UNIVERSITY OF THE WESTERN CAPE
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A COINTEGRATION ANALYSIS OF SECTORAL EXPORT PERFORMANCE AND ECONOMIC GROWTH IN SOUTH AFRICA

UNIVERSITY *of the*
WESTERN CAPE

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Vector Auto-regression

DECLARATION

I declare that this thesis research entitled "a co-integration analysis of sectoral export performance and economic growth in South Africa" is my own research work. It has not been submitted for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged by complete reference.

PAUL CIPAMBA

SIGNATURE…………………………

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LIST OF ABBREVIATIONS

ADF: Augmented Dickey-Fuller

AIC: Akaike Information Criteria

AR: Autoregressive

DTI: Department of Trade and Industry

ECM: Error Correction Model

ECT: Error Correction Term

ELG: Export-led Growth

GATT: General Agreement on Tariffs and Trade

GDE: Gross Domestic Expenditure

GDP: Gross Domestic Product

GEAR: Growth Employment and Redistribution: Macroeconomic Strategy

GEIS: General Export Incentive Scheme

GFCF: Gross Fixed Capital Formation

HQ: Hannan-Quinn HQ information criteria

ISI: Import Substitution Industrialization

LDC: Less Developing Countries

LR: Likelihood Ratio

MIDP: Motor Industry Development Programme

NIC: Newly Industrialized Countries

OLS: Ordinary Least Square

PP: Philip Peron

PPI: Producer Price Index

R&D: Research and Development

RSA: Republic of South Africa

SACU: The Southern African Custom Union

SADC: Southern African Development Community

SARB: South African Reserve Bank

StatSA: Statistics South Africa

TFP: Total Factor Productivity

VAR: Vector Auto-regression

VEC: Vector Error Correction

VECM: Vector Error Correction Models

WTO: World Trade Organization

A COINTEGRATION ANALYSIS OF SECTORAL EXPORT PERFORMANCE AND ECONOMIC GROWTH IN SOUTH AFRICA

ABSTRACT

The objective of this study is to investigate the empirical relationship between exports and economic growth in order to ascertain whether the hypothesis of export-led growth is valid in the case of South Africa. This study has not only focused on sectoral exports for the period 1990-2011; but it has also examined total exports for the period extending from 1970 to 2011. Using quarterly data and time series econometric techniques of co-integration and Granger-causality tests over the two set of periods, the key findings of the study are as follows:

(i) At the aggregate level (using total exports): the technique of co-integration suggests that total exports and GDP moved together in the long-run, though deviations from the steady state might happen in the short-run. Furthermore, Granger causality tests inferred from the Vector Error Correction model reveal that the direction of causality between export and GDP growth is bi-directional. (ii) At the sectoral level (using the main component of exports): export-growth link emerges as a long-run behavioural relationship since a co-integrating relation was found among output and agricultural, manufactured and mining exports. This relationship demonstrates that manufactured exports have the greatest positive impact on output growth. (iii) Sectoral level Granger-causality tests based on ECM reveal the existence of a long run causality running from manufactured exports to GDP; whereas the short-run causality runs from manufactured and mining exports to GDP. However, the Toda-Yamamoto Granger test confirms only short-run causality from manufactured exports to GDP. In both cases, there is evidence of a uni-directional causality from exports to GDP.

The above results show that the hypothesis of export-led growth is valid for South Africa. This implies that exports, particularly manufactured and mining exports play a key role in driving economic growth. Hence, the key policy implication of these results is that, measures which aim at stimulating production for exports and shifting the content of exports will meaningfully contribute to the improvement of GDP growth and employment prospects in South Africa.

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CHAPTER ONE: INTRODUCTION

1.0. BACKGROUND

In international trade, the theories of specialization, comparative advantage, abundance factor endowments, as well as new trade theories, explain how trade is likely to create value for each country that participates in international trade. Many studies have revealed that openness to global trade can accelerate economic growth in the long-run. For instance, Dollar & Kraay (2005:17) argue that developing countries that have increased their participation in international trade and investment have experienced faster economic growth than otherwise. Pugel (2007:121-124) makes similar arguments to the effect that there exists a significant link between openness to trade and a country's economic growth. Pugel points out that trade openness allows access to capital equipment that embodies improved foreign technologies that can be used to increase domestic productivity. Rodrik (2005:136-137) stresses that the most obvious channel that could link trade to growth, especially in developing countries, is via the import of capital goods because the latter are vital for boosting production.

Trade and economic development policies have shifted from the ones that emphasized the protection of the local industry, to those that encouraged openness to trade. The protectionist policy strategies are often referred to as Import Substitution industrialization (ISI) strategy; while on the other hand, openness strategies are called outward-oriented industrialization policies.

The ISI strategy seeks to promote domestic industrialization and productivity by granting local producers protection (in the form of high tariffs and import restrictions) against imports (Baer, 1972:95). This has been the most common approach to development embraced by most developing countries from the 1950s to the 1980s. For many developing countries, one of the driving motives for pursuing the ISI strategy has been the infant industry argument. For several decades the infant industry premise provided justification for protecting emerging young manufacturing firms in Less Developed Countries (LDC) where industrialization was crucial for development. Thus, newly established manufacturing industries in poor countries needed temporary assistance in the form of protection in order to cushion them against competition from lower cost foreign producers (Krueger, 1997:4; Edwards, 1993: 1358).

In the late 1980s, contrast views that emphasized an outward-oriented development approach started to emerge. These views arose in response to a number of events which include: first,

the success of the outward-oriented nations (East Asian countries). Second, the 1980-1982 debt crisis that led to the collapse of Latin American economies which implemented ISI policies (Krueger, 1997:5). Third, the emergence of the new theory of endogenous economic growth which argues that removing or lowering trade barriers will accelerate economic growth and development in the long term (Salvatore, 2011: 366).

In light of the above, the notion that economic growth is likely to increase for countries that adopt an outward looking strategy became increasingly dominant. It was particularly promoted by multilateral institutions such as the World Bank and the International Monetary Fund. These institutions urged developing countries to embark on liberal trade reforms and open up their economies to international trade; and made it a requirement to obtaining financial aid (Edwards, 1993: 1358).

In literature, the experience of Asian countries (Taiwan, South Korea, Hong Kong and Singapore, often dubbed "Asian miracle"[1]) is repeatedly used as an example to showcase the success story of outward-looking policies. In essence these policies have been central to the economic success of East Asian countries. According to Stiglitz (1996:170), the range of market- oriented policy measures that have been instrumental in promoting export growth include inter alia: infrastructure provision, special access to capital and foreign exchange market, the expansion of export markets, the provision of subsidies for firms to improve the reputation of the country's exports; and other licensing measures.

However, a further investigation into the Asian miracle has shown that neither of these countries has implemented significant market oriented policies in their early stage of growth. On the contrary, these policies which include trade liberalization took place in the 1980s when these countries have already sustained high growth. Hence, the key to the success of these countries is found in a range of policies that comprise not only market oriented measures, but also government's intervention in engineering a supportive policy environment including macroeconomic stability, duty free access to capital goods and inputs, education, and government coordination of infrastructure investments (Rodrik, 1995:56; 2005: 134).

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[1] In a nutshell, the miracle refers to the exceptionally rapid growth in manufactured exports that these countries experienced between 1965 and the 1990s. This surge of exports is often seen as a key factor that explains their rapid economic performance (Weiss, 2005: 2-3).

Following the success story of the Asian "Tigers", many countries have shifted their development strategies from inward looking to outward looking strategies. In South Africa, this shift was aimed at boosting economic growth and reducing poverty because outward looking development strategies tend to be associated with higher growth. Roberts (2000: 270) points out that the policy shift was considered in the post-apartheid government macroeconomic strategy, namely the Growth Employment and Redistribution Macroeconomic Strategy (GEAR), as an important step that could result in an export-led growth (ELG).

Hence, in South Africa, the path to an ELG strategy has been emphasized in GEAR as well as in a number of other policy documents such as Trade and Industrial Policy, the New Growth Path and the National Development Plan. All these policy documents emphasize the role of exports in economic growth in South Africa. For example in GEAR (RSA, 1996:3) it is stated that: …"sustained growth on a higher plan requires a transformation towards a competitive outward-oriented economy". In the South African Trade Policy and Strategic Framework (DTI, 2009:5), it is argued that the core of government strategic trade policy is to upgrade the industrial base in order to foster the production and export of more value-added manufactures. In the New Growth Path (RSA, 2010: 7 &14), exports have featured among the job drivers to the extent that the policy suggests that by increasing exports to SADC alone, the economy can create 60000 new jobs by 2015 and about 150000 by 2020. Moreover, the policy urges South African businesses to actively pursuit exports to emerging economies of China, India and Brazil. Recently, the National Development Plan (RSA, 2011: 12) has also suggested, amongst other policies, that the rise of exports and competiveness is crucial to increasing growth and employment in South Africa.

1.1. PROBLEM STATEMENT

As argued above, the experience of the Tigers countries and Newly Industrialized Economies (NIE) has led to a widespread prominence of the outward- oriented strategy of growth. To date, the economic performance of Brazil, China and India tends to support, to a greater degree, the evidence that growth can indeed be driven by increasing the external demand of local products.

In light of the above evidence, many developing countries including South Africa have embraced an outward oriented development path by implementing, amongst others, liberal trade policies. In South Africa, the initial phase of trade reforms dates back to the 1970s when the Apartheid government decided to introduce market oriented policies together with import protection in order to diversify the export sector away from gold dependency. The first direct form of export incentives announced in 1972, was a tax allowance for export related marketing expenditures (Rangasamy, 2009:604).

Subsequently, during the late 1980s and early 1990s, export subsidies and incentive schemes were strengthened so as to ease the burden on exporters. This was first evidenced by the introduction of the General Export Incentive Scheme (GEIS). The main aim of the GEIS was to provide a tax-free subsidy to exporters with the objective of fostering higher value added exports. This subsidy was linked to things like export value, the amount of local content contained in exports, the level of processing of export goods, and the level of overvaluation of the exchange rate (Jonsson & Subramanian, 2001: 200; Cassim et al, 2004: 9)

Lastly, following the election of a new democratic government in 1994, a major shift in policies occurred; and liberal trade policies were further intensified. This has made the South African trade regime considerably liberalized. For example, the new government announced a tariff liberalization program that went beyond its commitments to the World Trade Organization (WTO) in the Uruguay Round (Subramanian & Jonsson, 2001:201). Furthermore, various bilateral and regional trade agreements were envisaged following the resurgence of South Africa on the global arena.

The intensification of liberal trade policies since the early 1990s has indeed led to a far-reaching reduction in tariffs. According to the DTI (2009:2), the average tariff has decreased from about 23% in the 1990s to 8.2% in 2010 and the tariff regime has been significantly simplified. In 2006, the number of tariff lines was reduced to 6420 from 13609 tariffs in the 1990s and import controls were abolished. The result of these trade reforms materialized in the form of a strong trade performance with the ratio of trade in goods and services to GDP rising from below 40% in the 1990s to over 60% in 2006 (DTI, 2009).

The trends in real GDP and real total exports are shown in figure 1 where the left axis represents the log of GDP and the right axis shows the log of exports. The graph reveals a co-

movement between exports and GDP since 1970. Export performance was particularly noticeable from the 1990s suggesting that the removal of economic sanctions coupled with the implementation of tariff liberalization have meaningfully contributed to the rise of exports[2]. In the decade 1990-2000 South Africa's exports rose by 5.2 percent on average whereas the growth in exports was only 0.8 percent on average between 1970 and 1980. The decade 2000-2010 registered a very weak rise in exports of 1.3 percent on average. This is possibly due to the global recession which resulted in a sharp decline in global commodities demand. The impact of the global economic downturn was particularly adverse in 2009 when exports decreased by 19.5 percent from a level of R501 billion in 2008 to R422 billion in 2009 (SARB, quarterly bulletins)

Figure 1: Log of real GDP and real exports
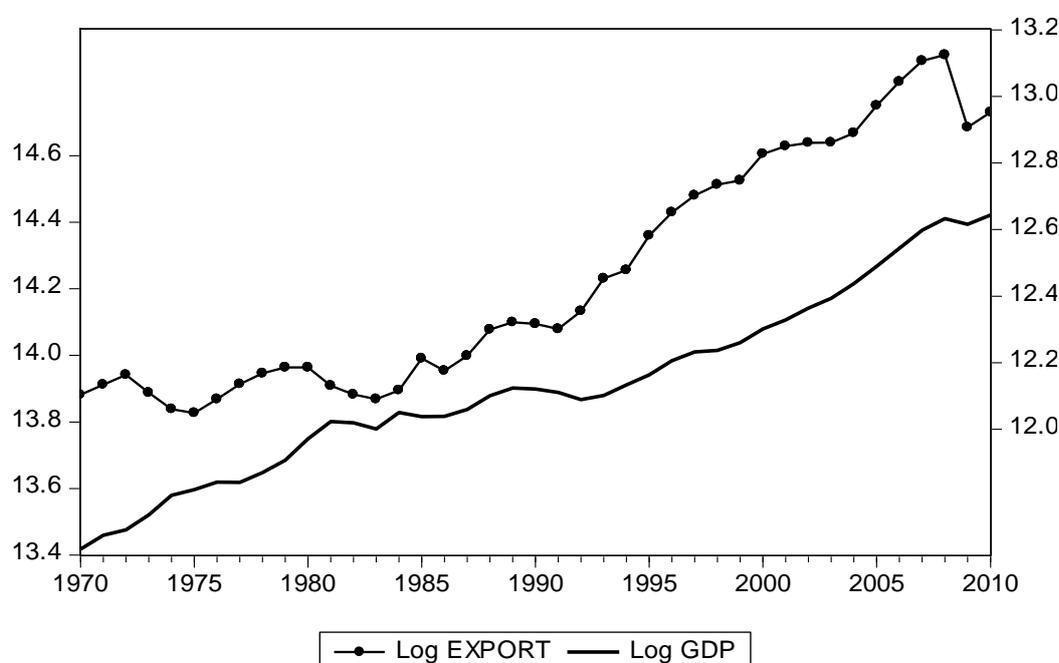
Source: SARB quarterly bulletins, online statistical query

Given the important role accorded to trade liberalization, many studies in South Africa have empirically assessed the degree of openness; as well as the impact of trade reforms on the

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[2] The 1994 democratic change led South Africa to be reintegrated into the international community. The implications of this were that South African businesses became able to not only trade and compete internationally, but also to access foreign capital markets. At the same time, the financial openness attracted foreign capital to South Africa. Roux (2011:193) argues that the net international capital inflow rose to a level of R654 billion between 1994 and 2009 compared to –R24 billion for the period 1980-1993. Hviding (2006:137-139) notes that the opening up of the financial sector has also had a positive impact on export performance. Specifically, the most significant financial relaxation was the removal of the financial Rand in 1995 which led to the elimination of exchange restrictions on foreigners. The financial Rand was a cheaper exchange rate (than the commercial Rand) applicable to foreigners in order to limit the outflow of their investments from South Africa

competitiveness of manufactured exports[3]. However, a few studies have empirically examined the export-led growth hypothesis. This study intends to investigate the latter in the case of South Africa for at least three reasons. First, in order to develop better understanding on the impact of export types on growth in South Africa, following the introduction of trade reforms. Second, given the fact that economic policies like trade and industrial policies give an important role to exports as one of the drives of economic growth in South Africa, an empirical investigation of the contribution of exports to output is needed to verify the theory of ELG. Third, the investigation of ELG could inform policy makers on whether more liberal trade measures should be envisaged in the context of an outward oriented growth strategy.

