position in an increasingly globalized economy. A clear symbol of its doing away with the past economic policies and a crucial element of its initiative to attainquicker economic growth was the new regime's liberalization of the external trade regime. From disorganizedearly stages in 1990 that gathered motion with a formal Offer in

1995 to the World Trade Organization, South Africa has noticeably liberalized its economy through reform of its import tariff and, to a minor level, agricultural deregulation. (Tsikata, 1999)

According to Tsikata (1999) the new government has indicated its dedication to trade reform by making extensive steps forward in streamlining the very complex tariff regime of the early 1990s and in dropping the overall level of nominal and effective protection. Tsikata (1999) compares South Africa to other middle income countries in the SADC region. It shows that South Africa has managed to acquire and maintain a relatively low mean tariff rate as shown in the box below.

Box2. 1: Tariff rates in South Africa

Box 1: Tariff Changes at a Glance

	1990	1996
Minimum Statutory Tariff	0	0
Maximum Statutory Tariff	1389	61
Mean Statutory Economy-wide Tariff*	27.5	9.45
Mean Statutory Manufacturing Tariff*	29.8	15.6
Coefficient of variation#	159.8	134.0
Number of Tariff lines	12500	8250
Number of Tariff rate bands	200	49
Mean implicit tariff (collection rate)	9.0	4.5
Mean effective protection	30.2	22.2

*= Unweighted

#= A normalized index of dispersion calculated as the standard deviation divided by the mean

Adopted from Tsikata (1999)

It should however be kept in mind that this average is misleading as it camouflages great dispersion in the regime, which to some extent is dueto the bigamount of zero-rated tariffs, and also as the progressing tendency to alter the rates repeatedly in a year. Tsikata's diagram sums up comprehensive tariff statistics for the economy pre and post liberalization utilising calculationsbuilt on customs transactions. The trade-weighted mean tariff rate is the weighted average of Most-Favoured Nation (MFN) rates relevant to the bundle of imported goods. All taxes are inclusive in both the weighted and unweighted cases, that is, *ad valorem*, specific or both. The average nominal and effective tariffs (both trade-weighted and unweighted) show a notable collapse. Tariff rates remain high at 49 even with a declining trend. This likely reveals the recurrent variations in tariff levelsin any given year. If the distinctive industries, that is, the textiles, clothing and motor vehicles industries were to be omitted, the rates will stand at 19. The range of statutory tariffs lessened as well from 0%- 13.89% in 1990 to 0%-61% and (0%- 40% in the case that the distinctive industries are excluded). Therefore, the spread of the tariff schedule has fallen (which is shown by the coefficient of variation of the statutory tariffs). The collection rate embodies the definite tariff income collected divided by the Free On Board (FOB) value of imports. Due to a big number of zero-rated tariffs, of 43.7% of the total in 1996, emanates the low rate of effective collection as a result of exceptions and trade preferences, duty rebates, and duty evasion.

Tsikata (1999) goes on to give a detailed evolution in South Africa's export regime which characteristically has tended more to consist of channels that support exporters, and is against the export control measures which were inherent in the Apartheid era. From 1990-97 the most important scheme was the General Export Incentive Scheme (GEIS). In this scheme there are no significant export bans or taxes that are in place except for a 15% tax that was put in place for unpolished diamonds and certain agricultural products regulated by the control boards. South Africa has integrated more into the World Trade Organisation (WTO) and so its nature of export support measures has also transformed. The active encouragement and diversification of exports initiated in the early 1990s and it has continued under the liberalization programme, although with different instruments.

Tsikata's 1999 report goes on to reveal that prior to 1990 there were four different export subsidies that were in existence, but these were substituted in 1990 by the GEIS. Benefits accumulating to firms for particular products under GEIS were approximated as a function of

their value-added and a formula to calculate GEIS has been given in the report and it is shown below:

$Z = U*(M +/-E) (P)$

Where:

Z = Tax-free value of export assistance

U = Export value (Free On Board-FOB)

M = Manufacturing level factor determined by the category of export goods

E = Exchange rate factor based on information provided by the Reserve Bank which took inflation and exchange rates into account.

P = Factor related to the local content of the exported product.

The manufacturing level factor was determined as follows:

Category	Percentage
1 - Raw materials	0.0
2 - Beneficiated raw materials	7.5
3 - Basic manufactured products	12.5
4 - Other manufactured goods	25.0

A further explanation given to this shows that GEIS was essential in stimulating exports or in other words at least making some firms less marginal. The effective subsidy on GEIS ranged from 5 percent to 18 percent. In its first year of operation, that is, in 1990 about R800 million/US$352 million was budgeted and by March 1992 GEIS was running at R2billion/ US$656 million. Payments to GEIS totalled R1.5 billion in 1993, R1.43 billion in 1994 and R1.37 billion in 1995. Then in 1996 which was the last full calendar year in which GEIS was in operation, payments were estimated to be 0.5% of GDP. Moving on to 1995, the

Government commenced a three year process to eradicate GEIS as the scheme was not consistent with its WTO commitments. In June 1995 they began taxing the benefits of the GEIS and the Government reduced the number of categories suitable for the subsidy and eventually the level of the subsidy was cut. Coming to March 1996, the Government publicized its decision to step up the phasing out of the GEIS which was only completed in 1997 with the last payments having been made in July 1997.Tsikata (1999) cites from a DTI (1997) report on a summary of Incentive Programmes that the fiscal savings from GEIS have been allocated to be utilized to fund a range of supply-side export-supporting activities that are WTO-friendly. The main instruments have been recognised to be a mass of technical, technological and marketing support schemes which are designed to attract the competitiveness of firms in general, with some targeted exclusively at exporters which shows that the ongoing trade reform program is undoubtedly important in reducing the anti-export bias that exporters faced previously.

According to Jenkins, Carolyn and Siwisa (1997) as cited by Choga (2008) the dual exchange rate system which was in use was eradicated [illegible] and this was followed by the execution of export subsidies in a bid to reduce the anti-export bias that was inherent in the economy. This process of trade liberalization was further improved in 1985 which saw the government varying the publication of a positive list to a negative list of items that needed approval before being imported. However some financial sanctions were imposed on South Africa in 1985 due to the political environment the country was in at that moment and therefore the progress of the trade liberalization process came to a standstill, South Africa lost some of its creditors as they were taking a capital flight from the economy and also the US bank stopped its rolling over of short-term loans to South Africa. This led other foreign banks to follow suit and hence it caused a major liquidity crisis in the economy. Still in 1985 a debt crisis arose and this crisis can be certified to be the cause of a striking reduction in foreign direct investment and short-term capital inflows, which only ended in a hefty and persistent deficit in the balance of payments of South Africa. Another end result that was encountered was the reversal of some policies, for example, the re-imposition of the dual exchange rate system attached with a considerable real depreciation of the rand and the introduction of a 10% import surcharge.

Jonsson and Subramanian (2001) review that by the end of the 1980s, South Africa had the most tariff rates, the widest range of tariff and the second highest level of dispersion among

developing countries. Ketil (2006) is cited by Choga (2008) as revealing that the country had a very restrictive trade regime, which had an unweighted average tariff rate of 25% and again, by the late 1980s, South Africa was faced with formal sanctions on its exports of coal, iron, steel, uranium and agricultural products to a number of industrial countries and on its imports of petroleum, computer and high-technology equipment. These measures were stimulated by action in the United States and the Commonwealth countries.

Choga (2008) cited Bell (1997) who went on to identify 1983 as the year that initially began a more intensified period for trade liberalization, a period that was characterized by a decrease in the pace of economic expansion, and this can be proved by the collapse of the gold price, the sharp decline of exports in general, the rapid increase in foreign debt and heightened political instability. So a kick starting amendment to this saw the introduction of a more powerful system of export incentives that were designed to ease the pressure on exporters of the comparatively higher cost of local production and delivery to overseas markets. Customs duty drawbacks and duty exemptions were granted. The incentive system was further cancelled by the massive real appreciation of the rand, accompanied by a world recession which led to the beginning of a sharp recession in South Africa's exports.

According to Kusi (2002) South Africa's trade regime in the 1960s and 1970s was disproportionate with both the altered external economic circumstances and the new domestic consensus on the suitable role of trade in growth and development. During this period, the country's trade regime was characterized by extreme protection which was built around high tariffs, formula duties, import surcharges and direct controls. The method of tariff protection was introduced during the 1960s, nevertheless direct import controls remained the core defensive mechanism through to the mid-1980s.

Kusi (2002) goes on to bring out the change of the trade techniques by South Africa so as to share in the gains of globalization as it began pursuing the trade liberalization strategy since the early 1980's but however noted that the thrust for liberalization gained momentum in the first half of the 1990s. This is the phase in which broad reforms in trade policy were introduced. During this stage nearly all limitations on trade were eliminated, the tariff system was restructured and simplified and the tariff charges were significantly reduced. Additionally, all other trade-allied instruments that breached the WTO rules, for instance local content requirements and export incentives, were eradicated.

Edwards and Lawrence (2006) have explained the South African trade policy to have exerted a major influence on the composition and aggregate growth of trade. In the Apartheid period, trade protection seriously impeded both exports and imports, and the economy depended on favourable global commodity price trends to avoid running into an external constraint. South Africa developed a comparative advantage in capital-intensive primary and manufactured commodities partly not only because of its natural resource endowments but also because the pattern of protection was particularly disadvantageous to exports of non-commodity manufactured goods. High and opaque tariffs seriously impeded export growth and when global commodity markets were weak, in combination with declining gold exports it seriously inhibited aggregate growth and dulled the response of exports to the weaker rand in the late 1980s. In addition surcharges were effective in reducing imports.

A further assessment by Edward and Lawrence (2006) is that in the 1990s, trade liberalization found its introduction to the South African context and contrastingly it not only increased imports but also boosted exports, by reducing both input costs and the relative profitability of domestic sales. The growth in non-commodity manufactured sectoral exports due to liberalization was essentially investment sectoral imports. This evidence suggests that additional trade liberalization could well be part of the strategy to enhance export diversification. It points to the importance of policies that afford South African firms with access to inputs at world prices as well as a competitive real exchange rate.

In Flatters and Stern's report (2007), South Africa since 1994 has been rapidly reintegrated into the global economy, with the contribution of imports and exports rising strongly as a percentage of the Gross Domestic Product (GDP). The economy has become more open, more productive and more outward leaning. They explain this adjustment as not only being somewhat a part of a response to domestic factors and the ending of South Africa's trade and political isolation due to apartheid, but also part of a worldwide process of trade liberalization and economic integration, commonly referred to as globalization.

Going on in Flatters and Stein's report (2007) South Africa has been involved in endowments of natural resources or basic industries but these are no longer required or adequate for involvement in this new global environment. International trade is a replacement for self-reliance or independence at all stages in product value chains and the sheer presence of these raw materials locally, if they are not managed appropriately, can be a barrier rather than a help to downstream industries. As an alternative, improved logistics and trade facilitation are

likely to be far more crucial to the country's future industrial competitiveness, development and growth.

The agricultural sector has contributed much to the export sector in South Africa and thus the liberalization of international trade had an effect on the agricultural sector largely. The trade liberalization strategy by South Africa has been a significant tool to achieve economic growth acceleration and to show that South Africa has diverted from the past economic policies in all sectors including agriculture too. According to Vink, Tregurtha and Kirsten (2002) before liberalization the trade regime of South Africa was characterized by several quantitative restrictions, a large number of tariff lines, a wide dispersion of tariffs and diverse forms of protection including specific and *ad valorem* duties and surcharges and when it came to agriculture they seriously impeded any foreign competition. However, the liberalization of international trade in agriculture started in 1993 with the Marrakech Agreement and it gained much thrust after the first democratic government came into power in 1994. This is said to have been part of a reorientation of the economy from import substitution to an export-led growth strategy.

In 1994 the new democratically elected government inherited an economic system characterized by deteriorating economic and employment growth. In reaction to these pressures, the government initiated a number of policy reforms to stimulate growth, employment and redistribution. The macroeconomic reforms were enclosed in the Growth, Employment and Redistribution macroeconomic policy (GEAR) strategy which not only encouraged growth and employment, but also aimed to convert South Africa into a "competitive, outward orientated economy". The new government agreed to an ambitious trade liberalization program which was a two-branched approach to the policy: multilateral trade liberalization in the context of the Uruguay Round of trade negotiations and unilateral trade liberalization. Numerous other policy changes relating to labour markets and competition have also been implemented (RSA, 1996).

Regardless of all the restrictions and drawbacks faced in South Africa due to the political and financial instabilities it did not stop the persistent commitment to make the trade liberalization policy to work, which became more evident towards the end of the 1980s. According to Black (1996) export promotion was further enhanced in 1989 by the introduction of sectoral 'structural adjustment programs', which were intended to improve the competitiveness of the local industry through selection and targeting, which was conducted

on the grounds that comparative advantage was not a fixed concept and be created by governments. More weight was put upon also the role of the state concerning technology transfer policy, with foreign exchange applications being evaluated on measures such as the amount of royalty payments, restrictive clauses (on exports) and the existence of alternative local sources of technology. These programs created huge conflict between the DTI (Department of Trade and Industry) and the BTI (Board of Tariffs and Trade), as the DTI criticized the complex and unmanageable programs that were clearly unaffordable on the basis of insufficient staff for implementation and openness to fraud on the part of exporters.

So as to boost up South Africa's investment identification, the government has endeavoured to support and smooth the progress of investment through institutional modernization and bilateral or in other words mutual negotiations. According to Roussot et al (2006) after the removal of sanctions, South Africa actively partook in trade negotiations on both bilateral and multilateral levels. This has been carried out by targeting a number of strategic partner countries with which to develop economic associations through bilateral free trade agreements with the majorly targeted being the European Union and SADC countries.

Roussot et al (2006) bring out that many African countries, of approximately 50 in number, have concluded bilateral investment treaties (BITs) and South Africa is said to be leading in this aspect. The BITs state and explain the stipulations under which FDI can occur amid partner countries and are inclined to contribute more to the commencement of a safe environment for foreign investors in the continent. BITs also contain provisions for dispute settlement, in case any arises, either between treaty partners or between investors and the hosting country. Another important aspect covered by the BITs is a restrain against discrimination in the treatment and entry of foreign-controlled firms. The statistics that Roussotetal (2006) have revealed show that South Africa (just like Egypt, Mauritius and Tunisia) has signed double taxation agreements (DTAs) and by 1999 the number of DTAs that South Africa had signed was 47, 29 for Mauritius had, 27 for Egypt and Tunisia 26.

As part of the strategy to promote more FDI there has also been the creation of the President's International Investment Council (IIC), the International Task Force on Information Society and Development, and the International Marketing Council. The role of the configurations is to promote South Africa's investment credentials and its image by "trademarking" the country, and in that way serving to form a subjective inclination for South Africa amongst foreign investors. With such a strategy, it has helped South Africa to develop

extensive relations with South America and Asia as can be supported by it becoming part of BRIC to form BRICS recently. The government's particular interest in this is to attract export-oriented FDI which it hopes to stimulate innovation and exports in local firms via technology and skills transfer and also other competitive pressures brought along with FDI. Another aim is to integrate domestic companies into the global economy and Roussot etal (2006) attest this notion pointing out the motor and components industry of South Africa.

According to National Treasury (2011) report, historically, a broad regime of exchange controls was in place in South Africa and it was designed to confine capital outflows in the context of the strict constraints on economic growth and limited access to international finance. The government is said to then have given a significant emphasis on the normalisation of international trade and financial linkages and exchange control reform from 1994. This has been a component of the strategy of economic policy and institutional development which has been targeted at escalating investment, growth and at the same time tackling some macroeconomic problems like unemployment and poverty. The reforms put in place have given priority to the elimination of barriers to inward investment at the same time strengthening the flexibility of the economy to foreign capital flows volatility which is commonly observed in emerging economies.

A very important element of the reforms implemented noted has been the measures to facilitate inward foreign direct investment which can yield bonus economic benefits mentioned earlier which include the transfer of technology and skills to the host country which in turn can promote productivity and growth, the creation of relationships with domestic firms supporting employment and growth in other parts of the economy, and the opening of new markets through cross-border trade.

One of the key features of capital account liberalization in South Africa has been the priority given to eliminating exchange control restrictions on foreign investors. The approach of the new democratic government in the mid-1990s reflected the role that foreign capital would need to play in South Africa in supporting investment and growth, especially in the context of a persistently low domestic savings rate. The abolition of the financial rand mechanism in March 1995 marked the end of restrictions on capital flows by non-residents, including inward foreign direct investment (FDI). On the contrary, the reform of controls on South African investors has followed a more phased and targeted approach that has prioritised macroeconomic stabilisation and financial sector development. South Africa offers an open

environment for inward FDI, in the sense that there are no screening and approval processes or formal ownership thresholds across much of the economy, although the B-BBEE scorecard is an appropriate factor in decisions on the constitution of ownership. There are no major areas of regulation where foreign investors receive unfavourable treatment relative to domestic investors as a matter of policy. The existing policy framework for inward FDI thus provides a substantial degree of certainty for foreign investors that they will not face undue or arbitrary prejudice (National Treasury, 2011).

Gelb (2010) gives a brief analysis of the inward FDI policy in South Africa and accounts that the South African policy framework has become largely laissez-faire or in simple terms, largely accommodative when it comes to the entry *per se* of foreign firms. This implies that there is no official authorization in the policy that is obligatory for foreign firms to enter the South African economy, with the exception of only a few sectors such as in the banking sector. Foreign investors are merely subject to the same laws and regulations as domestic investors. The policy interventions that are there and affecting business behaviour and performance in some way are largely concerned with domestic redistributive aims and do not discriminate between domestic and foreign investors, treating all business parties the same.

An example that Gelb (2010) gives in the report is that all firms in the mining sector, for instance, must comply with a set of licensing and royalty requirements, which affects all Greenfield operations, both domestic and foreign. However, foreign entrants acquiring shares in mines that are already in operation are unaffected. According to Gelb (2010), firms must comply with Black Economic Empowerment (BEE, or affirmative action) policies and codes if they are in regulated sectors, (which includes mining), or if they are larger than a threshold size (in employment terms), or if their intention is to bid for procurement contracts in both the public sector and the private sector. Nevertheless, in some sectors, such as ICT, foreign firms have lobbied for dispensations on BEE and they have won, which therefore has seen them being allowed to substitute actions such as promoting blacks into senior management or extending local procurement to black-owned suppliers, rather than extending black ownership as domestic firms are required to do. This has enabled foreign investors who prefer to hold 100% ownership of subsidiaries, to maintain their position.

2.4 FDI inflow volumes in South Africa

As according to Arvanitis (2002) South Africa has attracted very little foreign investment over the last quarter of a century which was largely attributable to the political environment

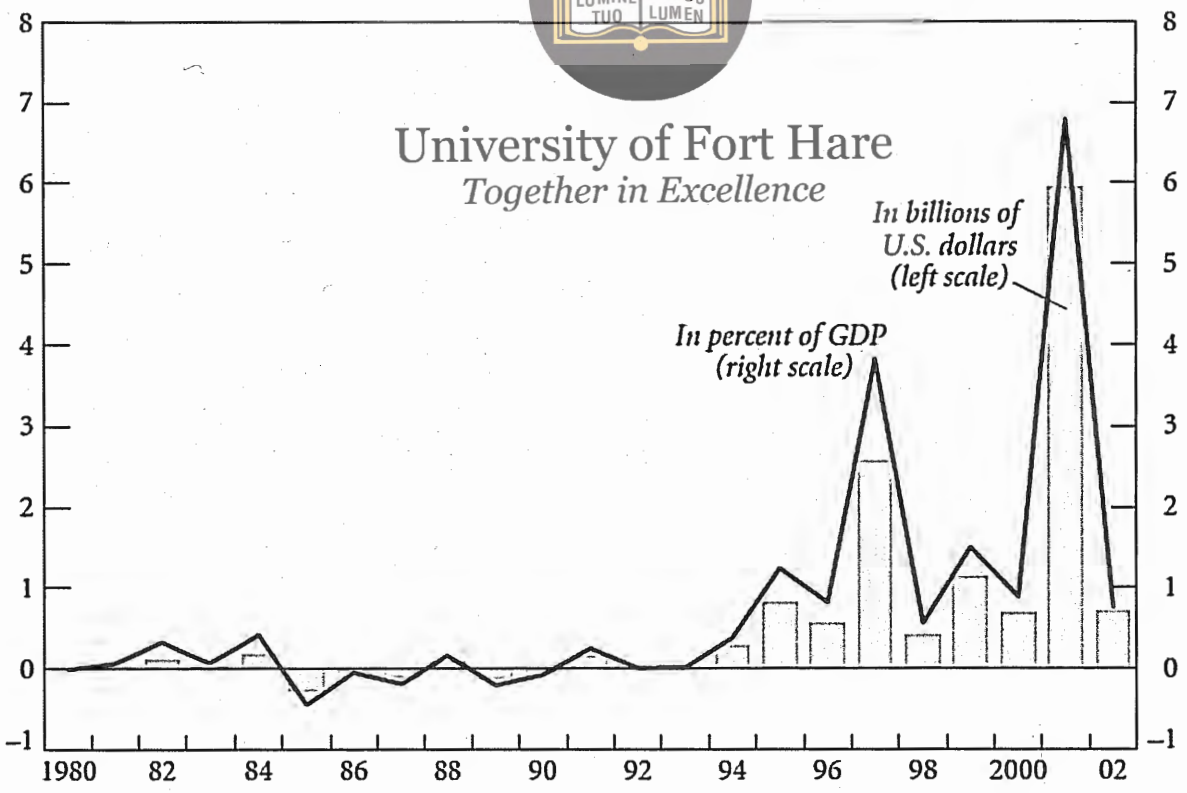
which was characterised by the imposition of trade and financial sanctions in the mid-1980s, followed by a financial crisis, the tightening of capital controls, and the declaration of a suspension on payments to external creditors. This thereby efficiently cut South Africa off from the international capital markets.

Collective FDI inflows from 1980–1993 summed up to merely over US$0.3 billion. However, after 1993, FDI increased because of two major events which took over this period:
1) the partial sale of government shares in Telkom in 1997; and

2) The takeover of De Beers by Anglo American in 2001.

An overall review, nevertheless, shows FDI has stayed moderately at low levels averaging about 1½% of GDP during 1994–2002.

Figure 2.1: FDI Inflows as % of GDP and in US$ billions

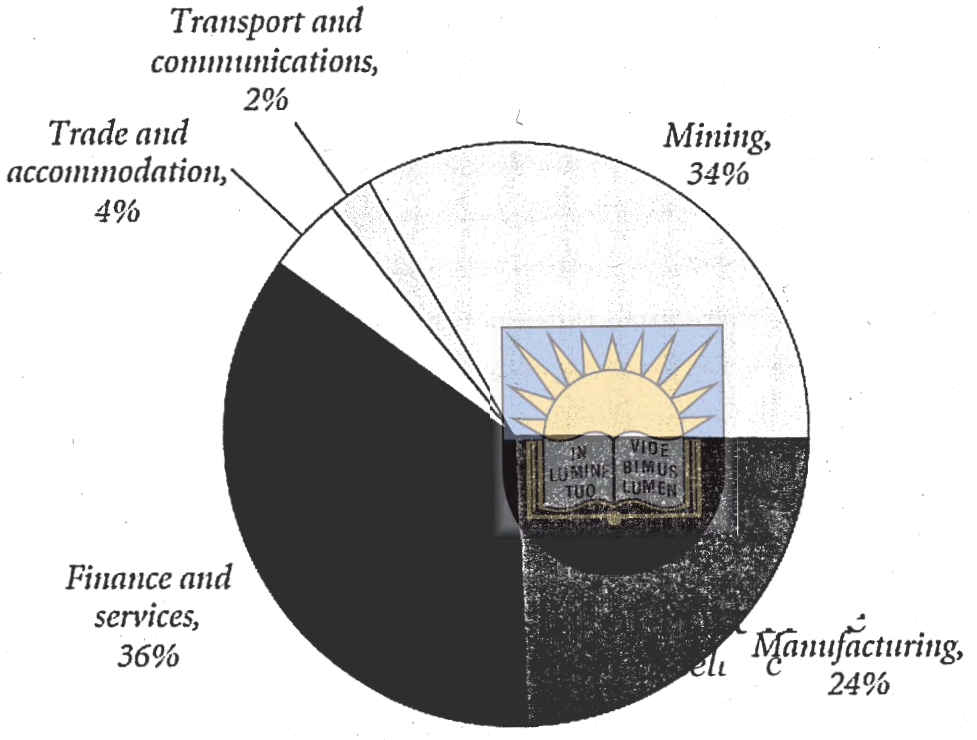


Adopted from Arvanitis (2002)

Arvanitis (2002) goes on to give an account of FDI flows in terms of sectoral distribution and reveals that the FDI inflows have been fairly diversified. Opposing to the likely expectation, the role of natural resources is less important although South Africa has large mineral reserves. The assessment shows that non-mining activities have pulled more than ⅔ of the

FDI inflows which might signify that the main aim of foreign investment in South Africa has been to capture domestic and regional markets as shown in figure 2.2 below.

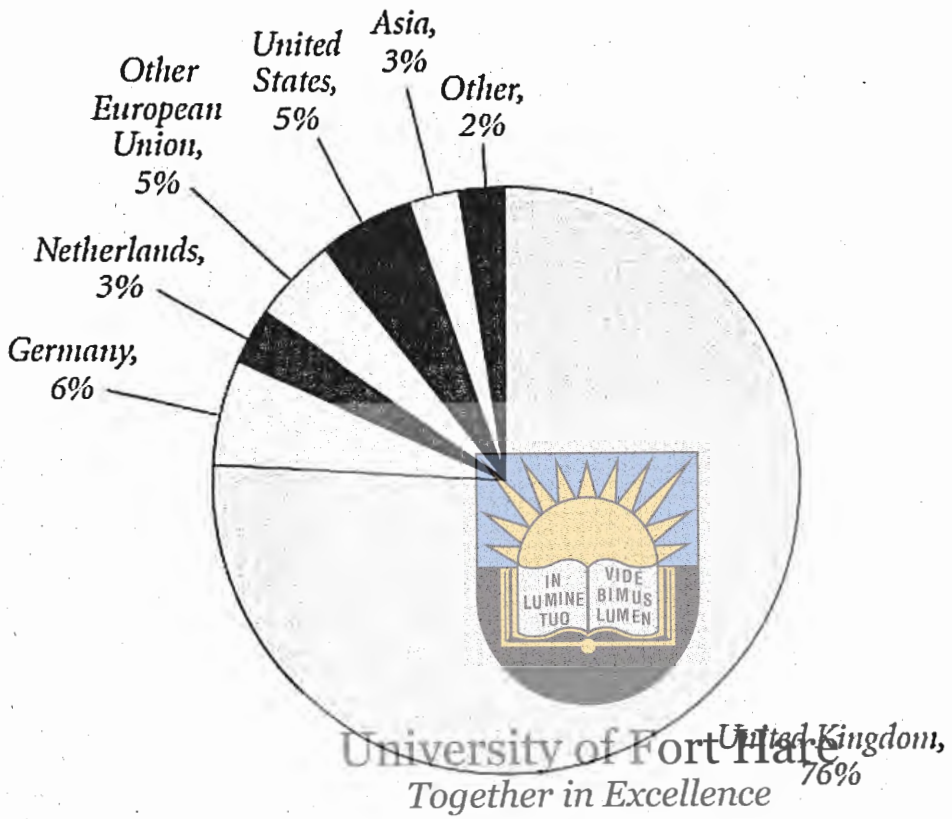
Figure 2.2: FDI by Sector



Adopted from Arvinitis (2002)

Arvanitis' (2002) study goes on to show the origin of investments as well, whereby the European Union (EU) has been seen to be the largest investor in South Africa, taking a share of about 90% of the total FDI inflows. Giving a further breakdown, investment from the United Kingdom outperforms investment from all other countries, accounting for $^{3}/_{4}$ of the total as shown in figure 2.3 below. The United States, Asian countries and other unmentioned investors complete the list of investors in South Africa having a proportion of 5%, 3% and 2% respectively.

Figure 2.3: FDI by Origin



Adopted from Arvinitis (2002)

A large part is investment in existing assets when it comes to the forms of FDI that are inherent in South Africa. Arvanitis' (2002) study like most others shows that cross-border mergers and acquisitions are prominent, accounting for more than 60% of the total FDI. The reorganization and divestiture of state assets has been an important force to attract FDI, as substantiated by the sale of government shares in Telkom in 1997 and the sale of South African Airways in 1999.

According to Mwilima (2003) in a study of FDI flows in Africa, investment flows in the continent have steadily declined as in the 1970s 25% FDI was accounted for, in 1992 only 5.2% whilst in 2000 only 3.8% was received. An overall analysis shows that the SADC region experienced a decline from 0.9% to 0.3% between 1995 and 2000. More in the study, in figures FDI inflows to Africa declined from $10.5 billion in 1999 to $9.1 billion in 2000. The African share of FDI in the world fell below 1% in 2000 and the top recipients of the inflow which are Angola, Morocco and South Africa are said to have fallen by half. The sharp drop of inflows in South Africa and Angola caused the whole Sub-Saharan Africa

region to also face a decline in FDI flows of approximately $1.5 billion from 1999 to 2000. The reason for South Africa's slump is said to be the reduced inflow of mergers and acquisitions (M & As) in the country. But despite all that South Africa is still the second-best source of FDI in Sub-Saharan Africa after Angola as according to Somo and Larri (2001) mainly from the US and UK, and it is also a huge source of investment to other countries as well.

According to Muradzikwa (2002) protocol of SADC Trade recognises the need for newly liberalised nations to gain from investment flows so as to ease down the real possibility of weaker economies merely becoming 'retail outlets' for goods and services produced in the relatively stronger economies. An example noted is that one of South Africa and Zimbabwe.

Muradzikwa (2002) also notes Angola and South Africa being the dominant recipients of the largest share of FDI flows into SADC region and that South Africa's FDI is mainly from (Mergers and Acquisitions) M&A activity whilst Angola's is determined majorly in the petroleum extraction industry, and mining. South Africa has accounted for 43% of the whole of Africa's US$1.3 billion FDI outflows in 2000, making it the continent's most important source of FDI.