The outward oriented growth strategy entails that export expansion leads to economic growth because export production disseminates positive externalities on the economy. This is the conventional explanation which tends to suggest that higher level of output, productivity gains, and efficiency are realized in the export-driven sectors than in the non-tradable sectors. But Yang (2008:4) contends that productivity improvements can also occur in the non-tradable sectors with direct positive effects on GDP. In other words, the performance of the tradable sectors alone is not always expected to boost economic growth. In the case of the East Asian countries, Rodrik (1995: 56) maintains that the combination of high export growth and high output growth was primarily due to the active role played by governments in implementing, amongst others, measures related to investment and infrastructure development.

In the case of South Africa, Roberts (2000:277) has conducted a cross- sectoral analysis of manufacturing trade, production and employment. In this study, Roberts observes that trade performance in many manufacturing sub-sectors has resulted in the reduction of production and employment; whereas employment has improved in sub-sectors where trade performance has deteriorated. Moreover, Holden (2001) points out that the booming export sector during the 1990s in South Africa appeared not have a significant impact on the economy with respect to output and employment expansion. Likewise, government has recognized that post 1994 trade and industrial policies did not have the expected effects on economic growth and job creation (DTI, 2002: 24). The fact that economic growth has not been robust enough to absorb labour corroborates these lines of argument. For example, the official unemployment

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[3] see for example Edwards, Cassim & Seventer (2009); Edwards & Lawrence (2008); Holden (2001 & 2005); Rangasamy (2003); Jonsson & Subramanian (2001) for a detail review

rate remains high at 25 percent in 2010 while the economy only grew at an average rate of 2.65 percent between 1990 and 2010.

In spite of the above backdrop, the promotion of export continues to receive policy priority amongst government's policy programs and researchers' recommendations. For example, the South African Trade Policy and Strategic Framework (2009) recommends the expansion of exports diversification in order to increase growth and reduce unemployment. Similarly, Rodrik (2008:773) suggests that an export-led strategy that improves the relative profitability of manufactured exports will breed economic growth and absorb low skilled workers because the manufacturing sector is intensive in low skilled labour relative to the services sector.

The main argument in favour of exports expansion is that exports could be a main driver of growth in production, income and employment for the domestic economy. However, the issue is whether outward-oriented strategies that encourage exports would remain part of the most promising development strategy. Accordingly, the emphasis that is placed on exports expansion merits at least two questions to be posed:

1. Is export growth contributing to economic growth in South Africa? What evidence?

2. Will policy measures such as trade liberalization and other industrial policies aiming at encouraging the competiveness of manufactured exports enhance South Africa's economic growth and employment prospects?

1.2. RESEARCH HYPOTHESIS

In literature the ELG hypothesis asserts that export expansion is a major determinant of economic growth. At the core of this idea, it is assumed that the export sector yields positive externalities that spread on the non-export sectors (Edwards, 1993:1380). Indeed, there is a causality relationship between exports and output. On the one hand, it is predicted that exports expansion can lead to GDP growth via efficient resources allocation and improved production techniques. On the other hand, economic growth is expected to induce exports growth through an overall economic performance. The latter could generate economies of scale leading to an increase of the production capacity (Economidou and Bahmani, 2009:179).

The central hypothesis being explored in this study is that export growth is a key factor influencing the economic performance of South Africa during the period 1970-2011. Thus, the aim of the study is to carry out an empirical investigation in order to validate or invalidate this hypothesis

1.3. OBJECTIVES OF THE STUDY

Following the above discussion, this thesis intends to empirically test the hypothesis that export expansion is a major determinant of economic growth. But exports come from different sectors that include mainly the agriculture, mining and manufacturing sectors. So, the main purpose would be to disaggregate exports by their various composition and sectors so as to capture the significance of the dynamics surrounding the export-led growth nexus. This approach is also in tandem with current policies such as the industrial policy which advocates the diversification of the export sector.

In order to investigate the existence of a long run equilibrium relationship between exports and growth; as well as the direction of causality, co-integration and Granger causality techniques will be used. The findings from this investigation propose to inform deliberate policy measures on whether stimulating production for exports and shifting the content of exports will boost growth and employment prospects in South Africa. A clear understanding of the degree of impact and the channels through which exports influence growth is therefore crucial to guide policy decisions.

1.4. LIMITATIONS OF THE STUDY

The major shortcoming of the study is related to data availability. Specifically, quarterly data for sectoral exports and employment were not available from 1970s. For this reason, the sectoral level analysis covers only the period from 1990 to 2011 which might appear to be short as far as a long run analysis is concerned. Moreover, the employment data was collected in annual frequencies; this data was interpolated in order to derive quarterly frequencies.

Another limitation could be the assumption of linear relationships among the variables when the co-integration approach is applied. Moreover, it is also assumed that the causal relationship between exports and output is stable when applying Granger causality techniques. Lastly, it is assumed that export is the outcome of other openness related shocks

such as factor endowment and policy. Hence, the export variable is essentially proxing for other variables that affect trade flows.

1.5. THESIS STRUCTURE

The remainder of this mini-thesis is structured as follows:

- Chapter two briefly reviews the state of the South African economy. It outlines some macroeconomic indicators, trends in exports and trade liberalization policies.
- Chapter three covers the theoretical argument around the export-led growth model. It also reviews the relevant literature in relation with this study.
- Chapter four presents and explains the methodological framework which consists of econometric techniques of multivariate co-integration and Granger causality tests. These techniques will attempt to answer the research questions and establish the validity or not of the main hypothesis. This chapter also discusses the sources and the description of data.
- Chapter five uses the methodology explained in chapter four in order to determine the empirical evidence
- Chapter six concludes and gives policy recommendations

<center>**CHAPTER TWO: THE SOUTH AFRICAN ECONOMY**</center>

2.0. INTRODUCTION

This chapter intends to provide an overview of the South African economy. It is divided into six sections: the first section briefly describes the main feature of the South African economy. Section two depicts the structure of the economy focusing on trends analysis of the major sectors of the economy, namely the supply, demand and the external sectors. This is followed by trends analysis of trade in section three. Section four covers the review of trade policies since Apartheid to the current period. The impact of these policies on the performance exports is outlined in section five. Finally, a succinct summary of the chapter is given in the last section.

2.1. SOUTH AFRICAN ECONOMY: AN OVERVIEW

South Africa is classified as an upper middle income developing country with an estimated real GDP and per capita GDP of Rand 183.4 billion and Rand 36.600 respectively for the year 2010 (SARB, 2010). The economy is confronted with the major issue of high unemployment levels. According to Statistics South Africa, the official unemployment rate was estimated at 25.5 percent in 2010. Table 2.1 shows selected economic indicators in recent periods.

Table 2.1   Selected key indicators of the SA economy   1990-2009

	1990	1994	2000	2005	2009
GDP	-0.3	3.2	4.2	5.3	-1.5
GDP percapita	-2.4	1.1	2.1	3.9	-2.6
Employment	0.9	0.8	-1.5	1.1	-3
Inflation	14.3	9.2	5.4	3.4	7.1

Source: SARB, quarterly bulletins: online statistical query; StatsSA

As indicated in Table 2.1, the South African economy did not perform well prior to 1994 with negative growth and high inflation during the early 1990s. On the other hand, the country has registered a relatively robust economic growth and single digit inflation rates since 1994. This amelioration owes to factors such as: introduction of far-reaching reforms by the post-apartheid government, sustained growth of the world economy, and improvement of the country's foreign opinion resulting in a rise of the business confidence (Roux, 2011: 48). The post 1994 era has also been marked by an improvement in per capita GDP as well as inflation. With the exception of 2009 (year of economic downswing), the average growth in

real per capita GDP was 1.8 per cent between 1994 and 2008. However, during the same period, increase in employment averaged only 0.5 per cent. Indeed employment did not fare very well even during the periods of high economic growth. The low level of employment growth is among the reasons that explain why income distribution remained extremely unequal. According to the South Africa New Growth path, 10 percent of the richest households earned about 40 percent of the country's income in the mid-2000s (South Africa New Growth Path, 2010: 3). This level of inequality finds its origin in the racial segregation policies that the apartheid regime has implemented for decades[4].

To address this high level of inequality and associated poverty, government has introduced a number of social security programs which include fiscal redistribution and social assistance. But, despite these interventions, poverty and inequality persist. Hence, Van der Berg & Siebrits (2010:18) argue that sustainable approaches to addressing inequalities in South Africa include the reduction of income inequality created by the labour market. This can happen by improving human capital via quality education.

Furthermore, Rodrik (2008:772) points out that, strategies to mitigating the effects of poverty and inequality should consider reducing unemployment by absorbing low skilled workers into the manufacturing sector. In other words, the issue of jobless economic growth can be addressed by expanding a labour intensive manufacturing sector. However, as discussed in the next section, the structure of the economy is dominated by the services sector which is not intensive in low skilled labour.

2.2. THE STRUCTURE OF THE SOUTH AFRICAN ECONOMY

This section discusses the contribution of the major sectors of the economy to GDP. These sectors are at the core of economic activities, including exports. Hence, a succinct analysis of the activities of major sectors is relevant to understanding the source of growth and production for export. This analysis covers selected years during the period 1970- 2010. It

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[4]Under the apartheid regime, there were different kinds of exclusion policies. In the area of social security for example, welfare policies were targeted at the white minority only. Despite the fact that most white population were skilled and securely employed, government has supported the so called poor white through additional social expenditures such as social grants while other race groups were excluded (Van Der Berg, 1997: 2).

starts with the production sector followed by the consumption sector and it ends with the foreign sector.

2.2.1. The Production sector

The production sector is classified into three categories, namely, the primary, secondary and tertiary sectors. The primary sector includes the production of raw materials such as minerals, agricultural, fishing and forestry products. The secondary sector is the industrial sector where primary products are transformed into other goods. It combines activities like manufacturing, construction and electricity. The tertiary sector is often called the services sector and includes activities such as trade, communication, financial services, tourism, government services as well as transport.

Table 2.2 shows the contribution of each sector to GDP. From this table, it can be observed that the value added by the primary sector has been declining since 1970; this is mainly due to the decline of agricultural crop production. On the other hand, the contribution of the secondary sector to total output remained relatively steady (at around 22%) throughout the period under review. The role of the tertiary sector in the economy has markedly increased since the 1970s. As reported in Table 2.2, the contribution of the services sector to GDP rose by 48 percent between 1970 and 2010.

The significance of the tertiary sector relative to the primary and industrial sectors shows that the structure of the South African economy has followed a general pattern of development phases which is common to many economies. But this structure has become more comparable with that of industrialized countries than emerging markets or developing countries. Indeed, when compared with other middle income countries, South Africa has a higher share of both output and employment in the service sectors, whereas this share is lower in the industrial and agricultural sectors (Fedderke, 2010:3). However, despite this resemblance with the structure of industrialized economies, a huge part of the South African population does not benefit from the formal sector of the economy due to the legacy of Apartheid (Fedderke, 2010: 3).

Table 2.2 Gross Value Added by major productive sectors as a % of GDP: 1970-2010

	1970	1980	1990	2000	2010
Primary	19	14	12	10	8
Secondary	22	26	23	21	20
Tertiary	46	49	54	57	61

Source: own calculations from SARB online dataset

2.2.2. The Demand sector

The expenditure components of GDP presented in Table 2.3 below exclude the external sector. Without export and import, GDP is narrowed down to Gross Domestic Expenditure (GDE) which comprises the final consumption expenditure by households and general government, as well as Gross Fixed Capital Formation (GFCF) or fixed investments. As shown in Table 2.3, households' expenditures have dominated the other component of domestic demand in each decade.

For example, in 2010 these expenditures represented 65 percent of GDP suggesting that a stronger consumption spending has driven growth. A number of factors could explain the surge in final consumption spending by households. These include improved real disposable incomes, and lower inflation and interest rates. In the same year, GDE exceeded GDP by 5 percent indicating the fact that an excess of domestic consumption (particularly household final consumption expenditure) was supplemented by foreign production.

The size of government, as measured by the ratio of government expenditure to GDP, grew by 50 percent between 1970 and 2010, denoting the rising role of government in the economy. On the other hand, the share of GFCF did not rise significantly as it averaged 17 percent of total demand during the period under review. This sluggish growth of capital owes, among others, to a slow pace of investment outlays by the business sector.

Table 2.3	Shares of expenditure in GDP (percentages) 1970-2010				
	1970	1980	1990	2000	2010
Household consumption	48	51	58	61	65
Government expenditure	14	17	21	19	21
GFCF	19	21	12	14	20
GDE	97	98	95	94	105

Source: own calculations from SARB on line dataset

2.2.3. The External sector

Being an open economy, South Africa's trade with the rest of the world influences the pattern of production and expenditure. This is due to the fact there is a portion of production that is exported while another portion of total expenditure is spent on imports (Fourie and Burger, 2009: 64). Table 2.4 presents the shares of the current account, exports and imports to GDP, as well as the terms of trade. This table shows that the current account deficit remarkably narrowed to minus 2.8 percent in 2010 from a level of minus 7.2 in 1970. This is probably

due to factors such as lower levels of imports, particularly of capital and intermediate goods as the private sector gross investments slowed (SARB, 2010).

Total exports reported in table 2.4 contain export of goods and services including gold. The share of exports in GDP has moderately risen since the 1970s almost at the same pace as imports. The notable increase in exports in the 1980s contributed to a positive balance of the current account. Similarly, the terms of trade have relatively improved during the period under review; from a lower level of 83 in 1970 to a level of about 122 in 2010. The possible interpretation of this improvement is the performance of exports mainly driven by high commodity prices. A further analysis of trends in aggregate and disaggregate exports will reveal how exports performed during the period under reviewed as discussed in the section that follows.

Table 2.4. Shares trade in GDP (%) & Terms of trade 1970-2010

	1970	1980	1990	2000	2010
Current Account/GDP	-7.2	4.1	1.4	-0.1	-2.8
Total Exports/GDP	21.8	35.4	24.2	27.9	27.4
Total Imports/GDP	25.3	27.3	18.8	24.9	27.5
Terms of trade	83.0	122.5	102.2	91.3	121.9

Source: SARB, quarterly bulletins: online dataset

2.3. REVIEW OF TRENDS IN TRADE

This section first discusses the trend in aggregate exports and imports. This is followed by a discussion of trends in disaggregate exports, namely the major export sectors which include agriculture, manufacturing and mining.

2.3.1. Aggregate export & import trends for the period 1970-2010

Average annual growth rates of real exports, imports and GDP are shown in figure 2.1; both exports and imports have markedly increased since the introduction of liberal trade policies in the early 1990s. For the period 1990-2000 exports and imports rose at annual average rates of 5.2 percent and 5.8 percent respectively; compared to a rise of 1.3 percent and a decline of 0.6 percent in the preceding decade (1970-1980). As discussed in the previous chapter (figure 1) the proximate cause of the performance of trade in the period 1990-2000 is the end of economic sanctions and the implementation of liberal trade and financial policies. On the other, during the decade prior to 1990-2000, trade measures were restrictive; which could explain the poor performance in trade.

The relationship between export and GDP can also be observed in figure 2.1. With reference to the period under review, the first two decades (1970-1990) recorded growth in export and GDP of about 24 and 62 percent respectively. But when compared to the decades 1990-2010, export and output grew by about 89 and 69 percent respectively. In terms of annual average growth rates, growth in GDP and exports amounted to 2.4 percent and 1 percent respectively for the period 1970-90; whereas in the last two decades (1990-2010), GDP and exports rose by 2.7 percent and 3.2 percent respectively.

In a nutshell, exports did not fare well prior to the 1990s largely due to protectionist measures of the apartheid government. As shown in Edwards & Lawrence (2008: 602), these measures have punished export of non-commodities manufactures more than commodities exports. On the other hand, the post-apartheid period registered a good export performance owing to factors alluded to in the previous paragraph.
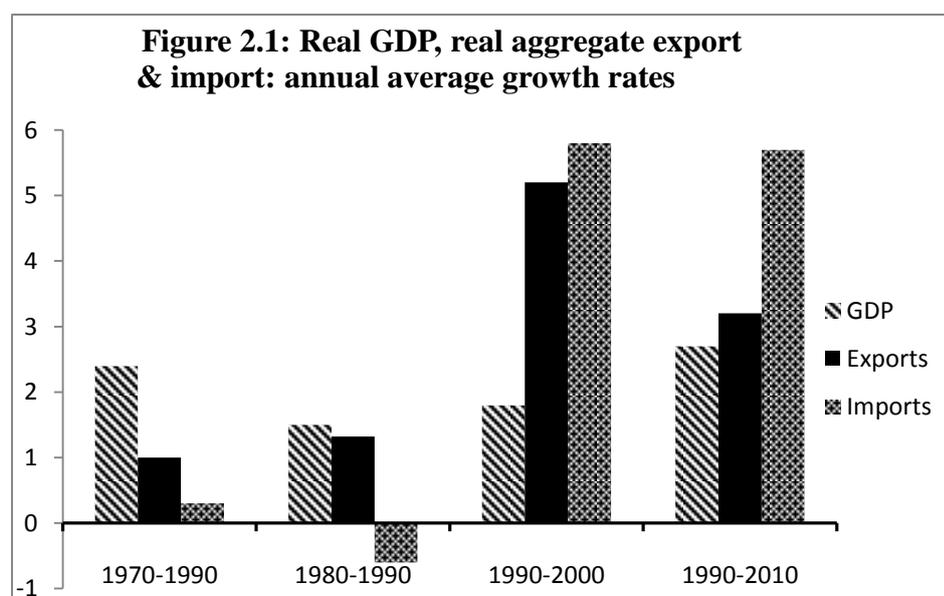
Source: own calculation using the SARB quarterly bulletins, online dataset

2.3.2. Sectoral export trends for the period 1992-2010

For the purpose of investigating ELG, analyses of trends in aggregate trade flows do not reveal important information that can be derived from the disaggregation of trade, particularly exports. For instance, a selective tariff policy on a specific sector could lead to an increase in the sector's exports; thereby raising its contribution to GDP. This effect can be masked when examining total exports instead of their composition; because the channels via which policy implementation impact exports are ignored (Edwards & Lawrence, 2008:595).

In other words, evidence of ELG can be informative by considering the composition of exports than by using aggregate exports.

Therefore, in table 2.5, exports are disaggregated according to their main sectors. Furthermore, table[5] 2.6 reports the composition of selected manufacturing exports. As shown in table 2.5, the agricultural sector represents the smallest share of exports averaging 4 percent for the period under review. A number of factors can be attributed to the low volume of agricultural exports. These factors include a volatile weather conditions (drought, excessive rain) and non-competitive international price for agricultural products.

Manufacturing share of exports rose by 46 percent between 1992 and 2010. During the same period, its average contribution to total exports was 55 per cent. This performance is often attributed to the liberal trade policies implemented since the 1990s. These measures have markedly reduced trade barriers, thereby contributing to lower costs of manufactured inputs required by the non- resource based manufactured sector.

Conversely, the mining sector contributed 41 percent to exports during the period under consideration. However this sector registered a decline of 34 percent between 1992 and 2010. The decline in mining exports can be attributed to a range of factors which include rising volatility in exchange rate and oil prices, as well as the fall in international commodity prices witnessed during the 2008 global recession.

Table 2.5 Structure of SA exports (in constant R million) 1992-2010

`	1992	1995	1998	2001	2004	2007	2010
Agriculture	3685	5017	7157	8868	10820	10048	13339
Manufacturing	47278	67623	85307	130114	142090	194425	173296
Mining	68775	68793	63962	86493	73904	87471	113641
Total	119738	141434	156426	225475	226815	291944	300275
% of Total							
Agriculture	3.1	3.5	4.6	3.9	4.8	3.4	4.4
Manufacturing	39.5	47.8	54.5	57.7	62.6	66.6	57.7
Mining	57.4	48.6	40.9	38.4	32.6	30.0	37.8

Source: own calculations using the DTI trade statistics

While Table 2.5 outlines the main exporting sectors, Table 2.6 shows the key components of one of the major sectors, namely manufacturing. This sector receives policy priority in terms

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[5] Due to the lack of disaggregate data from the 1970s, the study of trends in sectortal exports starts from 1992. This data was collected in nominal values and PPI for each sector were used to calculate the real values, except for the data in table 2.6. The totals shown in the two tables represent only the sum of the sectors or subsectors listed in the tables.

of diversifying the export basket in order to boost the country's competitiveness. South Africa's manufacturing exports are dominated by resourced-based products (such as chemical products) and automotive products. Table 2.6 shows that the proportion of both chemical and automotive products is higher relative to the share of machinery and high technology products. Moreover, Table 2.6 indicates that chemical the share of products was higher in the 1990s than in the 2000s; whereas the share of exported vehicles exhibited an opposite tendency. On the other hand, the high technology subsector has the smallest portion of manufacturing exports; followed by machinery and equipment.

The automotive sector which includes motor vehicle, parts and accessories, is often classified as medium technology manufactures (Lall, 2000 cited in Edwards & Alves, 2006: 475). This sector fared relatively well during the period under review. This is probably due to the fact that the automotive sector enjoys tariff protection and selective industrial policy whose effects translated into rising exports. Indeed, under the Motor Industry Development Programme (MIDP) introduced in 1995, exporters of vehicles, parts and accessories benefit from import rebates based on the domestic content of their exports (Edwards and Lawrence, 2008: 600).

Apart from the protection of the automotive and textile sectors, the overall trade regime has undergone significant liberalization overtime. The next section reviews the evolution of trade liberalization policies since Apartheid. Thereafter, the relationship between trade policy and export performance is outlined in section five.

Table 2.6 Structure of major manufacturing exports (in current R million) 1992-2010

	1992	1995	1998	2001	2004	2007	2010
Chemical products	4132	10036	15072	29140	30928	43198	51596
Motor vehicles	1527	4548	10054	31775	39997	66961	69976
Machinery & equipment	710	2007	4610	7080	8418	16076	18609
High tech products	692	2041	4045	7533	9262	15349	13468
Total	7061	18632	33781	75529	88605	141584	153649
% of total							
Chemical products	58.5	53.9	44.6	38.6	34.9	30.5	33.6
Motor vehicles	21.6	24.4	29.8	42.1	45.1	47.3	45.5
Machinery & equipment	10.1	10.8	13.6	9.4	9.5	11.4	12.1
High tech products	9.8	11.0	12.0	10.0	10.5	10.8	8.8

Source: own calculations using the DTI trade statistics

2.4. REVIEW OF TRADE POLICIES IN SOUTH AFRICA[6]

The following review of trade policy is divided into three periods, namely the Apartheid era, which is the period prior to the 1990s; the post-apartheid era, beginning from the 1990s when trade negotiations started, and the current period which covers the government new approaches to trade policy.

2.4.1. Trade policy during Apartheid

During the 1960s and the 1970s, the Apartheid government followed trade policies rooted in protectionism with high tariffs and complex import controls. In essence, these policies were in tune with the ISI strategy that government embraced. The adoption of ISI policies was based, inter alia, on the need to build a strategic domestic industrial sector, such as the creation of an automotive industry (Bell, 1993 cited in Cassim et al, 2004:7). But the perception that the ISI strategy was the driving force that could enhance industrial development had gradually capsized following the necessity to offset the anti-export bias[7] created by import protection measures (Muradzikwa et al, 2004:302)

Therefore, an attempt to shift trade and industrial policies started in 1972 with the introduction of export incentives and a gradual loosening of quantitative restrictions. One of the first direct export incentives was a tax allowance on export marketing related expenses; others incentives included tax concessions on export sales and profits, cash grants, and concessions on rail freight (Muradzikwa et al, 2004:304). On the import side, the first attempt of liberalization consisted of replacing import restrictions with equivalent tariff and other duties (Mhor and Fourie, 2008: 382). Furthermore, during the 1980s import licensing was eliminated, exemptions from import duties were initiated, and export subsidies and incentive schemes were further strengthened to ease the burden on exporters (Jonsson and Subramania, 2001: 200).

However, in response to financial sanctions and balance of payment pressures, import surcharges were introduced from the mid to the late 1980s. Import surcharge rates ranged from 10 percent on capital and intermediate goods to 60 percent on luxury items. These

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[6]see Table 1 in Edwards, Cassim & Seventer (2009: 30) for a summary of the chronology of trade reforms since the 1970s

[7] The anti-export bias of production arises from tariff protection as a measure that shows how profitable is production for the local market compared to production for the export market (Edwards & Lawrence, 2008: 597).

surcharges have once again shifted trade regime toward protection (Edwards and Lawrence, 2008: 590).

These changes in trade policy were primarily premised on the need to diversify the export sector away from the dependence on gold exports. In addition, these changes were introduced in response to the reality that an inward-looking strategy for growth was detrimental to imports and exports, as well as manufacturing production. Hence, a move towards an export-oriented approach for growth has been envisaged by gradually loosening trade barriers while export promotion measures were introduced. Notwithstanding these initial changes, the South African trade regime was still complex at the end of the 1980s with a substantial anti-export bias.

2.4.2. Trade regime post-Apartheid

The removal of sanctions in 1990 has ushered the reappearance of South Africa on the international scene. Following arguments that tariff protection has not only contributed to price distortions, but also to an underdeveloped manufacturing sector, a tariff liberalization program was undertaken. The main objective of this program was to improve price or cost competitiveness which has supposedly been undermined by price distortions (Rangasamy, 2003: 4-5).

Hence, the drive for trade liberalization has led South Africa to implement both unilateral and multilateral liberal trade policies as the country has committed to the Uruguay Round of the General Agreement Tariff and Trade (GATT). According to Jonsson and Subramanian (2001:201-202), unilateral trade liberalization took place from 1990 to 1998, while multilateral trade liberalization started from 1995 to 2002. Under the unilateral trade liberalization, almost all quantitative barriers to trade were abolished. These include the removal of import surcharges, the further reduction in import tariffs and the consolidation of export schemes into the GEIS. In 1994, the new democratic government, further implemented liberal trade policies by adopting a unilateral tariff liberalization policy that went beyond its commitments to the Uruguay Round. For example, the phasing out of the GEIS in 1997 occurred ahead of the schedule decided upon in the GATT (in the agreement, a three-year phasing out period started in April 1995).

The multilateral trade liberalization was mainly aimed at the tariffs reduction in the manufacturing sector; but with the exception of motor industry, textiles and clothing which

were expected to be liberalized by 2003 (Jonsson and Subramanian, 2001: 202). Apart from multilateral trade reforms, South Africa has also undertaken a number of bilateral and regional trade agreements. For instance, the negotiations on bilateral free trade agreements with the European Union and the United States were open. Regionally, while a tariff free trade zone exists in the context of SACU, more trade protocols aiming at the creation of a free trade zone within the SADC were signed in 1996 (Hviding, 2006:134)[8].

In a nutshell, trade liberalization in South Africa has consisted of a range of interventions including: i) elimination of quantitative restrictions; ii) gradual reduction in tariff rates; iii) sizeable simplification of the tariff structure, and iv) removal of significant export subsidization systems. As indicated in Table 2.7, the average tariff on manufactures decreased from about 30 percent in the 1990s to 12 percent in 2002. The numbers of tariff lines were further reduced to 7900 tariff lines from over13000 tariff lines in 1990 and all import controls were virtually abolished.

Currently, the scope for further tariff liberalization appears to be reduced as government envisages using trade policy strategically in order to steer the development agenda. This is the subject of the next subsection which discusses current trade policies.

Table 2.7. Trade Regime in South Africa
(in percent, unless otherwise indicated)

	1990	1998	2002
Manufacturing			
Maximum tariff	1389	72	60
Average unweighted tariff	30	14	12
Standard deviation	43	18	13
Number of tariff lines[*]	>13000	7814	7909
Percent of tariff lines with non ad-valorem duties	28	26	25
Import surcharge bands	10, 15, and 40	Eliminated	Eliminated
Agriculture			
Average tariff	25	9	10
Average import surcharge	8	0	0
Export subsidy	17	Eliminated	Eliminated

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[8] The Southern African Custom Union (SACU) comprises South Africa, Botswana, Lesotho, Namibia and Swaziland. The Southern African Development Community (SADC) members include: Angola, Botswana, the Democratic Republic of Congo, Lesotho, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe

Export taxes			
Diamonds	15	15	15
Quantitative restrictions on imports[**]	15	Virtually eliminated	Virtually eliminated
Quantitative restrictions on exports	Diamonds 21 agricultural Goods	Diamonds	unprocessed tigers eye
Memorandum items:			
Trade taxes revenue as a share of total			
Revenue	7.9	4	3.5
Import taxes as a share of imports	10.8	4.1	3.4
Export taxes as a share of GDP	0.3	0	0

Source: Hviding (2006:135)

[*]The figure for 1998 refers to June 1997

[**]As a percentage of total tariff lines (other than those maintained for health, security, and environmental reasons). The figure for 1990 refers to 1992.

2.4.3. Current trade policies[9]

After undertaking a significant trade liberalization program since the 1990s, the South African government has envisaged a rethinking of trade policy in line with current developments in the global trade. In response to these developments, a strategic framework for trade policy was launched in 2009 whereby government intends to use trade policies to boost economic growth, diversify export production, create employment, and alleviate poverty. These objectives are less likely to be achieved with uniform tariff liberalization; thus a case by case or a strategic approach to trade policy is needed. This approach is about ensuring that the economy is not locked into the production and export of primary commodities over the long run.

The main thrust of government strategic trade policy is to upgrade the industrial base in order foster the production and export of more value-added manufactures. Accordingly, tariffs will be used strategically to respond to the imperatives of industrial development and diversification, as well as job creation. For instance, the reduction of input costs into labour intensive downstream manufacturing will require that tariffs on upstream input sectors

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[9] see DTI (2009 & 2011): the South African Trade Policy and Strategic Framework, and New Growth Path (RSA, 2010:14 & 24)

(primary sectors) be lowered or removed. Whereas tariffs on downstream manufacturing (e.g. the automotive industry) that are strategic in terms of their employment creation and value addition could be unchanged or raised. Government strategic tariff policy approach will also be taken with respect to multilateral and bilateral trade relations.