Table 2.1: FDI Inflows into individual SADC Economies in US$ millions (1987-2000)

	1987-1992	1993	1994	1995	1996	1997	1998	1999	2000
	Annual Average								
Angola	178	302	170	472	181	412	1 114	2 471	1 800
Botswana	-29	-287	-14	70	71	100	96	37	30
Democratic Republic of Congo	-11	7	-2	1	2	1	1	1	1
Lesotho	11	15	19	275	286	269	262	136	223
Malawi	12	11	9	25	44	22	70	60	51
Mauritius	25	15	20	19	37	55	12	49	277
Mozambique	12	32	35	45	73	64	213	382	139
Namibia	44	55	98	153	129	84	77	111	124
Seychelles	19	4	15	40	30	54	55	60	56

South Africa	-24	-17	334	1 241	818	3 817	561	1 502	877
Swaziland	62	72	63	33	-62	-48	165	90	-37
Tanzania	3	20	50	150	149	158	172	183	193
Zambia	102	2	40	97	117	207	198	163	200
Zimbabwe	-8	38	41	118	81	135	444	59	30
TOTAL	**396**	**269**	**878**	**2 739**	**1 956**	**5 330**	**3 320**	**5 304**	**3 964**

Adopted from Muradzikwa (2002)

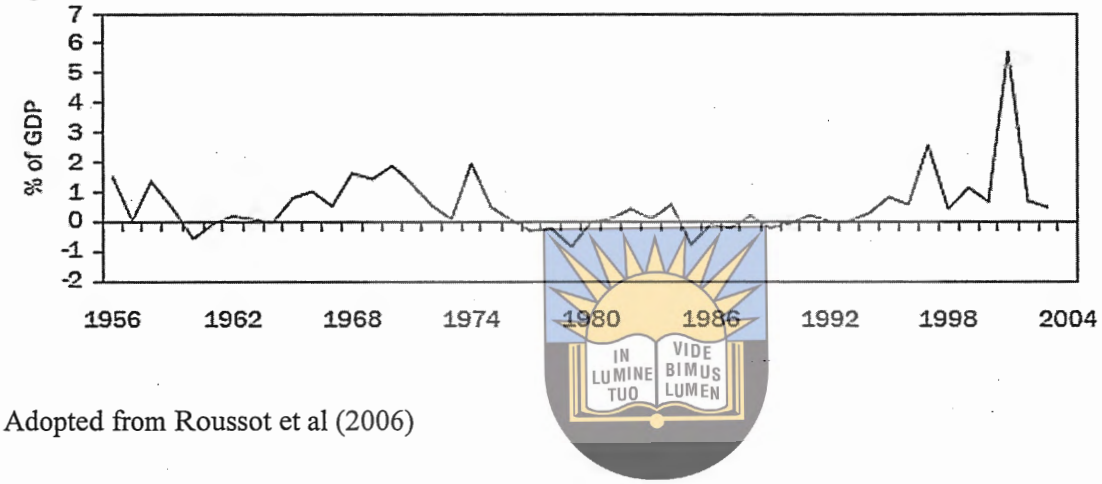
As can be seen from the table, in the Apartheid era South Africa's FDI inflows were actually in the negative figures then at the event of gaining political independence in 1994 there was a sharp shoot in the inflow of FDI into a positive figure of US$334 million. This was due to South Africa's abolishment of the restrictive trade policy regimes that were in use during the Apartheid era and moving to a non-restrictive trade policy regime that saw the emergence of trade liberalization in South Africa as it now connected much more freely with other economies globally, hence attracting FDI larg[illegible] the table above, FDI inflows to South Africa have shown an upward and downward trend over the years as it can be seen that in 1995 US$1241 million was recorded which slightly fell to US$818 million in the following year (1996) and yet rose again to a very high figure of US$3817 million in 1997. FDI drastically dropped in 1998 to US$561 million and raised again in 1999 to a figure US$1502 million and yet reduced in 2000 to US$877 million. However, even if the South African FDI flows have shown a fluctuating trend South Africa has still been the largest recipient of FDI in the SADC region as compared to the other countries shown, followed by Angola.

As shown above, during 2000, the SADC region received nearly US$4 billion. Angola accounted for over 45% of the total SADC FDI inflows, and South Africa just over 22% of the SADC total FDI inflows. Round about 42% of total FDI inflows into SADC were Mergers and Acquisitions and portfolio investments which is significantly lower than that for South Africa alone, where M&As /portfolio investments account for over 60% of total FDI inflows into the country.

According to Roussot et al (2006) preceding the 1870s, the economy was firmly concentrated on the exports of agricultural products to Europe and it was the London-based banks that dominated the financial system. To fully make the most of the vast diamond and gold deposits that were discovered in the second half of the 19th century required huge capital

insertions into the economy, which were only afforded by direct and portfolio investment from overseas. This FDI is also said to have played a vital job in developing the manufacturing industry from the 1920s going on. The data on FDI inflows to South Africa since 1956 are depicted in the figure 2.4 below.

Figure 2.4: FDI flows to South Africa as % of GDP (1956- 2003)



Adopted from Roussot et al (2006)

The figure depicts that South Africa received FDI in most years from 1956 to 1975 except for 1960 and 1961. This is when the anti-apartheid protests that ended in the Sharpeville shootings led to capital flight of the investors. However, entirely, the extent of the FDI flows was meek as regardless of rapid economic growth, FDI inflows only exceeded 1% of GDP in 8 of the 20 years under review by Roussot et al (2006). FDI was negative as a consequence of the 1976 Soweto disturbances and outflows occurred mostly in the years from 1977 to 1990. The cause of such a trend was due to an uncertain environment which was featured by political instability, too much government interference in the economy, declining economic performance and an active campaign to encourage MNCs to disinvest from South Africa, from the mid-1980s going onwards. The FDI inflows only recommenced when the changeover to democracy started in 1990, which has seen FDI being positive in every year since the first democratic elections in April 1994. On the other hand, when it comes to the magnitude, FDI has been a bit unsatisfactory as it exceeded 1% of GDP in only three years. Even though most studies have revealed the FDI inflows to South Africa to have declined drastically over the recent years, Bower (2008) has publicized that China has been the most significant investor giving substantial FDI inflows to South Africa. Trade and investment relations between South Africa and China have developed at a brisk rate since the initiation

of diplomatic relations in 1998, with numerous high-level visits between the two, all aimed at strengthening relations between the regional powerhouses.

According to Bower (2008) in September 2007, at the third meeting of the commission, it was agreed that cooperation on human resources, agriculture, poverty eradication, minerals and energy and public administration would be increased and that the China-Africa Development Fund (CADF), with a primary purse of US$1-billion, would be used to encourage companies to promote trade and investment. CADF's first investment plan was launched in February 2008 with US$90-million targeted at four projects in power, construction materials and mining on the continent. Recently China and South Africa have commenced what is called a 'strategic dialogue' where China sees South Africa as the gateway to investing on the rest of the continent – and South Africa is the only nation in Africa that has a manufacturing and service base that is anything near the scale required to engage the Chinese market. China overtook Germany as South Africa's largest import market in the first quarter of 2008.

During the early 1990s, direct trade relations between China and South Africa were commenced. The existence of Chinese firms in the South African market has been a rather new experience, but within a somewhat short period of time, two-way trade began to rise notably. Contrasting to other African markets, the South African market presented a number of structural challenges to Chinese firms that are eager on investing in the country, and the two most important challenges posed were:

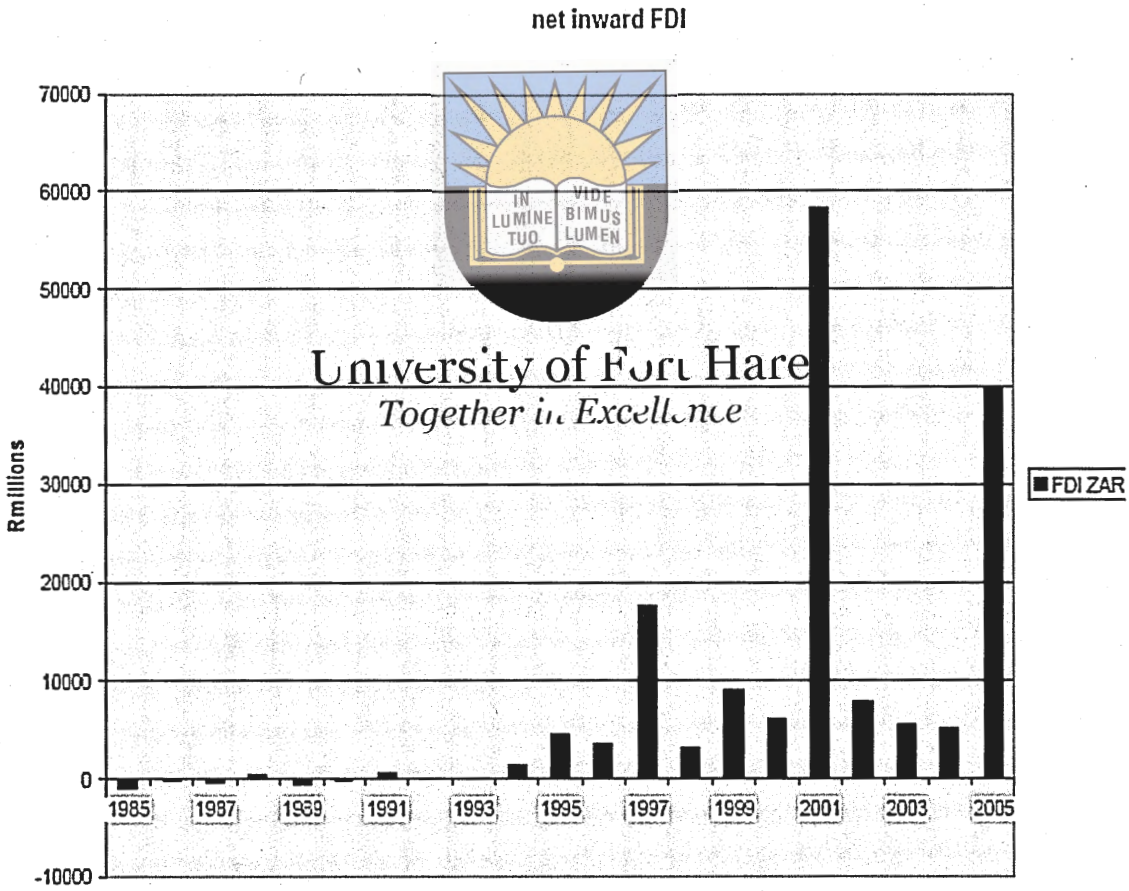
1. The dominance and structural strength of local industries in the domestic market, especially the construction sector; and
2. Increasing regulations and investment codes underpinning South Africa's economic transformation, like black economic empowerment.

While these factors in the beginning tended to sway Chinese investors into neighbouring economies, after some time the Chinese companies started to break into the South African market. China has set up more than 80 companies in South Africa since 1998 and the majority of these Chinese firms in South Africa are subsidiaries of State Owned Enterprises (SOEs). What attracts the Chinese investors to South Africa is that it is an attractive and sophisticated market in its own right and also, importantly, it is a facilitating base for operations serving the African market. Hence, South Africa is viewed as China's gateway to Africa. The inward FDI from China to South Africa cumulates approximately to almost

telecommunications equipment; textiles and apparel; commercial banking; transportation and shipping; light manufacturing; construction; and automobiles (Guliwe and Mkhonta, 2008).

Due to the natural resource seeking nature that FDI had in the 1950s and 1960s, the mining sector continued to receive flows of FDI although some flows were in the manufacturing and service sectors. Nonetheless, by the early 1970s this changed to 40% of the FDI stock going to the manufacturing sector and 25% in financial and business services, with only 15% in mining (Gelb and Black, 2004).

Figure 2.5: Net inward FDI to South Africa in ZAR millions



Adopted from Rusike (2008)

As shown from the graphical plot in figure 2.5 above and in agreement with other above studies cited, South Africa received negative or very little inward FDI from 1985 to 1993 which varied below R33 million. Rusike (2008) cites Clark and Borgran (2003) who suggest this downward trend in FDI during this period is attributable to the disinvestments of the 1980s, in mere response to the political isolation of the apartheid regime where the South African economic policies were not favourable to FDI as there was widespread state intervention in the economy. They add on that the economic distortion and political unrest in

African economic policies were not favourable to FDI as there was widespread state intervention in the economy. They add on that the economic distortion and political unrest in the 1980s had a negative influence on foreign investors as from the mid-1970s through to the 1980s and early1990s, trade sanctions and investment boycotts were imposed by the world against the apartheid South Africa.

Nevertheless, after 1994 when the Apartheid system was eliminated and the economy became more open, there was a gradual increase from around R1.3billion to R3.5billion in 1996. In 1997 there was a sharp increase in FDI inflow as it increased from the R3.5billion to R17.6billion. Thomas and Leape (2005) suggest that the large inflow of investment in 1997 is a reflection of foreign participation in the partial privatization of Telkom, which is the same notion they share with Roussot et al (2006). There is also a huge increase of 196% in 1999 from R3.104 billion in 1998 to R9.184 billion in 1999.

A further marked sharp increase was in 2001 when FDI inflow increased to a peak of R58.4billion from R6billion. The BusinessMap (2005) as cited by Rusike (2008) reveals this to have been due to the sale of a strategic stake in Telkom, which was an entirely government owned monopoly until 2001, and so contributed significantly to FDI in that year. However, the FDI inflow dropped in the following years to R5.1billion in 2004. In 2005 inward FDI it yet again increased by 671% to R39.7billion from the R5.1billion in 2004 and this is said to have been a result of a large transaction in the acquisition of ABSA (SA) by Barclays (UK) for R33 billion.

According to a National Treasury Review (2011) FDI capital flows to South Africa have tended to be lower in comparison with other countries with similar income levels to South Africa. The following table 2.2 shows the flow of patterns from 2005 to 2009 comparing South Africa to the group of upper middle-income economies.

Table 2.2: Foreign direct investment as % of GDP (2005-2009)

FLOWS						**STOCK**
	2005	**2006**	**2007**	**2008**	**2009**	**2009**
South Africa	2.6	-0.1	2.0	3.5	2.0	**43.7**
Upper-middle income	2.7	2.9	3.6	3.6	2.3	28.2
Brazil	1.7	1.7	2.5	2.7	1.7	26.2

China	3.5	2.9	3.9	3.3	1.6	10.1
India	0.9	2.1	2.0	3.4	2.6	13.3
Russia	1.7	3.0	4.2	4.5	3.0	20.3
Australia	-5.1	3.5	4.8	4.5	...	34.1
Chile	5.9	5.0	7.6	8.9	7.8	75.0

Adapted from National Treasury (2011)

Taking an average of the annual net inflow of FDI as GDP's percentage for South Africa it was 2.0% whilst for the upper middle-income economies it was approximately 3.0%. According to UNCTAD (2011) the prior 5 year period before 2005, that is, the period of 2000-2004 the average for South Africa's was 1.8% whilst that of the upper middle-income group was 2.8%. UNCTAD preliminary estimates for 2010 suggest that the net inflows to South Africa were much lower than in 2009, despite evidence of increased flows to developing countries as a whole (UNCTAD, 2011). Also shown in the table are inflows to other major emerging economies, namely, Brazil, China, India and Russia which have recently come together with South Africa to form the BRICS.

Adapting from the African Economic Outlook database, selected are FDI inflow statistics of ten Southern African countries from 2005 to 2010.

Table 2.3: FDI inflow in US$ millions (2005- 2010)

	FDI inflows					
	2005	2006	2007	2008	2009	2010
Angola	**6 794**	**9064**	**9796**	**16 581**	**11 672**	**9942**
Botswana	**279**	**486**	**495**	**528**	**579**	**529**
Lesotho	**57**	**89**	**97**	**56**	**48**	**55**
Malawi	**52**	**72**	**92**	**9**	**60**	**140**
Mozambique	**108**	**154**	**427**	**592**	**893**	**789**
Namibia	**348**	**347**	**733**	**720**	**516**	**858**
South Africa	**6 647**	**-527**	**5 695**	**9 006**	**5 365**	**1 553**
Swaziland	**-46**	**121**	**37**	**106**	**66**	**93**
Zambia	**357**	**616**	**1 324**	**939**	**695**	**1 041**
Zimbabwe	**103**	**40**	**69**	**52**	**105**	**105**

Source: African Economic Outlook online database, 2012

The figures show that Angola and South Africa have maintained being the top contributors of FDI to the Southern African region. The trend for South Africa shows that FDI inflows have gone low over the years starting with a big drop from an inflow of $US6 647 million in 2005 to a negative figure of $US527 million in 2006. This was followed by a substantial recovery of an inflow of $US5 695million in 2007 and again in 2008 the inflow of FDI improved further to $US9 006million. With the emergence of 2009 saw a drop once more in the inflow of FDI to $US5 365 million and 2010 also saw a sharp drop to $US1 553 million.

2.5 South Africa's Export Performance

According to Tsikata (1999) due to the shift in relative prices and incentives generally towards exporters, as well as a post-sanctions effect with the rise of a new era which brought about trade liberalization in South Africa, exports of manufactures have expanded hastily and have also become more diversified. If sustained, this structural makeover promises well for South Africa's capability to withstand future external shocks in demand for minerals. In most cases, South Africa is a price taker and encounters relatively inelastic demand for its traditional exports. The increased significance of relatively more distinguished manufactures, on the contrary, gives South Africa more capacity to influence export performance through trade and exchange rate policy. A further gain is the tendency of differentiated manufactures to be more labour-intensive which as a consequence has a more positive impact on employment.

The initiatives in the 1990s concerning the turnaround in the Trade Policy which saw the introduction of Trade Liberalization had an effect on manufacturing exports. According to Edwards and Alves' (2005) findings the successes of these post-Apartheid policies in generating export growth have been mixed. Exports of manufactures have improved but not by enough to produce an export-led growth boom comparable to those of East Asia and a few other resource-based export economies. Furthermore, South African manufactured exports remain resource-based and the country has lagged others in diversifying into new and fast growing export sectors. The inability to streamline exports towards these dynamic high technology products is one explanation for the relatively poor export performance of South African manufacturing during the 1990s.

2.5.1 Periods from 1960s-1990s

EIU's 1992 report showed that non-gold export volumes boomed in the 1970s following a premeditated gearing up of export potential through the development of new harbour facilities, railway lines and mines. Export volumes were, nevertheless, hit in the early 1980s

by the general decline in commodity demand and slower growth in world trade with the volume index falling from 56 in 1980 to 51 in 1984 but subsequently recovered, reaching 66 in 1988. The growth in non-gold export volumes during the period from 1986-1990 was much higher than the GDP growth, thus the ratio of real exports to GDP improved from 18% in 1987 to 23% in 1990. This strong revival in the second half of the 1980s reflected the recovery in Western industrial economies that had begun in 1983. The sanctions of the second half of 1980s did not appear to have had a significant impact on total export volumes, even though individual companies and sub-sectors were hit hard.

Tsikata (1999) asserts that the trade regime in the 1980s contributed to lower productivity as during this Apartheid era, the export basket was small, which found gold particularly, and primary products or lightly processed primary products dominating South Africa. Gold exports alone contributed close to 40% of the country's total exports earnings, other minerals such as coal and diamonds also contributed 20% to total exports.

According to an SARB (2001) report, gold w[illegible] country's largest export commodity up to the 1990s, and export profits were subject to large swings as the gold prices moved. The amount of gold produced and exported dropped from 1970 until the early 1980s. The drop in output was brought to an end due to a number of new shafts and some dump reprocessing schemes which had come on stream. The decline in output in the mid-1980s is said to be due also to labour problems which occurred. As a share of total export earnings, gold exports improved from 33% in the late 1970s to 43% in the 1980s, having a peak of 51% in 1980. Nonetheless, the share of gold exports in total export profits, witnessed an abrupt decline in the 1990s, reaching 14% in 1999.

Another notable attribute of the country's exports has been the sharp rise in manufacturing exports during the 1980s and its prevalence in the 1990s. The SARB's 2001 report brings out that manufacturing exports averagely accounted for 32% of total exports in each year of the 1980s and rose to an average of 49% in the 1990s. Collectively with gold, the two export commodities accounted for over 75% of total exports in the 1980s and 73% in the 1990s. The growth in manufacturing exports in the 1980s is explained to have been underpinned by the increased exports of non-ferrous metals, iron and steel, and food products, whilst in the 1990s it was accelerated by iron and steel, chemicals, machinery, motor vehicle parts and accessories, non-ferrous metals and food products. The share of non-gold mining exports in total export generally experienced an increase as it averaged 15% in the 1980s, increased to

22% in the first half of the 1990s, and then fell to 19% in the late 1990s. The share of agriculture, forestry and fishing exports steadily declined throughout the 1980s and 1990s. Exports fell from 5% in the 1980s to 4% in the 1990s.

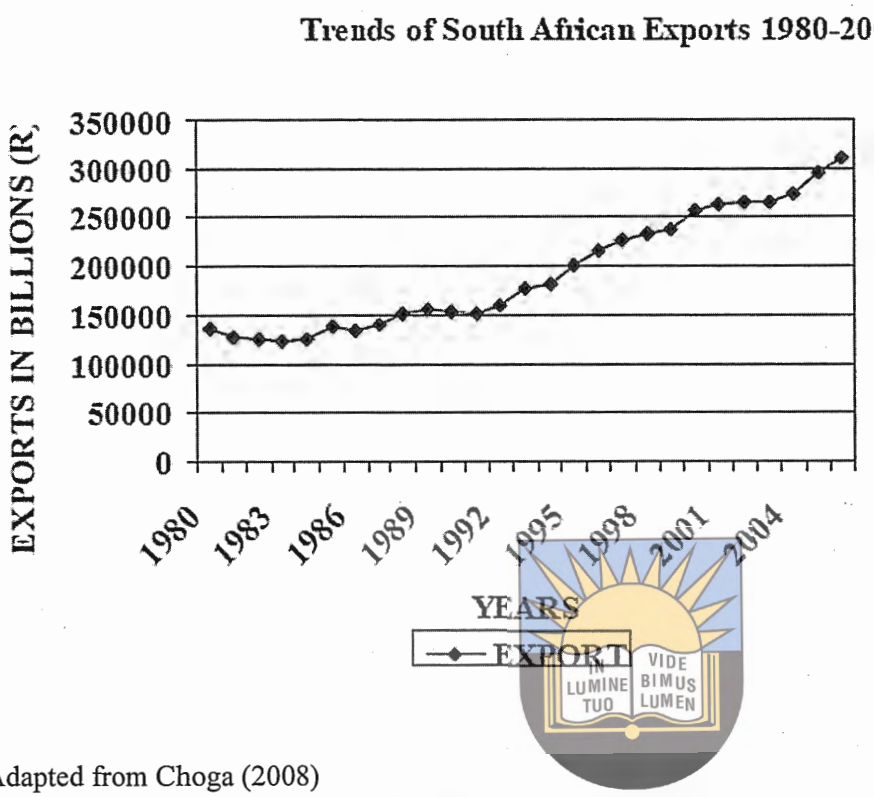
"In nominal terms, exports increased steadily throughout the 1980s and 1990s. From a total of R20 billion in 1976, exports increased to some R61 billion in 1990, and again to R175 billion in 1999. As a share of nominal GDP, however, exports declined from a peak of 33% in 1980 to 22% in 1990. Thereafter, it increased steadily, reaching 25% in 2000" (SARB 2002). As a percentage of world's exports, exports from South Africa experienced a fixed decline throughout the 1980s and 1990 where the exports fell from 1.3% of world's total exports in 1980 to 0.5% in 1999, as cited by Kusi (2007) from a UNCTAD (2001) report.

Flatters and Stern (2007) state that regardless of substantial economic restructuring, South Africa's post-1994 export performance is less than what might have been expected or anticipated. For the decade of the period from 1984 to 1994, South Africa's goods exports grew at a regular rate of 5.7% a year in terms of volume which was slightly faster than the 5.6% growth in world exports. It was hoped for that the end of sanctions and the deregulation of trade and former economic control measures would give a considerable boost to South Africa's relative and absolute export performance. Nonetheless, while world export growth increased to 6.2% a year over the decade since 1994, South Africa's average export growth rate fell slightly to 5.6% a year and the country's share of world exports fell from 0.7% to 0.5% over this period. Flatters and Stern (2007) question if this type of performance is simply due to the unfortunate composition of South Africa's exports and the probable reason they come up with is that for such a performance South Africa's exports are highly concentrated in natural-resource-based products, which experienced relatively low growth in world markets over most of this period.

2.5.2 Periods from 1990-2000s

Shown below is a graph adopted from Choga (2008) which explains the trends of South African exports from 1980- 2006:

Figure 2.6: South African exports in ZAR billion (1980-2006)



Adapted from Choga (2008)

From the figure 2.6 above the trend shown is that, exports increased steadily throughout the 1980s and 1990s from a total of R150 billion in 1980, exports increased to R200 billion in 1995 and again R300 billion in 2005. South Africa has experienced a remarkable growth in exports despite depressed world market conditions. There has been success in steady growth and diversification of the country's export base in recent years in terms of both products and trading partners. This follows after many years of trade isolation and inward looking policies. While the sharp depreciation of the local currency has certainly made a significant contribution, it does not fully explain the recent trends. Other factors such as improved competitiveness and supportive government policies also appear to have played an important role.

In a DTI (2010) quarterly report South Africa is to a greater extent, outwardly oriented: the ratio of trade in goods and services to GDP has risen from below 40% in 1993 to over 60% in 2006. The manufacturing sector remains relatively large as compared to that of other developing countries (with the exception of some middle-income developing countries), and the value added by manufacturing exports has grown and contributed to domestic growth over the 1990s. Even as all exports have grown significantly since 1994, manufactured exports continue to be heavily dominated by resource-based sectors although the total share

declined from 73, 55% to 62, 07% between 1994 and 2006. South African exports constitute around 0, 5% of world merchandise exports. Despite the up surge in South African exports since 1992, growth has not kept pace with that of developing countries such as India, China and Brazil as South Africa's growth in exports has been at least 11% slower than theirs. South Africa is ranked 24th among developing countries and 47th overall in terms of its presence in exports of dynamic products in world trade that show the most sustained gains in world market share.

The largest export category is precious metals, although the composition of this has changed over time from exports of gold to exports of platinum. The next-largest category is base metals, which consist of resource intensive manufactured goods, including Ferro-alloys, iron, steel and stainless steel products. Together with mineral products, which include coal, briquettes, oil from petrol, and iron ores and concentrates, these three product categories generally represent over half of total exports, underlining the dominance of mining and basic processing in South Africa's export profile. Growth in advanced manufactured exports is accounted for by machinery and vehicle expo , 2010)

In TIPS (2011) report is given a highlight of the trade patterns in geographical terms of South Africa, European Union, Asia and the rest if the world over the period of 1990-2009. The trends reveal South Africa's most important export markets being Germany and the United Kingdom even though the two countries' share of the South African exports has declined over the years. This research note shows the EU as the most significant trading partner to South Africa. However, post 2005 has shown Asia taking role as the crucial partner to South Africa and given the previous trends the expectations are for Asia to outdo the EU in terms of trade value within the next decade.

Since 1990, it seemed that South Africa's greater value of exports was to the EU and post 1994 the exports from South Africa destined for the EU and Asia even increased significantly. 2004 saw South Africa's exports to both the EU countries and Asia grow at a much faster rate than it was in the 1994-2002 period. Coming to the period 2006-2008 South Africa's exports to Asia now tended to be growing at a faster rate than to the EU and they passed the R180 Billion mark in 2008 and such a huge rise in South Africa's exports to Asia was mainly due to East Asia's bulk importation of goods to China.

Taking specific reviews of specific periods TIPS (2011) notes that in 1990 21% of South Africa's exports were destined to EU, another 18% were destined to Asia (13% to East Asia,

1% to South Central Asia, 1% to South East Asia and 3% to West Asia) and the rest which was about 61% went to the rest of the world. In 1995 the EU's share increased to 28% and Asia's share increased to 21% (with East Asia moving to 14%, South Central Asia maintaining 1%, South East Asia and West Asia both moving up to 3% each). This saw the share of South Africa's exports that went to the rest of the world decreasing to 51%. The share of South Africa's share to Asia increased by 2 percentage points to 23% in 2000 (East Asia's share increased to 15%, South Central Asia received 2%, South East Asia's share fell to 2% and West Asia's share rose to 4%), whilst EU's share totalled 31% and exports to the rest of the world further declined to 46%.

In 2005 a little over a quarter of the South African exports were all destined to Asia and in percentage value the share was 26% which was an increase as compared to the 2000 figures. The breakdown of the Asian sub regions was as follows: increase of exports to East Asia to 17%, South Central Asia's share remained at 2%, that of South East Asia rose back to 3% and West Asia maintained its share of 4%. About a third of the exports which are equivalent to 33% went to the EU countries and the rest of the world received 41% of South African exports which signalled a continued decline. Recent trends that were noted in 2009 saw tables turning and Asia the one now receiving almost a third of South Africa's exports (31%); East Asia got21%, South Central Asia 4%, South East Asia 3% and West Asia 3% as well. The EU received 24% indicating the decline of EU's dominance as related to Asia as South Africa's major export market. Exports to the rest of the world showed a gain of 4 percentage points rising to 45% from the 41% in 2005.

Despite the increases and decreases in the trends of exports of South Africa explained above, the EU remains an important destination for South Africa's exports, as evidenced by a growth in the EU's share of exports in total exports, with a slight decline in the second half of the last decade (TIPS, 2011). The dominant products exported to the EU include pearls, precious stones, metals, coins, mineral fuels, oils, distillation products, nuclear reactors, boilers and machinery. East Asia's share of the total exports has been progressively increasing as China's demand for a range of goods produced in South Africa has been on the rise, though on the other hand growth in the South East and South Central Asia have been on a much lesser level. Eastern Asia has mainly taken exports from South Africa that include pearls, precious stones, metals, coins, ores, slag, ash, iron and steel. As for West Asia before 2008 they mainly received precious stones, pearls, metals, coins, iron, steel, mineral fuels, oils and distillation products and 2008 saw the dominance of live animals, meat and edible meat offal, fish,

crustaceans, molluscs and aquatic invertebrates being exported by South Africa to Western Asia. The most dominants exports to South Central Asia have been inorganic chemicals, precious metal compound, isotopes, mineral fuels, oils, distillation products, iron and steel.

Summing it all up the TIPS (2011) report concludes that the export trend reveals that, since 1990, Asia and particularly East Asia, has since become a crucial trade partner of South Africa and to some extent it has surpassed the European Union as South Africa's favourable export destination. The report concludes giving a table that shows the above explanation:

Table 2.4: South Africa exports by region in 1990, 1995, 2000, 2005 and 2009

	1990	1995	2000	2005	2009
EU	21%	28%	31%	33%	24%
Asia	18%	21%	23%	26%	31%
Other	61%	52%	46%	41%	45%
East Asia	13%	14%	15%	17%	21%
South Central Asia	0%	1%	2%	2%	4%
South East Asia	1%	3%	2%	3%	3%
West Asia	3%	3%	3%	4%	3%

Adopted from TIPS (2011)

A DTI (2011) annual report reveals that the trade balance has displayed an interesting trend as it has switched from a deficit of R11.8 billion in the first quarter of 2010, to surpluses of R7.8 billion in the second quarter, R30.3 billion in the third quarter and R86 billion in the fourth quarter. In overall nominal terms, the trade balance improved hugely to R28.1 billion in 2010 from R2.3 billion in 2009. What has owed to this trend is the massive decrease in imports compared to exports due to the slow-moving global economic recovery. Buoyant mining exports to China and India have been the main contributors to positive trade balances in the second, third and fourth quarters of 2010. A combination of strong commodity prices and lower imports due to limited infrastructure projects after the 2010 FIFA World Cup tournament and an increase in net exports to R86 billion in the fourth quarter of 2010 more than doubled the figure registered in the third quarter of 2010.

2.5.3 Growth of some individual products over recent periods

The increased openness of the South African trade regime is reflected in the behaviour of some individual exports as shown in the table below. This increased openness occurred across most sectors.

Table 2.5: A selection of products exported by South Africa, growth in % value

Code	Product label	exportations growth in value between 2007-2008, %	exportations growth in value between 2008-2009, %	exportations growth in value between 2009-2010, %
'45	Cork and articles of cork	33.98	-49.83	214.79
'23	Residues, wastes of food industry, animal fodder	12.55	-19.84	201.54
'91	Clocks and watches and parts thereof	81.67	-32	142.21
'18	Cocoa and cocoa preparations	20.01	51.6	109.23
'82	Tools, implements, cutlery, etc of base metal	-25. 3	-11. 12	66. 22
'75	Nickel and articles thereof	-34.1	-6.5	51.49
'72	Iron and steel	20.84	-41.81	50.45
'08	Edible fruit, nuts, peel of citrus fruit, melons	7.31	1.96	30.95
'87	Vehicles other than railway, tramway	46. 23	-32. 38	28.93
'03	Fish, crustaceans, molluscs, aquatic invertebrates	5.16	-20.43	16.93
'22	Beverages, spirits and vinegar	15.4	-2.68	8.63
'52	Cotton	-5.51	59	-19.44
'10	Cereals	1,209.36	-26.66	-33.42

Sources: South African revenue services (SARS)online statistics since January, 2011 and UN COMTRADE statistics until January, 2011.