First, on the multilateral front, a flexible and pragmatic trade approach will be adopted. Though, government is committed to its international obligations, the policy space needed to build a diverse economy should not be undermined. In other words, the scope to use tariffs in order to support industrial upgrading and employment creation should not be reduced due to multilateral and bilateral trade arrangements. While tariffs remain an important instrument of trade policy, the new generation trade issues go beyond traditional tariffs to include matters like intellectual property, trade in services, trade dimensions of investment, competition, labour, government procurement, and the environment. Government's response to these challenges will once again be guided by the protection of policy space required to support the overall development path.

Secondly, with respect to SACU and SADC, the strengthening of regional trade does not lie in further liberalization, but in the development of infrastructures and institutions as well as the increase of production capacity. South Africa will increase its exports to SADC and position itself as a financial, logistic and service hub while building strong partnerships with other countries on the continent.

Following the above discussion, the aim of implementing trade measures is primarily to improve the performance of trade as well as of the economy. The section that follows outlines some findings on the role of post-apartheid trade policies in boosting the competiveness South African exports.

2.5. TRADE POLICY AND EXPORT PERFORMANCE

During the Apartheid era, protectionist measures were detrimental to the expansion of exports in general, and particularly of non-commodity manufactured exports. The proliferation of liberal trade policies since the 1990s has played a crucial role in boosting non-commodity exports. According to Edwards and Lawrence (2008), there has been a significant impact of trade liberalization on the performance of both sectoral and aggregate trade in South Africa. However, it is argued that non trade measures (financial openness in particular) have also positively contributed to trade performance in South Africa. Hviding (2006:137) points out

that non- trade measures such as the relaxation of exchange and capital controls, as well as interventions in the financial markets-through the removal of financial restrictions on the capital account, have also played a noteworthy role in the success of exports.

The analysis of the extent of tariff liberalization on the performance of exports has reached controversial results. On the one hand, Fedderke and Vaze (2001:447) observe that during the 1990s trade regime was not significantly liberalized because tariff protection on output increased in 1998 compared to 1988. On the other hand, Rangasamy and Harmes (2001) have found evidence that the South African trade regime was indeed liberalized and simplified in 1990s; and tariff liberalization had a positive impact on exports.

In a review of two previous studies, Holden (2005: 777 &784) shows that these studies relied on a single measure of trade policy, namely the effective rate of protection; hence they are prone to criticism. Holden argues that the analysis of the degree of trade policy in the economy should be based on a wide range of measures which includes both quantitative and qualitative measures of liberal trade stance. Following the same line of arguments, Edwards, Cassim and Van Seventer (2009: 8) investigate whether the levels of nominal protection, effective protection and the anti-export bias, have fallen as a result of tariff liberalization. Their general conclusion is that trade liberalization has improved openness, with positive effects on prices, productivity and trade flows in the South African economy.

An empirical analysis of the impact of tariff liberalization on the South African economy is beyond the scope of this study[10]. However, a graphical representation of the pattern of exports as a result of trade liberalization would suffice to roughly show how trade has responded to trade openness over time. As shown in figure 2.2(a) trade openness is measured as a ratio of total exports plus imports to GDP; this measure is a simple proxy for openness or liberal trade policy (see Holden (2005), Rangasamy (2003), Edwards & Lawrence (2008), and Edwards, Cassim & Van Seventer (2009) for more discussion on the measures of trade openness).

From figure 2.2(a), it can be observed that the share of trade in GDP has been declining since the 1970s to the mid-1980s mainly due to tariff protection. During the same period, exports were virtually stagnant as depicted by figure 2.2(b). The ratio of trade in GDP started

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[10] The present study reviewed trade policies because they have contributed to export performance; but the core of the study is to empirically verify the hypothesis that exports have driven growth. A review of evidence on the impact of openness on the economy is given, amongst others, in Edwards, Cassim & Van Seventer (2009: 14)

expanding from the mid-1980s, but this expansion was offset by increased tariff protection such as import surcharges. The early 1990s witnessed the beginning of a remarkable rise in the share of trade in GDP from a level below 40 percent in the early 1990s to about 60 percent in 2008. However, this ratio started falling from 2009 due to the global crisis. Similarly, exports behaved in the same fashion as a noticeable growth in exports began from the early 1990s until the 2009 recession.

Figure 2.2 (b):Log EXPORTS

Figure 2.2(a): Log OPENNESS
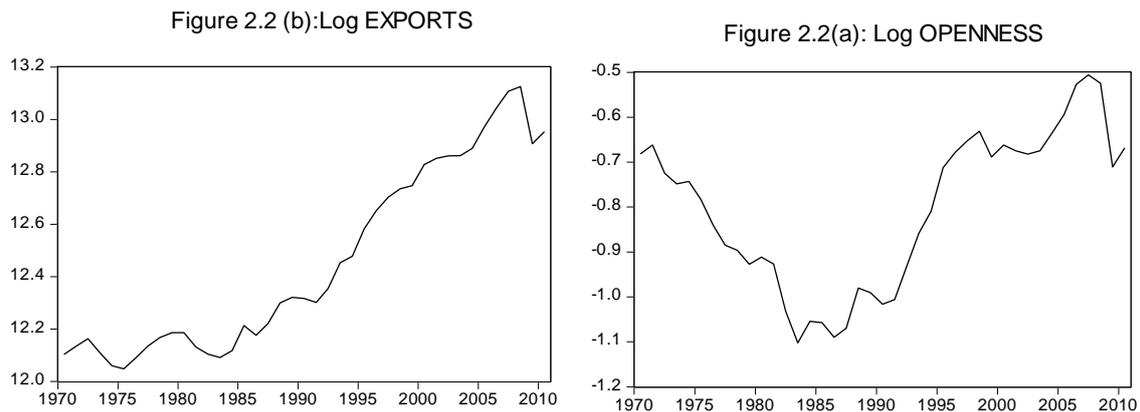
Source: SARB, on line dataset

2.6. SUMMARY

The purpose of this chapter was to outline major features of the South African economy. The main characteristic of the economy is the persistence of unemployment which exacerbates poverty and inequality. One of the causes of high unemployment levels is the weakening of the agriculture and manufacturing sectors in driving economic growth. Government's interventions to boost growth and employment include a range of policies such as trade liberalization policies. These have been accelerated since the 1990s. The implementation of liberal trade policies has improved the openness of the economy. This has resulted in a fairly good performance of trade in general and of exports in particular. Many studies argue that export performance is associated with high economic growth; a review of some of these studies is discussed in the next chapter.

<p style="text-align: center;">**CHAPTER THREE**: **REVIEW OF THE LITERATURE**</p>

3.0. INTRODUCTION

This chapter covers literature review relevant to the study. The first section discusses the theoretical review where trade theory is outlined and presented as the basis of the relationship between export and growth. This is followed by the review of various channels through which export can affect growth, as well as some theoretical considerations about the export-growth nexus. The second section carries out the empirical review of the hypothesis of ELG which draws largely from time-series studies. This review is divided into international literature and Southern African literature; the latter highlights studies from South Africa.

3.1. REVIEW OF THE THEORETICAL LITERATURE

3.1.1. Trade and economic growth

The theoretical associations between trade and growth have received enormous attention in the literature despite the polemic around their real impact on welfare. Earlier arguments in favour of trade can be traced back to the classical school of economic thought which advocates free trade and specialization (Medina-Smith, 2000: 1). More specifically, this school emphasizes the production via specialization of a surplus of a commodity where a country has an absolute cost advantage (Adam Smith) or the largest relative cost advantage (David Ricardo); and/or where the abundant factor can be used intensively (Heckscher-Ohlin). The surplus can then be traded as export in exchange for products that cannot be made as cost efficiently (Salvatore, 2011:35).

However, this trade theory is based on a number of simplifying assumptions including two factors (labour and capital), similar technologies and tastes, factors mobility within countries, and full employment. These assumptions do not explain important characteristics of modern international trade. Global trade is increasingly influenced by a range of factors such as imperfect competition (monopoly & oligopoly), differences in technologies, as well as intra-industry trade based on increasing returns to scale or economies of scale (Salvatore, 2011:193).

The new trade theory not only accounts for these issues, but also shows that endowment of abundant production factor cannot solely determine comparative advantage, and thereby trade (Fletcher, 2005)**.** In other words, comparative advantage may be secured by strategically

intervening in the production of tradable goods and services. This lends support to the notion that every country can participate in trade irrespective of its comparative advantage.

In light of the above, recent arguments in favour of trade claim that countries that increase their participation in international trade achieve long term economic growth faster than countries that are less open to global trade (World Bank, 1993; Dollar and Kraay, 2005; and Pugel, 2007). These arguments are often supported by the East Asian miracle where the nexus between trade and growth was evidenced between 1965 and 1990s. The surge of exports that the Tigers experienced during that period is often seen as a key factor that explains their rapid economic performance (Weiss, 2005: 2-3). Following the experience of East Asian countries, many empirical studies have focused on the relationship between export and growth.

3.1.2. The export-growth nexus

The relationship between export and economic growth has received a particular interest in international and development economics following the abandonment by many developing countries of ISI policies in preference for an outward-oriented strategy. In the late 1980s, economists and policy makers recommended this development strategy to many developing countries in anticipation that these countries would achieve higher growth rates (Medina-Smith, 2000: 3). In essence, this strategy simply assets that promoting and increasing the production for exports is crucial to driving economic growth (Felipe, 2003:3). Theoretically, there are direct and indirect benefits that are linked to export; these benefits are expected to affect output through different channels which include the following:

First from the demand side: as a component of aggregate demand, export expansion adds directly to aggregate output thereby boosting domestic output. Because export-oriented production is not limited by the small size of the local market, exports allow a country to access a sizable foreign demand for local exportable. Indirectly, exports affect aggregate output when a strong foreign demand triggers an increase in domestic production. The latter is likely to induce growth in investment, income, and again output (Cui, Shu and Su: 2009, 7; Ibarra 2010: 443; and Ye Lim et al: 2010, 1).

Furthermore, a thriving export sector contributes to the availability of foreign exchange earnings. This in turn eases the shortage of foreign exchange which is a common problem that affects many developing countries. Foreign exchange availability will allow these

countries to purchase, at world prices, foreign intermediate and capital goods which are crucial for enhancing production (Ghatak and Price, 1997:539). Further, with the abundance of foreign exchange earnings as a result of export expansion, developing countries can afford to service their foreign debts (Jin, 2002:64).

Second from the supply side: the expansion of the export sector can lead to a widespread productivity growth in the economy. This can happen via different channels which include: i) Export growth is expected to enhance specialization in sectors where a country enjoys comparative advantages. According to trade theory, specialisation improves efficiency in the allocation and utilisation of resources. It leads to a surplus of production that can now be traded as exports in exchange for products that cannot be made as cost efficiently (Salvatore, 2011:35). In other words, specialization occurs through the reallocation of resources from the relatively inefficient non-tradable sectors to the more efficient exporting sectors (Mahadevan, 2007:1071).

ii) Export expansion can boost the competitiveness of local producers: to remain competitive, domestic firms that are exposed to international competition in the global markets are more likely to improve both the quality of their products as well as their productivity. Hence, the prospect of economic efficiency in the long term for these firms will be found in the implementation of the most efficient production and management techniques, the adoption of technological changes and innovation, the training of the labour force, etc. (Herzer et al., 2006: 310).

iii) Export expansion can lead to the realization economies of scale: the role of exports in improving total factor productivity (TFP) growth results in reduced average production costs in the long run. TFP growth simply refers to technological progress[11] which the endogenous growth theory assimilates to Research and Development (R&D), human capital accumulation and learning by doing (He & Zhang: 2008, 20). Through trade countries can have access to international capital and derive the benefits of foreign improved technologies (Salvatore, 2011:366). The dynamic spill-over effects of these advancements in technologies on the rest of the economy result in the amelioration of TFP and output in the domestic economy.

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[11] For a detailed review of definition and measures of TFP, see for example Lipsey and Carlaw (2000)

Despite all the above positive benefits of exports on the rest of the economy, some researchers have challenged the validity of the ELG strategy. For example, Moon (1997) asserts that the advice of mainstream economists that developing countries should concentrate their development efforts on the expansion of exports must be considered with caution. This is due to the fact that political economists have identified some dangers with regard to the heavy reliance on the external markets for development. These risks include trade dependency, vulnerability to international market disruptions, exposure to other countries' policies; and the risk of creating an asymmetric development path if extreme specialization is adopted.

In light of the above arguments, Palley (2002:6) recommends a domestic demand-led growth paradigm in replacement of the ELG strategy. The author contends that the notion that all countries can grow by depending on demand growth in other countries is a myth (fallacy of composition). Thus countries should consider growth based on the expansion of internal markets. But Moon (1997, 14) cautions that countries that take extreme positions on either the ELG or the demand-led growth strategies, are unlikely to be successful.

In sum, following the previous opposing views to the ELG strategy, there appears to be no suitable model for development. In the literature, the combination of inward-looking and outward-oriented policies is also recommended. Rodrik (2005:134) suggests a two-track strategy, which is a combination of state and market initiatives, such as the Chinese's strategy of development. However, a more realistic alternative view suggests the diversification of export markets and the reinforcement of domestic policies and institutions in order to mitigate the impact of external vulnerabilities on a country's economy (He et al, 2007).

While it is evident that there is no single paradigm that guarantees a successful transition to development, it is also obvious that no country has successfully developed by ignoring global trade and capital flows. In addition, since a situation of a closed economy is almost unthinkable; trade openness is therefore crucial for the growth of any economy big or small since it allows, inter alia, the diffusion of new technologies that could lead to a long term growth. In fact, according to He, Cheug and Chang (2007: 4-5), one of the main reasons associated with the East Asian growth miracle is found in trade; and specifically the export-oriented growth model.

In today's globalized economies, the export sector will remain vital as far as South Africa's growth and development is concerned. As discussed earlier, the most obvious channel that could link trade to growth, especially in developing countries, is via the import of capital goods that are vital for investment. One reason for this is that imported capital equipment can be purchased at a cheaper world price than in the domestic market thereby raising domestic production and employment (Rodrik, 137:2005). Furthermore, Pugel (2007:317) stresses that for many developing countries, an outward-oriented trade policy that encourages manufactured exports remains part of the most promising development strategy. But the success or failure of this strategy has not been vividly established in the literature; as the following empirical evidence illustrates.

3.2. REVIEW OF THE EMPIRICAL LITERATURE

The hypothesis of ELG claims that export expansion can perform as the engine of growth. An extensive empirical literature exists on this hypothesis, and this literature can be divided into two groups. The first group focuses on earlier studies and the second looks at recent studies. Earlier empirical studies have used cross-sectional analysis whereas recent studies employ time-series data to examine the hypothesis of ELG. The next subsections discuss each of these types of empirical studies.