An examination of the growth rate of South African exports between from 2007- 2010 reveals some interesting trends. In overall, it can be seen from the table 5 above that the highest percentage growth in exports in the recent period of 2009-2010 is attributed to cork and articles of cork which had a growth of 214. 79%. In the 2007-2008 period exportation growth in value of cork was only 33. 98% then it actually declined into a negative of -49. 85% during 2008 to 2009. For residues, wastes of food industry and animal fodder in 2007-2008 the export growth value was 12. 55% then it plunged down to -19. 84% from 2008-

2009, but rose strongly in 2009-2010 to a high percentage of 201. 54%. Other products like clocks, watches and cocoa have also shown to have grown in export value quite highly over the 2007-2010 periods, whilst the exportations growth in value of other products like nickel, iron and steel, tools, implements and cutlery of base metal has been fairly average. Even though the above mentioned products have performed well, there are some which have actually shown a declining trend. An example is that of cereal products which in 2007-2008 were at a rate of 1, 209. 36% but dismally declined to -26. 66% in 2008-2009 and further fell in 2009-2010 to a value of -33. 42% and is one of the products that contributed lower percentage growth values in exports recently for South Africa.

2.6 Conclusion

The main aim of this chapter was to provide a background to this study by looking at what FDI is, the history of trade regimes that have been put in place in South Africa and how they have impacted on the way South Africa attracts investment from abroad and in the end how the economy will trade with the other economies globally. It can be noted that in the previous periods restrictive regimes were in place which discouraged FDI and hence dampened South African exports. With the emergence of a new and unrestrictive regime which introduced Trade liberalisation, FDI improved and in the process export growth also improved, however in the recent years it has not improved as according to expectations.

An analysis of the theoretical and empirical literature on FDI and export performance will be undertaken in the subsequent chapter to assess the impact the two have on the economy.

CHAPTER 3

Literature Review

3.1 Introduction

In this section is an attempt to review both the theoretical and empirical literature found on this subject being studied, that is, FDI impact on the export growth. Most determinants of exports are straight forward. However, FDI is a bit complex due to its nature of having supply capacity increasing effects and specific effects. Hence some studies have shown the two components to have a positive relationship, others a negative relationship whilst others a mixed outcome.

3.2 Theoretical Literature Review

There has been a long debate in the literature on how host country's exports respond to inward foreign direct investment. According to Njong (2008) the influence of FDI on the host country's export performance can be explained using three models which have different explanations of FDI flows but the direct and indirect effects of FDI provide a starting-point that FDI is likely to have a positive influence on the host country's export performance. The three models are: The flying geese model, Vernon's product life cycle theory and the new growth theory.

3.2.1 Flying Geese (FG) Model

"The term *flying geese pattern of development* was initially coined by Akamatsu in the 1930s and introduced into academia in the early 1960 (Lee, 2007)", (Njong, 2008). The FG model is based on the notion that spill over effects of FDI are likely to stimulate local firms' export ability using the explanation that MNE subsidiaries increase the host country's export performance by using the host country's factor endowments to produce at lower cost. According to Njong (2008) as he adopts from the Asian Development Bank (ADB, 1999 and 2005), labour costs and openness are the essential factors in the FG model. FDI is said to shift from a high labour cost home country to a lower labour cost host country and as the latter develops it becomes a high labour cost nation for a new set of low labour cost host countries making the process a continual one. So the increased export competitiveness of MNE subsidiaries directly boosts up the recipient country's export supply capacity. In addition the transfer of FDI brings new technology, capital equipments and manufacturing knowledge into the host country which is usually behind when it comes to the availability and quality of factor endowments.

3.2.2 Product Life Cycle (PLC) Theory

Vernon (1966) developed this framework in a bid to explain the increasing FDI from US MNEs and the influence it had on trade flows. It has four stages of production, namely: innovation, growth, maturity and decline.

The first assumption Vernon makes is that the enterprises in any one of the advanced countries of the world are not distinguishably different from those in any other advanced country, in terms of their access to scientific knowledge and their capacity to understand scientific principles. Therefore safely assumed is that they can secure access to the knowledge that exists in the physical, chemical and biological sciences. Vernon (1966) however emphasizes the importance of not making the mistake to assume that the equal access to scientific principles in all the advanced countries means equal probability of the use of these principles in the making of new products as there is ordinarily a large gap between the knowledge of a scientific principle and the embodiment of the principle in a marketable product.

A further analysis on the United States market by Vernon (1966) shows that this market offers certain unique kinds of opportunities to those who are in a position to be aware of them. For example the United States market consists of consumers who have an average income higher than that in any other national such that wherever there was a prospective offer of a new product reactive to wants at high levels of income, this chance would most probably first be apparent to someone in a position to observe the United States market. So the second assumption Vernon (1966) drives at is that entrepreneurs in the United States are the first to be aware of opportunities to satisfy the new wants associated with high income levels or high unit labour costs.

This leads to a third assumption that Vernon (1966) makes is that there is an indication of an empty need and the hope of some kind of monopoly windfall for the early starter which makes it satisfactorily strong to justify the primary investment that is usually involved in altering an abstract idea into a marketable product. This therefore gives a reason for expecting a time and again higher expenditure rate on the development of the product that the United States producers have to undertake than by producers in other countries, when it comes to channels which promise to substitute capital for labour or which promise to satisfy high-income wants. As a result, if United States firms spend more than their foreign counterparts on new product development this may be due to more effective communication

between the potential market and the potential supplier of the market rather than some ambiguous sociological drive for innovation.

Vernon (1966) goes on with the explanation that in the early stages of introduction of a new product, producers usually are faced up with a number of critical, although brief, conditions. For instance, the product itself may be rather unstandardized for a time as its inputs, processing, and final specifications may cover a wide array. The unstandardized nature of the design at this early stage bears with it a number of locational implications. Firstly, producers at this stage are particularly concerned with the extent of independence they have in altering their inputs. The cost of these inputs is relevant, but as long as the nature of the inputs cannot be pre-fixed with assurance, the calculation of cost must take into account the general need for flexibility in any locational choice. Secondly, the price elasticity of demand for the output of individual firms is comparatively low which Vernon (1966) highlighted can be explained by the high degree of production differentiation, or the existence of monopoly in the early stages. Thirdly, the need for quick and efficient communication on the part of the producer with customers, suppliers, and even competitors is predominantly high at this point as a result of the fact that a large amount of insecurity still remains pertaining to the crucial characteristics of the market, the efforts of competitors to pre-empt that market, the specifications of the inputs needed for production, and the specifications of the products likely to be most successful in the effort. Having made all these considerations, hence, in short, the producer who spots a market for some new product in the United States may be led to opt for a United States location for production on the basis of national locational contemplations which extend well beyond simple factor cost analysis plus transport considerations.

So in simple terms Vernon's observation is that at the innovation stage of production, US MNEs tend to produce new and innovative products in the US mainly for home consumption and no FDI is undertaken. The rest of the existing output is exported to serve foreign markets.

As products evolve to the growth stage and become high in growth and demand, the US MNEs start undertaking FDI and are looking to enter into joint venture investment to set up production in other countries. Basu (1997) notes that the interesting thing is that, MNEs' production at the growth stage seeks local markets yet in the meantime, foreign competitors start penetrating the market. As a result, the demand for exports from the US declines and the

US consumers begin to purchase some of the products from these newly industrialised countries (NICs).

Progressing to the maturity stage the demand for the product expands and a definite measure of consistency takes place, but it does not mean that efforts at product differentiation stop. They might actually increase because competitors make an effort to avoid the full impact of price competition. Likewise, diversity may emerge due to specialization. An example Vernon gives in the U.S. is that of radios which eventually attained specialized forms as clock radios, automobile radios, portable radios, and so on. However, while the subcategories may increase and the efforts at product differentiation also increase, a rising acceptance of certain general standards seems to be distinctive. Once more, the change has locational implication as the requirement for flexibility declines. This is because there is now an obligation to some set of product standards which open up technical potential for realizing economies of scale through mass production, and it also promotes enduring commitments to some given process and some fixed set of facilities. Another cause for change which impacts on location is that the concern about production cost begins to replace concern about product features. Although increased price competition is not yet present at this stage, the decline of the reservations surrounding the operation improves the usefulness of cost projections and increases the attention committed to cost. However, a problem arises from cost-reduction for the producers. Most of the FDI which was at first allocated to advanced countries is shifted to other lower cost NICs. Besides the local market consumption, part of the output is exported to serve the US and other foreign markets, hence the US and other advanced countries switch from being the exporters to being the importers.

At the decline stage of production which is the final stage, cost-minimising becomes the most important task for the MNEs' production and the distribution of FDI will be to the countries having lower and even the lowest production costs. MNEs' production at the final stage of production serves not only the local market but also the US and the rest of the world.

3.2.3 New Growth Theory

New Growth Theory is a view of the economy that incorporates two important points. First, it views technological progress as a product of economic activity. Previous theories treated technology as a given, or a product of non-market forces. New Growth Theory is often called "endogenous" growth theory, because it internalizes technology into a model of how markets function. Second, New Growth Theory holds that unlike physical objects, knowledge and

technology are characterized by increasing returns, and these increasing returns drive the process of growth (Cortright, 2001).

As he takes from Meier and Rauch's (1995) contribution Njong (2008) brings out that investment in human capital contributes to increasing returns in the production function, and the more resources devoted to research and development, the faster the rate of innovations and the higher the rate of growth. Additionally, the transfer of advanced technology strengthens the host country's existing stock of knowledge through labour training, skill acquisition, the introduction of alternative management practices and organisational arrangements. Hence, FDI increases productivity in the recipient economy, and FDI can be deemed to be a catalyst for domestic investment and technological progress.

3.2.4. Theory of Multinational Enterprise

The theory of multinational enterprise (MNE) looks at the conditions under which firms may take on foreign direct investment and become MNEs. Choices like this possibly will have certain costs when it comes to the host country's exports. According to Kutan and Vuksic (2008) this theory overally signifies that positive effects of inward FDI on a host country's exports can possibly be expected when the host country and the home country have diverse factor intensities. In simple terms, the MNE may subcontract some sections of its production process to the host country then export these (intermediate) products back, not only to the home country but also to other countries. Correspondingly, when the host country has a cost advantage and low trade costs comparing to the trade costs of the home country, the host country may be utilised by the MNE as an export platform for serving its home market, and also other markets.

Kutan and Vuksic (2008) cite Dunning (1993) to explain the theory of multinational enterprise in a way that firms must have certain advantages in order to become multinational companies and these advantages structured in three fundamental sets which are:

1) Ownership advantage;
2) Location advantage; and
3) Internalization advantage.

The *ownership advantage* refers to the situation where the MNE has a product or a production process that endows it with market control in the foreign market. For example, other firms will not be having access to such things like patent rights, blueprint or trade secret or more intangible advantages like reputation for quality like this particular firm will be

having in the production process in the foreign economy. The *location advantage* refers to a situation which points out that the MNE needs to locate production in a foreign country to sustain its competitive advantage, like low factor prices or customer access, in conjunction with trade barriers or transport costs that make FDI more profitable than exporting. Lastly, the *internalization advantage* refers to a situation which advocates that the MNE has an incentive to exploit its ownership advantage internally. According to Di Mauro (2000) this advantage is a more theoretical notion to explain why licensing may not be practised as it draws from the firm's concern in preserving its knowledge assets like highly skilled workers who know the firm's technology internally. So it avoids "defection" once the licensee fully understands the technology and sets up his own firm which will compete in with the MNC. Informational asymmetries may also drive MNCs to choose foreign production over licensing, for example, enhanced knowledge of the domestic market by the licensee.

Kutan and Vuksic (2008) stress the importance of differentiating between horizontally and vertically integrated MNEs so as to make it simpler to analyze FDIs effects on the host country's exports. It is said that in the former situation, that is, horizontal integration, the MNE produces the same product in several plants located in more than one country, whilst in the latter situation of vertical integration different segments of the production process are carried out in different countries.

Why horizontally integrated firms are in existence is due to trade barriers like tariffs or high transportation costs and the MNC has to make a choice as it is faced with the predicament of either building an extra plant in the host country (which means inflow of FDI) to supply the host country's market, or exporting to host country from the (already existing) plant in the home country. Referring from (Markusen and Venables 1998 and Markusen 2002) Kutan and Vuksic (2008) go on to explain that in an instance of it being a model with oligopoly competition, FDI would then be favoured comparative to exports (of home country) only given the following three conditions:

(i) High transport and tariff costs,
(ii) Relatively large firm-level economies of scale, compared to those of plant-level economies, and
(iii) Countries similar in size and their relative endowments.

Moving to an evaluation of vertically integrated MNCs, which embraces the trade in intermediary products, models imply that the production process is probably geographically disjointed only if the countries have factor-price differences and the production stages are related with different factor intensities. In view of the fact that the segments of the production process transpire in different countries, intermediate products should be traded. Extracting from (Zhang and Markusen 1999 and Markusen 2002) Kutan and Vuksic (2008) wind up with the expectation that FDI has a direct positive impact on the host country's exports, as the fraction of intermediate products produced by the foreign subsidiary in the host country is typically shipped back to the home country.

Zhang (2005) also expresses contrasting theoretical views pertaining to the relationship between inward FDI and exports, that inward FDI may not prop up exports if FDI dampens local savings and investment, transfers unsuitable technology, investment is done only with the intention to avoid import restrictions so that production is mainly for domestic markets, holds back the growth of local firms and industries that might potentially become exporters, and if resource-seeking FDI happens so as to exploit the host country's low-cost labour and raw materials and as a result discourage the progress of the host country's dynamic comparative advantage.

3.2.5. Standard theory of international trade

According to Vuksic (2006), one of the important questions posed by international trade theory is whether the international factor movements and international trade in goods are substitutes or complements. Given a standard Heckscher-Ohlin-Samuelson model (H-O-S), the factor prices will equalize even if there is only trade in goods and there are no factor movements at all, which is known as the factor price equalization theorem. A clarification to explain this is that countries would be trading the factors of production indirectly incorporated in the traded goods, making trade and factor movements substitutes. This would also apply to be true if only factors of production were mobile, and there were no trade in goods, making a propensity for equalization of the commodity prices. The reason for this is because in the H-O-S model, trade occurs due to the differences in factor endowments between the countries. So in simple terms, when the cause of trade is factor endowment differences, factor mobility and goods trade are substitutes. However, they may be complements for other causes of trade when by allowing for differences in technologies and preferences across countries, introducing production taxes, a monopoly market structure and external economies of scale.

Horst (1976) presents a rather unlike model of a probable complementary relationship between FDI and exports. Horst disputes that foreign investment is not limited to local production of final goods in the host country, but that the MNE investing in the host country also takes on non-manufacturing activities which are not directly associated to production, hence these activities have the objective of escalating demand for the MNE good in the host country market. Suggestions of these activities that Horst (1976) gives include advertising, retail distribution, technical assistance and adaption of the good to local preferences making use of the concept of 'ancillary goods' to illustrate such activities. Therefore, demand for other types of goods is established, which probably creates an increase in exports from the MNEs home country to the host country.

On another note Brainard (1993) demonstrates how including intermediate goods into a standard trade model permits for the possibility of a complementary relationship between FDI and trade. Brainard builds up a two-country, two-sector general equilibrium model which has a three-stage production process where firms decide between exporting and cross-border investment. The decision depends on the t[illegible] between nearness to the market and concentration advantages as a result of economies of scale at the plant level. The trade-offs differ according to production stages with FDI and trade existing concurrently. One of the equilibrium results implies that FDI encourages intra-firm trade in intermediate goods whilst at the same time reducing trade in final goods.

Johnson (2006) gives a summary of these different views of the standard theory of trade and all the additional literature which has been contributed towards it pertaining to the contribution of FDI to trade, in the form of a table which is table 3.1 below:

Table 3.1 Relationship between FDI and trade suggested by trade theory

Form of FDI	**The primary relationship between FDI and trade**	**References**
Horizontal	Substitutional	Helpman (1984)
Vertical	Complementary	Markusen (1984)
Knowledge capital based	Complementary or substitutional	Carr et al. 92001), Markusen and Maskus (2002)
Export-platform	Complementary (inward FDI and host country exports are complementary)	Ekholm et al. (2004)

Adopted from Johnson (2006)

Shown is that theoretical models of horizontal MNEs forecast a substitutional relationship between outward FDI and exports meaning that local MNE production substitutes for exports. Vertical models on the other hand principally predict a complementary relationship by reason of an increase in demand for intermediate goods. Knowledge-capital models are able to integrate horizontal and vertical MNEs concurrently, and therefore both complementary and substitution relationships between FDI and trade are feasible. Lastly, export-platform FDI advocates a complementary relationship between inward FDI flows and host country exports. So the above table merely shows that trade theory can support FDI and trade either being complements or substitutes depending on the form that the FDI takes.

3.3 Empirical Literature Review

3.3.1 Positive views

Horst (1972) analysed the link between U.S. exports and FDI to Canada and discovers that exports and foreign investments are alternative ways for U.S. manufacturing firms to supply the Canadian market. In another paper data for individual U.S. firms are utilised by Lipsey and Weiss (1984) so as to examine the effect of foreign production on exports from the home country and they find that higher MNE affiliate sales in the host country are linked to higher exports from the MNE parent, that is, foreign production does not substitute for exports. The empirical results of the paper signify that when a firm produces both final and intermediate goods, production of final goods in a host country can raise the exports of intermediate goods used in host country production from the source country.

O'Sullivan (1993) carried out a study on Ireland's export-led growth owing to FDI and cites the Buckley study of 1974 which observed that virtually one third of total Irish exports are attributable to foreign firms, with the percentage increasing to over 40 percent when food, drink, and tobacco are excluded. In this study the findings were that FDI amongst other variables, for instance, market size, is statistically significant in explaining the variation in the supply of Irish merchandise exports. O'Sullivan goes on to explain that with the high export propensity of foreign enterprises and the immediacy of the United Kingdom to Ireland as well as the trade relations between the two countries, this outcome was to be expected.

Barry and Bradley (1997) also take a focus on Ireland by attempting to shape the nature of FDI in the Irish economy and they analyze the effects of FDI on exports in a descriptive way.

Their conclusion is that there has been a large direct contribution of foreign producers to the increase in Irish exports because the FDI in Ireland has predominantly been export-oriented. Barry and Bradley (1997) believe that the decline in the almost total dependence on the United Kingdom as a trading partner that occurred to Ireland as a result of FDI was especially significant and they also mention the likelihood of additional indirect influence through spillovers.

The evidence of indirect spillovers can be obtained from the paper by Aitken et al (1997) who used panel data on Mexican manufacturing plants for 1986 and 1989 as they estimated a probit model. The evidence they came up with is that the higher export activities of MNCs increase the probability that a local firm in the same sector is an exporter. One of the most impressive case studies of export growth due to entry of MNCs, hence giving spillover effects of FDI is also given. According to Aitken et al (1997) the development of garment exporters in Bangladesh advocate that informational externalities are presumably extremely significant as proven by the entry of one Korean garment exporter in Bangladesh which led to the establishment of hundreds of local-own[illegible]ting enterprises. The garment exports which accounted for a slight percentage of total export earnings became the single largest source of foreign exchange earnings after the entry of this one multinational firm.

Leichenko and Erickson (1997) investigate the connecting relationship between FDI inflows in manufacturing sectors and manufactured export performance based on the US statistics levels from the year 1980 to 1991 and the results show the relationship to be a positive one. Goldberg and Klein (1998) confirm that FDI may promote export, improve import substitution, and lead to a greater trade in intermediate inputs which often exist between parent and associate producers. Given that the orientation of most investment by MNCs is toward exports, this could presumably serve as a channel for the incorporation of the FDI host economy to a global production network in sector in which it may formerly have no experience at all in.

A UNCTAD (1998) World Investment Report shows that modifications in FDI flows into China and FDI's contributions to exports are astounding. From an almost isolated economy in late 1970s, China has become the largest recipient of FDI among the developing world and globally the second only to the U.S. since 1993. FDI flows into China in 1997 amounted to US$200 billion, which constitutes 31% of total FDI in all developing countries.

In a paper by Sharma (2000) on an analysis of the export growth in India, the export growth is said to have been much faster than GDP growth with several factors having contributed to this phenomenon, amongst them being foreign direct investment (FDI). The success stories of East and South East Asian countries are viewed as suggesting that FDI is an influential tool of export promotion due to the characteristics of multinational companies (MNCs), through which most FDI is undertaken, which have the well-recognized contacts and up to date information about foreign markets.

As mentioned previously FDI importantly can affect exports indirectly through the spillover effects from MNCs to domestic firms. A domestic firm has the potential to become more export oriented in response to the activities of MNCs' subsidiaries in the host country. Three channels can be acknowledged through which this may transpire, and these are namely export information externalities, increased competition in the domestic market and demonstration effects. MNCs may endorse efficiency, economies of scale and increasing international specialisation in domestic firms which in turn presents a motivation to long-run economic growth in the host country as MNCs are a ch[illegible]or the introduction of new technology, circulation of information, as well as an important competitive stimulus. Wakelin et al (2000) investigate this empirically for the United Kingdom and they use a large firm-level dataset of 3662 firms from 1992 to 1996. Their results back up positive spillover effects from MNCs on the choice to export of UK-owned firms as well as on their export propensity. It is also clear from the results that the main channel for this phenomenon is increased competition.

Zhang and Song (2001) analyse the case of China. They show the performance of inward FDI on Chinese manufacturing exporting at the provincial level for the period 1986-1997 and their results reveal that FDI has a strong influence on export performance. Liu et al (2001) also carried out an interesting study in China whereby they looked at the effects of FDI on the trade of China. After basing their study on a panel of bilateral data for China and 19 home countries and regions over the period 1984–1998 they found out that for China, it is a virtuous procedure of development as the growth of China's imports initially causes the growth in inward FDI from a home country or region, which, in turn, causes the growth of exports from China to the home country or region. Then the growth of the exports goes on to cause the growth of imports creating an on-going or continuous cycle and according to Liu et al (2001) it is because of these synergies formed by the continuous procedure that China's inward FDI and trade have expanded very quickly over the last two decades or so.

Liu and Shu (2003) however feel that despite the interest in the driving force of export growth in industrial sectors, comparatively little empirical research exists on the relationship between export performance and Chinese industry characteristics. There is little formal evidence as to whether the comparative advantages postulated by traditional trade or new trade theories can be applied to explain Chinese manufacturing exports. Among the different factors affecting export performance, the links between FDI and export performance warrants particular attention, as a two-way causal relationship may exist between them. Therefore they found it important to understand the nature and determinants of export performance in Chinese industries. The empirical evidence can have important policy implications for designing the development strategies during China's economic transition. So they made use of data from China's Third National Industrial Census in 1997 which contains disaggregated data for broad industrial sectors so as to increase the chances of confining the true behavioural relationship between export performance and industry characteristics, which may not be detected at the aggregate level. They investigated the determinants of export performance in China at industrial level. Their results suggested that the export performance of different industries is significantly influenced by FDI.

In the study of how China's export performance is affected by FDI Zhang (2005) cites UNCTAD (2002) noting that the simulative effects of FDI on exports of the host country draw from the supplementary capital, technology, and managerial know-how the multinational corporations (MNCs) bring with them, along with access to global, regional, and especially home-country, markets. These resources and market access brought along with FDI complement the host country's resources and abilities and provide some of the missing elements for greater competitiveness. In the case of China, it has therefore built upon these so as to enter new export activities and it also has enhanced its performance in existing ones.

Johnson (2005) analyses the relationship between FDI and exports by choosing East Asia as the region of study and has been particularly interested in this region giving an argument that FDI and trade have been fundamentally important for the successful economic development in East Asia during the recent times as there have been large increases in both FDI inflows and trade flows. The focus in this study was on the eight 'high-performing' economies, namely: China, Hong Kong, Indonesia, Korea, Malaysia, Singapore, Taiwan and Thailand. Examined is the relationship between inflows and outflows of FDI and exports by the use of individual time series regressions for each of the eight economies and also carrying out a panel data analysis utilising data for the period 1980 to 2003. Results from these procedures

done indicate that FDI inflows tend to have a significant and positive effect on host country which suggests that export-platform FDI may be important for the East Asian economies. According to Johnson (2005) this strategy implies that MNEs invest in the host country so as to export the output to third countries.

Kutan and Vuksic (2007) tested the potential effects of FDI on the exports in 12 Central and Eastern European (CEE) economies. They separated the FDI effects into supply capacity-increasing effects and FDI-specific effects whereby the former effects arise when FDI inflows increase the host country's production capacity which, in turn, increase export supply potential, and the latter effects arise because the multinational company may have superior knowledge and technology, better information about export markets, or better contact to the supply chain of the parent firm than the local firm has. The results that they came up with showed for all the countries in the sample, FDI indeed increased domestic supply-capacity and therefore exports. As for the FDI-specific effects on exports, they were only observed and evident in the new European Union member states.

According to Mahmood et al (2007) China has outperformed other NICs in terms of attracting FDI and stimulating exports over the last two decades and for this reason China provides a distinctive case study to validate the link between FDI and exports and this also explains why most researchers have been interested in the case of China. Their study used an ADL regression framework in the assessment of the relationship of FDI and export growth in China and they came up with two most important findings. The first one is that FDI positively impacts on exports in both the current period of study and in the lagged periods which thereby makes China likely to experience a prolonged positive role of FDI on its exports. The second finding is that labour productivity merely presents a positive lagged effect on exports and one of the feasible reasons for the lag in labour productivity is the indirect role of FDI being the source of technological progression. So a significant lagged effect of FDI on exports and the pattern of FDI flows goes on to suggest that the role of FDI is likely to become increasingly important for China's export venture in the near future.

Wang et al (2007) use data from China to study the relationship between inward FDI and the export performance in China and the results they come up with show that FDI promotes exports by foreign as well as domestically-owned firms, and that this impact is strongest for labour-intensive industries. Xuan and Xing (2006) studied on the case of Vietnam and they concluded that the liberalization of trade and FDI to a great extent improved the country's

exports and FDI inflows. They used an augmented gravity model to investigate the extent to which FDI in Vietnam has contributed to the fast growth of its exports and they based their investigation on Vietnam's exports to 23 FDI source countries from 1990 to 2004. Their results showed that FDI has largely enhanced Vietnam's exports to its source countries and that a 1% increase in FDI can be expected to give an increase of 0.13% in exports to the FDI source countries.

According to Agasha (2008) in previous studies on the export performance determinants in developing countries, it has been shown that FDI has an essential positive impact on export structure. Agasha (2008) cites Van dijk (2002) who conducted a similar study on Indonesia and found out that FDI was very significant in explaining its export performance and also refers to another study on the relative performance in Eastern Europe which suggested that lack of changes in export structure and FDI had significant effects on export performance. Corresponding with this notion, Santos-Paulino (2002) in a study of Trade Liberalization effects in 48 selected developing countries discovered that FDI significantly impacts on export volumes. The study revealed that FDI sometimes chooses sectors in the economy where a country may not have relatively specialized and that this also affects export performance.

Awokuse et al (2008) studied the FDI inflow impact on export performance of 14 most export-engaged FDI-attracting industrial and food-manufacturing sectors in China during a ten year period from 1995-2005 and their study concludes with a positive outcome. In the study it is noted that once some export determining variables such as imports, real exchange rates, domestic investment and GDP are controlled for, FDI inflow compels a positive impact on China's total exports. A cross-section effect of FDI was also accounted for in the study and a positive relationship between FDI and export performance emerged for 13 sectors which excluded only one sector. Importance of a cross-section analysis in this study is that it allows for and empirically estimates variation in the effects of FDI on exports across sectors rather than concentrating mainly on aggregated data.

Gunawardana and Sharma (2009) examine how FDI inflows, labour productivity and effective rate of industry assistance probably affect Australian manufacturing sectors covering the period 1988-2005 and their findings are that FDI and exports materialize to be positively correlated in cases where they captured short-run effects, lagged effects and long-run effects as according to the estimation model they constructed. Specifically implied in the

research is that in the short-run, a 1% increase in FDI inflows causes a 0.397% increase in the Australian manufacturing industries' exports, whereby the effect of four-quarter lagged FDI variable on exports is found to be of 0.487% and lastly in the long-run a 2.668% possible increase in exports is observed.

Pham and Tran (2009) investigated the causal relationship between FDI and exports for Vietnam over the period 1995-2006. The used a panel co-integration framework that allowed for heterogeneity across seven economic sectors. Firstly they used the General Method of Moments method for a dynamic heterogeneous panel, and then subject sector-specific FDI and export data to Granger causality tests. The obtained results were that FDI "causes" exports in the long-run in five sectors, namely:

1) Heavy industries;
2) Light industries;
3) Food industries;
4) Oil and gas; and lastly
5) Agriculture, forestry and fisheries.

Finally, they explore the possibility of cross-sector spillovers and to do this they carried out more Granger causality tests and the results showed that there is cross-sector causality running from FDI inflows to services and lastly to exports of the five mentioned-above sectors. In comparison, FDI inflows into other sectors cause exports in Light industries, Food industries, Oil and Gas, Agriculture, Forestry and Fisheries but not in the Heavy industries.

3.3.2 Negative views

Goldberg and Klein (1999) on a different note, opposed to Goldberg and Klein (2008), do not find evidence to support a significant link between FDI and aggregate export in Latin America. According to them the trade-promoting effects of FDI emerge to be weak or of no consequence with regards to Latin American trade with USA and Japan.

A UNCTAD (1998) report is sceptical about the positive role of FDI in manufacturing export performance. The opinion given here is that capital and consumption goods not available locally are imported, and profits forwarded back to the home country, so as a consequence it cuts into the export earnings generated.

Ibrahimova (2010) investigated FDIs influence on the export performance of nine Commonwealth of Independent States (CIS countries).Used in this study was annual aggregate level data over the period of 1995 and 2008 and the results revealed existence of

significant negative effects of stock of FDI on export performance in these countries studied upon even though FDI is believed to have potential spillover effects over the host countries' economies.

3.3.3 Mixed views

Goldberg and Klein (1999) analyze the impact of FDI from the United States in the manufacturing sectors of individual Latin American countries on the net exports of those and other sectors. They fundamentally test if the capital movements and trade in goods are substitutes or complements. The results they get vary across sectors and host countries, as in some the impact of FDI is positive whilst in some it is not significant at all and this reflects the importance of the specific conditions in individual countries and industries.

In the paper by Sun (2001) an examination of whether FDI encourages China's export performance at the provincial level across three different regions was carried out. Sun (2001) used the time-series and cross-section model for the period 1984-1997 looking at the different role of foreign investment on exports in three regions of China and therefore completely takes the detailed primary settings of the individual regions into account and finds that the effects of FDI on export performance vary across the three regions. The impact is positive and the strongest in the coastal region, whilst in the central part of China it is weaker, but still positive and significant, and then in the western region it is insignificant.

After doing a panel study on China, Wen (2003) brings to notice both positive and negative tendencies in China with respect to the role of FDI on export performance. In east China, geographical advantage in export attracts FDI inflow and in turn the FDI promotes export. Additionally, rise of the FDI-GDP ratio enhances regional share in industrial value added in east China. These effects therefore contribute positively to regional income growth in east China even though there is a direct crowding out effect between FDI and domestic investment in growth. On the contrary, the negative effect of FDI inflow in central China on regional export orientation weakens its contribution to regional income growth.

In another paper Zhang (2005) examines the role on Chinese export performance estimating not only the full sample of industries but also labour-intensive and capital intensive industries. The results bring out that FDI has a greater influence on export performance in China at the industrial level and furthermore the export performance in labour-intensive industries is positively and largely affected by inward FDI whilst that of capital-intensive industries is less affected by FDI.

On a different note, Pacheco-Lopez (2005) on a study of Mexico carried out the Granger causality test and demonstrates that, yes there is a relationship between inward FDI and export performance in Mexico, but there is an indication that the relationship is bi-directional meaning that FDI impacts on exports whilst exports also impact on FDI in Mexico. Lee (2007) cites Baliamoune-Lutz (2004) who agrees with this notion as after carrying out an examination of the relationship between FDI, exports and economic growth in Morocco and the results revealed also a two-way causal relationship at national level.