3.2.1. Earlier studies: cross-sectional data

The approach used in cross-sectional studies includes rank correlation and linear regression analysis. In both cases a positive and statistically significant coefficients provide support for ELG. Evidence from these studies with cross-sectional or panel data has mostly buttressed the ELG hypothesis, meaning that export expansion was found to have a positive impact on economic growth. For example, Michaely (1977), Balassa (1978), and Darrat(1986) perform cross-country comparison using rank correlation and find that export expansion leads to economic growth. Other studies in this category that reach a similar conclusion by using the OLS method include: Balassa (1985), Ram (1985), Fosu (1990),Dodaro (1991), and Coppin (1994)

As argued by Medina-Smith (2000:10), one of the prominent limitations of cross-sectional studies is that results (for LDCs particularly) from these studies do not inform policy makers

because they are averages. In other words, these results do not convey country specific information as they assume the same economic structure, technology and production function across all countries. Furthermore, strong correlation between export and output resulting from countries cross-sectional studies might be the result of short run dynamics. Long run dynamics or trend relationships between variables are not tested; consequently cross-sectional analysis cannot fully depict a long run phenomenon such as exports and economic growth (Krugler: 1991, 74; Shirazi and Abdul, 2005:474).

Failure to capture country specific features and the exogeneity of the export variable as well as to differentiate between statistical links and statistical causality, has led scholars to consider advanced empirical tests. These include co-integration and Granger causality tests which are used in most time-series studies.

3.2.2. Recent and current studies: time series data

Most recent works with time-series analysis have reached diverse results. While findings of some studies have presented moderately strong evidence in support of the export-output link; others have cast doubt on the validity of the ELG hypothesis. In other words, time-series studies of ELG hypothesis have largely reached mixed results because these studies seem to be responsive to the countries examined, variables included in the model, methods used and periods covered. The present review of empirical studies is divided into international literature and Southern Africa literature.

3.2.2.1. International literature

The earlier time-series empirical works have employed the OLS estimation method to determine the link between export expansion and economic growth. These include Ram (1987), Salvatore and Hatcher (1991) and Sengupta (1993). As Bahmani-Oskooee and Economidou (2009: 179) point out, the results of these studies could be spurious on two accounts: First, because most of these studies have applied OLS methods on non- stationary data. Second, due to the fact that these analyses did not investigate the direction of causality between export and output. Among these studies, Jung and Marshall (1985) examine the export-growth relationship for a sample of 37 countries by using a bivariate autoregressive

model. The overall conclusion from their findings is that export growth did not lead to output growth in most the cases.

The successful export driven growth strategy of the Asian 'Tigers' (Hong Kong, South Korea, Singapore, and Taiwan) has also led to widespread empirical studies on the topic. For example, Jin (1995) finds evidence supporting the ELG hypothesis in all four countries. But in three cases (except Taiwan), the author finds that growth has a positive impact on exports. The author analyzes the four countries using quarterly data for the period 1973Q1-1976Q1 and by applying a multivariate VAR model where variance decompositions and impulse response functions tested the export-growth relationship. On the other hand, Darrat (1986) re-examines the hypothesis of ELG for Asian Tigers and finds no evidence of one-way causality from export to growth or growth to export in all four countries; with the exception of Taiwan. In the latter case the author finds that the unidirectional causality runs from growth to export.

Subsequently, many studies have explored the export-output link for developed and for developing countries. Amongst them, Krugler (1991) examines the validity of the ELG hypothesis for the United State of America, Japan, Switzerland, West Germany, France and United Kingdom using quarterly data. The author finds no evidence of ELG except for France and West Germany. Henriques and Sardorsky (1996) test the two- way causality relation in the case of Canada using annual data for the period 1870-1991. They conclude that export did not Granger cause growth, neither the opposite. But changes in growth preceded changes in exports. Ghatak and Price (1997) investigate the validity of the hypothesis for India during the period 1960-1992 by applying co-integration and error-correction techniques on both aggregated and disaggregated export data. At the aggregate level, the findings of this study indicate that non-export GDP causes aggregate export expansion. By considering the composition of export (disaggregate level), the authors finds that export of machinery and transport equipment causes output growth; whereas traditional manufactured exports has little impact on growth. Siddique and Selvanathan (1999) investigate the export-output relationship for Malaysia for the period 1966-1996. Using Wald test to look into causality, the authors discover evidence buttressing GDP-led manufacturing export and no facts in support of the ELG. Abdulai and Jaquet (2002) test the causal relationship between export and economic growth for Côte- d'Ivoire for the period 1961-1997. The authors find the existence of one long-run equilibrium relationship (between GDP, exports, investments, and labour force) whereby export, investment and labour force caused GDP growth. Also, in the long run,

domestic investment originated from growth, export and labour force; whereas in the short run, only export and investment triggered growth. Herzer et al (2006) examine, through increases in TFP, the role of manufacturing and primary exports in economic growth in Chili for the period 1960-2001. Using both the Engle-Granger single equation and the Johansen multivariate co-integration techniques, they find that the two sectors' exports have a significant impact on output growth; but primary exports led to limited productivity spillovers. Bahmani-Oskooee and Economidou (2009) survey the relationship between export and economic growth for 61 LDC and find no uniformity in the patterns of results as these vary from country to country.

Evidently, the strategy that many countries embraced a few decades ago as a result of shift in the development policy from ISI to outward-oriented policies continues to be promoted even nowadays. Some current studies include China because of its robust economic performance coupled with a buoyant export expansion. Amongst them, Cui, Shu and Su (2009) measure the effect of exports on China's economic performance using panel datasets. Their results at the national level show that a 10 percentage-points reduction in export expansion leads to about 2.5 percentage-points decrease in real output growth. Furthermore, positive spill-over effects run from export to domestic demand and employment. Guo and N'diaye (2009) evaluate the sustainability of China's export- led growth over the medium to long term. They argue that China will face limitations in expanding its external market, unless productivity rises, profits decline and industries are subsidized.

Apart from China, a number of other recent studies re-survey the ELG hypothesis. For example, Jiranyakul (2010) revisits the outward looking growth assertion for Thailand. The author uses quarterly data from 1993Q1 to 2008Q4 to test for co-integration in a multivariate framework and finds that there is indeed evidence in support of the hypothesis. Ye Lim et al (2010) re-examine the long-run validity of ELG for Korea (1954-2008), Singapore (1966-2008) and Hong Kong (1971-2008). The authors use both linear (Johansen test) and nonlinear (Breitung rank test) procedures of co-integration. Their results are mixed because evidence of ELG is found in South Korea with both tests; while in Singapore only the Breitung rank test reveals that exports have driven growth; but the two procedures show no validity of the ELG scenario for Hong Kong. Ibarra (2010) explores the impact of rising manufactured exports on growth in Mexico during the free trade period 1988-2006. This study is based on the aggregate demand decomposition and the estimation of co-integration models. The author

finds no evidence in support of ELG. Tang and Lai (2011) re-investigate the hypothesis of ELG in the Asian four little dragons. The authors emphasize the stability of the causal relationship in both bivariate and trivariate models. Using co-integration and rolling causality techniques, they find evidence of ELG for all four countries in trivariate models. However, in bivariate models, ELG is valid only for Hong Kong and Singapore. Moreover, the authors verify the stability of ELG by applying rolling regression based on Modified Wald tests. Their results suggest that the ELG hypothesis is unstable in all four countries.

3.2.2.2. Southern African literature

In Southern Africa, Sinoha (2006) surveys nine Southern African countries using annual data covering the period 1980-2002. The author applies two types of bi-variate VAR models (models with and without exogenous variables) to investigate and compare co-integration and causality between exports and economic growth. The results reveal that when using a bivariate model with no exogenous variables, the validity of ELG hypothesis is confirmed in two countries (Lesotho and Swaziland) and the GDP-driven export growth is also valid in two countries (Malawi and Namibia). When exogenous variables are included into the bivariate models, the export-output assertion turns out to be suitable in three countries (Botswana, Lesotho, and Swaziland) and growth-led export is verified in two countries (Malawi and Namibia).

A few other studies have researched the validity of the ELG premise on individual countries in Southern Africa. Amongst these country-specific studies, Hinaunye Eita and Jordaan (2007) analyze the export-growth relationship for Botswana and Namibia using respectively, quarterly data for the period 1995Q1-2005Q1 and annual data from 1970-2005. Based on the Johansen approach and ECM, they reach the conclusion that (for both cases) co-integration and bi-directional causality exist between exports and growth. However, in the case of Botswana the bi-directional causality exists between export and growth when output excluding export is used. But if GDP is used in the model as a proxy for economic growth, the results show that GDP or output causes export. Musonda (2007) reaches comparable conclusions in the case of Zambia using annual data from 1970-2003. Macuacua (2009) explores the similar causal relationship for Mozambique for the period 1987-2004. The author finds evidence of growth-led export for the long run period; and for a shorter period

(2000-2004), verification of ELG is found due to structural breaks in economy for that episode.

For South Africa, Ukpolo (1998) investigates the export-led growth premise for the period 1964-1993 using co-integration and Granger causality techniques. The author finds evidence that economic growth Granger causes exports; hence no validity of the ELG hypothesis. On the other hand, Rangasamy (2009) examines the export-growth nexus for the period 1960Q1-2007Q3 in a multivariate model. The conclusions of this study reveal a unidirectional Granger causation running from exports to output; which means that exports drive economic growth. Moreover the author finds that GDP accounting identity miscalculates the role of exports in economic growth. Likewise, Ziramba (2011) tests the hypothesis of export-led growth by using the component of exports, namely merchandise exports, net gold exports, export of services and income receipts. The sample of this study spanned a period from 1960Q1 to 2008Q3; and two methodological approaches were employed: the bounds test approach to co-integration and the Toda-Yamamoto Granger causality test. Findings from the latter method show that only merchandise exports lead to GDP growth; while the former technique reveals the existence of a long run relationship among the composition of exports and GDP.

The present study intends to further explore the export-output nexus for South Africa by examining aggregate exports and the main composition of exports. Looking into the components of exports is crucial for policy making because evidence of ELG may stem from only a certain category of exports instead of aggregate exports. Along the same lines of argument, Cuaresma and Julia (2005: 34) point out that, the link between export composition and growth has not been broadly explored, despite the fact economic development literature and deliberate policy measures insist on export diversification.

The core of the present empirical research is based, inter alia, on the works done by Herzer et al (2006) for Chili, Bahmani-Oskooee and Economidou (2009) for a number of LDC, Ghatak and Price (1997) for India, and Rangasamy (2009) and Ziramba (2011) for South Africa. With respect the first two papers, the particularity of this study is to look into the broad composition of exports by studying exports from the real sectors of the economy. The last three studies did not base their econometric model on economic theory, namely the

neoclassical production function; the present study uses an augmented neoclassical production as basis for model specification.

3.3. SUMMARY

The aim of this chapter was to review the literature pertaining to this study. First, the relationship between export and growth was implicitly inferred as emanating from trade and growth relationship. In addition, theoretical considerations on the export-growth nexus were discussed. ELG theory argues that export expansion leads to economic growth because the export sector allows access to a large foreign market and new technologies. Also, export expansion leads to rising productivity and competition in the domestic economy. Secondly, this chapter reviewed the empirical literature on ELG hypothesis. This review has consisted of international studies and Southern African studies where the South African literature was highlighted. Overall empirical literature has not yet provided conclusive outcomes, as some studies validate the ELG hypothesis while others do not. Despite, this inconclusiveness of evidence, this study undertakes a further investigation of the ELG theory. It broadly draws from country specific studies that have used time-series data in a multivariate co-integration and causality framework. This approach is explained the next chapter.

CHAPTER FOUR: RESEARCH METHODOLOGY AND DATA

4.0. INTRODUCTION

This chapter explains the methodological approach and data used in this study in order to tackle the research questions and hypothesis. The study makes use of the Johansen co-integration procedure as well as Granger causality techniques. The reason for using the Johansen approach is to account for the long-run behavioural causal relationships that might emerge between export and output growth. In other words, this procedure will be useful in revealing the existence of a long run co-integrating relationship between exports and GDP. The reason for using Granger causality tests is to establish whether the ELG hypothesis is valid in the case of South Africa. These tests will be based on a Vector Error Correction Model (VECM) as well as on the Toda-Yamamoto procedure.

The structure of this chapter is as follows: the first section discusses some of the theoretical arguments underlying the construction of an empirical model of ELG hypothesis. In the second section, the empirical model is specified and explained. The third section outlines the econometric method used in the study; and the last section describes the data and variables used in this study.

4.1. THE THEORETICAL FRAMEWORK

In the previous chapter, a number benefits related to openness have been discussed. These include the realisation of economies of scale, increased competition and productivity, efficient production and management techniques, access to a superior technology, and the relaxation of foreign exchange constraints. From a theoretical perspective, these benefits could be associated with increased participation in international trade and investment (Dollar and Kraay, 2005:199). The foundation of this argument is established in the neoclassical trade theory.

The neoclassical trade theory and production function constitute the basis of the empirical model of this study. The basic neoclassical production function is of the form: $Y = AF(K,L)$ where Y denotes *output* or GDP, A shows technological progress, K and L represent *capital* and *labour* respectively. For the purpose of analysing ELG, this function is often augmented with other inputs such as exports and imports. These two factors are not really inputs of production in the neoclassical sense; but ignoring them could bias GDP because they account for some international factors that impact on the productivity of K and L (Bahmani-Oskooee

and Economidou, 2009: 195). For instance, import of intermediate and capital goods can embody newer technologies which could enhance domestic production, thereby increasing economic growth. As Edwards (1993: 1385) points out, overlooking imported inputs in the analysis would exaggerate the extent of export expansion on output growth. Thus, the inclusion of imports is a way of capturing the indirect channels through which exports can affect growth.

The reason for incorporating exports into the production function is to account for the effects of total factor productivity growth or technological spill overs. The latter ensures that economic growth is sustained in the long run. Furthermore, the incorporation of export into the production function is a way of establishing the relationship between export expansion and economic growth. In other words, like capital and labour, exports are expected to have positive effects on aggregate output. However, as discussed in the previous chapter, aggregate exports are likely to hide information pertaining to the impact of a particular export sector on growth. Thus following Ghatak and Price (1997: 540), the present study includes the types of exports because they provide a clear insight of the sustaining factors of the export-growth relationship.

4.2. THE EMPIRICAL MODEL

The empirical model is based on the augmented neoclassical production function. It intends to demonstrate whether expansion of exports and other inputs result in the expansion of economic growth. The estimation of this model is expected to answer the research questions as well as shed light on the central hypothesis being explored in this study. This hypothesis asserts that export growth is the engine of the economic performance of South Africa during the period under review. In light of this and following Herzer et al (2006), the specification of the model is as follows:

$$Y = Af(K, L, AX, IX, MX, M) \tag{1}$$

Where A, Y, K, L, AX, IX, MX and M denote respectively *TFP*, *output (GDP)*, *capital (GFCF), labour, agricultural exports, manufactured exports, mining exports* and *imports.* From (1), it is assumed that TFP is expressed as a function of exports i.e. A=f (X). In other words, TFP (A) is affected by exports, via for example better access to production blue-prints, foreign technology through foreign direct investment (exporting firms tend to have higher foreign ownership), improved allocative efficiency, exit of relatively inefficient firms, etc. By replacing A=f (X) in (1) and taking logarithms, the linear form of the model is given by:

$$logY_t = \alpha + \beta logK_t + \gamma logL_t + \delta logAX_t + \varphi logIX_t + \rho logMX_t + \theta logM + \epsilon_t \quad (2)$$

Where α is a constant, ε_t is the stochastic error term which is assumed to measure the impact all other explanatory factors; β, γ, δ, φ, ρ and θ are coefficients of the independent variables. The coefficients δ, φ, ρ and θ are assumed to measure the effect of each export sector and import on TFP. On the other hand, the coefficients β and γ are elasticities. From the aggregate demand identity, a positive influence of exports on GDP is arithmetically obvious because exports are a component of GDP. In order to have an estimate of GDP that does not include the positive influence of exports resulting from national account identity, it is parsimonious to separate this influence from the economic impact of exports on output. Hence, as demonstrated in Ghatak and Price, and Herzer et al (2006), a measure of net GDP is calculated by subtracting each export category from aggregate GDP as follows:

GDP net of Exports or $YN = Y - (AX + IX + MX)$; replacing Y by YN, equation (1) becomes:

$$logYN_t = \alpha + \beta logK_t + \gamma logL_t + \delta logAX_t + \varphi logIX_t + \rho logMX_t + \theta logM_t + \epsilon_t \qquad (3)$$

The estimation of equation (3) will reveal the impact of an expansion in agricultural, manufactured and mining exports as well as capital, labour and imports on economic growth. But export growth could also be the result of GDP growth; this relates to causality issues which the empirical analysis will reveal. Meanwhile, it is worth explaining the econometric procedures pertaining to the empirical work or the estimation of equation (3).

4.3. ECONOMETRIC METHODOLOGY

This study makes use of the Johansen co-integration procedure as well as Granger causality techniques. The application of the co-integration approach requires a prior examination of the time series properties. This is done because macroeconomic time-series may exhibit time trends which can lead to erroneous results.

Trends in economic time series data can be deterministic or/and stochastic. A deterministic trend is a predictable function of time which can be linear in time such as a monthly 1 per cent rise in prices. On the contrary, a stochastic trend is a random function of time which can exhibit an extended period of decrease followed by an extended period of increase in a variable (Stock and Watson, 2007: 555).

Stochastic trends in time series data cause some problems with regard to the robustness of results. For example, the estimation of a model with stochastic trends can produce spurious results. Economists often use econometric technique of unit roots to check for the presence of a time trend in the series. Unit root testing is the first step in the Johansen analysis of co-integration; other steps include VAR model and lag selection, co-integration tests, and Granger causality tests. Each of these steps is explained in what follows.

4.3.1 Unit root tests

Unit roots refer to the presence of stochastic trends in the series, that is, the series are not stationary because they have got a time invariant mean and variance. In other words, a time series is said to be stationary if its mean and variance are the same overtime (Cooray, 2008:100). In the event that the series exhibit a time trend, that is, the variables are non-stationary, estimating regressions using traditional methods will lead to erroneous results such as inflated t-statistics, F-statistics and correlation coefficient R^2. Thus, prior to estimating the model, it is recommended to transform the non-stationary series into stationary series or sequences. In the econometric literature, a number of tests are proposed in order to test stationarity. These tests include the Augmented Dickey-Fuller (ADF) and the Philips-Peron (PP) tests

4.3.1.1. Augmented Dickey-Fuller test[12]

The ADF test for unit roots is based on the estimation by OLS of one or more of the following models: a pure random walk, a model with an intercept (drift) and a model containing both an intercept and a linear deterministic time trend. These models have been developed in differences and their residuals are assumed to be statistically independently distributed. The ADF test regression assumes that the dependent variable (Y series) follows an autoregressive process of order p, i.e. AR(p) and adds p lagged differenced terms of the Y series to the right hand side of the regression. The more general case of this model is presented below:

$$\Delta Y_t = \alpha Y_{t-1} + \delta x_t + \beta_1 \Delta Y_{t-1} + \beta_2 \Delta Y_{t-2} + \cdots + \beta_p \Delta Y_{t-p} + v_t \qquad (4)$$

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[12] Much of the technical discussion on ADF and PP tests is drawn from EViews 7 User's Guide (2009: 384). EViews7 is the econometric package used to perform the empirical estimations in this thesis.

Where x_t are optional exogenous variables which may consist of a constant, or a constant and trend; δ, and β are parameters to be estimated, and v_t are stochastic errors assumed to be normally distributed (white noise). The coefficient of interest in equation (4) is α; the null (H_0) and alternative (H_1) hypotheses are based on the t-statistic of α: H_0: $\alpha=0$; $H_1 < 0$. The null hypothesis assumes the presence of a unit root in the series; failing to reject this hypothesis means that the series are trend-stationary.

4.3.1.2. Phillip-Peron (PP) test

The Phillips and Peron (1988) unit root test accounts for a single structural break in the series and does not assume the normality of residuals. It is an alternative procedure that controls for serial correlation in the series while testing for unit roots and it is based on the non-augmented Dickey Fuller test which is a simple AR(1) of the form:

$$Y_t = \alpha Y_{t-1} + \delta x_t + v_t \tag{5}$$

Unlike the ADF, the test hypotheses in PP are written by evaluating the modified t-statistic of the coefficient α in (5) so that the serial correlation does not have an impact on the asymptotic distribution of the test statistic.

Two practical issues arise when performing the ADF and PP tests. The first is whether to include a constant or a constant plus a linear trend in the test regression. The second problem is about the specification of the number of lagged differenced terms to be included in the regression. Because these tests are sensitive to each of the two issues, their robustness is likely to be affected. For example, the second issue is likely to reduce the power of the ADF and PP tests which will tend to reject the null hypothesis of a unit root. A common solution with respect to the first issue is to choose a model specification that describes better the data under both hypotheses. With regard to the issue of lag length, one recommendation is to include the number of lagged differenced terms that would remove serial correlation in the residuals.

4.3.2. VAR model and the choice of lag length

A model that relates a time series variable to its past values is known as an auto-regression model denoted AR. A multiple time series version of an AR model is called a vector

autoregressive model (Maddala and Kim, 1998:34). The VAR model treats every dependent variable in the system as a function of the lagged values of all dependent variables in the system. In equation notation, suppose that economic growth (Y) and exports (X) are together modeled by a VAR which includes, for simplicity, two lags and a constant α as the only exogenous variable; this equation is written as follows:

$$Y_t = \alpha_1 + \beta_{11}X_{t-1} + \beta_{12}Y_{t-1} + \varphi_{11}X_{t-2} + \varphi_{12}Y_{t-2} + \epsilon_{1t} \qquad (6)$$

$$X_t = \alpha_2 + \beta_{21}X_{t-1} + \beta_{22}Y_{t-1} + \varphi_{21}X_{t-2} + \varphi_{22}Y_{t-2} + \epsilon_{2t} \qquad (7)$$

Equation (6) is an example of bivariate VAR model; but the VAR model can be extended to include more than two variables. The innovations ε_i in equation (6) are assumed to be independent and normally distributed. The β_i and φ_i are coefficients of lagged regressors. If no restrictions are imposed on the regressors, the unrestricted VAR model is a congruent model. However, if some regressors are eliminated (i.e. restrictions are imposed) from the system of equations, the model is called a restricted VAR (Hendry and Nielsen, 2007: 204-207).

As argued earlier, one of the real issues faced in performing most tests such as the ADF and PP tests is first; whether to include an intercept and/or trend terms in the model. Second, it is the problem relating to the selection of the suitable number of lags entering the model. These two problems are also encountered in the construction of a suitable VAR model because results are very sensitive to both the number of lags included in the test regression as well as the choice between intercept, intercept plus trend, trend or none.

One approach to tackle the issue of the appropriate lag length in the VAR model is to use several statistical information criteria test in order to determine the right lag length. These criteria are discussed in Stock and Watson (2007) among others. They include the Likelihood Ratio (LR), the Akaike's Information Criterion (AIC), Hannan and Quinn's information criteria (HQ) and the Schwarz's Information Criterion (SIC), also called Bayes information criterion (BIC). Based on these criteria, the model that represents better the data will be the one that maximizes the LR or minimizes the statistical information criteria function.

However, Stock and Watson (2007: 553) argue that lag length selection should involve a tradeoff between the benefit of adding more lags and the cost of estimating additional

coefficients. This means that, if too little lags are included, valuable information that could be found in more remote lags are likely to be lost. At the same time, adding too many lags could result in errors as more that needed parameters are estimated.

In practice, Gujarati and Porter (2009:753) suggest the lag order choice based on the selection of large lags which are then reduce according to some statistical information criteria. They also argue that further visible evidence in the form of graphs is necessary to complement the choice of these criteria functions; especially with respect to the problem of including in a VAR or a test regression a constant, a trend, a constant and a trend or neither. Graphical analysis can provide a preliminary clue of expected nature of the series (Gujarati and Porter, 2009:749). This process is particularly important as far as an appropriate order of VAR is concerned; because the VAR model is generally used as a point of departure for co-integration analysis.

4.3.3. Co-integration analysis

The theory of co-integration was first introduced by Granger (1969); then researchers such as Engle-Granger (1987) and Johansen (1988; 1991) formally extended the idea in applied econometrics. These scholars have basically established that results from regression estimated with non-stationary series were spurious. Thus trend stochastic series should be detrended or differenced (using the procedures outlined above) in order to render them stationary and then estimate the regression.

Simply defined, co-integration refers to the presence of long run equilibrium relationships between two or more non- stationary time series variables. According to Engle-Granger (1987:2), time series are co-integrated of order d, b denoted C.I (d, b), if they are integrated of order d, but their linear combination is integrated of order b<d. This means that if a linear combination of two or more non-stationary variables is stationary, these variables are co-integrated (Hendry and Nielsen, 2007: 255).

Moreover, Harris (2000:22) interprets economically co-integration as the existence of a long run relationship between the variables, meaning that the variables evolve closely together overtime and the deviation between them will be stable. In the case of export and economic

growth, co-integration analysis will seek to establish whether exports and growth have trended together over time in a causal relationship

A number of procedures have been developed to perform the test for co-integration. These include co-integration tests employing the Engle-Granger (1987) or Phillips-Ouliaris (1990) residual based tests; as well as tests using the Johansen (1995) system approach. The present study uses the latter procedure; that is, the Johansen full information maximum likelihood co-integration method. This procedure is useful in determining the long-run relationships between export types and economic growth by revealing the existence of a stable long run relationship between exports and growth. Furthermore, the value of this approach is that it determines a system of variables endogenously, suggesting that a vector auto-regression (VAR) is the appropriate model. Contrary to the residual based tests, the Johansen method considers all variables as potentially endogenous, hence avoiding the issue of arbitrary normalising the co-integrating vector on one of the variables. Lastly, the Johansen procedure allows the determination of the number of co-integrating vectors and calculates the maximum likelihood parameters of these co-integrating relations.

4.3.3.1. The Johansen method of co-integration

The multivariate Johansen test for co-integration is based on the unrestricted VAR(p) represented by the equation below:

$$Y_t = \mu + \sum_{k=1}^{p} \prod_k Y_{t-k} + \varepsilon_t \tag{8}$$

Where Y_t is the k vector of non-stationary I(1) variables, μ denotes the vector of constants, Π_k represents the coefficient matrix, p is the lag length and ε_t denoted the vector of innovations. The Y_t vector in equation (8) includes the variables non-export GDP, GFCF, labour, agricultural, manufacturing and mining exports, and imports ($\log YN_t$, $\log K_t$, $\log L_t$, $\log AX_t$, $\log IX_t$, $\log MX_t$ and $\log M_t$). Since these variables are assumed to be I(1), letting $\Delta Y_t = Y_t - Y_{t-1}$ is an attempt to reach stationarity; thus the first difference notation of equation (8) which is reformulated in Vector Error Correction (VEC) is as follows:

$$\Delta Y_t = \mu + \sum_{k=1}^{p-1} \Gamma_k \Delta Y_{t-k} + \prod Y_{t-1} + \varepsilon_t \tag{9}$$

Where Π and Γ_k are coefficient matrices and the rank r of matrix Π will determine the co-integrating rank or the number of co-integrating relations. Equation (9) denotes an uneven degree of integration because some variables such as ΔY_t and ΔY_{t-k} are I(0); other variables Y_{t-1} are I(1). To run a co-integration test, it is recommended that all variables on the left and the right hand side of equation (9) have the same order (degree) of integration. Therefore, if the rank r of matrix Π equals zero ($r = 0$), $\Pi=0$. But if $r > 0$, the parameters of Π will be such that $\prod Y_{t-1}$ is stationary. In the case where $r = 0;\ \Pi = 0$, there is no co-integration and equation (9) will be like a common VAR model in first differences. But in the event that $r > 0$, there will be r possible linear combinations of the vector Y_t. This means that there exists $r < k$ co-integrating relations. If $0 < r < k$, Π has a reduced rank matrix which can be separated into two matrices α and β with rank r such as that:

$$\prod Y_{t-1} = \alpha\beta^{'} Y_{t-1} \tag{10}$$

Where $\beta^{'} Y_{t-1}$ is the co-integrating relations; the property of the vector β is such that $\beta^{'} Y_t$ is stationary even if Y_t itself is non-stationary. The α term represents the loading matrix which contains the coefficients of the error correction vector; these coefficients measure the speed of adjustment toward equilibrium.

In the Johansen framework, the formal tests for co-integration use the trace and maximum eigenvalue statistics. The trace statistic is a test of the null hypothesis that there are at most r co-integrating vectors against the alternative hypothesis of k co-integrating vectors. The maximum eigenvalue statistic tests the null hypothesis of the existence of r co-integrating relations against the alternative hypothesis of r+1 co-integrating vectors. (Maddala and Kim, 1998: 211-212). These two tests are presented below:

$$\lambda_{trace}\ (r) = -T \sum_{i=r+1}^{n} \ln(1 - \lambda_i),\ \textbf{and} \tag{11}$$

$$\lambda_{max}\ (r, r+1) = -T \sum \ln(1 - \lambda_{r+1}) \tag{12}$$

In both tests T represents the number of observations and λ_i are the smallest values of the coefficient matrix Π or the determinant equation. The decision rule is such that the null hypothesis of zero co-integration vectors is rejected in favour of the alternative hypothesis of r co-integrating vectors if the likelihood ratio is greater than the critical values. Should co-integration relations be found, Granger causality can be inferred from an ECM.

4.3.4. Granger causality

In statistics if two variables such as export and economic growth are joint covariance stationary processes; then export is said to 'Granger cause' growth, if previous values of export and growth are a better prediction of current values of growth than only the past values of growth.

Granger causality tests consist of establishing the direction of causal relationships among the variables. The causal relationship between two variables can be independent, uni-directional or bi-directional. Granger causality tests are also sensitive to lag length; thus an appropriate lag order in a VAR must be used on the basis of various statistical information criteria. Two types of Granger-causality tests will be used in this study, namely causality tests based on the VECM and Granger causality based on the Toda-Yamamoto procedure.

4.3.4.1. Error Correction Model (ECM)

The ECM accounts for short-run dynamics in the system as well as long run equilibrium mechanism. (Maddala & Kim, 1998:35). In the case of this study, an ECM will be estimated if there is a stable long-run equilibrium relationship between export and growth (co-integration). Based on this model Granger causality can be deduced and the direction of causality will depend on the significance or non-significance of the error correction coefficient of the lagged error correction term. If the error correction coefficient α is significant, it can be inferred that long- run causality runs from all exogenous variables ($\log K_t$, $\log L_t$, $\log AX_t$, $\log IX_t$, $\log MX_t$ and $\log M_t$) to the dependent variable ($\log YN_t$).