According to Njong (2008) the available empirical evidence of the role of FDI on export performance of host countries is mixed. Cited is Jeon (1992) who found out that numerous cross-country studies support the hypothesis of a negative relationship between FDI and export growth and Sharma (2000) who does not see any statistically significant impact of FDI on Indian exports yet in disparity, whilst other studies by Cabral (1995) and Blake and Pain (1994) show that FDI actually has a positive effect on export performance of host countries.

In another case study of China's export performance in the light of FDI, Gu and Awokuse (2007) used evidence from disaggregated sectors and got results generally suggesting that FDI has a statistically significant and positive impact on China's exports. More specifically FDI positively affects exports strongly in the machinery, then textile, then mineral, and lastly chemical sectors. FDI's impact on exports is positive however not statistically significant in the food processing sector, whilst in the beverage industry FDI and exports relationship is statistically significant but it is a negative one, meaning FDI does not promote exportation of beverages.

3.3.4 Other views

Carrying out a research to explain the FDI in the United States utilising economic indicators, Ajami and BarNiv (1984) concluded that the sole most important basis for the variability, in this case, increase in the level of FDI in the U.S. by the different investors from different countries is the increase in export to the U.S. This alternative indicator may signify the need to safeguard markets established by exports. So Ajami and BarNiv (1984) concluded FDI and export have a positive relationship but that the cause of impact is from exports to FDI.

While export-led growth has often been cited as the engine behind the Asian miracle, recent research has shifted the focus of the debate away from the mere fact of exporting and towards the importance of export composition for growth. For instance, one of the recent stylized

facts of development is the finding that countries which promote exports of more "sophisticated" goods tend to grow faster (Rodrik, 2006; Hausmann et al, 2006).

Harding and Javorcik (2011) in their study they argue that it is the policies which are aimed at attracting FDI inflows that can boost a country's ability to upgrade its export basket. The entry of MNCs can affect the composition of exports through two channels:

1) MNCs using a country as an export platform can engage in production of more sophisticated or higher quality goods than those previously exported by the host country.
2) The presence of MNCs can lead to knowledge spillovers to local firms in the same industry or to local firms in the supplying sectors, which in turn can facilitate product upgrading.

To examine whether FDI is a catalyst for upgrading the export portfolio, they use information on exports of 105 countries during the 1984-2000 period. The suggestion given in this study is that FDI can play an imperative role in helping developing countries to develop the quality of their exports and the presence of FDI may lead to upgrading of production and marketing methods and thus increasing the capacity of exporters to obtain higher prices in foreign markets. With the argument that it is the policies aimed at attracting FDI inflows which offer a potential guideline for upgrading export structure in developing countries, Harding and Javorcik (2011) explain that once production is of high quality goods, those goods will be demanded more by the trading partners and hence the country experiences major export growth.

The results of their empirical analysis recommend that there is existence of a positive relationship between FDI and export quality hence leading to export growth. Those sectors which prioritize in national efforts to attract FDI are found to have 11% higher unit values of exported products than other sectors. Their findings are robust to using two different data sets, including highly disaggregated figures on US imports, and to instrument for the choice of priority sectors and the findings suggest that attracting FDI inflows can be a viable strategy for low and middle income countries aspiring to upgrade the quality of their export basket.

3.4 Assessment of Literature

The relationship between FDI and export performance of a host country reviewed above emerges to be a significant one. The literature identifies an important factor for economies

that wish to benefit in exporting more as a host country of inward FDI, to be liberalized in terms of trade and to be more open economies. Taking a glance at the theoretical literature or models put across, theories such as the Flying Geese model, Vernon's PLC theory, new growth theory and the theory of Multinational Enterprise, it is clear as to how devoted they are to explaining the trend of the FDI flows and its positive influence on the host country's export performance. Then the Standard theory of International trade treats FDI and exports of the host country to have either a subtitutional or complementary relationship depending on the form of FDI injected into the host country, though the expected relationship between the two is also a positive one.

Empirically, different studies have yielded different results. The majority of the studies, for example UNCTAD (1998), Zhang and Song (2001), Liu et al (2001), Liu and Shu (2003) found a positive impact of inward FDI on Chinese exports in all their different analyses. Other studies that found a positive relationship between FDI and export growth include Goldberg and Klein (1998), Sharma (2000), Barry and Bradley (1997), Johnson (2005) and more recent ones like Gunawardana and Sh[illegible]009) and Pham and Tran (2009). On another hand a few studies revealed the notion that export performance in the host country is affected negatively by FDI and these include Goldberg and Klein (1999) and Ibrahimova (2010). Some studies have found a mixed result whereby in some regions FDI impacts export growth positively and in some regions the impact is negative or there is no impact at all like in the study by Sun (2001).

Other studies carried out have still come up with a different view pertaining to the FDI-export performance relationship, like Ajami and BarNiv (1984) who found a relationship to be there but it runs from exports to inward FDI, and Harding and Javorcik (2011) who found that it is not the FDI that boosts up export growth for the host country but it is the policies used to attract the FDI which matter in boosting the country's ability to upgrade its export basket. Further still, it can be found in other studies like Agasha (2008) that it is not only FDI significant for export performance, but also other factors are involved such as, the price of the exports, the Terms of trade in use in the economy, GDP, the exchange rate regime and they work hand-in-hand to drive the export performance of an economy.

In a nutshell, the studies have exposed different results most probably due to different levels of development and economic structures of the countries, the different time periods included

in the analysis by the researchers or econometric techniques. Comparing the different results obtained by the researchers to some extent remains impossible.

3.5 Conclusion

The main objective of this chapter was to investigate the various theoretical features surrounding the FDI-export performance relationship so as to fully comprehend the subject concerned and to aid in exploring further the effects of the inward FDI, with South Africa as the host country, on its export performance. The main models adapted to explore the FDI-export growth relationship were the FG model, Vernon's PLC theory and the New Growth theory. Empirical literature on the issue under examination largely gives the notion of a positive effect of FDI on exports, but negative views and other totally different views also come, hence suggesting that FDIs impact varies from case to case depending on strategies and efforts the different economies make. Therefore from both the theoretical and empirical literature surveyed, it is clear and evident that inward FDI has a significant impact on export growth in an economy.

CHAPTER 4

Analytical framework

4.1 Introduction

The chapter preceding this one outlined the theoretical and empirical considerations of the impact of foreign direct investment on export growth. This chapter seeks to explore the methodology that will be used to investigate the relationship between FDI and export growth. It sets out the analytical framework that is used to provide answers to the objectives set out in chapter one and also to test the hypothesis set in chapter one by carrying out an econometric analysis on South African data to establish the impact of FDI on export growth of South Africa. This first section of this chapter will specify a vector auto regression (VAR) model using yearly data for the period 1978-2010 to capture the relationship between FDI and exports. The second section will be about the definition of variables and data sources used in the study follows in section three. A review of estimation techniques for the study of how FDI impacts on exports will be carried out [illegible]our. Section five of this chapter will show the diagnostic check tests carried out in the study and the last section, which is section six, will give the conclusion.

4.2 Model specification

As brought out in the literature review in the previous chapter, the focal point of this study is to assess the effect that FDI has on the growth of exports in the host country. The various theories reviewed have given direction upon the selection of the variables to be employed.

The model to be used is a modified version of Njong (2008). It is a parsimonious one which takes into consideration some trade reform indicators. In the model is included a proxy for the supply capacity of the recipient country that positively affects export supply capacity. FDI stock data is used to capture the spill over effects. The proposal is to include both variables in the same specification to see whether FDI has an additional impact on exports beyond its impact on exports through the domestic supply capacity variable. Hence, to test the impact of FDI on exports, it is important to control for the other major determinants of exports in South Africa.

The model is specified as follows:

$EXP = f(REER, PGDP, TLI, MKT)$..... (1)

$EXP = f$ (REER, PGDP, TLI, MKT, SFDI)..... (2)

In both equations to be used, EXP is real exports and it is the dependent variable whilst REER, the real effective exchange rate index, PGDP, the potential output which is used a trend of real GDP, TLI, the trade liberalization index and MKT, the external market access indicator are the independent variables in the first equation. In the second equation SFDI which is the stock of FDI is added as an independent.

For analytical convenience the variables are taken in the log level and it is to be noted that proxies have to be taken for those variables without time series data. The equations (1) and (2) become:

$$\log EXP_t = \alpha_0 + \alpha_1 \log REER_t + \alpha_2 \log PGDP_t + \alpha_3 \log TLI_t + \alpha_4 \log MKT_t + \varepsilon_t \quad \text{.....(3)}$$

$$\log EXP_t = \alpha_0 + \alpha_1 \log REER_t + \alpha_2 \log PGDP_t + \alpha_3 \log TLI_t + \alpha_4 \log MKT_t + \alpha_5 \log SFDI_{(t-1)} + \varepsilon_t \quad \text{.....(4)}$$

Brief definitions and explanations of the variables and the priori expectations of how they impact on exports are given as follows:

Real exports **(EXP)** - This is the independent variable in both the equations.

Real effective exchange rate **(REER)** - In simple terms this is the rate which is used to determine an individual country's currency value relative to the other major currencies in the index, as adjusted for the effects of inflation. It is a good and important measure to capture the competitiveness of an economy as movements in the real effective exchange rate provides an indication of the evolution of a country's aggregate external price competitiveness. As standard macroeconomic theory suggests, relative prices are significant in explaining a country's exports, thus in this study REER is included so that it captures the influence of relative prices. In its construction, the index of REER behaves in a way that an increase in REER denotes a real appreciation of the currency, hence it is expected that the coefficient α_1 is negative.

Potential output **(PGDP)** - Also referred to as potential GDP, it is the highest level of production that can persist for an extensive period without raising the rate of inflation. In a

Publication for the European Commission, Ladiray, Mazzi and Sartori (2003) define potential output as the maximum level of durably sustainable production, without tensions in the economy and more precisely without acceleration of inflation. It is a trend of real GDP used as a proxy for the supply capacity of a country. This variable is expected to capture the effects of increased supply capacity due to FDI inflows, thus the expectation is that the coefficient α_2 to be positive. The PGDP variable enters the regression with one year lag since it may take some time before additional supply capacity is reflected in increasing exports.

Trade liberalization index **(TLI)** – Trade liberalization is the process whereby trade policy allows domestic providers of goods and/or services to compete more freely in world markets and in turn foreign providers also compete more freely in domestic markets. Trade liberalization is enabled through the removal or reduction of restrictions or barriers on the free exchange of goods between nations. This includes the removal or reduction of both tariff (duties and surcharges) and non-tariff obstacles (like licensing rules and quotas). According to Njong (2008) as taken from (Bamou et al., 2006) the trade liberalization index is calculated as import ratio on total international trade volume. It is included in the model so as to account for the potential impact of the trade liberalization measures undertaken by the country. The expectation is that the co-efficient α_3 is positive because trade liberalization is the key to more openness of the economy to international trade which brings about rapid growth facilitating for the economy to export more.

External market access indicator **(MKT)** - Having access to external markets signifies that an economy now has increased connectivity, interdependence and integration with other economies when it comes to trade. One of the advantages it brings with it is development in the less developed economies because developed ones bring investment to them which can in turn enhance their export sectors. The external market access indicator according to Njong (2008) is approximated by the growth rate of export penetration index, which is calculated as export ratio on total international trade. Just like the TLI variable the MKT variable is also included in the equation so as to account for the potential impact of the trade liberalization measures undertaken by the country. Its co-efficient α_4 is expected to be positive as well.

Stock of FDI **($SFDI_{(t-1)}$)** - Equation 1 is the benchmark equation and in the second equation that is when the stock of FDI ($SFDI_{(t-1)}$), with a one-year lag is added to equation 1. This is to test the spill-over effects on exports with the impact of increased supply capacity held constant. The lagging of FDI stock can be supported by the argument that for an export-

oriented foreign investment the assumption is that building a new plant and achieving a desired level of production takes time. Njong (2008) cites Barrios et al. (2005) stressing upon the point that the cumulative FDI stock variable is a better choice than FDI inflows hence it is the cumulated FDI that matters. Using FDI inflows is also possible, but it would require using many lags of the FDI variable which reduces the number of observations. Njong (2008) also supports the use of FDI stock rather than FDI inflows by citing (Girma et al. 2007) who suggests that there is a potential endogeneity issue, when regressing exports on FDI, therefore using FDI stock with a one year lag is likely to be better and to ease up this problem. The expectation is that $\alpha_6$is to be positive.

4.3 Data sources

For empirical analysis of the South African economy the work makes use of time series yearly data stretching from period of 1978 to 2010, thus having 32 observations. The period taken into account is reasonably appropriate as it allows for an analysis during the Apartheid era, where restrictive Trade policy regimes were operational, and also an analysis after the Apartheid era where new and more open Trade regimes were established.

The main sources of data were obtained from secondary sources including publications of the World Bank, the South African Reserve Bank (SARB) electronic data delivery systems, International Financial Statistics (IFS), Statistics South Africa (STATS S. A.) and the Department of Trade and Industry (DTI).

4.4 Analytical framework and Estimation Techniques

4.4.1 Unit root/Stationarity tests

A key concept underlying time series is that of stationarity and non-stationarity. A time series is covariance stationary when its mean, variance and covariances remain constant over time. It is important for a time series to be stationary because if it is not then all typical results of the classical regression analysis are not valid, they will have no meaning and are therefore called "spurious." For a stationary time series, if shocks occur they are temporary and over time the shocks dissipate and the series will restore to its long-run mean level. On the other hand, a non-stationary time series will contain permanent components, therefore the mean and/or the variance of the non-stationary time series will depend on time which will lead to cases where a series:

1. has no long-run mean to which the series returns;
2. the variance will depend on time and will approach infinity

So it is important to identify non-stationary series or the presence of unit roots in a time series. Most macroeconomic time series are trended and therefore non-stationary. According to Asteriou and Hall (2006:291) with non-stationary or trended data, the standard OLS regression procedures can lead to incorrect conclusions easily, for instance, getting very high R^2values (which are sometimes higher than 0.95) and very high t-ratio values (sometimes higher than 4) while the variables used in the analysis have no interrelationships, that is, spurious regressions. So tests are carried out to identify unit roots and if a series is stationary or non-stationary.

The first simple process that can be carried out is to test for the order of integration which is a test for the number of unit roots present in the series and it follows the steps below:

Step 1

Test Y_t to see if it is stationary. If yes then $Y_t \sim I(0)$; if no then $Y_t \sim I(d)$; where $d>0$.

Step 2

Take first differences of Y_t as $\Delta Y_t = y_t - y_{t-1}$, and test ΔY_t to see if it is stationary. If yes then $Y_t \sim I(1)$; if no then $Y_t \sim I(d)$; where $d>0$.

Step 3

Take second differences of Y_t as $\Delta^2 Y_t = \Delta Y_t - \Delta Y_{t-1}$, and test $\Delta^2 Yt$ to see if it is stationary. If yes then $Y_t \sim I(2)$; if no then $Y_t \sim I(d)$; where $d>0$. It goes on till it comes to stationarity and then the process stops. So for example if $\Delta^3 Y_t \sim I(0)$, then $\Delta^2 Y_t \sim I(1)$, and $\Delta Y_t \sim I(2)$, and finally $Y_t \sim I(3)$; which means that Y_t needs to be differenced three times in order to become stationary.

Therefore, in simpler terms, a non-stationary series must be differenced d times before it becomes stationary. It is then said to be integrated of order d. This is denoted as $I(d)$, where d is the order of integration. The order of integration refers to the number of unit roots in the series, or the number of differencing operations it takes to make a variable stationary. An $I(0)$ series is a stationary one whilst an $I(1)$ series contains one unit root, and so on.

There are quite a number of methods used to test for stationarity and unit roots and these tests can either be informal and formal tests. The informal tests are of a graphical analysis nature done by means of visual plots of data in the form of graphs and correlogram (autocorrelation

function). The formal unit root tests include the simple Dickey-Fuller test, the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Informal tests are simple and check for stationarity by just plotting the time series and looking for evidence of trend in mean, variance, autocorrelation and seasonality and by making use of subjective visual inspection of plots and correlograms. However, they do give hints as to the presence or absence of stationarity. Formal tests help with determining stationarity and are based for the most part on formal statistical tests. The difference between the different types of formal tests lies in the stringency of the assumptions they use as well as in the form of the null and alternative hypotheses they adopt. Most economists adapt to formal tests because of their statistical nature. This study employs the Augmented Dickey Fuller and Phillips-Perron tests to check for robustness of the results.

4.4.1.1 The Augmented Dickey-Fuller test

It is a standard test performed to assess the degree of integration of the variables in a time series. The ADF test can be viewed as a stringent version of the Dickey Fuller (DF) test. The DF test is valid if the error term ε_t is white noise. [illegible]hat the error term ε_t is uncorrelated with the dependent variable of the regression. However, an error term is unlikely to be white noise so a solution that Dickey and Fuller came up with to cater for this shortfall was then to include extra lagged terms of the dependent variable so as to do away with autocorrelation, and this is what they termed the Augmented Dickey-Fuller (ADF) test. The ADF test is more preferred to the DF test because the latter has critical values larger in absolute than nominal terms and so may lead to a rejection of a correct null hypothesis usually. According to Brooks (2008:329) the estimated form of the ADF test is given by the following equation:

$$\Delta Y_t = \gamma Y_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta Y_{t-1} + u_t \quad \text{..... (5)}$$

The lags of ΔY_t now "soak up" any dynamic structure in the dependent variable, so as to ensure that u_t is not auto correlated. Like the DF test, the ADF test also estimates three models for each variable, which are;

i. with no constant and no trend

ii. with constant and no trend

iii. with constant and trend

The lag length on the extra terms included in the ADF is either determined by the Akaike

Information Criterion (AIC) or Schwartz Bayesian Criterion (SBC), or more usefully by the lag length necessary to whiten the residuals. (Asteriou and Hall, 2006:297). According to Gujarati (2004:817) the number of lagged difference terms to include is often determined empirically and the idea is to include enough terms so that the error term is serially uncorrelated. Brooks (2008:329) suggests two simple rules of thumb that can be used to determine the optimal number of lags of the dependent variable. Firstly, the frequency of the data can be used to make this decision, for example, if the data are monthly, 12 lags are used or if the data are quarterly, 4 lags are used. Secondly, an information criterion can also be used to decide. It is also very significant to try and use an optimal number of lags and to observe the sensitivity of the outcome of the test to the lag length chosen. Including too few lags will not eliminate all of the autocorrelation, consequently biasing the results. On the other hand using too many lags will increase the coefficient standard errors. This latter effect crops up since an increase in the number of parameters to estimate uses up degrees of freedom, therefore the absolute values of the test statistics will be reduced. This will result in a reduction in the power of the test, meaning that for a stationary process the null hypothesis of a unit root will be rejected less frequently than would otherwise have been the case (Brooks, 2008:329).

4.4.1.2 The Phillips-Perron test

This is a second unit root test that can help ensure accuracy of the unit root results. Phillips and Perron (1988) developed a more comprehensive theory, a generalization of the ADF test procedure that permits for fairly mild assumptions concerning the distribution of errors. This test is similar to the ADF test but incorporates an automatic correction to the DF procedure so as to allow for auto correlated residuals. The technique by Phillips and Perron applies nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. The test regression is the AR (1) process:

$$\Delta Y_{t-1} = \propto_0 + \gamma Y_{t-1} + \varepsilon_t \quad \ldots\ldots (6)$$

According to Brooks (2008) the PP test makes a correction to the t-statistic of the coefficient γ from the AR(1) regression in a bid to account for the serial correlation in ε_t. So the PP statistics are basically modifications of the ADF t-statistics that take into account the less restrictive nature of the error process. Just like with the ADF test, the PP test can be done including a constant, a constant and a trend or neither in the test regression.

4.4.2 Co-integration and vector error correction modeling

After ascertaining that all the variables are of the same order of integration the next procedure would be to test for the possibility of cointegration among the variables used. The process of converting non-stationary data into stationary data usually leads to the loss of the long run relationship between the variables and so testing if the variables are cointegrated is a necessity in this study. Cointegration is an econometric technique for testing whether or not a long run (equilibrium) relationship exists between the series. This implies that the series move together in the long run,and also that if two or more series are themselves non-stationary, but a linear combination of them is stationary, then the series are said to be cointegrated.

Most macroeconomic time series are typically non-stationaryand according to Asteriou and Hall (2006) co-integration therefore becomes an over-riding requirement for an economic model using non-stationary time series. When the variables do not co-integrate then there is the risk of having problems of spurious regression and obtaining meaningless results. On another hand, if the stochastic trends cancel then it means there is cointegration. The main point is that if there is a genuine long-run relationship between Y_t and X_t, then although the variables will rise over time, since they are trended, there will be a common trend that links them together. For an equilibrium or long-run relationship to be in existence a linear combination of Y_t and X_t that is a stationary variable is required.

In order to proceed to this stage, all the series of interest should be integrated of the same order, preferably $I(1)$ and the reason behind this is that if the series display level stationarity, or are $I(0)$, standard regression and statistical inference could be carried out as there would be no problem of spurious regressions. Alternatively, if the series are integrated of different orders the standard procedure used to be that of differencing all the variables to be included in regressions. However, it is not necessary for all the variables in the model to have the same order of integration, especially if theory *a priori* suggests that such variables should be included. Thus, a combination of I (0), I (1) and I (2) can be tested for co-integration.

There are several ways of testing for cointegration. However the mostused methods for cointegration include the residual based Engle-Granger (1987) approach and the maximum likelihood based Johansen (1991) technique. The former technique seeks to determine whether the residuals have an equilibrium relationship or are stationary and the latter seeks to determine the rank of the matrix.

4.4.2.1 Engle-Granger Technique

Engle and Granger proposed a method to test for cointegration which follows the steps below:

Step 1: Test the variables for their order of integration

As seen in the definition, cointegration necessitates that the variables be integrated of the same order, therefore the first step is to test each variable to determine its order of integration, whereby the ADF test can be used to infer the number of unit roots (if any) in each variable. Three outcomes can be inherent; a) if both variables are stationary [I (0)] then there is no need to proceed and the classical regression analysis can be applied, b) if the variables are integrated of different order it is then possible to conclude that they are not cointegrated; or c) if both variables are integrated of the same order then the next step is carried out.

Step 2: Estimate the long-run (possible cointegrating) relationship

If the result in step 1 indicates that both X_t and Y_t are integrated of the same order the next step is to estimate the long-run equilibrium relationship of the form:

$$Y_t = \beta_1 + \beta_2 X_t + \varepsilon_t \quad \ldots\ldots (7)$$

and obtain the residuals of this equation. If there is no cointegration, the results obtained will be spurious but if there is cointegration then OLS regressions will yield 'super-consistent' estimators for the cointegrating parameter β_2.

Step 3: Check for (cointegration) the order of integration of the residuals

So as to determine if the variables are actually cointegrated, denote the estimated residual sequence from the equation $\hat{e}_t$ which is the series of the estimated residuals of the long-run relationship. If these deviations from the long-run equilibrium are found to be stationary, then $X_t$and Y_t are cointegrated.

Step 4: Estimate the error-correction model

If the variables are cointegrated, the residuals from the equilibrium regression can be used to estimate the error-correction model and to analyse the long-run and short-run effects of the variables as well as to see the adjustment coefficient, which is the coefficient of the lagged residual terms of the long-run relationship identified in step 2. Finally, diagnostic tests are carried out to check for the adequacy of the model.

Having looked at the Engle-Granger approach, Asteriou and Hall (2006) highlight some important shortcomings which this approach has. Firstly there is no specification of the order

of the variables, that is, nothing is said about which of the variables is to be used as the regressor and why and this becomes even more complicated when there are two or more variables to test. Secondly, the Engle-Granger approach does not give the number of cointegrating vectors. Thirdly this approach relies on a two-step estimator, whereby the first step is to generate the residual series and the second step is to estimate a regression for this series so as to see if this series is stationary or not. Therefore if an error occurs in the first step, it will be carried over into the second step. The Johansen approach is a better test and it is preferred to the Engle-Granger approach as it resolves all the problems mentioned above and hence it is the approach to be utilized in this study. The Johansen approach has an advantage as it is used for multivariate cases. As mentioned earlier this test is based on the maximum likelihood procedure and for this reason it provides a unified framework for testing cointegrating relations in the context of vector auto regressive (VAR) error correction models (ECM). The Johansen technique is described below.

4.4.2.2 The Johansen Technique

The Johansen test allows for testing restricte[redacted] the co-integrated vector(s). It centers on an examination of the behavior of the Π matrix under different circumstances. Π is interpreted as the long-run coefficient matrix. The Johansen technique projected two tests for determining the number of cointegrating vectors. The first is expressed as the likelihood ratio test and it is based on the maximum eigenvalue and the second is termed the likelihood ratio test based on the trace test. According Johansen's analysis, the power of the trace test is lower than the power of the maximal eigenvalue test. In interpreting the results, if the null hypothesis of no cointegrating vector can be rejected, it indicates that there is a long run relationship among the variables in the model and as a result, the error correction mechanism can be presented. Asteriou and Hall (2006) outlined the steps of the Johansen technique as follows:

Step 1: Testing the order of integration of the variables

Just the same as with the Engle-Granger approach, the Johansen approach first tests for the integration orders of the variables under examination as has been noted earlier that most economic time series are non-stationary and hence integrated. Mostly, cases where variables are integrated of the same order are the desirable ones so as to continue with the cointegration test, however in cases where variables are integrated of different order, cointegration relationships might exist as well. In the latter case the results will be affected hugely and more consideration should be applied to such cases.

Step 2: Setting the appropriate lag length of the model

This is such a crucial step in the test because the important thing is to have standard normal error terms that do not suffer from non-normality, autocorrelation, heteroskedasticity and so on (Gaussian error terms). Setting the value of the lag length is affected by the omission of variables that might affect only the short-run behavior of the model, because omitted variables instantly become part of the error term. Hence, a careful inspection of the data and the functional relationship is necessary before going forward with estimation so as to decide whether to include additional variables and dummy variables are quite common as they take into account short-run 'shocks' to the system, like political events that had vital effects on macroeconomic conditions. According to Asteriou and Hall (2006:322) the most common procedure to choose the optimal lag length is to estimate a VAR model including all the variables in levels, that is, non-differenced data. This VAR model should be estimated for a large number of lags, then reducing down by reestimating the model for one lag less until zero lags are reached. A way of deciding on this issue of the optimal lag length is the use of the Akaike Information Criteria (AIC), Schwarz Bayesian Criteria (SBC), Hannan-Quinn criterion (HIQ), Final predication error (FPE) as well as Likelihood Ratio test (LR) criteria and choose that model that gives the lowest values of these criteria. This is because all these criteria can produce conflicting VAR order selections. However, decision about the lag structure of a VAR model could be based on the fact that a given criteria produces a white noise residual and conserves degree of freedom. Including too many lagged terms will waste degrees of freedom and may introduce the possibility of multicollinearity. On the other hand including too few lags will lead to specification errors and omission of important lag dependences. Also if serial correlation is present the estimated coefficients will be inconsistent. The lag length also influences the power of rejecting hypothesis.

Step 3: Choosing the appropriate model regarding the deterministic components in the multivariate system

Whether an intercept and/or a trend should enter either in the short-run or the long-run model, or both models is another important aspect in the formulation of the dynamic model. The choice of deterministic components requires that all variables be pre-tested to assess the order of integration. It is easier to detect the possible trends when a series is plotted. The order of integration is important, because variables with different orders of integration pose problems in setting the co-integration relationship. Order of integration is detected by the unit root tests discussed prior. The graphical analysis of the raw data together with *a priori* knowledge from

economic theory should assist in selecting the deterministic trend assumption to be used in the Johansen test for co integration (rank of Π).

Step 4: Determining the rank of Π (or the number of cointegrating vectors)

This step involves determining the number of co-integrating vectors. The model considered for co-integration can be estimated in several forms based on the specification of the constant and the time trend. If the model has a constant without a time trend, then it can be estimated in two forms. It can be estimated with either the constant inside the co-integrating vector or outside the co-integrating vector. If the model has a time trend, then it is considered either inside or outside the co- integrating vector. Asteriou and Hall (2006) also bring out as from Johansen (1988) and Johansen and Juselius (1990) that there are two methods, just as mentioned earlier to determine the number of cointegrating relations and both methods involve the estimation of the matrix Π. This is a k x k matrix with rank r. The procedures are based on propositions about eigenvalues.

a) One method tests the null hypothesis, that *Rank* (Π) = *r* against the hypothesis that the rank is *r*+1. So, the null in this case is that there is cointegrating vectors and that there are up to *r* cointegrating relationships, with the alternative suggesting that there is (*r*+1) vectors. The test statistics are based on the characteristic roots, that is, eigenvalues obtained from the estimation procedure. The test consists of ordering the largest eigenvalues in descending order and considering whether they are significantly different from zero. To make it clear, if there are *n* characteristic roots for instance, denoted by $\lambda_1 > \lambda_2 > \lambda_3 > \ldots > \lambda_n$. So, if the variables under examination are not cointegrated, the rank of Π is zero and all the characteristic roots will equal zero. Therefore, (1- λ_i) will be equal to 1 an since In (1) = 0, each one of the expressions will be equal to zero for no cointegration. On the other hand, if the rank of Πis equal to 1, then $0 < \lambda_1 < 1$ so that the first expression (1-λ_1) < 0, while all the rest will be equal to zero. To test how many of the numbers of the characteristic roots are significantly different from zero this test uses the following statistic:

$$\lambda_{max}(r, r+1) = -TIn(1 - \lambda_{r+1}) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(8)}$$

As mentioned earlier, the test statistic is based on the *maximum eigenvalue* and because of that, it is called the *maximal eigenvalue statistic* (denoted by λ_{max}).

b) The second method is based on a likelihood ratio test about the trace of the matrix. Due to this it is called the *trace statistic*. This test considers whether the trace is increased by adding

more eigenvalues beyond the *r*th eigenvalue. The null hypothesis in this case is that the number of cointegrating vectors is less than or equal to *r*. When all characteristic roots equal 0 then the trace statistic is also equal to 0 as well. However, if the characteristic roots are close to unity then the more negative is the In(1- λ_i) term and hence, the larger the trace statistic. This statistic is calculated as:

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{n} In(1-\lambda_{r+1}) \quad \ldots\ldots (9)$$

The procedure then is to work downwards and stop at the *r*-value which is associated with a test statistic that exceeds the displayed critical value and critical values are given by Johansen and Juselius (1990).

Step 5: Testing for weak exogeneity

This is the next step after determining the number of cointegrating vectors. A variable is weakly exogenous if it is only a function of lagged variables and the parameters of the equation generating it are independent of the parameters generating the other variables in the system. If a variable is found to be weakly exogenous it can be dropped as an endogenous part of the whole system meaning that the whole equation can be dropped for that variable, although it will continue to feature on the right hand side of the other equations.

Step 6: Testing for linear restrictions in the cointegrating vectors

The last important feature of the Johansen test is that it allows to obtain estimates of the coefficients of the matrices and test for possible linear restrictions regarding the matrices, especially for the matrix that contains long-run parameters, it is very important as it allows testing specific hypotheses regarding various theoretical predictions from an economic theory point of view.

Estimating the VECM

The final step involves estimating the VECM if co-integration is found. This is done by specifying the number of co integrating vectors, trend assumption used in the previous step and normalizing the model on the true co-integrating relation(s). Hence, a VECM is merely a restricted VAR designed for use with non-stationary series that have been found to be co integrated. The specified co integrating relation in the VECM restricts the long run behaviour of the endogenous variables to converge to their co-integrating relationships, while allowing for short run adjustment dynamics. Once estimation is complete, the residuals from the VECM must be checked for normality, heteroskedasticity and autocorrelation.

4.4.3 The Error-correction model

The error correction models (ECM) specify the short-run dynamics of each variable in the system, and in a framework that holds the dynamics to long-run equilibrium relationships suggested by economic theory. For instance, economic theory suggests that economic activity across regions should converge. If this convergence hypothesis is true, we might observe long-run relationships between employment performances across regions. The existence of such long-run conditions does not prevent the occurrence of stationary, though variable, short-run deviations from them. As seen earlier if Y_t and X_t are cointegrated then by definition $u_t \sim I\ (0)$. So the relationship between Y_t and X_t can be expressed with an ECM specification as:

$$\Delta Y_t = a_0 + b_1 \Delta X_t - \pi u_{t-1} + Y_t \text{ .... (10)}$$

It will now have the advantage of including both long-run and short-run information. In this model, b1 is the impact multiplier, that is, the short-run effect that measures the immediate impact that a change in Xt will have on a change in Yt. On the other hand, ∏ (make it as in book) is the feedback effect, or the adjustment effect and it shows how much the disequilibrium is corrected, that is, the extent to which any disequilibrium in the previous period effects any adjustment in Yt.

Advantages of the ECM

1. It is a convenient model measuring the correction from disequilibrium of the previous period which has a very good economic implication

2. Where there is cointegration ECMs are formulated in terms of first differences which typically eliminates trends from the variables involved and hence, resolving the problem of spurious regressions.

3. With the ECM there is ease of being able to fit into the general-to-specific approach to econometric modelling, which is in fact a search for the most parsimonious ECModel that best fits the given data sets.

4. The most important feature of the ECM comes from the fact that the disequilibrium error term is a stationary variable (by definition of cointegration). Due to this, the ECM has important implications as the fact that the two variables are cointegrated implies that there is

some adjustment process which prevents the errors in the long-run relationship becoming larger and larger.

4.4.4 Impulse response and variance decomposition

After the independent variables or the determinants of the endogenous variable are identified in a well-behaved model questions that remain are: how the demand of, in this case, exports reacts to shocks in any of its determinants, which shock is relatively the most important and how long, on average, will it take for exports to restore its equilibrium following such shock. According to Brooks (2008: 298) block F-tests and an examination of causality in a VAR will suggest which of the variables in the model have statistically important effects on the future values of each variable in the system. It should be noted however that such test results will not, by construction, be able to explain the sign of the relationship or how long these effects require to take place. In other words, the F-test results will not show whether changes in the value of a given variable have a positive or negative effect on other variables in the system, or how long it would take for the effect of that variable to work through the system. Nevertheless, such information will be gi examination of the VAR's impulse responses and variance decompositions which are discussed briefly below.

4.4.4.1 Impulse response analysis

To provide answers pertaining to how FDI affects the growth of exports an impulse response and variance decomposition analysis is used. Impulse responses trace out the responsiveness of the dependent variables in the VAR to shocks to each of the independent variables. Hence, for each variable from each equation separately, a unit shock is applied to the error, and the responses for all the future periods are traced and noted. A shock to a variable in a VAR not only directly affects that variable, but is also transmitted to all other endogenous variables in the system through the dynamic structure of the VAR. An analysis in general, if there are g variables in a system, a total of g^2 impulse responses could be generated. According to Brooks (2008), the way that this is achieved practically is by expressing the VAR model as a VMA, that is, the vector autoregressive model is written as a vector moving average. Given that the system is stable, the shock should gradually die away. In the context of this study, the impulse response function answers questions with regard to response of export growth to a one standard error unit shock in any of the other variables being studied. The analysis is also used to determine the signs of the effects between the variables. Given that the system is stable, the shock should gradually die away.

4.4.4.2 Variance decomposition analysis

The next to be performed is a variance decomposition analysis and it is a confirmation of the impulse response functions for examining the effects of shocks to the dependent variables. Variance decomposition analysis offers a slightly different method for examining VAR system dynamics. It provides information on the linkage of each of the variables to the objective being tested. According to Brooks (2008) it gives the proportion of the movements in the dependent variables that are due to their 'own' shocks, versus shocks to the other variables. A shock to the i^{th} variable will directly affect that variable of course, but it will also be transmitted to all of the other variables in the system through the dynamic structure of the VAR. This technique determines how much of the forecast error variance for any variable in a system, is explained by innovations to each explanatory variable, over a series of time horizons. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR. An important step during this analysis is also to consider the ordering of the variables when conducting the tests, because the error terms of the equations in the VAR will be correlated, so the result will be dependent on the order in which the equations are estimated in the model. Brooks (2008) also observed that, in practice, it is usually observed that own series shocks explain most of the forecast error variance of the series in a VAR. The same factorization technique and information used in estimating impulse responses is applied in the variance decompositions, therefore to some extent, impulse responses and variance decompositions offer very similar information.

4.4.5 Granger Causality

Causality in econometrics refers to the ability of one variable to predict, and therefore, cause the other. To test for causality between FDI and exports, three Granger- causality alternative models can be specified: VAR in levels, VAR in first differences and the ECM. Before the ECM can be formed, there first has to be evidence of co- integration to determine an indirect test of long-run causality. Depending on the results of unit root and co-integration tests, the appropriate Granger-causality alternative models that best fit the model developed will be used. It is possible to have evidence of long-run causality, but not short-run causality and vice versa. In multivariate causality tests, the testing of long-run causality between two variables is more problematic, as it is impossible to tell which explanatory variable is causing the causality through the error correction term. According to Granger (1969), causality can be sub-divided into long-run and short-run causality using error correction models or VECMs, depending on the approach for determining causality. The former is determined by the error

correction term where significance is indicative of evidence of long run causality from the explanatory variable to the dependent variable, whilst the latter is determined with a test on the joint significance of the lagged explanatory variables, using an F-test or Wald test.

So as to test causality, Granger (1969) suggests a procedure, in which we examine how much of the current value of Y can be explained by past values of Y and then looking at whether adding lagged values of X can improve the explanation. X is said to Granger cause Y if X aides in the prediction of Y, or equally if the coefficients on the lagged X's are statistically significant. Here we determine whether FDI Granger-causes exports by formulating and testing a simple regression where the change in exports is regressed on lags of exports and the change in FDI. This approach is extended by including other macroeconomic variables such as the real effective exchange rate and potential GDP.

4.5 Diagnostic checks

The aim of this section is to gradually acquire a regular, powerful and simple diagnostic test for testing the adequacy of a parametric regression model with property of being free from any user chosen parameter and at the same time, being suitable for cases in which the covariance is of high or moderate finite dimension.

4.5.1 Autocorrelation test: Lagrange Multiplier (LM)

The term autocorrelation may be defined as "correlation between members of series of observations ordered in time. Lagrange Multiplier (LM) test which is a multivariate test statistic for residual serial correlation up to the specified lag order.

The LM test is formulated as below:

$TR^2 \approx \chi 2\ (m)$

Where:

m is the number of regressors in the auxiliary (which is equal to the number of restrictions placed in under the F-tests); and

T is the number of observations.

The test concentrates on the R^2 values for the auxiliary regression and the test statistic for the chosen lag order (m) is computed by running an auxiliary regression of the residuals (μ_t) on the original right- hand explanatory variables and the lagged residuals (μ_t–m) and multiplying

it by the number of observation, T. According to Harris (1995), the lag order for this test should be the same as that of the corresponding VAR. The null hypothesis of the test is that there is no serial correlation in the residuals up to the specified lag order. There is serial correlation (i.e. autocorrelation) when the residuals show correlation with its values in pasts periods. An (effectively) zero probability value would strongly indicate the presence of serial correlation in the residuals, and if the probability of the LM statistic is high, one fails to reject the null that there is no serial correlation. The value of the R^2 for a specific equation will be relatively significant if one or more coefficients are statistically significant. Conversely, R^2 will be relatively low if the variables are insignificant.

4.5.2 Heteroscedasticity test

One of the assumptions of the classical linear regression model is that the variances of the error terms should be constant, that is, Var $\mu_t = \delta^2 < \infty$. If the errors do not have a constant variance, they are termed heteroscedastic. However, there are a number of formal statistical tests for heteroscedasticity and one such test is White (1980) general test for heteroscedasticity. It assumes that the estimation equation model is a standard linear. The test regression is run by regressing each cross product of the residuals on the cross products of the regressors and testing the joint significance of the regression. The null hypothesis of this test is that the errors are both homoscedastic and independent of the regressors and that there is no problem of misspecification. The absence of any one or more these conditions could result in a significant test statistic. Subsequently, if we fail to reject the null hypothesis, we have homoscedasticity. Heteroscedasticity can be corrected by transforming the variables into logs or reducing by some other measure of size or using heteroscedasticity consistent standard error estimates. All these remedies for heteroscedasticity will be employed if the problem surfaces in the regression results.

4.5.3 Residual Normality Test

The normality test is used to find out whether the random variable is normally distributed or not. This test is applied to residuals from a linear regression model. If they are not normally distributed, the residuals should not be used in Z tests or any other tests derived from the normal distribution such as F-tests and the chi-square test. The Jarque-Bera normality test statistic is one such that is used for testing whether the series is normally distributed. The test statistic measures the difference of the skewness and kurtosis of the series with those from the normal distribution. Under the null hypothesis of a normal distribution, the Jarque-Berastatistic is distributed as (put symbol-chi squared). The reported probability is the

probability that a Jarque-Bera statistic exceeds (in absolute value) the observed value under the null hypothesis—a small probability value leads to the rejection of the null hypothesis of a normal distribution. A significant BeraJarques statistic thus points to non-normality in the residuals. Nevertheless, the lack of normality in the residuals may not result in co-integration tests being invalid. The null hypothesis of normality would be rejected if the residuals are either significantly skewed or leptokurtic or both.

4.6 Conclusion

The purpose of this chapter was to highlight the method to be employed in pursuing the objectives of the research. The various research techniques to be applied have been discussed which include tests for stationarity, cointegration and heteroscedasticity. The chosen methods to test for stationarity are the Augmented Dickey Fuller and Phillips-Perron tests. Cointegration and vector error correction modeling is done using the Johansen (1991) approach. The Johansen has been chosen in place of the Engle-Granger (1987) because the model in this study is multivariate. Diagnostic test have been reviewed, as they must be performed before interpretation of parameters [illegible]s. The next chapter goes on further and presents the results from the data obtained.

CHAPTER FIVE

Presentation and Analysis of Results

5.1 Introduction

This chapter presents results obtained from the methodology employed in the preceding chapter by applying the analytical framework and reviewing the model estimation techniques to be used in this study in order to achieve the objectives set out in the first chapter. This chapter augments the analysis techniques proposed on annual South African data covering the period 1978-2010. The results presented include those of unit root tests, co integration test and finally the regression. Stationary co integration tests will be done so as to establish the long run relationship. Thereafter, the error correction model will be estimated. The econometric package used in this study is E-views version 7. The following section will present the empirical findings.

5.2 Empirical Findings

This section is divided into 6 sub-sections. The first section presents the results of stationary/unit root tests, the second presents and discusses the co integration test results; the third section discusses the long run relationship of the model, whilst the last section concludes the chapter.

5.2.1 Unit root/ stationarity test results

The incident of sizeable co-movements among most economic time series data has grimly undermined the policy implications that could be deduced from such modelling constructs. When the dependent and independent variables have unit roots, traditional estimation method by means of observations on levels of those variables will probably find a statistically significant relationship, even when meaningful 'economic' linkage is absent, (Newbold and Granger, 1974). This means that, for any significant policy analysis, it is crucial to make a distinction between a correlation that arises from a shared trend and one associated with an underlying causal relationship, and to achieve this target, the data were subjected to a variety of tests to establish their univariate time series behaviour. The tests include the, Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP), which specify the null hypothesis as one with a unit root. A rejection of the null hypothesis means that the series does not have a unit root and is stationary. Table 5.1 below presents the results of the stationarity tests carried out.

Table 5.1: Unit root tests 1978-2010 at level

Test	Augmented Dickey – Fuller (ADF)			Phillips Peron (PP)		
Variable	With constant	With constant and trend	No constant and no trend	With constant	With constant and trend	No constant and no trend
LEXP	-0.368009	-2.239641	2.300658	-0.400888	-2.296278	2.194049
LREER	-1.367145	-2.878045	-0.499326	-1.480168	-2.916250	-0.565759
LPGDP	1.607163	-0.840732	2.618784	0.552571	-0.747468	4.890411***
LTLI	-1.534030	-2.585954	-0.428277	-1.534030	-2.585954	-0.443925
LMKT	-1.448043	-2.654094	-0.420297	0.563848	-1.869082	4.841237***
LSFDI	0.254460	-1.941804	3.378997***	-1.448043	-2.654094	-0.425399
Critical value 1%	-3.653730	-4.273277	-2.639210	-3.653730	-4.273277	-2.639210
Critical value 5%	-2.957110	-3.557759	-1.951687	-2.957110	-3.557759	-1.951687
Critical value 10%	-2.617434	-3.212361	-1.610579	-2.617434	-3.212361	-1.610579

Notes:

i. *** (0.01 level of significance), ** (0.05 level of significance) and * (0.1 level of significance).

ii. Maximum Bandwidth for the PP test has been decided on the basis of Newey-West (1994)

iii. The ADF and PP tests are based on the null hypothesis of unit roots.

Variables were entered in their log values and by applying the ADF and PP most variables were regarded as non-stationary at their levels as the reported t-statistic for each variable was less than the critical t-value in absolute terms, as indicated above. The results show that LEXP, LREER and LTLI are not stationary at their levels in all forms in both the ADF and PP tests. LPGDP and LMKT are both not stationary at level in all forms in the ADF test whilst in the PP test they are stationary at level with no constant and no trend at 1%, 5% and 10% significant levels. As for LSFDI, it is not stationary at level in all forms in the PP test whilst in the ADF test it is stationary at level with no constant and no trend at 1%, 5% and 10% significant levels.

To correct for unit root in the series, the variables were tested for stationarity at first differences and the results are shown below in table 5.2.

Table 5.2: Unit root tests 1978-2010 at first difference

Test	**Augmented Dickey – Fuller (ADF)**			**Phillips Peron (PP)**		
Variable	With constant	With constant and trend	No constant and no trend	With constant	With constant and trend	No constant and no trend
ΔLEXP	-4.841682***	-4.760360***	-4.294900***	-4.813205***	-4.727206***	-4.302815***
ΔLREER	-4.726057***	-4.682856***	-4.800002***	-4.647123***	-4.620269***	-4.753413***
ΔLPGDP	-3.769579***	-4.408368***	-2.493394**	-3.679310***	-3.625942**	-2.493394**
ΔLTLI	-4.640861***	-4.552467***	-4.720426***	-4.664337***	-4.571225***	-4.747023***
ΔLSFDI	-5.699820***	-5.695763***	-4.324056***	-5.739073***	-5.940359***	-4.324056***
ΔLMKT	-4.297477***	-4.248282**	-4.379039***	-4.309824***	-4.260360**	-4.398480***
Critical value 1%	-3.661661	-4.284580	-2.641672	-3.661661	-4.284580	-2.641672
Critical value 5%	-2.960411	-3.562882	-1.952066	-2.960411	-3.562882	-1.952066
Critical value 10%	-2.619160	-3.215267	-1.610400	-2.619160	-3.215267	-1.610400

Notes:

Δ is a symbol for the first difference operator.

Table 5.2 above presents the stationarity tests for the variables used for the regression analysis. All variables have become stationary in their 1st differences in both the ADF and PP tests. LEXP, LREER, LTLI and LSFDI are stationary in all forms at 1% significant levels after being differenced once. LPGDP in the ADF test is stationary at 1% where there is a constant and a constant with a linear trend, but stationary at 5% where there is no constant and no trend. In the PP test it is stationary at 1% significant level where there is a constant, whilst where there is a constant and trend and where there is no constant and no trend it is stationary at 5% significant level. LMKT is stationary at 1% significant level where there is a constant and where there is no constant and no trend, whilst it is stationary at 5% where there is a constant and trend in both the ADF and PP tests.

This therefore establishes that the variables are integrated of the same order and so, the next procedure would be to test the possibility of cointegration amongst the variables used. For this purpose, the Johansen technique is used to test the existence of cointegration and the number of cointegrating vectors.

5.2.2 Cointegration analysis

Co-integrated variables have the task to certify the elimination of spurious relations and as such share common stochastic trends. Another thing is that they enable the performance of an error correction model so as to determine the long run relationship amongst exports and its theoretical determinants in this study. With this model being a multivariate one, the odds of having more than one co-integrating vector are high. To capture the underlying time series properties of the data the Vector Autoregressive (VAR) based on co-integration tests developed by Johansen (1991) is therefore preferred as it does this. One of the advantages of this approach is that it permits one to integrate the long-run and the short-run relationship between variables within a unified framework. There are two conditions to be met for two or more variables to be co integrated.

- Variables have to be of the same order of integration.
- Linear combinations of the variables from the regression of the non-stationary variables (in level)must be stationary

The Johansen maximum likelihood approach is utilised in this study as it is capable of detecting multiple cointegrating relationships and this technique requires the specification of

the lag length and the deterministic trend assumption of the VAR, for instance, with or without a constant in the VAR equations (Hendrel et al., 2000).

5.2.2.1 Optimal Lag Length Selection Criteria

The choice of optimal lag length of the variables of interest is very crucial in econometric model estimation, especially in a VAR model. This is done so as to avoid unauthentic rejection or acceptance of estimated results. If there are n variables with lag length k, for instance, it is essential to estimate n (nk+I) coefficients. The lag length also influences the power of rejecting hypothesis. If the lag length is too large, degrees of freedom may be wasted and this may introduce the possibility of multicollinearity. Likewise, if the lag length is too small, important lag dependences may be lost from the VAR and if serial correlation is present the estimated coefficients will be inconsistent, thus, resulting in specification errors.

The common information criteria in lag length selection are the Akaike Information Criteria (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn information criterion, (HIQ), Final predication error (FPE) as well as Li[illegible]tio test (LR). An optimal lag length suggested by a combination of some of the above information criteria can be chosen as these criteria may sometimes produce conflicting lag length choices. Conversely, decisions about the lag structure of a VEC model could be based on the fact that a given criterion produces a white noise residual and conserves degrees of freedom. Table 5.3 below presents the selection of an optimal lag length for this study.

Table 5.3: VAR Lag Order Selection Criteria

VAR Lag Order Selection Criteria
Endogenous variables: LEXP01 LMKT LPGDP LREER LSFDI LTLI
Exogenous variables: C

Sample: 1978 2010
Included observations: 23

Lag	LogL	LR	FPE	AIC	SC	HQ
0	81.58623	NA	5.63e-11	-6.572715	-6.276499	-6.498218
1	193.4720	155.6671*	8.64e-14*	-13.17148*	-11.09797*	-12.64999*

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

Source: *Author's Computation using* ***EViews 7 Econometric Packages***

Since the series is yearly, the selection is drawn from just 1 lag, and as shown in table 5.3, all criteria select 1lag for the VAR. This study will be based on the Schwarz Information Criterion (SIC) which is one and it is the most preferred one as it enforces a harsher price for including an increasingly large number of regressors.

5.2.2.2 Test results/ Vectors of Co-integration (Trace and Eigen Value tests)

Co-integration analysis is performed using the Johansen procedure to establish whether there is a long run equilibrium relationship between the exports and FDI. The steps of the co-integration process can be summarized. A rejection of the null of no co-integrating relationship in favour of at most one co-integrating relationship would mean that in the next step, the null hypothesis of at most one co-integrating relationship would be tested against the alternative of at most two co-integrating relationships, and so on. The trace tests the hypothesis that r < *p* against the alternative, *r* is the rank which is the number of co-integrating equations and *p* is the number of variables (Hendrel et al., 2000).

According to Hendrelet al (2000), when the test statistic is less than the trace test's critical values, the null hypothesis fails to be rejected. The maximum eigenvalue tests the null hypothesis of *r* co-integrating equations against the alternative of *r+1*. In addition, if the test statistic is smaller than the maximum eigenvalue's critical value then we fail to reject the null hypothesis. According to Ibrahim (2000) the Johansen technique is preferable as it performs better than single-equation and alternative multivariate methods. Table 5.4 below shows the results of the Johansen and Juselius co-integration tests for the private investment model.

The Johansen test is carried out on two cases, one where SFDI is excluded and the other where it is included. Table 5.4 shows the Johansen co-integration test results without SFDI.

Table 5.4 Johansen Co-integration results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.971501	132.5750	69.81889	0.0000
At most 1 *	0.854068	57.85921	47.85613	0.0044
At most 2	0.383581	17.44227	29.79707	0.6073
At most 3	0.201562	7.281863	15.49471	0.5451
At most 4	0.114548	2.554793	3.841466	0.1100

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

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

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.971501	74.71579	33.87687	0.0000
At most 1 *	0.854068	40.41694	27.58434	0.0007
At most 2	0.383581	10.16040	21.13162	0.7295
At most 3	0.201562	4.727069	14.26460	0.7758
At most 4	0.114548	2.554793	3.841466	0.1100

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

Source: *Author's Computation using **EViews Econometric Package***

The top part of table 5.4 shows the Johansen co-integration test based on the trace test, whilst the bottom part shows the results based on the maximum eigenvalue test. The results of the trace test reject the null hypothesis of no co-integrating vectors, since the test statistic of about 132.5750 and 57.85921 are greater than the 5% critical values of 69.81889 and 47.85613 respectively. In a similar way, the null hypothesis that there are at most 2 co-integrating vectors cannot be rejected. Therefore, the trace test indicates that there are 2 co-integrating relationships at 5%significance level.

The maximum eigenvalue test gives similar results and rejects the null hypothesis that there are no co-integrating vectors as can be shown by the test statistics of 74.71579 and 40.41694 being larger than the 5% critical values of 33.87687 and 27.58434 respectively. This maximum eigenvalue test also gives the same results for the first equation in the model under study and illustrates there being 2 co-integrating relationships between exports, trade liberalization, excess market access, potential GDP and real effective exchange rate.

Performing the Johansen test on the second equation where the stock of FDI is added, however, produces better results as table 5.5 below illustrates.

Table 5.5 Johansen Co-Integration Results

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.971446	173.1999	95.75366	0.0000
At most 1 *	0.869718	98.52458	69.81889	0.0001

At most 2 *	0.797415	55.72551	47.85613	0.0077
At most 3	0.413252	22.19697	29.79707	0.2877
At most 4	0.358571	11.00062	15.49471	0.2115
At most 5	0.076682	1.675420	3.841466	0.1955

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.971446	74.67535	40.07757	0.0000
At most 1 *	0.869718	42.79907	33.87687	0.0033
At most 2 *	0.797415	33.52854	27.58434	0.0076
At most 3	0.413252	11.19635	21.13162	0.6277
At most 4	0.358571	9.325198	14.26460	0.2601
At most 5	0.076682	1.675420	3.841466	0.1955

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: *Author's Computation using EViews Econometric Package*

Three co-integrating vectors are established when the stock of FDI is added for both the trace and maximum eigenvalue tests. The addition of stock of FDI has significance on the growth of exports.

Since a long run relationship has been established between the variables, the short run and ling run dynamics of the model can be established within the error correction model. Thus a Vector Error Correction Model (VECM) can be specified from the results of the analysis.

5.3 VECM (for the long run and short run dynamics)

Table 5.6: Parameter Estimates on the benchmark equation

Vector Error Correction Estimates

Sample (adjusted): 1980 2003
Included observations: 21 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LEXP01(-1)	1.000000
LMKT(-1)	9.722698 (1.43187) [6.79021]
LPGDP(-1)	10.73331

	(0.47781)
	[22.4637]
LREER(-1)	-4.468184
	(0.29070)
	[-15.3705]
LTLI(-1)	8.269179
	(1.27246)
	[6.49856]
C	170.7370

Source: *Author's Computation using* ***Eviews Econometric Package***

The table above contains the estimates of the first equation to capture the FDI effects via changes in the supply capacity of the host economy. Real effective exchange rate is significant and with the expected negative sign as when REER increases, it shows a real appreciation of the currency. Potential output also has a significant and positive effect on export growth whilst TLI and MKT are also significant and have a positive impact too. This greatly reveals that South Africa's enterpris[illegible]ffective and competitive, for instance, when it comes to high standard equipment and high utilization of existing capacities. Table 5.7 goes on to show the results when FDI stock is added to the model. This will provide evidence whether FDI has both supply side effects and spillover effects and for this to be the case, both the supply capacity and FDI stock variables should be statistically significant and have positive signs.

Table 5.7: FDI-specific effects on export growth

Vector Error Correction Estimates

Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

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

Co integrating Eq:	CointEq1
LEXP01(-1)	1.000000
LMKT(-1)	7.611820
	(2.35183)
	[3.23655]
LPGDP(-1)	13.50404
	(1.01918)
	[13.2499]
LREER(-1)	-5.301219
	(0.34653)

	[-15.2980]
LSFDI(-1)	1.223719
	(0.12280)
	[2.82184]
LTLI(-1)	6.326179
	(2.09609)
	[-3.01809]
C	209.6092

Source:*Author's computation using* ***EViews Econometric Package***

Estimating a VECM normalized on export growth, the long run regression test results are given as:

LEXP= 209.6092 – 5.301219LREER + 7.611820LMKT + 6.326179LTLI + 13.50404LPGDP

(1.01918) (2.35183) (2.09609) (1.01918)

[13.2499] [3.23655] [-3.01809] [13.2499]

+ 1.223719LSFDI

(0.12280)

[2.82184]

Notes:

( ) standard error

[ ] t-statistic

The results show, stock of FDI and potential output to be statistically significant as their t-statistics of 13.2499 and 2.82184 (taken in absolute terms) respectively are both above 2 and they have a positive impact on export growth. Real effective exchange rate is also significant and has the expected negative sign which according to theory implies that, when the rand depreciates it means exports rise and vice-versa. This result is consistent with previous findings by Agasha (2008) on the case of Uganda.

The external market access indicator shows to be significant with a t-statistic of 3.23655 and as per priori expectations it positively relates with the growth of exports in the long run. South Africa has over the years gained access of external markets through forming ties with

different countries, taking note of the recent BRICS formation, so this signifies increased connectivity, interdependence and integration with other economies in terms of trade. The importance of this is that exports are enhanced as South Africa has become developed due to the investment injected in the economy by the trade partners. A study on Cameroon by Njong (2008) supports this notion.

Moving on to the trade liberalization index, a positive link is also shown with exports growth and this variable is also statistically significant. South Africa emerged on the trade liberalization path a few years back and this has seen an improvement on the movement of the country's goods to other economies as it has become more open. Bucevska (2008) on a study of FDIs impact on export performance from selected EU Candidate countries also found a similar result.

The fact that the variables are co integrated justifies the use of VECM. The VECM allows the long term behaviour of the endogenous variables to converge to long term equilibrium relationships while allowing a wide range of short term dynamics. In Table 5.8 below the speed of adjustment is indicated by the coefficients of the error correction terms in cointegrating equation 1. A further analysis into the residuals of the long run equation is given which shows the pair-wise contemporaneous correlation matrix for the residuals of each equation.

Table 5.8: Vector Error Correction Model

Error Correction:	D(LEXP01)	D(LMKT)	D(LPGDP)	D(LREER)	D(LSFDI)	D(LTLI)
CointEq1	-0.001040	-0.040581	0.020748	0.144760	0.096666	0.031406
	(0.01237)	(0.19695)	(0.00819)	(0.03135)	(0.12991)	(0.22969)
	[-0.08406]	[-0.20605]	[2.53288]	[4.61786]	[0.74410]	[0.13673]

Source: *Author's computation using* ***EViews Econometric Package***

Changes in the dependent variable are a function of the degree of disequilibrium in the cointegrating relationship which is captured by the error correction term. The long-term causal relationship is provided by the t-test on the coefficients of the lagged error-correction term since they are derived from the long-term cointegration relationship. However, the

coefficients show only short-term adjustments that are made in each period in order to effect the necessary correction in the long-term imbalance.

In table 5.8 the speed of adjustment is indicated by the coefficients of the error correction terms. LEXP01 and LMKT have negative coefficients showing that they converge to their long-run equilibrium. LPGDP, LREER, LSFDI and LTLI have a positive co-efficient showing that any disequilibrium in them continually grows. This means that if there is a shock, they take longer to adjust, that is, they do not adjust immediately.

Table 5.9: Residual Correlation Matrix

	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
LEXP01	1.000000	0.235844	0.508428	- 0.429910	-0.183289	0.237754
LMKT	0.235844	1.000000	0.514060	0.568869	-0.247512	0.999001
LPGDP	0.508428	0.514060	1.000000	-0.052514	0.038983	0.527390
LREER	- 0.429910	0.568869	-0.052514	1.000000	-0.274142	0.550947
LSFDI	-0.183289	-0.247512	0.038983	-0.274142	1.000000	-0.252097
LTLI	0.237754	0.999001	0.527390	0.550947	-0.252097	1.000000

Source: *Author's Computation using EViews Econometric Packages*

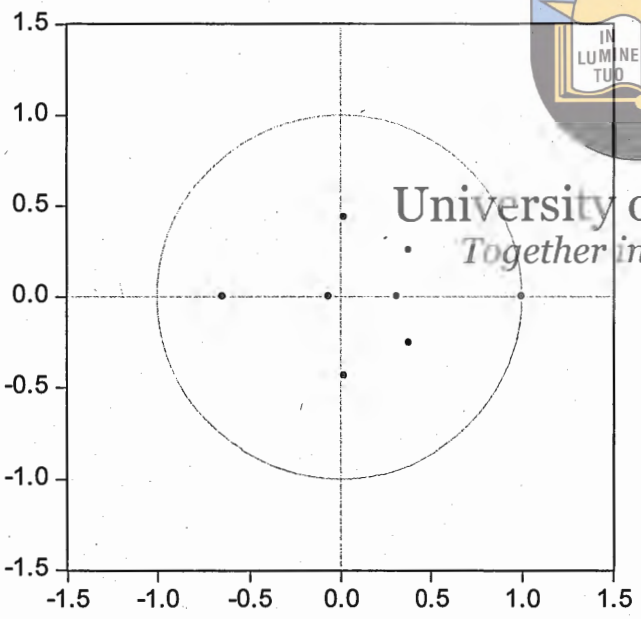
Table 5.9 represents the correlation matrix which represents the short run relationships amongst the variables. The sign of the correlation coefficient defines the direction of the relationship in the short run. A positive correlation coefficient means that as the value of one variable increases, the other variable's value also increases and as one decreases, the other also decreases. On another hand, a negative correlation coefficient indicates that as one variable's value increases, the other's value decreases and vice versa. A correlation coefficient of r=0.50 indicates a stronger degree of linear relationship than one of r=0.40. Likewise a correlation coefficient of r=-0.50 shows a greater degree of relationship than one of r= -0.40. Thus a correlation coefficient of zero (r=0.0) indicates the absence of a linear relationship and correlation coefficients of r=+1.0 and r=-1.0 indicate a perfect linear relationship.

The correlation matrix of the reduced-form errors suggests and supports the postulations of inverse relationship between exports and stock of FDI (-0.183289) in the short run. This can be supported by the explanation given by Njong (2008) that it will take time to build new plants by the investors and to achieve the desired level of production so in the short run FDI affects exports negatively and the fruits will only start kicking in the long run. Exports also show an adverse relationship with real effective exchange rates with the co-efficient (-

0.429910). This can be supported by Sharma (2000) whose study on India also brought out an inverse relationship between these two. Exports are favorably related with TLI, MKT and potential output with the co-efficients (0.237754), (0.235844) and (0.508428) respectively. Redding and Venables (2003) echo the same sentiments of a positive relationship where economies have access to the external markets with it boosting up export growth. Das (2002) supports the relationship of trade liberalization and exports being positive as a more open policy for trade means no restriction and a free flow of goods, so it boosts up exports.

Before conducting the Impulse Response and Variance Decomposition, the VAR was tested for AR Roots and the results are indicated in figure 5.1 below.

Figure 5.1: AR Roots Graph



Source: *Author's Computation using* ***EViews Econometric Packages***

Figure 5.1 shows Inverse Roots of AR characteristic Polynomial checks the stability of VAR. When the roots are within the circle it means the VAR is stable therefore the results of impulse response and variance decomposition are reliable. As can be noted from the graph above the VAR is stable hence the results of variance decomposition and impulse response are reliable. We proceed to conduct impulse response and variance decomposition therefore.