The ECM representation of the model (equation 9) can be written as a VECM (equation 13) where ECT_{t-1} is the one period lagged error correction term; the coefficients α measure the long-run adjustments while the coefficients Γ_k for the lagged values of differenced variables capture the short run dynamics.

$$
\begin{bmatrix} \Delta logYN_t \\ \Delta logK_t \\ \Delta logL_t \\ \Delta logAX_t \\ \Delta logIX_t \\ \Delta logMX_t \\ \Delta logM_t \end{bmatrix} = \begin{bmatrix} \mu_1 \\ \mu_2 \\ \mu_3 \\ \mu_4 \\ \mu_5 \\ \mu_6 \\ \mu_7 \end{bmatrix} + \sum_{k=1}^{p-1} \Gamma_k \begin{bmatrix} \Delta logYN_{t-k} \\ \Delta logK_{t-k} \\ \Delta logL_{t-k} \\ \Delta logAX_{t-k} \\ \Delta logIX_{t-k} \\ \Delta logMX_{t-k} \\ \Delta logM_{t-k} \end{bmatrix} + \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \\ \alpha_6 \\ \alpha_7 \end{bmatrix} ECT_{t-1} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \\ \varepsilon_{6t} \\ \varepsilon_{7t} \end{bmatrix} \qquad (13)
$$

4.3.4.2. Toda-Yamamoto Granger causality tests

Contrary to the ECM representation, the Toda-Yamamoto causality procedure does not depend on the prior existence of co-integrating relations among the variables. For this reason, this procedure is most likely to improve the power of Granger causality than other Granger causality techniques (Awokuse, 2003:130).

The Toda-Yamamoto approach suggests the use of a modified Wald test for restrictions on the coefficients of a $VAR(k)$ in levels. This VAR model is then augmented (over-fitted) with an extra lag denoted d-max, which represents the maximum order of integration of the variables, so that the order of the VAR becomes $p = k + d$. The parameters of the last d-max lagged vectors are not included in the Wald test; only the first k parameter matrices are included. By using an over-fitted VAR such as $VAR(k + d)$, this approach ensures that Wald test statistics have their usual chi-square asymptotic distribution under the null hypothesis (Toda and Yamamoto, 1995:245-246).

A simple representation of VAR model with only two variables, namely output Y and a component of export X is given below to illustrate the Toda-Yamamoto procedure:

$$
Y_t = \alpha_1 + \beta_{11}X_{t-1} + \cdots + \beta_{1p}X_{t-p} + \varphi_{11}Y_{t-1} + \cdots + \varphi_{1p}Y_{t-p} + \epsilon_{1t} \qquad (14)
$$

$$
X_t = \alpha_2 + \beta_{21}X_{t-1} + \cdots + \beta_{2p}X_{t-p} + \varphi_{21}Y_{t-1} + \cdots + \varphi_{2p}Y_{t-p} + \epsilon_{2t} \qquad (15)
$$

We can then test the hypothesis that the parameters of only the first p lagged values of X are zero in Y; and vice versa. Hence, the null hypothesis H_0 that: $\beta_{11} = \beta_{12} = \cdots = \beta_{1p} = 0$ against the alternative H_A that: not H_0, is a test that a component of export (X) does not Granger cause GDP(Y). Likewise, testing H_0: $\varphi_{21} = \varphi_{22} = \cdots = \varphi_{2p} = 0$ against the H_A that $\varphi_{21} = \varphi_{22} = \cdots = \varphi_{2p} \neq 0$ is the test that output does not Granger cause export. In either case, the rejection of the null hypothesis implies a rejection of non-causality, which entails that there is Granger causality.

4.4. DATA AND VARIABLES EXPLANATION

4.4.1. Data

The data used for this study is obtained from sources including the DTI, the SARB and Statistics South Africa (StatSA). The frequency of data is quarterly and two datasets are employed. The first dataset is used for the aggregate (with total exports) analysis and it covers the period extending from 1970Q1 to 2011Q4. The second dataset is used for sectoral analysis and it spans a period of 21 years from 1990Q1 to 2011Q4.

The main time series that the study makes use of are: (i) GDP, GFCF, total exports and total imports. This data is sourced from the SARB, it is expressed in constant prices (2005) and it is seasonally adjusted; (ii) agricultural, manufactured and mining exports series which are obtained from the DTI and are expressed in nominal terms. The producer price index of each sector is used to calculate the real export/import flows; (iii) employment data represent the number of employed people in the non- agriculture sector of the economy. This data is obtained from Hodge (2009) who constructed annual employment series from 1946. However, the original source of this data include: Central Statistical Services, *South African Labour Statistics* (1990-1995); Statistics South Africa, *October Household Survey* (Statistical release P0317), 1995-1999; Statistics South Africa, *Labour Force Survey* (Statistical release P0210), 2000-2007. The employment data was interpolated by applying the quadratic match average function (Eviews, 2009) in order to obtain quarterly series.

4.4.2. Variables definition

1. GDP represents the aggregate value of final goods and services that a country produces during a specific period. It is commonly used to measure the performance of the economy (Mhor and Fourie, 2008:57). As explained earlier in section 2, this study uses a measure of GDP net of exports as the dependent variable of the model. This is denoted in logarithmic terms as logYN

2. Capital (logK): as an input of production, capital is expected to have a positive effect on output or GDP. This variable is often proxied by GFCF which consists of

expenditures on additions to the country's fixed assets plus the net variations in the inventories. Fixed assets contain machinery, land improvements, plant, and construction of railways, roads, schools, residential, commercial and industrial buildings, hospital, and the like. Inventories changes denote goods produced in a previous period but sold during the current period; as well as current period production that has not yet been consumed (Bahmani-Oskooee and Economidou, 2009:207; Mhor , 2008:65)

3. Labour (logL): labour plays the same role as capital in the production function. This variable consists of the number of economically active people who are employed in a particular year. The employment figures used in this study consist of the number of employed in the non-agriculture sectors.

4. Exports (logAX: agricultural exports; logIX: manufactured exports and logMX: mining exports) represent the value of agricultural, manufactured and mining goods provided to the rest of the world. Exports are added to the neoclassical production to control for the long run nature of the relationship between export expansion and output growth. As discussed in section one of the previous chapter, exports are assumed to drive economic growth, hence the ELG hypothesis.

5. Imports (logM): imports contain spending on goods and services received from the rest of the world. These include the value of goods, freight, insurance, transport, travel, royalties, license fees, and other services. As argued before, imports are not proper inputs of production; but because of their indirect positive effect on output via imported capital goods, an ELG model would be bias if imports are not included.

4.5. SUMMARY

This chapter has first outlined theoretical background that underpins the specification of the model. This conceptual framework is traced back to the neoclassical trade theory. This theory advocates free trade and the international integration of economies. Secondly, the empirical model specification has been presented. This model is based on the traditional neoclassical production function augmented with variables such as sectoral exports and imports. Thirdly, a discussion of the econometric approach was presented. This has centered on the Johansen's

co-integration procedure as well as Granger causality tests. Here, the chapter outlined a step by step explanation of the different tools to be used in order to estimate the model. The chapter ends with an explanation of data and variables to be employed in the study. The next chapter applies the approach explained above on this data in order to derive empirical findings.

CHAPTER FIVE: EMPIRICAL ANALYSIS AND RESULTS DISCUSSION

5.0. INTRODUCTION

The previous chapter explained the methodological approach, namely the co-integration and Granger causality techniques, which this study would employ. Based on this approach, this chapter discusses the empirical investigation of the study. This investigation consists of establishing whether the hypothesis of export-led growth holds in the case of South Africa. The first section examines the relationship between output and exports over the period 1970-2011using total exports. On the other hand, the second section discusses empirical findings at the sectoral level for the period 1990-2011; using the broader composition of exports in the real sector. This composition includes primary exports (agriculture and mining) as well as manufactured exports. The last section of the chapter gives a brief summary.

5.1. AGGREGATE EXPORTS

5.1.1. Initial investigation of data

Before analyzing time series properties in the following subsection, a preliminary visual analysis of the data can be insightful. Gujarati & Porter (2009:749) argue that a graphical representation of the series provides a primary clue of the expected nature of the series with regard to the inclusion or not of a trend, a constant or both in the model. This analysis is done by using time graphs of all the variables. These variables include GDP net of exports (denoted GDPnet), GFCF (proxy for Capital input), Labour, total Exports and Imports. Figure 5.1 below shows a graphical representation of these variables for the period 1970Q1-2011Q4.

The GDP net series display a rough upward linear trend for the period under review; while the Capital series depicts considerable swings around an almost horizontal trend from the 1970s through the 2000s. The level of Capital has markedly increased since 2002 owing to an acceleration of both public and private sector investments. However, this level has declined in 2009 due to the global recession. The fluctuations in the employment series exhibit three broad trends: employment rose from the 1970s to 1990s, then it declined until the mid-1990s; thereafter the upward trend in employment is almost steady owing to a relatively robust growth registered in the economy for most of the 2000s. However, the 2008 recession induced an increase in unemployment. Exports and Import series show almost similar patterns in that they fluctuated around a horizontal trend from 1970 to the late 1980s;

thereafter they increased monotonically, except for a decline around 2009 due to the global recession.

Figure 5.1: Log of Gdpnet, Capital, Labour, Exports and Imports: 1970Q1-2011Q4
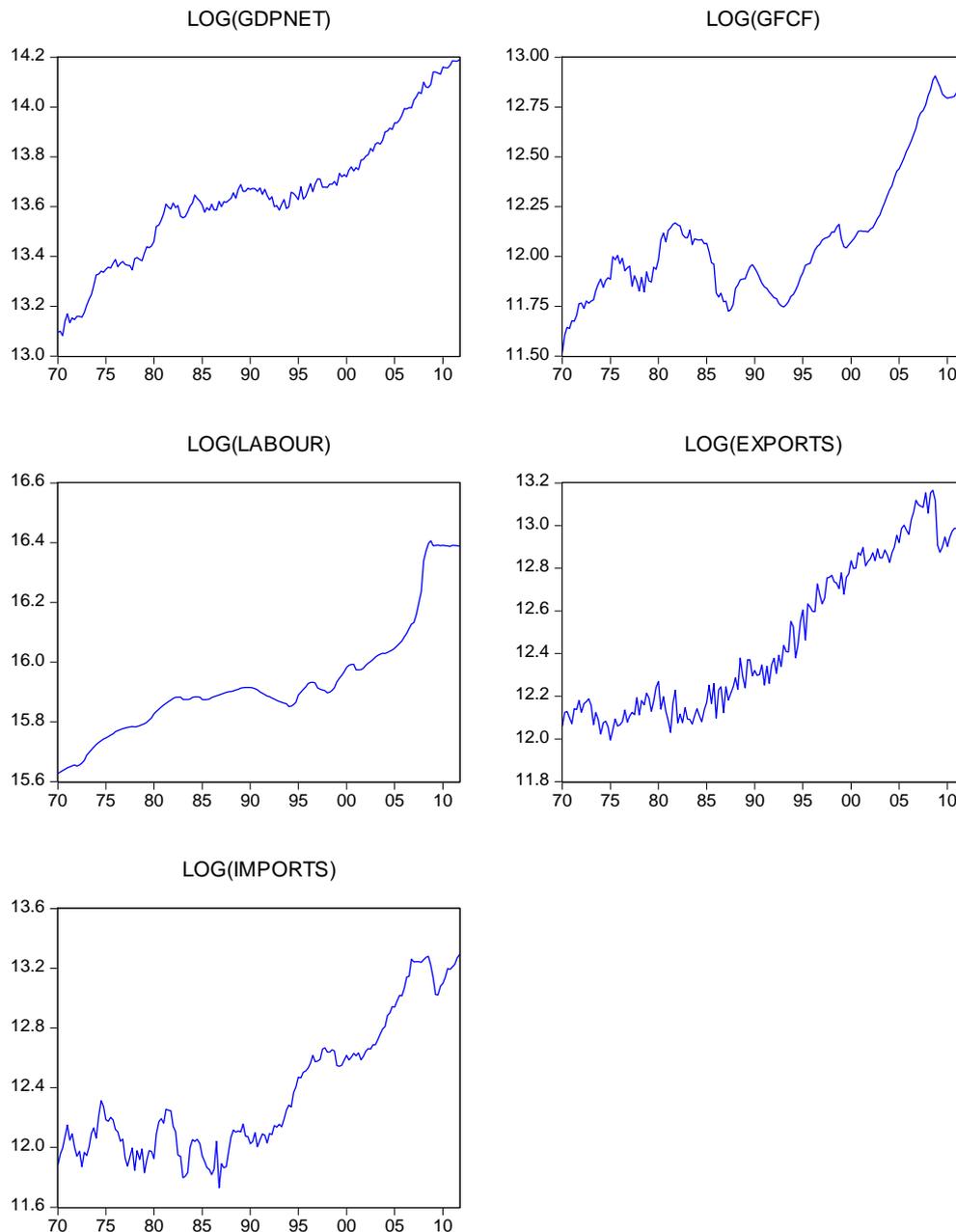
5.1.2. Analysis of time series properties

A look at figure 5.1 reveals that all series exhibit a time trend. This is evidence that the series are non-stationary; which means that they may have unit roots. This subsection covers the formal investigation of time series properties by determining the order of integration using

the augmented Dickey Fuller (ADF) unit root tests. However, because figure 5.1 also reveals that all variables, except employment grew approximately rapidly since the 1990s, there is a possibility of a structural break in the series which must be accounted for in the co-integration test. Therefore, the ADF unit root test is complemented with the Philip-Peron (PP) test. It is argued that PP unit root test is considered to be more powerful in accounting for a discontinuity in the series than ADF tests[13].

Table 5.1 Unit root tests, 1970Q1-2011Q4

Variables	PP unit roots			ADF unit roots		
	Critical values @ 5% (1)	PP t-statistic @ 5%		Critical values @ 5% (1)	ADF t-statistic @ 5%	
		Level	First differences		Level	First differences
LogGdpnet(YN)	-2.88*	-0.54*	-15.2*	-2.88*	-0.52*	-15.61*
	-3.44**	-1.71**	-15.41**	-3.44**	-1.57**	-15.57**
LogExports(X)	-2.88*	-0.33*	-21.95*	-2.88*	0.18*	-11.34*
	-3.44**	-3.41**	-22.17**	-3.44**	-2.39**	-11.38**
LogCapital(K)	-2.88*	-0.27*	-13.08*	-2.88*	-0.54*	-4.63*
	-3.44**	-1.13**	-13.08**	-3.44**	-1.60**	-4.36**
LogLabour(L)	-2.88*	0.61*	-5.93*	-2.88*	-0.31*	-4.49*
	-3.44**	-0.79**	-5.97**	-3.44**	-1.48**	-4.56**
LogImports(M)	-2.88*	-0.12*	-14.75*	-2.88*	-0.16*	-14.90*
	-3.44**	-1.88**	-14.80**	-3.44**	-1.85**	-14.95**

Notes: 1. **(1)** Critical values are from MacKinnon (1996) and are the same in level or in first differences
    2. * denotes the inclusion of a constant and ** denotes the inclusion in test regression of a constant plus time trend
    3. The lag order in both tests was selected automatically. The PP tests used the Newey-West Bandwidth, whereas the ADF tests used the Akaike information criterion (AIC) which selected lag length from a maximum of 13 lags

Source: Own calculations

Table 5.1 shows the results of these tests: the null hypothesis of the presence of a unit root is rejected if the PP and ADF test-statistics are larger than their critical values at 5 percent significance level. The ADF and the PP test results reveal that all series are non-stationary in their levels, but stationary or integrated of order zero I(0) in their first differences. These results appear to be robust even with the inclusion of an intercept and a linear trend in both

---

[13]The PP procedure allows an endogenous identification of one unknown break point in the series while the ADF technique is inclined towards finding stationarity in the presence of structural shifts (Herzer et al, 2006:314)

test statistics. Since all variables are non-stationary in their levels and integrated of the same order (first difference), co-integration tests can be performed.