5.4 Impulse response function

The impulse response function traces the temporal and directional response of an endogenous variable to a change in one of the structural advances. Impulse responses functions give a

signal of the lag structure in the economy. It shows the responses of a particular variable to a one-time shock in each of the variables in the system. The interpretation of the impulse response functions should take into consideration the use of first differencing of the variables as well as the vector error correction estimates. Thus, a one-time shock to the first difference in a variable is a permanent shock to the level of that variable.

Of particular interest in this study are the dynamic responses of exports to shocks in excess market influence, potential output, stock of FDI, trade liberalization and the real effective exchange rate. Figure 2 in the appendix shows the response of exports to movements in the few selected macroeconomic variables annually. The first panel is of high importance and is the one that will be used as the spotlight is on the response of exports and the other independent variables. A response of exports to exports itself shows that if there is a shock, there are decreases in exports which tend to stabilise in the 6th period. Given that there is a shock to LMKT, exports increase sharply in the first period and reach their peak in the second period, but start decreasing gradually from the second period and stabilises around the 4th period. This is the same with SFDI. Unexpected shocks to PGDP see a small increase of exports in the first period which drops in the 2nd period, is constant from 3rd period to 4th period and further decreases in the 5th period, but stabilises from the 6th period. A response of exports to REER shows that if there is a shock, exports decrease in the 1st period and stabilise as from the second period. A shock to TLI causes exports to increase in the 1st period, become constant in the second period, but increase again and reach a peak in the 4th period. Stabilization commences in the 5th period.

5.5 Variance decomposition

Variance decomposition corresponds to the proportion of the movements in a series due to its 'own' shocks versus shocks to the other variables. It shows the fraction of the forecast error variance for each variable that is attributable to its improvements and to improvements in the other variables in the system. Table 76 in the appendix represents a ten-period horizon variance decomposition. The accounted figures specify the percentage of variation in each variable that can be attributed to its own shock and the shocks to the other variables in the system. Used in this study is the Cholesky decomposition method.

Referring to table 76, 'own' shocks as expected form the major sources of variations for all the variables in the model. The chief sources of variation in exports forecast errors is own shocks, accounting for 100% in the first period. In the second period, exports again accounts

for approximately 66.4% of the variation. This is followed by LSFDI with 16.1%, LMKT with 13.3%, LTLI with 3.23%, LREER with 0.56% and lastly LPGDP with 0.39%.

From the third period the major variance in exports is still due to shocks in exports itself, LSFDI and now LMKT. From the 4th period, however, LPGDP and LTLI begin to explain a slightly higher proportion of the variation in exports. The exports rates exceptionally decrease over time, but all the other variables contribute more and provide more explanation in the exports rates variations. Nevertheless, LREER seems to have the least contributions but it is still relevant.

5.6 Conclusion

The chapter focused on interpreting regression results specified and explained in chapter 4 and has identified major factors affecting the performance of export growth in South Africa such as real effective exchange rate, stock of foreign direct investment, trade liberalization, the access to external markets and potential output. The variables were first subjected to stationarity tests using the ADF and PP tests. Non stationarity was established resulting in the VECM being specified. With VECM, cointegration tests were conducted to determine the long-term relationship between the above mentioned variables and exports. Impulse response and variance decomposition functions were also constructed to trace the temporal and directional response of real GDP to structural innovations in the variables and as well as tracing the proportion of the movements in exports to its own shocks versus shocks to other variables.

These findings have important policy implications for South Africa. Hence, the following chapter presents conclusions, policy implications and recommendations that can be drawn from the results obtained in this chapter.

CHAPTER 6

Conclusions, Policy Implications and Recommendations

6.1 Summary and Conclusion

This chapter tries to draw conclusions and give policy implications and recommendations based on the results from chapter 5. The study examined the relationship between export growth and foreign direct investment in the South African economy. The second chapter reviewed the South African trade policies that have been in place during and after the apartheid era. A historical overview of FDI volumes inflows to South Africa and the export performance was also provided. With taking a look at the South African economy in general relevant theoretical and empirical literature that puts in the picture of the direction of the study was reviewed in the third chapter.

The purpose was to find out what theory states on the relationship between exports and foreign direct investment. The conclusion from the theory was mainly that the growth of exports is boosted up by foreign direct investment amongst other determinants of exports. Having established the relationship, the study set out to find what other empirical studies found to be the relationship between FDI and exports and the methodology used to come up with the results. The empirical literature, however, came out with contrasting views as some studies found a positive link, others a negative one, whilst others found a relationship but it running from exports influencing FDI not the other way round, like Ajami and BarNiv (1984).

Based on the extensive review of the literature on the impact of FDI on export growth and on data availability, an empirical model that links them was specified. So as to determine both the long and short run determinants of exports, the Johansen cointegration test and VECM modelling were used because of the several advantages over other substitute estimation techniques. The ADF and PP tests were put in use so as to test for the existence of unit roots in the variables. The variables were found to be non-stationary at the level and were stationary after first differencing. The long-run relationship between export growth and real effective exchange rate, FDI, trade liberalization, external market access and potential output in South Africa over the period 1978-2010 was examined. Once the Johansen cointegration

test confirmed there was cointegration between exports and the variables, VECM was carried out to gauge the parameter estimates for both long and short run relationships.

Results from this study shown in the previous chapter reveal that foreign direct investment plays an important role in the growth of exports as two equations were estimated, one in which the stock of FDI was excluded and one in which it was included. When the stock of FDI was added to the estimated equation the results showed that SFDI and potential output are statistically significant as their t-statistics are both above 2 (in absolute terms) and they carry positive signs as prior expectations. With potential output carrying a positive sign it indicates that FDI stocks have supply-increasing effects on exports. This is consistent with the study by Njong (2008). Real effective exchange rate is also significant and has the expected negative sign which according to theory implies that, when an increase in the real effective exchange rate means a real appreciation for the local currency which makes exports pricey. This result is consistent with previous findings by Agasha (2008) on the case of Uganda. LMKT and LTLI also show to be significant.

6.2 Policy Implications and Recommendations

The study makes a contribution to the policy debate by examining whether FDI plays a role in the growth of exports. As mentioned earlier two equations where estimated, one in which FDI was absent and one in which it was included and the results proved the FDI-specific effects on the growth of exports. The other variables also proved to provide a good influence on the growth of exports in the long run.

The presence of FDI has brought about some positive influences. Firstly it can be said that the exports of South Africa have been to some extent expanded directly by MNEs' subsidiaries because they exploit the country's factor endowments for lower production cost so as to increase their exporting competitiveness in the global market. Secondly, it can be said that South Africa's export performance has somehow been improved by local firms through spillover effects of FDI, for instance, the transfer of advanced technology, knowledge and skills. Additionally, the existence of competition between MNEs and local firms also keeps on stimulating the local firms to increase their exports so that they can protect their market shares and earnings. Therefore, to boost up the growth of exports policy makers must create an environment where the MNEs and local firms get into combined ventures and sub-contract between themselves as this will most likely be a good means to transfer spillover effects.

A chief priority that policy makers also need to put into place is greatly promoting inward FDI. They can be able to do this by facilitating more incentives to foreign firms and crafting appropriate polices and reforms that would attract foreign investment and this encouragement of FDI should focus on export-oriented foreign firms.

Infrastructure plays an important role in the overall competitiveness of an economy. Road infrastructure, electricity, transportation and telecommunication facilities are key factors that have an effect on transaction and production costs and therefore it would be very important to have strategies leading to improvements in infrastructure, human resources, good governance and the business climate moving along with other economies fairing well in the global market. These improvements would create an enabling environment for FDI and consequently raise the rate of private investment and the cost-effectiveness of total investment in the country.

According to Asafo-Adjei (2007) the development of infrastructure should just not be physical but financial too. Financial facilities include financial markets, insurance, accounting and legal skills. Taking a look at South Africa, its financial facilities look good, but policy makers should keep on advancing these financial infrastructures like the capital markets, money markets and property markets because it assures the investors that South Africa is organised as a host country and has the platform to manage inflows well.

From the study, it shows that the openness of trade through trade liberalization has enhanced more investment by foreigners as there are no longer restrictive barriers to limit them, also having access to external markets in the global market has benefited South Africa to be able to market its products on a wider scale. This has facilitated the growth of South African exports as it not only has specific markets interested in its products but from the global market, more countries may be interested in the South African products. Openness of trade has seen South Africa recently joining BRIC which is now BRICS. Trade now occurs between South Africa and the major economies like Brazil, Russia, India and China. With trade, it just does not only mean South Africa exports its products to its partners, but they also export their products to South Africa. It is fairly good to have trade relations but it would also be necessary to have a policy in place that goods traded between partners are high quality goods all the time as it is a danger that as we would send high quality goods in return low quality goods are dumped upon us.

Real effective exchange rate has come out as having an influence on the growth of exports in the study. An increase in the real effective exchange rate has adverse effects on the volume and growth of exports so the country has to maintain its exchange rate. Therefore there is a need for policy measures to maintain the stability in the Rand to keep the country competitive. Having a stable currency is generally good for trade, because it makes business more predictable, it reduces risks and means that consumer prices can be kept stable hence artificially high exchange rate can put exporters at a disadvantage.

In a nutshell, the policies to be implemented should by all means attract more FDI as it has been shown in the study that exports are boosted by both specific FDI effects and spillover effects it brings along. However, it should also be noted that it is not only the economic environment that matters, even the political environment should be kept stable with well-governing policies which will assure investors that their investment is safe as compared to when a market is politically unstable and they are unsure of when they can be sent packing.

6.3 Limitations of the study and areas for further research

The study was fixed on selected macroeconomic variables that influence exports but there are other export determinants meaning some important variables which could have enhanced the results were left out. The study utilised yearly time series data for the period 1978-2010 and the problem with this is that the time period might not be sufficient enough to capture all the necessary data for accurate results. Another cause for concern is the availability of accurate time series data because some secondary data sources are published with some data missing. The study is also limited to the South African economy only and hence the results obtained may not apply to other economies. However this does not rule the study as insignificant. The study remains significant as the conclusions drawn from it may prove to be useful in the South African context.

The use of aggregated data in this study gives the assumption that the FDI effects are equal across all the sectors. So this provides an area of further research whereby sectoral data has to be obtained so as to carry out an analysis of how FDI really affects the export performance of South Africa's sectors separately as this would allow capturing of possible variations in the FDI effects on export growth between different sectors. Such an analysis might also have more significant policy implications for crafting development strategies and steering FDI inflow to specific sectors.

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Appendices

Table 1: Raw Data

period	EXP	PGDP	SFDI	REER	MKT	TLI
1978	192488	845472	9855	119.93	5.57E-05	4.42E-05
1979	196031	877520	10339	112.81	3.45E-05	2.66E-05
1980	196025	935617	12273	139.12	2.73E-05	2.5E-05
1981	185531	985773	14188	152.11	-8.9E-05	-9.8E-05
1982	180624	981994	16092	160.05	2.82E-05	2.64E-05
1983	178225	963861	17075	151.66	4.33E-05	3.44E-05
1984	182977	1013009	21830	167.01	8.84E-05	8.21E-05
1985	201415	1000737	22760	147.32	3.65E-05	2.65E-05
1986	193982	1000915	21451	111.86	2.96E-05	2.18E-05
1987	203000	1021942	19327	103.26	2.18E-05	1.59E-05
1988	219585	1064864	18422	116.55	3.23E-05	2.64E-05
1989	224375	1090366	20433	110.07	4.05E-05	3.26E-05
1990	223401	1086901	23602	110.51	3.45E-05	2.62E-05
1991	219949	1075833	28004	115.31	3.83E-05	3.02E-05
1992	232026	1052843	32552	124.14	3.69E-05	2.91E-05
1993	256108	1065830	36334	128.24	3.4E-05	2.6E-05
1994	262473	1100300	44701	135.85	5.97E-05	5.17E-05
1995	291182	1134582	54764	120.46	0.000122	0.000112
1996	312159	1183445	61976	117.09	0.000109	0.000101
1997	328689	1214768	81463	107.54	0.000142	0.000131
1998	339359	1221053	91862	113.49	0.00017	0.000156
1999	343638	1249847	318630	104.34	8.57E-05	7.09E-05
2000	372207	1301773	328859	98.69	7.92E-05	6.37E-05
2001	381114	1337382	370695	95.55	7.25E-05	5.71E-05
2002	384884	1386435	264419	84.3	8.09E-05	6.65E-05
2003	385305	1427322	311208	72.22	0.000112	9.96E-05
2004	396222	1492330	362858	93.28	-0.00141	-0.0014
2005	430169	1571082	499586	101.43	-0.00138	-0.00141
2006	462271	1659121	611722	100	-0.00011	-0.00012
2007	492557	1751499	751925	94.43	-9.5E-05	-0.00011
2008	501196	1814134	632619	89.55	-0.00011	-0.00013
2009	403304	1783617	866664	84	-0.00011	-0.00012
2010	421589	1834435	1015517	91.92	-0.0001	-0.00013

Table 2: EXP-ADF at levels with none

Null Hypothesis: LEXP01 has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.300658	0.9936
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/05/12 Time: 16:29
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	0.001945	0.000846	2.300658	0.0283

R-squared	-0.001609	Mean depen	0.024500
Adjusted R-squared	-0.001609	S.D. dependent var	0.059911
S.E. of regression	0.059959	Akaike info criterion	-2.759560
Sum squared resid	0.111448	Schwarz criterion	-2.713756
Log likelihood	45.15296	Hannan-Quinn criter.	-2.744377
Durbin-Watson stat	1.788843		

Table 3: EXP-ADF at levels with constant

Null Hypothesis: LEXP01 has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.368009	0.9031
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/05/12 Time: 15:47
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	-0.011797	0.032057	-0.368009	0.7155

C	0.172329	0.401843	0.428846	0.6711

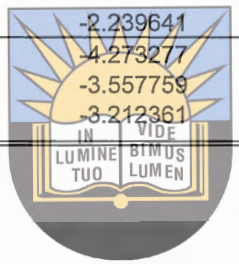
R-squared	0.004494	Mean dependent var	0.024500
Adjusted R-squared	-0.028689	S.D. dependent var	0.059911
S.E. of regression	0.060764	Akaike info criterion	-2.703172
Sum squared resid	0.110768	Schwarz criterion	-2.611563
Log likelihood	45.25075	Hannan-Quinn criter.	-2.672806
F-statistic	0.135431	Durbin-Watson stat	1.775482
Prob(F-statistic)	0.715450		

Table 4: EXP-ADF at levels with trend

Null Hypothesis: LEXP01 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.239641	0.4529
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

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



Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/05/12 Time: 16:21
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	-0.267089	0.119255	-2.239641	0.0329
C	3.213292	1.425407	2.254298	0.0319
@TREND(1978)	0.009576	0.004328	2.212639	0.0350

R-squared	0.148281	Mean dependent var	0.024500
Adjusted R-squared	0.089542	S.D. dependent var	0.059911
S.E. of regression	0.057166	Akaike info criterion	-2.796666
Sum squared resid	0.094770	Schwarz criterion	-2.659254
Log likelihood	47.74666	Hannan-Quinn criter.	-2.751118
F-statistic	2.524395	Durbin-Watson stat	1.624952
Prob(F-statistic)	0.097566		

Table 5: EXP-ADF at 1st difference with none

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.294900	0.0001
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	

10% level	-1.610400	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/05/12 Time: 16:43
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP01(-1))	-0.767815	0.178774	-4.294900	0.0002

R-squared	0.380688	Mean dependent var	0.000842
Adjusted R-squared	0.380688	S.D. dependent var	0.081436
S.E. of regression	0.064087	Akaike info criterion	-2.625412
Sum squared resid	0.123216	Schwarz criterion	-2.579155
Log likelihood	41.69389	Hannan-Quinn criter.	-2.610334
Durbin-Watson stat	1.957734		

Table 6: EXP-ADF at 1st difference with constant

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.841682	0.0005
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/05/12 Time: 16:34
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP01(-1))	-0.895661	0.184990	-4.841682	0.0000
C	0.022212	0.011911	1.864915	0.0723

R-squared	0.447007	Mean dependent var	0.000842
Adjusted R-squared	0.427938	S.D. dependent var	0.081436
S.E. of regression	0.061594	Akaike info criterion	-2.674161
Sum squared resid	0.110021	Schwarz criterion	-2.581645
Log likelihood	43.44949	Hannan-Quinn criter.	-2.644003
F-statistic	23.44188	Durbin-Watson stat	1.963598
Prob(F-statistic)	0.000039		

Table 7: EXP-ADF at 1st difference with trend

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.760360	0.0032
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/05/12 Time: 16:39
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP01(-1))	-0.896000	0.188221	-4.760360	0.0001
C	0.019360	0.024534	0.789082	0.4367
@TREND(1978)	0.000168	0.001258	22	0.8946

R-squared	0.447360	Mean dependent var	0.000842
Adjusted R-squared	0.407885	S.D. dependent var	0.081436
S.E. of regression	0.062664	Akaike info criterion	-2.610283
Sum squared resid	0.109951	Schwarz criterion	-2.471510
Log likelihood	43.45938	Hannan-Quinn criter.	-2.565046
F-statistic	11.33294	Durbin-Watson stat	1.964094
Prob(F-statistic)	0.000248		

Table 8: PGDP-ADF at levels with none

Null Hypothesis: LPGDP has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.618784	0.9970
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/05/12 Time: 16:31
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	0.001111	0.000424	2.618784	0.0139
D(LPGDP(-1))	0.343240	0.173778	1.975163	0.0578

R-squared	0.122754	Mean dependent var	0.023787
Adjusted R-squared	0.092504	S.D. dependent var	0.024534
S.E. of regression	0.023372	Akaike info criterion	-4.612205
Sum squared resid	0.015841	Schwarz criterion	-4.519690
Log likelihood	73.48918	Hannan-Quinn criter.	-4.582048
Durbin-Watson stat	1.835612		

Table 9: PGDP-ADF at levels with constant

Null Hypothesis: LPGDP has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.607163	0.9992
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/05/12 Time: 15:52
Sample (adjusted): 1981 2010
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	0.037372	0.023254	1.607163	0.1201
D(LPGDP(-1))	0.341832	0.180361	1.895271	0.0692
D(LPGDP(-2))	-0.305530	0.201611	-1.515440	0.1417
C	-0.501231	0.323122	-1.551213	0.1329

R-squared	0.219021	Mean dependent var	0.022443
Adjusted R-squared	0.128908	S.D. dependent var	0.023765
S.E. of regression	0.022180	Akaike info criterion	-4.655661
Sum squared resid	0.012791	Schwarz criterion	-4.468835
Log likelihood	73.83492	Hannan-Quinn criter.	-4.595894
F-statistic	2.430515	Durbin-Watson stat	2.172776
Prob(F-statistic)	0.087847		

Table 10: PGDP-ADF at levels with trend

Null Hypothesis: LPGDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.840732	0.9500
Test critical values:	1% level	-4.296729	

	5% level	-3.568379
	10% level	-3.218382

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/05/12 Time: 16:24
Sample (adjusted): 1981 2010
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	-0.069792	0.083014	-0.840732	0.4085
D(LPGDP(-1))	0.362095	0.178275	2.031101	0.0530
D(LPGDP(-2))	-0.177848	0.220150	-0.807848	0.4268
C	0.954276	1.129494	0.844871	0.4062
@TREND(1978)	0.002372	0.001766	1.343048	0.1913

R-squared	0.271577	Mean dependent var	0.022443
Adjusted R-squared	0.155030	S.D. dependent var	0.023765
S.E. of regression	0.021845	Akaike info criterion	-4.658662
Sum squared resid	0.011930	Schwarz criterion	-4.425129
Log likelihood	74.87993	Hannan-Quinn criter.	-4.583952
F-statistic	2.330184	Durbin-Watson stat	2.152444
Prob(F-statistic)	0.083700		

Table 11: PGDP-ADF at 1st difference with none

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.493394	0.0144
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares
Date: 12/05/12 Time: 16:45
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.334894	0.134313	-2.493394	0.0184

R-squared	0.171566	Mean dependent var	-0.000294
Adjusted R-squared	0.171566	S.D. dependent var	0.028074
S.E. of regression	0.025552	Akaike info criterion	-4.464450
Sum squared resid	0.019588	Schwarz criterion	-4.418192

Log likelihood	70.19897	Hannan-Quinn criter.	-4.449371
Durbin-Watson stat	2.011816		

Table 12: PGDP-ADF at 1st difference with constant

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.769579	0.0077
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares
Date: 12/05/12 Time: 16:36
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.653321	0.173314	-3.769579	0.0007
C	0.015439	[illegible]	[illegible]	0.0143

R-squared	0.328855	Mean dependent var	-0.000294
Adjusted R-squared	0.305712	S.D. dependent var	0.028074
S.E. of regression	0.023392	Akaike info criterion	-4.610485
Sum squared resid	0.015869	Schwarz criterion	-4.517970
Log likelihood	73.46252	Hannan-Quinn criter.	-4.580327
F-statistic	14.20973	Durbin-Watson stat	1.835611
Prob(F-statistic)	0.000745		

Table 13: PGDP-ADF at 1st difference with trend

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.408368	0.0077
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares

Date: 12/05/12 Time: 16:40
Sample (adjusted): 1981 2010
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.928452	0.210611	-4.408368	0.0002
D(LPGDP(-1),2)	0.272135	0.188372	1.444667	0.1605
C	0.004708	0.009285	0.507018	0.6164
@TREND(1978)	0.000945	0.000485	1.950038	0.0620

R-squared	0.463827	Mean dependent var	-0.001200
Adjusted R-squared	0.401961	S.D. dependent var	0.028088
S.E. of regression	0.021722	Akaike info criterion	-4.697447
Sum squared resid	0.012268	Schwarz criterion	-4.510621
Log likelihood	74.46171	Hannan-Quinn criter.	-4.637680
F-statistic	7.497284	Durbin-Watson stat	2.188625
Prob(F-statistic)	0.000897		

Table 14: SFDI-ADF at levels with none

Null Hypothesis: LSFDI has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		3.378997	0.9996
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/05/12 Time: 16:32
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	0.012920	0.003824	3.378997	0.0020

R-squared	0.001045	Mean dependent var	0.144849
Adjusted R-squared	0.001045	S.D. dependent var	0.242968
S.E. of regression	0.242840	Akaike info criterion	0.037927
Sum squared resid	1.828116	Schwarz criterion	0.083732
Log likelihood	0.393164	Hannan-Quinn criter.	0.053110
Durbin-Watson stat	2.132513		

Table 15: SFDI-ADF at levels with constant

Null Hypothesis: LSFDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.254460	0.9719
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/05/12 Time: 15:54
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	0.007550	0.029671	0.254460	0.8009
C	0.060810	0.333134	0.182538	0.8564

R-squared	0.002154	Mean dependent var	0.144849
Adjusted R-squared	-0.031108	S.D. dependent var	0.242968
S.E. of regression	0.246718	Akaike info criterion	0.099317
Sum squared resid	1.826088	Schwarz criterion	0.190926
Log likelihood	0.410925	Hannan-Quinn	0.129683
F-statistic	0.064750	Durbin-Watson stat	2.123483
Prob(F-statistic)	0.800876		

Table 16: SFDI-ADF at levels with trend

Null Hypothesis: LSFDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.941804	0.6096
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/05/12 Time: 16:26
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	-0.206219	0.106200	-1.941804	0.0619
C	1.857905	0.917020	2.026025	0.0520
@TREND(1978)	0.035293	0.016907	2.087504	0.0457

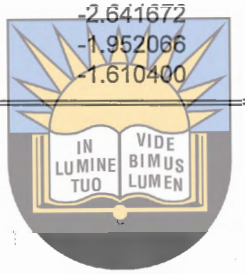
R-squared	0.132507	Mean dependent var	0.144849
Adjusted R-squared	0.072680	S.D. dependent var	0.242968
S.E. of regression	0.233972	Akaike info criterion	0.021825
Sum squared resid	1.587537	Schwarz criterion	0.159238
Log likelihood	2.650797	Hannan-Quinn criter.	0.067374
F-statistic	2.214835	Durbin-Watson stat	1.972009
Prob(F-statistic)	0.127308		

Table 17: SFDI-ADF at 1st difference with none

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.324056	0.0001
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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



Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:46
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-0.772484	0.178648	-4.324056	0.0002

R-squared	0.383888	Mean dependent var	0.003566
Adjusted R-squared	0.383888	S.D. dependent var	0.358155
S.E. of regression	0.281126	Akaike info criterion	0.331697
Sum squared resid	2.370950	Schwarz criterion	0.377954
Log likelihood	-4.141296	Hannan-Quinn criter.	0.346775
Durbin-Watson stat	2.132379		

Table 18: SFDI-ADF at 1st difference with constant

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.699820	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:37
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-1.054123	0.184940	-5.699820	0.0000
C	0.155791	0.052270	2.980511	0.0058

R-squared	0.528363	Mean dependent var	0.003566
Adjusted R-squared	0.512100	S.D. dependent var	0.358155
S.E. of regression	0.250171	Akaike info criterion	0.128994
Sum squared resid	1.814976	Schwarz criterion	0.221510
Log likelihood	0.000589	Hannan-Quinn criter.	0.159152
F-statistic	32.48795	Durbin-Watson stat	1.983984
Prob(F-statistic)	0.000004		

Table 19: SFDI-ADF at 1st difference with trend

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.695763	0.0003
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:41
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-1.073545	0.188481	-5.695763	0.0000
C	0.096327	0.098423	0.978699	0.3361
@TREND(1978)	0.003663	0.005120	0.715443	0.4803

R-squared	0.536830	Mean dependent var	0.003566
Adjusted R-squared	0.503746	S.D. dependent var	0.358155
S.E. of regression	0.252303	Akaike info criterion	0.175395
Sum squared resid	1.782392	Schwarz criterion	0.314168
Log likelihood	0.281381	Hannan-Quinn criter.	0.220631
F-statistic	16.22648	Durbin-Watson stat	1.976708
Prob(F-statistic)	0.000021		

Table 20: REER-ADF at levels with none

Null Hypothesis: LREER has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.499326	0.4920
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/05/12 Time: 16:31
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.001975	0.003955	-0.499326	0.6211

R-squared	0.001667	Mean depen	-0.008312
Adjusted R-squared	0.001667	S.D. dependent var	0.105875
S.E. of regression	0.105786	Akaike info criterion	-1.624939
Sum squared resid	0.346913	Schwarz criterion	-1.578234
Log likelihood	26.98462	Hannan-Quinn crite.	-1.608856
Durbin-Watson stat	1.732587		

Table 21: REER-ADF at levels with constant

Null Hypothesis: LREER has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.367145	0.5857
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/05/12 Time: 15:53
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.130468	0.095431	-1.367145	0.1817

C	0.608019	0.451194	1.347577	0.1879

R-squared	0.058649	Mean dependent var	-0.008312
Adjusted R-squared	0.027270	S.D. dependent var	0.105875
S.E. of regression	0.104421	Akaike info criterion	-1.620310
Sum squared resid	0.327113	Schwarz criterion	-1.528701
Log likelihood	27.92495	Hannan-Quinn criter.	-1.589944
F-statistic	1.869085	Durbin-Watson stat	1.620389
Prob(F-statistic)	0.181737		

Table 22: REER-ADF at levels with trend

Null Hypothesis: LREER has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.878045	0.1824
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/05/12 Time: 16:25
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.403156	0.140080	-2.878045	0.0074
C	2.017372	0.700275	2.880830	0.0074
@TREND(1978)	-0.007344	0.002935	-2.502427	0.0182

R-squared	0.225822	Mean dependent var	-0.008312
Adjusted R-squared	0.172430	S.D. dependent var	0.105875
S.E. of regression	0.096315	Akaike info criterion	-1.753324
Sum squared resid	0.269021	Schwarz criterion	-1.615911
Log likelihood	31.05318	Hannan-Quinn criter.	-1.707775
F-statistic	4.229536	Durbin-Watson stat	1.555674
Prob(F-statistic)	0.024445		

Table 23: REER-ADF at 1st difference with none

Null Hypothesis: D(LREER) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.800002	0.0000
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	

	10% level	-1.610400

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/05/12 Time: 16:45
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.875132	0.182319	-4.800002	0.0000

R-squared	0.433695	Mean dependent var	0.004881
Adjusted R-squared	0.433695	S.D. dependent var	0.141598
S.E. of regression	0.106557	Akaike info criterion	-1.608547
Sum squared resid	0.340632	Schwarz criterion	-1.562289
Log likelihood	25.93248	Hannan-Quinn criter.	-1.593468
Durbin-Watson stat	1.700411		

Table 24: REER-ADF at 1st difference with constant

Null Hypothesis: D(LREER) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.726057	0.0006
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/05/12 Time: 16:36
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.880589	0.186326	-4.726057	0.0001
C	-0.005234	0.019559	-0.267621	0.7909

R-squared	0.435090	Mean dependent var	0.004881
Adjusted R-squared	0.415610	S.D. dependent var	0.141598
S.E. of regression	0.108245	Akaike info criterion	-1.546498
Sum squared resid	0.339793	Schwarz criterion	-1.453982
Log likelihood	25.97071	Hannan-Quinn criter.	-1.516340
F-statistic	22.33562	Durbin-Watson stat	1.697029
Prob(F-statistic)	0.000054		

Table 25: REER-ADF at 1st difference with trend

Null Hypothesis: D(LREER) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.682856	0.0038
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/05/12 Time: 16:41
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.891849	0.190450	-4.682856	0.0001
C	0.012170	0.042411	0.286940	0.7763
@TREND(1978)	-0.001031	0.002222	[illegible]21	0.6461

R-squared	0.439405	Mean dependent var	0.004881
Adjusted R-squared	0.399362	S.D. dependent var	0.141598
S.E. of regression	0.109740	Akaike info criterion	-1.489648
Sum squared resid	0.337197	Schwarz criterion	-1.350875
Log likelihood	26.08955	Hannan-Quinn criter.	-1.444412
F-statistic	10.97345	Durbin-Watson stat	1.694012
Prob(F-statistic)	0.000303		

Table 26: MKT-ADF at levels with none

Null Hypothesis: LMKT has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.420297	0.5204
Test critical values:	1% level	-2.669359	
	5% level	-1.956406	
	10% level	-1.608495	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/05/12 Time: 16:30
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.003640	0.008660	-0.420297	0.6783

R-squared	0.002776	Mean dependent var	0.028937
Adjusted R-squared	0.002776	S.D. dependent var	0.409092
S.E. of regression	0.408524	Akaike info criterion	1.089973
Sum squared resid	3.671624	Schwarz criterion	1.139343
Log likelihood	-11.53469	Hannan-Quinn criter.	1.102390
Durbin-Watson stat	1.821090		

Table 27: MKT-ADF at level s with constant

Null Hypothesis: LMKT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.448043	0.5411
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/05/12 Time: 15:50
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.213743	0.147608	-1.448043	0.1624
C	-2.070040	1.451916	-1.425730	0.1686

R-squared	0.090784	Mean dependent var	0.028937
Adjusted R-squared	0.047488	S.D. dependent var	0.409092
S.E. of regression	0.399261	Akaike info criterion	1.084537
Sum squared resid	3.347592	Schwarz criterion	1.183276
Log likelihood	-10.47218	Hannan-Quinn criter.	1.109370
F-statistic	2.096828	Durbin-Watson stat	1.610255
Prob(F-statistic)	0.162371		

Table 28: MKT-ADF at levels with trend

Null Hypothesis: LMKT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.654094	0.2623
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/05/12 Time: 16:23
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.451374	0.170067	-2.654094	0.0152
C	-4.841638	1.795056	-2.697207	0.0139
@TREND(1978)	0.031682	0.013849	2.287661	0.0332

R-squared	0.279355	Mean dependent var	0.028937
Adjusted R-squared	0.207291	S.D. dependent var	0.409092
S.E. of regression	0.364232	Akaike info criterion	0.939058
Sum squared resid	2.653303	Schwarz criterion	1.087166
Log likelihood	-7.799162	Hannan-Quinn criter.	0.976306
F-statistic	3.876461	Durbin-Watson stat	1.625762
Prob(F-statistic)	0.037776		

Table 29: MKT –ADF at 1st difference with none

Null Hypothesis: D(LMKT) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.379039	0.0001
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/05/12 Time: 16:44
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMKT(-1))	-0.942426	0.215213	-4.379039	0.0003

R-squared	0.489403	Mean dependent var	0.006906
Adjusted R-squared	0.489403	S.D. dependent var	0.566519
S.E. of regression	0.404812	Akaike info criterion	1.075659
Sum squared resid	3.277453	Schwarz criterion	1.125398
Log likelihood	-10.29442	Hannan-Quinn criter.	1.086454
Durbin-Watson stat	2.117025		

Table 30: MKT-ADF at 1st difference with constant

Null Hypothesis: D(LMKT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.297477	0.0033
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/05/12 Time: 16:35
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMKT(-1))	-0.947741	0.220534	-4.297477	0.0004
C	0.032787	0.090521	0.362200	0.7212

R-squared	0.492905	Mean dependent var	0.006906
Adjusted R-squared	0.466213	S.D. dependent var	0.566519
S.E. of regression	0.413902	Akaike info criterion	1.164016
Sum squared resid	3.254978	Schwarz criterion	1.263495
Log likelihood	-10.22217	Hannan-Quinn criter.	1.185606
F-statistic	18.46831	Durbin-Watson stat	2.121230
Prob(F-statistic)	0.000389		

Table 31: MKT-ADF at 1st difference with trend

Null Hypothesis: D(LMKT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.248282	0.0155
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/05/12 Time: 16:40
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(LMKT(-1))	-0.956419	0.225131	-4.248282	0.0005
C	-0.089170	0.235183	-0.379152	0.7090
@TREND(1978)	0.008225	0.014591	0.563675	0.5799

R-squared	0.501701	Mean dependent var	0.006906
Adjusted R-squared	0.446334	S.D. dependent var	0.566519
S.E. of regression	0.421539	Akaike info criterion	1.241757
Sum squared resid	3.198519	Schwarz criterion	1.390974
Log likelihood	-10.03845	Hannan-Quinn criter.	1.274141
F-statistic	9.061429	Durbin-Watson stat	2.144058
Prob(F-statistic)	0.001894		

Table 32: TLI-ADF at levels with none

Null Hypothesis: LTLI has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.428277	0.5173
Test critical values:	1% level	-2.669359	
	5% level	-1.956406	
	10% level	-1.608495	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI)
Method: Least Squares
Date: 12/05/12 Time: 16:32
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.004179	0.009758	-0.428277	0.6726

R-squared	0.003185	Mean dependent var	0.032944
Adjusted R-squared	0.003185	S.D. dependent var	0.470498
S.E. of regression	0.469748	Akaike info criterion	1.369266
Sum squared resid	4.854598	Schwarz criterion	1.418635
Log likelihood	-14.74655	Hannan-Quinn criter.	1.381682
Durbin-Watson stat	2.067857		

Table 33: TLI-ADF at levels with constant

Null Hypothesis: LTLI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.534030	0.4989
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI)
Method: Least Squares
Date: 12/05/12 Time: 15:55
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.234366	0.152778	-1.534030	0.1400
C	-2.315132	1.533617	-1.509589	0.1460

R-squared	0.100767	Mean dependent var	0.032944
Adjusted R-squared	0.057947	S.D. dependent var	0.470498
S.E. of regression	0.456663	Akaike info criterion	1.353199
Sum squared resid	4.379362	Schwarz criterion	1.451938
Log likelihood	-13.56179	Hannan-Quinn criter.	1.378031
F-statistic	2.353247	Durbin-Watson stat	1.815535
Prob(F-statistic)	0.139951		

Table 34: TLI-ADF at levels with trend

Null Hypothesis: LTLI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.585954	0.2890
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI)
Method: Least Squares
Date: 12/05/12 Time: 16:26
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.450905	0.174367	-2.585954	0.0177
C	-4.945176	1.884160	-2.624606	0.0162
@TREND(1978)	0.033312	0.015691	2.123028	0.0464

R-squared	0.266150	Mean dependent var	0.032944
Adjusted R-squared	0.192765	S.D. dependent var	0.470498
S.E. of regression	0.422725	Akaike info criterion	1.236919
Sum squared resid	3.573932	Schwarz criterion	1.385027
Log likelihood	-11.22457	Hannan-Quinn criter.	1.274168
F-statistic	3.626757	Durbin-Watson stat	1.800699
Prob(F-statistic)	0.045298		

Table 35: TLI-ADF at 1st difference with none

Null Hypothesis: D(LTLI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.720426	0.0001
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:46
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.036766	0.219634	-4.720426	0.0001

R-squared	0.526186	Mean depen	0.027918
Adjusted R-squared	0.526186	S.D. dependent var	0.693782
S.E. of regression	0.477559	Akaike info criterion	1.406190
Sum squared resid	4.561251	Schwarz criterion	1.455929
Log likelihood	-13.76499	Hannan-Quinn criter.	1.416984
Durbin-Watson stat	2.015860		

Table 36: TLI-ADF at 1st difference with constant

Null Hypothesis: D(LTLI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.640861	0.0015
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:37
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.041013	0.224315	-4.640861	0.0002

C	0.048457	0.106433	0.455280	0.6541

R-squared	0.531299	Mean dependent var	0.027918
Adjusted R-squared	0.506631	S.D. dependent var	0.693782
S.E. of regression	0.487314	Akaike info criterion	1.490577
Sum squared resid	4.512027	Schwarz criterion	1.590056
Log likelihood	-13.65106	Hannan-Quinn criter.	1.512167
F-statistic	21.53759	Durbin-Watson stat	2.029598
Prob(F-statistic)	0.000178		

Table 37: TLI-ADF at 1st difference with trend

Null Hypothesis: D(LTLI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.552467	0.0084
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/05/12 Time: 16:42
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.048556	0.230327	-4.552467	0.0002
C	-0.050961	0.278509	-0.182978	0.8569
@TREND(1978)	0.006702	0.017279	0.387839	0.7027

R-squared	0.535184	Mean dependent var	0.027918
Adjusted R-squared	0.483537	S.D. dependent var	0.693782
S.E. of regression	0.498589	Akaike info criterion	1.577494
Sum squared resid	4.474635	Schwarz criterion	1.726711
Log likelihood	-13.56368	Hannan-Quinn criter.	1.609878
F-statistic	10.36248	Durbin-Watson stat	2.033648
Prob(F-statistic)	0.001013		

Table 38: EXP-PP at levels with none

Null Hypothesis: LEXP01 has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		2.194049	0.9918
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	

	10% level	-1.610579

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

Residual variance (no correction)	0.003483
HAC corrected variance (Bartlett kernel)	0.003825

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/06/12 Time: 13:49
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	0.001945	0.000846	2.300658	0.0283

R-squared	-0.001609	Mean dependent var	0.024500
Adjusted R-squared	-0.001609	S.D. dependent var	0.059911
S.E. of regression	0.059959	Akaike info criterion	-2.759560
Sum squared resid	0.111448	Schwarz criterion	-2.713756
Log likelihood	45.15296	Hannan-Quinn criter.	-2.744377
Durbin-Watson stat	1.788843		

Table 39: EXP-PP at levels with constant

Null Hypothesis: LEXP01 has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.400888	0.8974
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Residual variance (no correction)	0.003462
HAC corrected variance (Bartlett kernel)	0.003839

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/06/12 Time: 13:35
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	-0.011797	0.032057	-0.368009	0.7155
C	0.172329	0.401843	0.428846	0.6711

R-squared	0.004494	Mean dependent var	0.024500
Adjusted R-squared	-0.028689	S.D. dependent var	0.059911
S.E. of regression	0.060764	Akaike info criterion	-2.703172
Sum squared resid	0.110768	Schwarz criterion	-2.611563
Log likelihood	45.25075	Hannan-Quinn criter.	-2.672806
F-statistic	0.135431	Durbin-Watson stat	1.775482
Prob(F-statistic)	0.715450		

Table 40: EXP-PP at levels with trend

Null Hypothesis: LEXP01 has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.296278	0.4239
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			0.002962
HAC corrected variance (Bartlett kernel)			0.003204

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01)
Method: Least Squares
Date: 12/06/12 Time: 13:43
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXP01(-1)	-0.267089	0.119255	-2.239641	0.0329
C	3.213292	1.425407	2.254298	0.0319
@TREND(1978)	0.009576	0.004328	2.212639	0.0350

R-squared	0.148281	Mean dependent var	0.024500
Adjusted R-squared	0.089542	S.D. dependent var	0.059911
S.E. of regression	0.057166	Akaike info criterion	-2.796666
Sum squared resid	0.094770	Schwarz criterion	-2.659254
Log likelihood	47.74666	Hannan-Quinn criter.	-2.751118
F-statistic	2.524395	Durbin-Watson stat	1.624952
Prob(F-statistic)	0.097566		

Table 41: EXP-PP at 1st difference with none

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*

Phillips-Perron test statistic		-4.302815	0.0001
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Residual variance (no correction)	0.003975
HAC corrected variance (Bartlett kernel)	0.004029

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/06/12 Time: 14:09
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP01(-1))	-0.767815	0.178774	-4.294900	0.0002

R-squared	0.380688	Mean dependent var	0.000842
Adjusted R-squared	0.380688	S.D. dependent var	0.081436
S.E. of regression	0.064087	Akaike info criterion	-2.625412
Sum squared resid	0.123216	Schwarz criterion	-2.579155
Log likelihood	41.69389	Hannan-Quinn criter.	-2.610334
Durbin-Watson stat	1.957734		

Table 42: EXP-PP at 1st difference with constant

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.813205	0.0005
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.003549
HAC corrected variance (Bartlett kernel)	0.003221

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/06/12 Time: 13:56
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(LEXP01(-1))	-0.895661	0.184990	-4.841682	0.0000
C	0.022212	0.011911	1.864915	0.0723

R-squared	0.447007	Mean dependent var	0.000842
Adjusted R-squared	0.427938	S.D. dependent var	0.081436
S.E. of regression	0.061594	Akaike info criterion	-2.674161
Sum squared resid	0.110021	Schwarz criterion	-2.581645
Log likelihood	43.44949	Hannan-Quinn criter.	-2.644003
F-statistic	23.44188	Durbin-Watson stat	1.963598
Prob(F-statistic)	0.000039		

Table 43: EXP-PP at 1st difference with trend

Null Hypothesis: D(LEXP01) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.727206	0.0034
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Residual variance (no correction)	0.003547
HAC corrected variance (Bartlett kernel)	0.002211

Phillips-Perron Test Equation
Dependent Variable: D(LEXP01,2)
Method: Least Squares
Date: 12/06/12 Time: 14:01
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXP01(-1))	-0.896000	0.188221	-4.760360	0.0001
C	0.019360	0.024534	0.789082	0.4367
@TREND(1978)	0.000168	0.001258	0.133722	0.8946

R-squared	0.447360	Mean dependent var	0.000842
Adjusted R-squared	0.407885	S.D. dependent var	0.081436
S.E. of regression	0.062664	Akaike info criterion	-2.610283
Sum squared resid	0.109951	Schwarz criterion	-2.471510
Log likelihood	43.45938	Hannan-Quinn criter.	-2.565046
F-statistic	11.33294	Durbin-Watson stat	1.964094
Prob(F-statistic)	0.000248		

Table 44: PGDP-PP at levels with none

Null Hypothesis: LPGDP has a unit root
Exogenous: None
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		4.890411	1.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Residual variance (no correction)	0.000568
HAC corrected variance (Bartlett kernel)	0.000762

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/06/12 Time: 13:51
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	0.001734	0.000306	5.667997	0.0000

R-squared	0.003902	Mean dependent	0.024206
Adjusted R-squared	0.003902	S.D. dependent var	0.024252
S.E. of regression	0.024204	Akaike info criterion	-4.573317
Sum squared resid	0.018161	Schwarz criterion	-4.528013
Log likelihood	74.18107	Hannan-Quinn criter.	-4.558634
Durbin-Watson stat	1.304363		

Table 45: PGDP-PP at levels with constant

Null Hypothesis: LPGDP has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.552571	0.9860
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Residual variance (no correction)	0.000559
HAC corrected variance (Bartlett kernel)	0.000758

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/06/12 Time: 13:39
Sample (adjusted): 1979 2010

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	0.015773	0.020807	0.758049	0.4543
C	-0.196348	0.290981	-0.674778	0.5050

R-squared	0.018795	Mean dependent var	0.024206
Adjusted R-squared	-0.013912	S.D. dependent var	0.024252
S.E. of regression	0.024420	Akaike info criterion	-4.526380
Sum squared resid	0.017890	Schwarz criterion	-4.434772
Log likelihood	74.42209	Hannan-Quinn criter.	-4.496015
F-statistic	0.574639	Durbin-Watson stat	1.343681
Prob(F-statistic)	0.454336		

Table 46: PGDP-PP at levels with trend

Null Hypothesis: LPGDP has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.747468	0.9603
Test critical values:	1% level	-4.273277	
	5% level		
	10% level	-3.212361	

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

Residual variance (no correction)	0.000541
HAC corrected variance (Bartlett kernel)	0.000541

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP)
Method: Least Squares
Date: 12/06/12 Time: 13:45
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LPGDP(-1)	-0.057223	0.076556	-0.747468	0.4608
C	0.796239	1.043212	0.763257	0.4515
@TREND(1978)	0.001704	0.001720	0.990820	0.3300

R-squared	0.050923	Mean dependent var	0.024206
Adjusted R-squared	-0.014530	S.D. dependent var	0.024252
S.E. of regression	0.024427	Akaike info criterion	-4.497173
Sum squared resid	0.017304	Schwarz criterion	-4.359760
Log likelihood	74.95476	Hannan-Quinn criter.	-4.451624
F-statistic	0.778007	Durbin-Watson stat	1.291817
Prob(F-statistic)	0.468672		

Table 47: PGDP-PP at 1st difference with none

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: None
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.493394	0.0144
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Residual variance (no correction)	0.000632
HAC corrected variance (Bartlett kernel)	0.000632

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares
Date: 12/06/12 Time: 14:10
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.334894	0.134313	-2.493394	0.0184

R-squared	0.171566	Mean dependent var	-0.000294
Adjusted R-squared	0.171566	S.D. dependent var	0.028074
S.E. of regression	0.025552	Akaike info criterion	-4.464450
Sum squared resid	0.019588	Schwarz criterion	-4.418192
Log likelihood	70.19897	Hannan-Quinn criter.	-4.449371
Durbin-Watson stat	2.011816		

Table 48: PGDP-PP at 1st difference with constant

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.679310	0.0096
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.000512
HAC corrected variance (Bartlett kernel)	0.000445

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares
Date: 12/06/12 Time: 13:58
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.653321	0.173314	-3.769579	0.0007
C	0.015439	0.005922	2.606990	0.0143

R-squared	0.328855	Mean dependent var	-0.000294
Adjusted R-squared	0.305712	S.D. dependent var	0.028074
S.E. of regression	0.023392	Akaike info criterion	-4.610485
Sum squared resid	0.015869	Schwarz criterion	-4.517970
Log likelihood	73.46252	Hannan-Quinn criter.	-4.580327
F-statistic	14.20973	Durbin-Watson stat	1.835611
Prob(F-statistic)	0.000745		

Table 49: PGDP-PP at 1st difference with trend

Null Hypothesis: D(LPGDP) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 7 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.625942	0.0438
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Residual variance (no correction)	0.000497
HAC corrected variance (Bartlett kernel)	0.000245

Phillips-Perron Test Equation
Dependent Variable: D(LPGDP,2)
Method: Least Squares
Date: 12/06/12 Time: 14:03
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LPGDP(-1))	-0.682766	0.176645	-3.865181	0.0006
C	0.008623	0.009465	0.911070	0.3700
@TREND(1978)	0.000443	0.000479	0.924469	0.3631

R-squared	0.348733	Mean dependent var	-0.000294
Adjusted R-squared	0.302214	S.D. dependent var	0.028074
S.E. of regression	0.023451	Akaike info criterion	-4.576035
Sum squared resid	0.015399	Schwarz criterion	-4.437262
Log likelihood	73.92855	Hannan-Quinn criter.	-4.530799
F-statistic	7.496572	Durbin-Watson stat	1.845763

Prob(F-statistic)	0.002470

Table 50: SFDI-PP at levels with none

Null Hypothesis: LSFDI has a unit root
Exogenous: None
Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		4.841237	1.0000
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	

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

Residual variance (no correction)	0.057129
HAC corrected variance (Bartlett kernel)	0.028332

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/06/12 Time: 13:52
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	0.012920	0.003824	3.378997	0.0020

R-squared	0.001045	Mean dependent var	0.144849
Adjusted R-squared	0.001045	S.D. dependent var	0.242968
S.E. of regression	0.242840	Akaike info criterion	0.037927
Sum squared resid	1.828116	Schwarz criterion	0.083732
Log likelihood	0.393164	Hannan-Quinn criter.	0.053110
Durbin-Watson stat	2.132513		

Table 51: SFDI-PP at levels with constant

Null Hypothesis: LSFDI has a unit root
Exogenous: Constant
Bandwidth: 11 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		0.563848	0.9863
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Residual variance (no correction)	0.057065

HAC corrected variance (Bartlett kernel)	0.034348

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/06/12 Time: 13:41
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	0.007550	0.029671	0.254460	0.8009
C	0.060810	0.333134	0.182538	0.8564

R-squared	0.002154	Mean dependent var	0.144849
Adjusted R-squared	-0.031108	S.D. dependent var	0.242968
S.E. of regression	0.246718	Akaike info criterion	0.099317
Sum squared resid	1.826088	Schwarz criterion	0.190926
Log likelihood	0.410925	Hannan-Quinn criter.	0.129683
F-statistic	0.064750	Durbin-Watson stat	2.123483
Prob(F-statistic)	0.800876		

Table 52: SFDI-PP at levels with trend

Null Hypothesis: LSFDI has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.869082	0.6469
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

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

Residual variance (no correction)	0.049611
HAC corrected variance (Bartlett kernel)	0.044107

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI)
Method: Least Squares
Date: 12/06/12 Time: 13:48
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LSFDI(-1)	-0.206219	0.106200	-1.941804	0.0619
C	1.857905	0.917020	2.026025	0.0520
@TREND(1978)	0.035293	0.016907	2.087504	0.0457

R-squared	0.132507	Mean dependent var	0.144849
Adjusted R-squared	0.072680	S.D. dependent var	0.242968

S.E. of regression	0.233972	Akaike info criterion	0.021825
Sum squared resid	1.587537	Schwarz criterion	0.159238
Log likelihood	2.650797	Hannan-Quinn criter.	0.067374
F-statistic	2.214835	Durbin-Watson stat	1.972009
Prob(F-statistic)	0.127308		

Table 53: SFDI-PP at 1st difference with none

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: None
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.324056	0.0001
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Residual variance (no correction)	0.076482
HAC corrected variance (Bartlett kernel)	0.076482

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/06/12 Time: 14:12
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-0.772484	0.178648	-4.324056	0.0002

R-squared	0.383888	Mean dependent var	0.003566
Adjusted R-squared	0.383888	S.D. dependent var	0.358155
S.E. of regression	0.281126	Akaike info criterion	0.331697
Sum squared resid	2.370950	Schwarz criterion	0.377954
Log likelihood	-4.141296	Hannan-Quinn criter.	0.346775
Durbin-Watson stat	2.132379		

Table 54: SFDI-PP at 1st difference with constant

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: Constant
Bandwidth: 8 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.739073	0.0000
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

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

Residual variance (no correction)	0.058548
HAC corrected variance (Bartlett kernel)	0.048585

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/06/12 Time: 14:00
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-1.054123	0.184940	-5.699820	0.0000
C	0.155791	0.052270	2.980511	0.0058

R-squared	0.528363	Mean dependent var	0.003566
Adjusted R-squared	0.512100	S.D. dependent var	0.358155
S.E. of regression	0.250171	Akaike info criterion	0.128994
Sum squared resid	1.814976	Schwarz criterion	0.221510
Log likelihood	0.000589	Hannan-Quinn criter.	0.159152
F-statistic	32.48795	Durbin-Watson stat	1.983984
Prob(F-statistic)	0.000004		

Table 55: SFDI-PP at 1st difference with trend

Null Hypothesis: D(LSFDI) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.940359	0.0002
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Residual variance (no correction)	0.057497
HAC corrected variance (Bartlett kernel)	0.033636

Phillips-Perron Test Equation
Dependent Variable: D(LSFDI,2)
Method: Least Squares
Date: 12/06/12 Time: 14:07
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LSFDI(-1))	-1.073545	0.188481	-5.695763	0.0000
C	0.096327	0.098423	0.978699	0.3361
@TREND(1978)	0.003663	0.005120	0.715443	0.4803

R-squared	0.536830	Mean dependent var	0.003566
Adjusted R-squared	0.503746	S.D. dependent var	0.358155
S.E. of regression	0.252303	Akaike info criterion	0.175395
Sum squared resid	1.782392	Schwarz criterion	0.314168
Log likelihood	0.281381	Hannan-Quinn criter.	0.220631
F-statistic	16.22648	Durbin-Watson stat	1.976708
Prob(F-statistic)	0.000021		

Table 56: REER-PP at levels with none

Null Hypothesis: LREER has a unit root
Exogenous: None
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.565759	0.4642
Test critical values:	1% level	-2.639210	
	5% level	-1.951687	
	10% level	-1.610579	
*MacKinnon (1996) one-sided p-values.			
Residual variance (no correction)			0.010841
HAC corrected variance (Bartlett kernel)			0.007879

Phillips-Perron Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/06/12 Time: 13:50
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.001975	0.003955	-0.499326	0.6211

R-squared	0.001667	Mean dependent var	-0.008312
Adjusted R-squared	0.001667	S.D. dependent var	0.105875
S.E. of regression	0.105786	Akaike info criterion	-1.624039
Sum squared resid	0.346913	Schwarz criterion	-1.578234
Log likelihood	26.98462	Hannan-Quinn criter.	-1.608856
Durbin-Watson stat	1.732587		

Table 57: REER-PP at levels with constant

Null Hypothesis: LREER has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.480168	0.5306
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

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

Residual variance (no correction)	0.010222
HAC corrected variance (Bartlett kernel)	0.011735

Phillips-Perron Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/06/12 Time: 13:40
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.130468	0.095431	-1.367145	0.1817
C	0.608019	0.451194	1.347577	0.1879

R-squared	0.058649	Mean dependent var	-0.008312
Adjusted R-squared	0.027270	S.D. dependent var	0.105875
S.E. of regression	0.104421	Akaike info criterion	-1.620310
Sum squared resid	0.327113	Schwarz criterion	-1.528701
Log likelihood	27.92495	Hannan-Quinn criter.	-1.589944
F-statistic	1.869085	Durbin-Watson stat	1.620389
Prob(F-statistic)	0.181737		

Table 58: REER-PP at levels with trend

Null Hypothesis: LREER has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.916250	0.1710
Test critical values:	1% level	-4.273277	
	5% level	-3.557759	
	10% level	-3.212361	

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

Residual variance (no correction)	0.008407
HAC corrected variance (Bartlett kernel)	0.008869

Phillips-Perron Test Equation
Dependent Variable: D(LREER)
Method: Least Squares
Date: 12/06/12 Time: 13:44
Sample (adjusted): 1979 2010
Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LREER(-1)	-0.403156	0.140080	-2.878045	0.0074
C	2.017372	0.700275	2.880830	0.0074
@TREND(1978)	-0.007344	0.002935	-2.502427	0.0182

R-squared	0.225822	Mean dependent var	-0.008312
Adjusted R-squared	0.172430	S.D. dependent var	0.105875
S.E. of regression	0.096315	Akaike info criterion	-1.753324
Sum squared resid	0.269021	Schwarz criterion	-1.615911
Log likelihood	31.05318	Hannan-Quinn criter.	-1.707775
F-statistic	4.229536	Durbin-Watson stat	1.555674
Prob(F-statistic)	0.024445		

Table 59: REER-PP at 1st difference with none

Null Hypothesis: D(LREER) has a unit root
Exogenous: None
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.753413	0.0000
Test critical values:	1% level	-2.641672	
	5% level	-1.952066	
	10% level	-1.610400	

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

Residual variance (no correction)	0.010988
HAC corrected variance (Bartlett kernel)	0.009308

Phillips-Perron Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/06/12 Time: 14:10
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.875132	0.182319	-4.800002	0.0000

R-squared	0.433695	Mean dependent var	0.004881
Adjusted R-squared	0.433695	S.D. dependent var	0.141598
S.E. of regression	0.106557	Akaike info criterion	-1.608547
Sum squared resid	0.340632	Schwarz criterion	-1.562289
Log likelihood	25.93248	Hannan-Quinn criter.	-1.593468
Durbin-Watson stat	1.700411		

Table 60: REER-PP at 1st difference with constant

Null Hypothesis: D(LREER) has a unit root
Exogenous: Constant
Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.647123	0.0008
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	

	10% level	-2.619160

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

Residual variance (no correction)	0.010961
HAC corrected variance (Bartlett kernel)	0.007678

Phillips-Perron Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/06/12 Time: 13:57
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LREER(-1))	-0.880589	0.186326	-4.726057	0.0001
C	-0.005234	0.019559	-0.267621	0.7909

R-squared	0.435090	Mean dependent var	0.004881
Adjusted R-squared	0.415610	S.D. dependent var	0.141598
S.E. of regression	0.108245	Akaike info criterion	-1.546498
Sum squared resid	0.339793	Schwarz criterion	-1.453982
Log likelihood	25.97071	Hannan-Quinn criter.	-1.516340
F-statistic	22.33562	Durbin-Watson stat	1.697029
Prob(F-statistic)	0.000054		

Table 61: REER-PP at 1st difference with trend

Null Hypothesis: D(LREER) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.620269	0.0045
Test critical values:	1% level	-4.284580	
	5% level	-3.562882	
	10% level	-3.215267	

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

Residual variance (no correction)	0.010877
HAC corrected variance (Bartlett kernel)	0.009159

Phillips-Perron Test Equation
Dependent Variable: D(LREER,2)
Method: Least Squares
Date: 12/06/12 Time: 14:02
Sample (adjusted): 1980 2010
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.

D(LREER(-1))	-0.891849	0.190450	-4.682856	0.0001
C	0.012170	0.042411	0.286940	0.7763
@TREND(1978)	-0.001031	0.002222	-0.464221	0.6461

R-squared	0.439405	Mean dependent var	0.004881
Adjusted R-squared	0.399362	S.D. dependent var	0.141598
S.E. of regression	0.109740	Akaike info criterion	-1.489648
Sum squared resid	0.337197	Schwarz criterion	-1.350875
Log likelihood	26.08955	Hannan-Quinn criter.	-1.444412
F-statistic	10.97345	Durbin-Watson stat	1.694012
Prob(F-statistic)	0.000303		

Table 62: MKT-PP at levels with none

Null Hypothesis: LMKT has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.425399	0.5184
Test critical values:	1% level	-2.669359	
	5% level	-1.956406	
	10% level	-1.608495	

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

Residual variance (no correction)	0.159636
HAC corrected variance (Bartlett kernel)	0.152713

Phillips-Perron Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/06/12 Time: 13:53
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.003640	0.008660	-0.420297	0.6783

R-squared	0.002776	Mean dependent var	0.028937
Adjusted R-squared	0.002776	S.D. dependent var	0.409092
S.E. of regression	0.408524	Akaike info criterion	1.089973
Sum squared resid	3.671624	Schwarz criterion	1.139343
Log likelihood	-11.53469	Hannan-Quinn criter.	1.102390
Durbin-Watson stat	1.821090		

Table 63: MKT-PP at levels with constant

Null Hypothesis: LMKT has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*

Phillips-Perron test statistic		-1.448043	0.5411
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

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

Residual variance (no correction)	0.145547
HAC corrected variance (Bartlett kernel)	0.145547

Phillips-Perron Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/06/12 Time: 13:38
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.213743	0.147608	-1.448043	0.1624
C	-2.070040	1.451916	-1.425730	0.1686

R-squared	0.090784	Mean dependent var	0.028937
Adjusted R-squared	0.047488	S.D. dependent var	0.409092
S.E. of regression	0.399261	Akaike info criterion	1.084537
Sum squared resid	3.347592	Schwarz criterion	1.183248
Log likelihood	-10.47218	Hannan-Quinn criter.	1.109370
F-statistic	2.096828	Durbin-Watson stat	1.610255
Prob(F-statistic)	0.162371		

Table 64: MKT-PP at levels with trend

Null Hypothesis: LMKT has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.654094	0.2623
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

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

Residual variance (no correction)	0.115361
HAC corrected variance (Bartlett kernel)	0.115361

Phillips-Perron Test Equation
Dependent Variable: D(LMKT)
Method: Least Squares
Date: 12/06/12 Time: 13:48
Sample (adjusted): 1979 2003

Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LMKT(-1)	-0.451374	0.170067	-2.654094	0.0152
C	-4.841638	1.795056	-2.697207	0.0139
@TREND(1978)	0.031682	0.013849	2.287661	0.0332

R-squared	0.279355	Mean dependent var	0.028937
Adjusted R-squared	0.207291	S.D. dependent var	0.409092
S.E. of regression	0.364232	Akaike info criterion	0.939058
Sum squared resid	2.653303	Schwarz criterion	1.087166
Log likelihood	-7.799162	Hannan-Quinn criter.	0.976306
F-statistic	3.876461	Durbin-Watson stat	1.625762

Table 65: MKT-PP at 1st difference with none

Null Hypothesis: D(LMKT) has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.398480	0.0001
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

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

Residual variance (no correction)	0.156069
HAC corrected variance (Bartlett kernel)	0.127353

Phillips-Perron Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/06/12 Time: 14:12
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMKT(-1))	-0.942426	0.215213	-4.379039	0.0003

R-squared	0.489403	Mean dependent var	0.006906
Adjusted R-squared	0.489403	S.D. dependent var	0.566519
S.E. of regression	0.404812	Akaike info criterion	1.075659
Sum squared resid	3.277453	Schwarz criterion	1.125398
Log likelihood	-10.29442	Hannan-Quinn criter.	1.086454
Durbin-Watson stat	2.117025		

Table 66: MKT-PP at 1st difference with constant

Null Hypothesis: D(LMKT) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.309824	0.0032
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

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

Residual variance (no correction)	0.154999
HAC corrected variance (Bartlett kernel)	0.125666

Phillips-Perron Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/06/12 Time: 14:00
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMKT(-1))	-0.947741	0.220534	-4.297477	0.0004
C	0.032787	0.090521	0.362200	0.7212

R-squared	0.492905	Mean dependent var	0.006906
Adjusted R-squared	0.466216	S.D. dependent var	0.568619
S.E. of regression	0.413902	Akaike info criterion	1.164016
Sum squared resid	3.254978	Schwarz criterion	1.263495
Log likelihood	-10.22217	Hannan-Quinn criter.	1.185606
F-statistic	18.46831	Durbin-Watson stat	2.121230

Table 67: MKT-PP at 1st difference with trend

Null Hypothesis: D(LMKT) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.260360	0.0152
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

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

Residual variance (no correction)	0.152310
HAC corrected variance (Bartlett kernel)	0.121845

Phillips-Perron Test Equation
Dependent Variable: D(LMKT,2)
Method: Least Squares
Date: 12/06/12 Time: 14:08
Sample (adjusted): 1980 2003

Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LMKT(-1))	-0.956419	0.225131	-4.248282	0.0005
C	-0.089170	0.235183	-0.379152	0.7090
@TREND(1978)	0.008225	0.014591	0.563675	0.5799

R-squared	0.501701	Mean dependent var	0.006906
Adjusted R-squared	0.446334	S.D. dependent var	0.566519
S.E. of regression	0.421539	Akaike info criterion	1.241757
Sum squared resid	3.198519	Schwarz criterion	1.390974
Log likelihood	-10.03845	Hannan-Quinn criter.	1.274141
F-statistic	9.061429	Durbin-Watson stat	2.144058
Prob(F-statistic)	0.001894		

Table 68: TLI-PP at levels with none

Null Hypothesis: LTLI has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.443925	0.5111
Test critical values:	1% level	-2.692358	
	5% level	-1.956406	
	10% level	-1.607830	

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

Residual variance (no correction)	0.211069
HAC corrected variance (Bartlett kernel)	0.183539

Phillips-Perron Test Equation
Dependent Variable: D(LTLI)
Method: Least Squares
Date: 12/06/12 Time: 13:52
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.004179	0.009758	-0.428277	0.6726

R-squared	0.003185	Mean dependent var	0.032944
Adjusted R-squared	0.003185	S.D. dependent var	0.470498
S.E. of regression	0.469748	Akaike info criterion	1.369266
Sum squared resid	4.854598	Schwarz criterion	1.418635
Log likelihood	-14.74655	Hannan-Quinn criter.	1.381682
Durbin-Watson stat	2.067857		

Table 69: TLI-PP at levels with constant

Null Hypothesis: LTLI has a unit root
Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.534030	0.4989
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

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

Residual variance (no correction)	0.190407
HAC corrected variance (Bartlett kernel)	0.190407

Phillips-Perron Test Equation
Dependent Variable: D(LTLI)
Method: Least Squares
Date: 12/06/12 Time: 13:42
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.234366	0.152778	-1.534030	0.1400
C	-2.315132	1.533617	-1.509589	0.1460

R-squared	0.100767	Mean dependent var	0.132044
Adjusted R-squared	0.057947	S.D. dependent var	0.470498
S.E. of regression	0.456663	Akaike info criterion	1.353199
Sum squared resid	4.379362	Schwarz criterion	1.451938
Log likelihood	-13.56179	Hannan-Quinn criter.	1.378031
F-statistic	2.353247	Durbin-Watson stat	1.815535
Prob(F-statistic)	0.139951		

Table 70: TLI-PP at levels with trend

Null Hypothesis: LTLI has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.585954	0.2890
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

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

Residual variance (no correction)	0.155388
HAC corrected variance (Bartlett kernel)	0.155388

Phillips-Perron Test Equation
Dependent Variable: D(LTLI)

Method: Least Squares
Date: 12/06/12 Time: 13:47
Sample (adjusted): 1979 2003
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LTLI(-1)	-0.450905	0.174367	-2.585954	0.0177
C	-4.945176	1.884160	-2.624606	0.0162
@TREND(1978)	0.033312	0.015691	2.123028	0.0464

R-squared	0.266150	Mean dependent var	0.032944
Adjusted R-squared	0.192765	S.D. dependent var	0.470498
S.E. of regression	0.422725	Akaike info criterion	1.236919
Sum squared resid	3.573932	Schwarz criterion	1.385027
Log likelihood	-11.22457	Hannan-Quinn criter.	1.274168
F-statistic	3.626757	Durbin-Watson stat	1.800699
Prob(F-statistic)	0.045298		

Table 71: TLI-PP at 1st difference with none

Null Hypothesis: D(LTLI) has a unit root
Exogenous: None
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.747023	0.0001
Test critical values:	1% level	-2.692358	
	5% level	-1.958088	
	10% level	-1.607830	

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

Residual variance (no correction)	0.217202
HAC corrected variance (Bartlett kernel)	0.189056

Phillips-Perron Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/06/12 Time: 14:11
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.036766	0.219634	-4.720426	0.0001

R-squared	0.526186	Mean dependent var	0.027918
Adjusted R-squared	0.526186	S.D. dependent var	0.693782
S.E. of regression	0.477559	Akaike info criterion	1.406190
Sum squared resid	4.561251	Schwarz criterion	1.455929
Log likelihood	-13.76499	Hannan-Quinn criter.	1.416984
Durbin-Watson stat	2.015860		

Table 72: TLI-PP at 1st difference with constant

Null Hypothesis: D(LTLI) has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.664337	0.0015
Test critical values:	1% level	-3.788030	
	5% level	-3.012363	
	10% level	-2.646119	

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

Residual variance (no correction)	0.214858
HAC corrected variance (Bartlett kernel)	0.186119

Phillips-Perron Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/06/12 Time: 13:59
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.041013	0.224315	-4.640861	0.0002
C	0.048457	0.106433	0.455280	0.6541

R-squared	0.531299	Mean dependent var	0.027918
Adjusted R-squared	0.506631	S.D. dependent var	0.693782
S.E. of regression	0.487314	Akaike info criterion	1.490577
Sum squared resid	4.512027	Schwarz criterion	1.590056
Log likelihood	-13.65106	Hannan-Quinn criter.	1.512167
F-statistic	21.53759	Durbin-Watson stat	2.029598
Prob(F-statistic)	0.000178		

Table 73: TLI-PP at 1st difference with trend

Null Hypothesis: D(LTLI) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.571225	0.0081
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

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

Residual variance (no correction)	0.213078
HAC corrected variance (Bartlett kernel)	0.183080

Phillips-Perron Test Equation
Dependent Variable: D(LTLI,2)
Method: Least Squares
Date: 12/06/12 Time: 14:06
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LTLI(-1))	-1.048556	0.230327	-4.552467	0.0002
C	-0.050961	0.278509	-0.182978	0.8569
@TREND(1978)	0.006702	0.017279	0.387839	0.7027

R-squared	0.535184	Mean dependent var	0.027918
Adjusted R-squared	0.483537	S.D. dependent var	0.693782
S.E. of regression	0.498589	Akaike info criterion	1.577494
Sum squared resid	4.474635	Schwarz criterion	1.726711
Log likelihood	-13.56368	Hannan-Quinn criter.	1.609878
F-statistic	10.36248	Durbin-Watson stat	2.033648
Prob(F-statistic)	0.001013		

Table 74: Johansen Cointegration Results

Date: 12/10/12 Time: 12:13
Sample (adjusted): 1980 2003
Included observations: 21 after adjustments
Trend assumption: Linear deterministic trend
Series: LEXP01 LMKT LPGDP LREER LTLI LSFDI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.971446	173.1999	95.75366	0.0000
At most 1 *	0.869718	98.52458	69.81889	0.0001
At most 2 *	0.797415	55.72551	47.85613	0.0077
At most 3	0.413252	22.19697	29.79707	0.2877
At most 4	0.358571	11.00062	15.49471	0.2115
At most 5	0.076682	1.675420	3.841466	0.1955

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.971446	74.67535	40.07757	0.0000
At most 1 *	0.869718	42.79907	33.87687	0.0033
At most 2 *	0.797415	33.52854	27.58434	0.0076
At most 3	0.413252	11.19635	21.13162	0.6277
At most 4	0.358571	9.325198	14.26460	0.2601
At most 5	0.076682	1.675420	3.841466	0.1955

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

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

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.872052	14.24972	-25.28027	-9.924156	-11.84293	0.418814
-10.28871	47.17649	6.871566	-1.413771	-39.23982	-0.467907
15.40501	42.44248	20.28060	8.083512	-38.82293	-5.243033
-15.18814	-2.933495	19.56650	-10.96718	3.879983	-0.472005
-5.969064	-69.76432	-11.12995	-7.531492	64.72112	2.490797
-10.85365	2.613173	-2.417116	-11.13058	-0.895418	2.030404

Unrestricted Adjustment Coefficients (alpha):

D(LEXP01)	-0.000556	-0.002758	-0.017435	-0.003161	0.006258	-0.001847
D(LMKT)	-0.021677	-0.336345	-0.007571	-0.040595	-0.003902	-0.027262
D(LPGDP)	0.011083	-0.006818	-0.005347	-0.007634	0.001012	0.000965
D(LREER)	0.077327	-0.032673	-0.012509	0.019865	0.013221	-0.006802
D(LTLI)	0.016776	-0.387654	-0.009732	-0.055586	-0.010214	-0.033932
D(LSFDI)	0.051636	0.059411	0.129633	-0.057149	0.100233	0.010616

1 Cointegrating Equation(s): Log likelihood 205.6947

Normalized cointegrating coefficients (standard error in parentheses)

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.000000	7.611820	-13.50404	-5.301219	6.326179	0.223719
	(2.35183)	(1.19716)	(0.34655)	(2.06830)	(0.12280)

Adjustment coefficients (standard error in parentheses)

D(LEXP01)	-0.001040
	(0.01237)
D(LMKT)	-0.040581
	(0.19695)
D(LPGDP)	0.020748
	(0.00819)
D(LREER)	0.144760
	(0.03135)
D(LTLI)	0.031406
	(0.22969)
D(LSFDI)	0.096666
	(0.12991)

2 Cointegrating Equation(s): Log likelihood 228.0942

Normalized cointegrating coefficients (standard error in parentheses)

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.000000	0.000000	-5.493391	-1.907141	0.001909	0.112484
		(0.42167)	(0.15391)	(0.03269)	(0.03963)
0.000000	1.000000	-1.052396	-0.445896	-0.831350	0.014613
		(0.08214)	(0.02998)	(0.00637)	(0.00772)

Adjustment coefficients (standard error in parentheses)

D(LEXP01)	0.027340	-0.138049
	(0.06865)	(0.32354)
D(LMKT)	3.419975	-16.17646
	(0.50865)	(2.39700)
D(LPGDP)	0.090897	-0.163720
	(0.04127)	(0.19446)

D(LREER)	0.480924	-0.439513
	(0.14726)	(0.69395)
D(LTLI)	4.019863	-18.04908
	(0.61815)	(2.91301)
D(LSFDI)	-0.514597	3.538605
	(0.70494)	(3.32205)

3 Cointegrating Equation(s): Log likelihood 244.8585

Normalized cointegrating coefficients (standard error in parentheses)

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.000000	0.000000	0.000000	0.163833	-0.129125	-0.166499
			(0.07526)	(0.01795)	(0.01199)
0.000000	1.000000	0.000000	-0.049149	-0.856453	-0.038833
			(0.01906)	(0.00455)	(0.00304)
0.000000	0.000000	1.000000	0.376994	-0.023853	-0.050785
			(0.02122)	(0.00506)	(0.00338)

Adjustment coefficients (standard error in parentheses)

D(LEXP01)	-0.241253	-0.878053	-0.358511	
	(0.08267)	(0.28879)	(0.14711)	
D(LMKT)	3.303340	-16.49781	-1.916763	
	(0.90477)	(3.16046)	(1.60991)	
D(LPGDP)	0.008532	-0.390642	-0.435486	
	(0.06809)	(0.23783)	(0.12115)	
D(LREER)	0.288216	-0.970446	2.433062	
	(0.25410)	(0.88760)	(1.[illegible]4)	
D(LTLI)	3.869947	-18.46211	-3.285260	
	(1.09943)	(3.84046)	(1.95627)	
D(LSFDI)	1.482403	9.040560	1.731908	
	(1.06168)	(3.70856)	(1.88911)	

4 Cointegrating Equation(s): Log likelihood 250.4567

Normalized cointegrating coefficients (standard error in parentheses)

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.000000	0.000000	0.000000	0.000000	-0.130424	-0.188218
				(0.02209)	(0.01111)
0.000000	1.000000	0.000000	0.000000	-0.856063	-0.032317
				(0.00529)	(0.00266)
0.000000	0.000000	1.000000	0.000000	-0.026843	-0.100763
				(0.02174)	(0.01093)
0.000000	0.000000	0.000000	1.000000	0.007930	0.132569
				(0.05702)	(0.02867)

Adjustment coefficients (standard error in parentheses)

D(LEXP01)	-0.193241	-0.868780	-0.420364	-0.096857
	(0.10459)	(0.28339)	(0.16748)	(0.07363)
D(LMKT)	3.919901	-16.37872	-2.711064	1.074651
	(1.13584)	(3.07758)	(1.81884)	(0.79958)
D(LPGDP)	0.124473	-0.368249	-0.584829	-0.059851
	(0.07164)	(0.19411)	(0.11472)	(0.05043)
D(LREER)	-0.013502	-1.028721	-2.044366	-1.040201
	(0.30001)	(0.81287)	(0.48041)	(0.21119)
D(LTLI)	4.714199	-18.29905	-4.372889	0.912521
	(1.36960)	(3.71096)	(2.19316)	(0.96414)
D(LSFDI)	2.350397	9.208208	0.613693	1.078221
	(1.31611)	(3.56602)	(2.10751)	(0.92648)

5 Cointegrating Equation(s): Log likelihood 255.1193

Normalized cointegrating coefficients (standard error in parentheses)

LEXP01	LMKT	LPGDP	LREER	LTLI	LSFDI
1.000000	0.000000	0.000000	0.000000	0.000000	-0.221319
					(0.01604)
0.000000	1.000000	0.000000	0.000000	0.000000	-0.249578
					(0.09482)
0.000000	0.000000	1.000000	0.000000	0.000000	-0.107575
					(0.00854)
0.000000	0.000000	0.000000	1.000000	0.000000	0.134582
					(0.02278)
0.000000	0.000000	0.000000	0.000000	1.000000	-0.253791
					(0.10973)

Adjustment coefficients (standard error in parentheses)

D(LEXP01)	-0.230597	-1.305391	-0.490020	-0.143992	1.184498
	(0.09883)	(0.38091)	(0.15989)	(0.07391)	(0.34318)
D(LMKT)	3.943190	-16.10653	-2.667639	1.104036	13.33875
	(1.17006)	(4.50961)	(1.89291)	(0.87503)	(4.06291)
D(LPGDP)	0.118435	-0.438820	-0.596087	-0.067470	0.379703
	(0.07349)	(0.28324)	(0.11889)	(0.05496)	(0.25519)
D(LREER)	-0.092421	-1.951100	-2.191519	-1.139777	1.784740
	(0.29549)	(1.13888)	(0.47805)	(0.22099)	(1.02607)
D(LTLI)	4.775168	-17.58647	-4.259206	0.989449	14.51385
	(1.40949)	(5.43241)	(2.28025)	(1.05409)	(4.89430)
D(LSFDI)	1.752102	2.215543	0.501801	0.323319	-1.710111
	(1.16847)	(4.50348)	( )	(0.87384)	(4.05739)

Table 75: Vector Error Correction Estimates

Vector Error Correction Estimates

Sample (adjusted): 1980 2003
Included observations: 21 after adjustments
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LEXP01(-1)	1.000000
LMKT(-1)	7.611820
	(2.35183)
	[3.23655]
LPGDP(-1)	13.50404
	(1.01918)
	[13.2499]
LREER(-1)	-5.301219
	(0.34653)
	[-15.2980]
LSFDI(-1)	1.223719
	(0.12280)
	[2.82184]
LTLI(-1)	6.326179
	(2.09609)
	[-3.01809]

C	209.6092					

Error Correction:	D(LEXP01)	D(LMKT)	D(LPGDP)	D(LREER)	D(LSFDI)	D(LTLI)
CointEq1	-0.001040	-0.040581	0.020748	0.144760	0.096666	0.031406
	(0.01237)	(0.19695)	(0.00819)	(0.03135)	(0.12991)	(0.22969)
	[-0.08406]	[-0.20605]	[2.53288]	[4.61786]	[0.74410]	[0.13673]
D(LEXP01(-1))	0.245478	0.746977	0.096830	-0.365040	-0.293657	0.870709
	(0.21189)	(3.37273)	(0.14028)	(0.53683)	(2.22471)	(3.93342)
	[1.15850]	[0.22148]	[0.69026]	[-0.67999]	[-0.13200]	[0.22136]
D(LMKT(-1))	-0.433753	1.129799	0.139326	0.358652	1.172107	1.644913
	(0.15534)	(2.47253)	(0.10284)	(0.39355)	(1.63092)	(2.88356)
	[-2.79232]	[0.45694]	[1.35481]	[0.91133]	[0.71868]	[0.57045]
D(LPGDP(-1))	-0.922109	-0.349138	0.400297	-0.423334	-0.599359	-0.171025
	(0.45809)	(7.29145)	(0.30327)	(1.16057)	(4.80955)	(8.50357)
	[-2.01295]	[0.04788]	[1.31995]	[-0.36476]	[-0.12462]	[-0.02011]
D(LREER(-1))	-0.125099	-0.579188	-0.006570	0.556566	1.368386	-0.531019
	(0.10272)	(1.63496)	(0.06800)	(0.26023)	(1.07844)	(1.90675)
	[-1.21790]	[-0.35425]	[-0.09661]	[2.13871]	[1.26885]	[-0.27849]
D(LSFDI(-1))	0.078940	-0.199283	0.009916	0.062824	-0.004184	-0.272072
	(0.02609)	(0.41[illegible])	(0.01727)	(0.06610)	(0.27394)	(0.48433)
	[3.02556]	[-0.47986]	[0.57408]	[0.95041]	[-0.01527]	[-0.56175]
D(LTLI(-1))	0.438493	-0.946456	-0.113118	-0.207262	-0.907753	-1.409633
	(0.14031)	(2.21840)	(0.09269)	(0.35549)	(1.47319)	(2.60468)
	[3.12508]	[-0.42377]	[-1.21774]	[-0.58304]	[-0.61618]	[-0.54119]
C	0.032741	0.008478	0.007755	0.000214	0.200369	0.020657
	(0.01225)	(0.19502)	(0.00811)	(0.03104)	(0.12864)	(0.22745)
	[2.67222]	[0.04347]	[0.95607]	[0.00690]	[1.55758]	[0.09082]
R-squared	0.623545	0.074456	0.462679	0.664255	0.200913	0.090784
Adj. R-squared	0.420839	-0.423914	0.173352	0.483469	-0.229365	-0.398794
Sum sq. resids	0.011926	3.021530	0.005227	0.076550	1.314648	4.109625
S.E. equation	0.030288	0.482105	0.020052	0.076736	0.318004	0.562250
F-statistic	3.076098	0.149398	1.599155	3.674267	0.466937	0.185433
Log likelihood	48.67459	-9.440739	57.33589	29.15282	-0.702697	-12.67021
Akaike AIC	-3.873770	1.661023	-4.698657	-2.014554	0.828828	1.968591
Schwarz SC	-3.475857	2.058936	-4.300743	-1.616641	1.226742	2.366505
Mean dependent	0.036712	0.034214	0.021748	-0.025347	0.146396	0.047648
S.D. dependent	0.039799	0.404017	0.022054	0.106771	0.286809	0.475393

Determinant resid covariance (dof adj.)	2.02E-15
Determinant resid covariance	1.14E-16
Log likelihood	206.6947
Akaike information criterion	-14.54235
Schwarz criterion	-11.85644

Figure 1: Inverse roots of AR Characteristic Polynomial

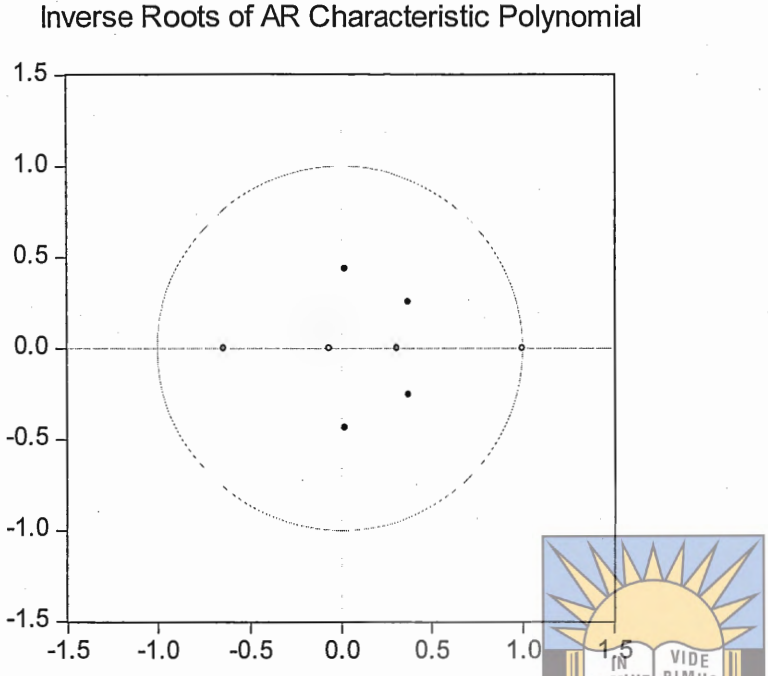


Table 76: Variance Decomposition Estimates

Variance Decomposition of LEXP01: Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.030288	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.051605	66.42095	13.30618	0.393262	0.556090	16.09437	3.229146
3	0.063169	63.20159	15.19786	2.481477	0.800233	14.54374	3.775098
4	0.072870	60.08457	15.79110	3.845281	1.062396	13.49043	5.726213
5	0.080780	58.58452	15.77213	6.124577	1.056539	12.32147	6.140762
6	0.087958	57.10680	15.97499	7.333679	1.081723	11.81305	6.689749
7	0.094350	56.24892	15.95130	8.501156	1.087213	11.29580	6.915619
8	0.100344	55.55347	15.95286	9.207249	1.107535	10.97772	7.201175
9	0.105957	55.07504	15.91578	9.841129	1.116268	10.68668	7.365100
10	0.111315	54.65671	15.90848	10.29310	1.127803	10.48177	7.532133

Variance Decomposition of LMKT: Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.482105	5.562224	94.43778	0.000000	0.000000	0.000000	0.000000
2	0.696231	6.618284	92.60008	0.006038	0.067874	0.665116	0.042605
3	0.867571	7.973835	90.78191	0.139179	0.140405	0.867276	0.097392
4	1.018656	8.925307	89.81613	0.136373	0.119710	0.930882	0.071598
5	1.157760	9.331783	89.48990	0.160072	0.110973	0.843619	0.063649
6	1.280948	9.605381	89.25662	0.152206	0.103857	0.827939	0.053993

7	1.393662	9.783790	89.10302	0.153236	0.101044	0.807791	0.051117
8	1.497555	9.922792	88.98205	0.148588	0.097334	0.802419	0.046815
9	1.594995	10.02058	88.90031	0.147448	0.095034	0.792143	0.044481
10	1.686633	10.10034	88.83224	0.145044	0.092903	0.787453	0.042019

Variance Decomposition of LPGDP:

Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.020052	25.84992	16.45046	57.69962	0.000000	0.000000	0.000000
2	0.033839	20.46262	14.13229	60.74431	0.080738	2.316026	2.264016
3	0.046986	18.66921	11.51739	64.77893	0.642049	3.156738	1.235676
4	0.057104	19.48246	10.33323	65.37886	0.767838	3.100303	0.937304
5	0.066374	19.69877	10.19396	65.17083	0.824226	3.395939	0.716284
6	0.074172	20.00612	10.26140	64.76396	0.839988	3.511784	0.616749
7	0.081302	20.12694	10.34332	64.51753	0.862583	3.617084	0.532541
8	0.087719	20.27371	10.38629	64.32800	0.873557	3.657271	0.481174
9	0.093747	20.35171	10.42555	64.19880	0.883546	3.702259	0.438139
10	0.099373	20.42765	10.45224	64.09351	0.889787	3.729239	0.407576

Variance Decomposition of LREER:

Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.076736	18.48222	23.14071	37.66813	20.70894	0.000000	0.000000
2	0.143845	5.406349	33.78493	38.26796	15.01996	4.874714	2.646084
3	0.181337	3.605567	32.41638	44.87930	12.88940	3.960958	2.248397
4	0.208995	2.916854	28.97697	50.78107	12.23307	3.033718	2.058318
5	0.232837	2.516055	26.97136	53.93369	12.06561	2.535726	1.977556
6	0.254809	2.251188	25.65256	55.90834	11.97252	2.218045	1.997346
7	0.274613	2.071885	24.77276	57.27381	11.88679	2.003887	1.990871
8	0.293016	1.932499	24.06023	58.35565	11.82665	1.833176	1.991801
9	0.310269	1.822400	23.52713	59.17635	11.78217	1.704744	1.987203
10	0.326665	1.732764	23.09325	59.84010	11.74651	1.600212	1.987174

Variance Decomposition of LSFDI:

Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.318004	3.359492	4.418994	8.193689	3.204335	80.82349	0.000000
2	0.450348	2.570405	2.288168	4.122964	6.725853	83.79855	0.494061
3	0.567586	3.015986	2.276290	2.671904	7.606495	83.76758	0.661743
4	0.654299	3.673619	1.999908	2.273003	8.129295	83.14328	0.780892
5	0.728506	4.158846	1.746492	2.017796	8.467445	82.80611	0.803307
6	0.796004	4.488244	1.559856	1.857895	8.761083	82.47193	0.860995
7	0.858931	4.728170	1.431885	1.717446	8.942232	82.28679	0.893481
8	0.917261	4.908702	1.330853	1.615722	9.083869	82.13577	0.925084
9	0.972147	5.046784	1.252499	1.530411	9.187187	82.03896	0.944161
10	1.024053	5.155878	1.189201	1.464143	9.274134	81.95441	0.962239

Variance Decomposition of LTLI: Period	S.E.	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
1	0.562250	5.652688	94.14816	0.029126	0.027538	0.005169	0.137324
2	0.796040	6.210919	92.63015	0.020554	0.193697	0.850826	0.093858
3	0.980170	7.356781	90.51171	0.272857	0.420052	1.155365	0.283236
4	1.140010	8.346507	89.39353	0.272406	0.404731	1.349920	0.232901
5	1.290170	8.772020	89.01338	0.329800	0.403108	1.248834	0.232861
6	1.423066	9.067983	88.75292	0.321473	0.396366	1.248235	0.213018
7	1.545302	9.257439	88.57050	0.330889	0.398594	1.228680	0.213897
8	1.657861	9.410833	88.42866	0.326313	0.395582	1.231989	0.206623
9	1.763747	9.517745	88.33116	0.328198	0.394861	1.223258	0.204777
10	1.863337	9.606200	88.25082	0.326330	0.393296	1.222442	0.200910

Cholesky Ordering: LEXP01 LMKT LPGDP LREER LSFDI LTLI

Figure 2: Impulse Response

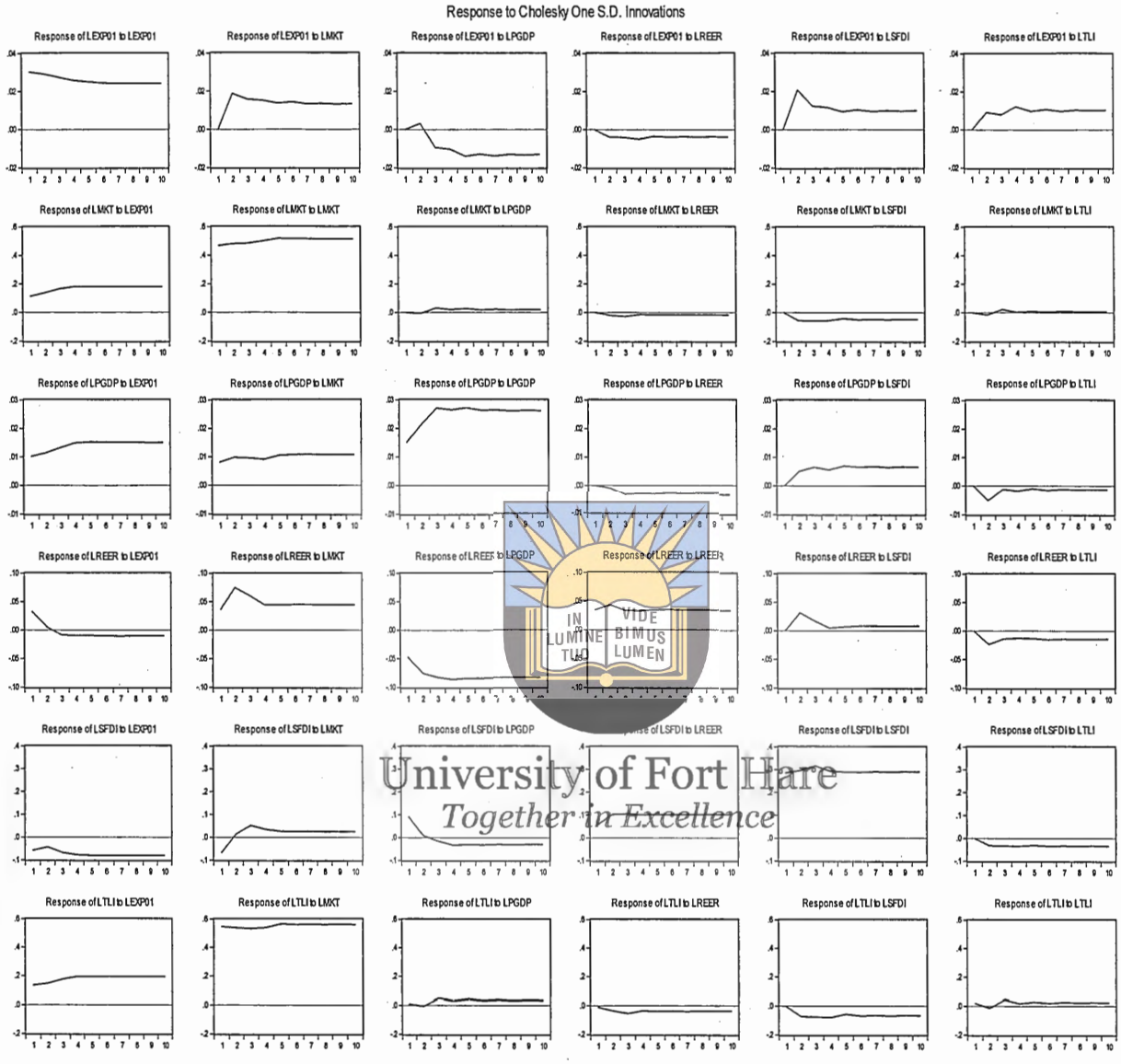


Table 77: Residual Correlation Matrix

	LEXP01	LMKT	LPGDP	LREER	LSFDI	LTLI
LEXP01	1.000000	0.235844	0.508428	-0.429910	-0.183289	0.237754
LMKT	0.235844	1.000000	0.514060	0.568869	-0.247512	0.999001
LPGDP	0.508428	0.514060	1.000000	-0.052514	0.038983	0.527390
LREER	-0.429910	0.568869	-0.052514	1.000000	-0.274142	0.550947
LSFDI	-0.183289	-0.247512	0.038983	-0.274142	1.000000	-0.252097
LTLI	0.237754	0.999001	0.527390	0.550947	-0.252097	1.000000

Table 78: VEC Residual Serial Correlation LM tests

VEC Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h

Sample: 1978 2010
Included observations: 21

Lags	LM-Stat	Prob

1	54.47972	0.0248
2	54.39958	0.0252

Probs from chi-square with 36 df.

Table 79: VEC Residual Normality Tests

VEC Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal

Sample: 1978 2010
Included observations: 21

Component	Skewness	Chi-sq	df	Prob.
1	0.678688	1.612162	1	0.2042
2	-0.559365	1.095112	1	0.2953
3	-0.206387	0.149084	1	0.6994
4	-0.907322	2.881315	1	0.0896
5	0.683027	1.632839	1	0.2013
6	0.332736	0.387497	1	0.5336
Joint		7.758009	6	0.2564

Component	Kurtosis	Chi-sq	df	Prob.
1	2.842513	0.021702	1	0.8829
2	3.160539	0.022551	1	0.8806
3	2.119143	0.678920	1	0.4100
4	3.226834	0.045022	1	0.8320
5	4.942870	3.302901	1	0.0692
6	2.410221	0.304360	1	0.5812
Joint		4.375456	6	0.6260

Component	Jarque-Bera	df	Prob.
1	1.633864	2	0.4418
2	1.117663	2	0.5719
3	0.828004	2	0.6610
4	2.926336	2	0.2315
5	4.935740	2	0.0848
6	0.691857	2	0.7076
Joint	12.13346	12	0.4350