5.1.3. Co-integration tests

The test for co-integration uses the Johansen procedure. This approach estimates the number of co-integrating relations between non- stationary variables integrated of the same order by using the technique of maximum likelihood. This technique is based on the estimation of a VAR model. This model includes a dummy variable denoted D94 which will account for the existence of a structural break in 1994 due to the change in the political regime. The dummy D94 will take on zero values for the period up to and including 1993Q4; and the values of one otherwise.

Table 5.2 contains the results of the Johansen co-integration test based on VAR(2). Following the visual evidence that all sequences possibly trended together over the period under review, an intercept and a linear trend are included in the VAR. The Johansen test reported in Table 5.2 is based on the estimation of the likelihood ratio test statistics, namely the Trace and Maximum-Eigen statistics. The null hypothesis (H_0) of no co-integration is rejected if the estimated statistics are larger than their critical values. Thus the testing strategy starts with the null hypothesis r =0, or the number of co-integrating vectors r =0; against the alternative hypothesis (H_1) of at most 1 co-integrating relation. If the null of r=0 is certainly rejected, this procedure continues (with H_0 of r=1 and H_1 of r=2) until the null hypothesis is accepted for the first time.

Table 5.2: Johansen Co-integration tests; 1970Q1-2011Q4
Variables included in the unrestricted VAR: $\log YN, \log K, \log L, \log X, \log M$

Hypothesizes N0 of co-integrating vectors		Trace Statistic	Max-Eigen Statistic
Null	Alternative		
r =0	r=1	99.07(88.8)	39.6(38.33)
r≤ 1	r=2	59.46(63.88)	29.93(32.12)
r≤ 2	r=3	29.53(42.92)	14.86(25.82)
r≤ 3	r= 4	14.67(25.87)	7.79(19.39)
r≤ 4	r=5	6.87(12.52)	6.88(12.52)

Notes: the model includes exogenous variable D94; figures in parentheses are critical values @ 5% level. These values are derived from Osterwald-Lenum (1992).

The results from both test statistics indicate the presence of a unique co-integrating vector between the variables. Indeed, the comparison of Trace and Maximum-Eigen statistics with their corresponding critical values leads to the rejection of the null hypothesis of zero co-integrating relation in favour of the alternative hypothesis of at most r=1, or one co-integrating vector. Since output is the dependent variable, the long-run co-integrating vector can be estimated after normalizing on logYN; which gives the following long-run relation (with standard errors in parentheses):

$$logYN = 0.296logX + 0.211logM + 0.342logK - 0.182logL - 0.006 \quad (1)$$
$$(0.075) \quad\quad (0.052) \quad\quad (0.055) \quad\quad (0.119)$$

Taking into account the impact of exports on GDP, it can be inferred, from equation (1) that non-export GDP increases approximately by 0.3% in the long run, for every rise of 1% in total exports. Other positive coefficients in equation (1) also denote their positive effect on output. However the coefficient of labour is negative, which is contrary to theory. As argued in the previous chapter, this could be due to the way in which labour series was constructed as reliable employment data are not available. Moreover, this coefficient is insignificant; hence it is excluded from Granger causality test.

5.1.4. Granger causality test

Having found a unique co-integrating relation among the variables, Granger causality can be conducted in order to establish the direction of causality and thereby determining whether the hypothesis of ELG is valid. Following Engle and Granger (1987), an ECM representation is used for this purpose. The estimation of the ECM is based on a VEC model which is a restricted VAR that is used with non-stationary series identified as co-integrated. Having removed employment from the co-integrating relation, the ECM representation with four variables can be written as follows:

$$\Delta logYN = \mu_1 + \sum_{k=1}^{p}[\beta_{1k}\Delta logYN_{t-k} + \delta_{1k}\Delta logX_{t-k} + \varphi_{1k}\Delta logK_{t-k} + \alpha_{1k}\Delta logM_{t-k}] + \lambda_1 ECT_{-1} + \varepsilon_1 \quad\quad (2)$$

$$\Delta logX = \mu_2 + \sum_{k=1}^{p}[\beta_{2k}\Delta logYN_{t-k} + \delta_{2k}\Delta logX_{t-k} + \varphi_{2k}\Delta logK_{t-k} + \alpha_{2k}\Delta logM_{t-k}] + \lambda_2 ECT_{-1} + \varepsilon_2 \quad\quad (3)$$

$$\Delta logK = \mu_3 + \sum_{k=1}^{p}[\beta_{3k}\Delta logYN_{t-k} + \delta_{3k}\Delta logX_{t-k} + \varphi_{3k}\Delta logK_{t-k} + \alpha_{3k}\Delta logM_{t-k}] + \lambda_3 ECT_{-1} + \varepsilon_3 \quad\quad (4)$$

$$\Delta logM = \mu_4 + \sum_{k=1}^{p}[\beta_{4k}\Delta logYN_{t-k} + \delta_{4k}\Delta logX_{t-k} + \varphi_{4k}\Delta logK_{t-k} + \alpha_{4k}\Delta logM_{t-k}] +$$
$$\lambda_4 ECT_{-1} + \varepsilon_4 \tag{5}$$

Where p is the lag order and ECT_{-1} is the one period lag value of the error correction term (ECT). This term is assumed to capture long run relationships. In other words, it holds information about whether the current values of the variable have been influenced by past values of variables. On the other hand, short run dynamics are captured by individual lagged values of differenced terms.

Table 5.3 reports the results of the ECM. These results show that the coefficients λ of the error correction term in all ECM (equations 2 to 5) are significant. This suggests the existence of long run Granger causality from the independent variables (logX, logK and logM) to the dependent variable (logYN). This also means that, in the long- run economic growth adjusts to changes in exports, capital and imports; likewise changes in exports adjust to changes in GDP, capital and imports. Thus there is a bi-directional causation between GDP and exports.

Besides revealing long-run relationships, short run dynamics are also inferred from the ECMs by imposing restrictions on lagged differenced terms[14]. Looking at the coefficients in table 5.3, one can deduce that the lagged coefficient of ΔlogYN is significant in equations (4) and (5); meaning that short run dynamic effects run from GDP to capital and imports. Similarly, in equations (2) and (5), the lagged value of δ_{1k} and δ_{4k} are statistically significant; implying that exports growth Granger causes GDP and imports in the short run.

Conversely, the lagged term β_{2k} is insignificant in ΔlogY (equation 3) suggesting that statistically, GDP does not Granger cause exports in the short run. Unlike the long- run causality, here the direction of causality is unidirectional, running from exports to GDP. This evidence supports the hypothesis that aggregate export growth led to economic growth. But of more interest for this study is the evidence from sectoral exports which is presented in the section that follows.

---

[14] The Wald test was used to test the restrictions that lagged differenced terms have zero coefficients

Table 5.3 Error Correction Models for logYN, logK, logL, logX, logM: 1970Q1-2011Q4

Regressors	Dependent variables			
	$\Delta logYN$	$\Delta logX$	$\Delta logM$	$\Delta logK$
ECT	0.06	-0.19	-0.192	0.257
	(2.29)	**(-2.3)**	**(-2.08)**	**(5.08)**
$\Delta logYN(-1)$	_	0.642	2.36	0.446
		(1.67)	**(5.5)**	**(1.9)**
$\Delta logX(-1)$	0.093	_	0.563	-0.011
	(2.3)		**(4.02)**	(-0.15)
$\Delta logM(-1)$	0.016	0.026	_	0.053
	(0.69)	(0.36)		(1.17)
$\Delta logK(-1)$	-0.004	0.073	-0.067	_
	(-0.11)	(0.58)	(-0.47)	

Values in parentheses are t- statistics; values in bold indicate significance at 5% level

5.2. ANALYSIS OF ELG FOR SECTORAL EXPORTS

The analysis of ELG for aggregate exports does not show the influence of export types on output. As argued in earlier chapters, the role of a particular export sector in driving output is ignored when examining aggregate exports in lieu of their composition. In this section, consideration is given to the role of real sector exports in driving output growth.

The real sector exports include agricultural, mining and manufacturing activities. The extent of the impact of each export sector on output growth is analyzed below using 8 digit Harmonized System (HS) trade statistics sourced from the DTI. The analysis covers the period from 1990 to 2011. The choice of this period is justified on the basis of the inception of major policy shifts following the end of apartheid. These policies include the implementation of liberal trade policies, amongst others that took place in the 1990s. The second reason for choosing the period 1990-2011 is because reliable time series for disaggregate exports are not available prior to the 1990s.

As discussed in chapter four, the model specification for sectoral exports analysis is an augmented production function d denoted as follows:

$$lnYN_t = \alpha + \beta lnK_t + \gamma lnL_t + \delta lnAX_t + \varphi lnIX_t + \rho lnMX_t + \theta lnM_t + \epsilon_t \qquad (6)$$

where α is a constant, ε_t is the stochastic error term which is assumed to be white noise; β, γ, δ, φ, ρ and θ are coefficients of the independent variables; YN, K, L, AX, IX, MX and M represent respectively GDP net of exports, Capital, Labour, Agricultural exports, Manufactured exports, Mining exports, and Imports. Following Johansen approach, the investigation of ELG hypothesis follows the same steps as in the previous section (determining the time series properties, testing for the existence co-integration relations, and running Granger causality tests).

5.2.1. Testing for the order of integration

As most macroeconomic series are not stationary in levels, the first step leading to co-integration analysis is to establish the order of integration of variables. This is done in table 5.4 where the ADF and PP unit root tests reveal that all variables are non-stationary in their levels, but stationary in their differences.

Table 5.4 Unit root tests, 1990Q1-2011Q4

Variables	PP unit roots			ADF unit roots		
	Critical values @ 5% (1)	PP t-statistic @ 5%		Critical values @ 5% (1)	ADF t-statistic @ 5%	
		Level	First differences		Level	First differences
Log(NY)	-2.90*	1.58*	-13.22*	-2.90*	1.30*	-3.48*
	-3.46**	-3.54**	-14.69**	-3.46**	-3.34**	-4.33**
Log(AX)	-2.91*	-2.20*	-9.43*	-2.91*	-2.20*	-9.39*
	-3.48**	-3.54**	-9.56**	-3.48**	-3.43**	-9.46**
Log(IX)	-2.91*	-1.42*	-6.07*	-2.91*	-1.45*	-6.39*
	-3.48**	-2.66**	-6.07**	-3.48**	-3.46**	-6.43**
Log(MX)	-2.91*	-0.13*	-10.15*	-2.91*	-0.13*	-10,18*
	-3.48**	-2.70**	-10.15**	-3.48**	-2.70**	-10.17**
Log(M)	-2.91*	-0.79*	-6.98*	-2.91*	-0.78*	-6.98*
	-3.48**	-2.47**	-6.91**	-3.48**	-2.16**	-6.91**
Log(K)	-2.90*	0.59*	-4.17*	-2.90*	0.09*	-4.17*
	-3.46**	-2.77**	-4.25**	-3.46**	-2.71**	-4.25**
Log(L)	-2.90*	0.64*	-4.28*	-2.90*	0.07*	-4.25*
	-3.46**	-1.83**	-4.50**	-3.46**	-2.15**	-4.42**

Notes: 1. **(1)** Critical values are from MacKinnon (1996) and are the same in level or in first differences
2. * denotes the inclusion of a constant and ** denotes the inclusion in test regression of a constant plus time trend
3. The lag order in both tests was selected automatically. The PP tests used the Newey-West Bandwidth, whereas the ADF tests used the Akaike information criterion (AIC) which selected lag length from a maximum of 13 lags

Source: Own calculations

5.2.2. Co-integration tests

Having established the order of integration of variables, the next step is to test for the existence of a long run relationships between the variables. Based on VAR(4), the Johansen maximum likelihood procedure yields the trace and maximum eigenvalue statistics. Both statistics indicate the existence of two co-integrating relations between the variables at 5% level of significance. The long-run co-integrating vector derived from the Johansen estimation is given by equation (7) where values in parentheses are standard errors:

$$logYN = 0.55logK - 0.79logL + 0.58logAX + 0.86logIX + 041logMX - 1.85logM \quad (7)$$
$$\quad (0.276) \quad (0.572) \quad (0.13) \quad (0.213) \quad (0.16) \quad (0.352)$$

Like in the previous case, the coefficient of labour in equation (7) is negative and insignificant. Given the unreliability of the employment series, labour is dropped from the model specification and the VAR(4) co-integration test is re-run. Table 5.5 reports the results of co-integration tests. Unlike the former specification, the VAR without the variable labour shows that only the trace statistic indicates the existence of one co-integrating relations between the variables at 5% level of significance. The maximum eigenvalue yields zero co-integrating relation. In this case one relies on the trace statistic which leads to the conclusion that there is one co-integrating vector[15].

Table 5.5: Johansen Co-integration tests; 1990Q1-2011Q4
Variables included in the unrestricted VAR: $logYN, logK, , logAX, logIX,$
$logMX, and \ logM$

Hypotheses N0 of co-integrating vectors		Trace Statistic		Max-Eigen Statistic	
Null	**Alternative**				
r=0	r=1	121.13	(117.7)*	39.67	(44.50)
r≤1	r=2	102.52	(88.80)	30.35	(38.33)
r≤2	r=3	51.12	(63.90)	17.42	(32.12)
r≤3	r=4	33.70	(42.92)	14.65	(25.82)
r≤4	r=5	19.04	(25.87)	11.38	(19.39)
r≤5	r=6	7.67	(12.51)	7.67	(12.52)

Note: figures in parentheses are critical values @ 5% level. These values are derived from Osterwald-Lenum (1992). Rejection of the null hypothesis of no co-integration is indicated by *

---

[15] It is argued that the trace statistic is more powerful than the maximum eigenvalue because it appears to be robust to excess kurtosis and skewness in the residuals. Hence when these two statistics yield conflicting results, the trace statistic will most likely be used (Love, 2004: 388)

The long-run co-integrating vector is given by the following equation (with standard errors in parentheses):

$$logYN = 0.31logK + 0.33logAX + 0.59logIX + 0.19logMX - 1.2logM \qquad (8)$$
$$ (0.15) \qquad (0.11) \qquad (0.17) \qquad (0.09) \qquad (0.22)$$

This equation depicts the existence of a long-run equilibrium relationship among the variables. Statistically, positive significant coefficients denote positive effect of exogenous variables on output. For example, the coefficient 0.59 means that for every 1% rise in manufactured exports, output is rose by 0.59%. The magnitude of this coefficient suggests that manufactured exports have had the greatest impact on economic growth, possibly through increases in productivity. This finding can be associated with the implementation of liberal trade policies which has led to rise in manufactured exports (Edwards and Lawrence, 2008).

However, the contribution of agricultural exports compared to mining exports appears to be contrary to expectations. Though both have been declining overtime, mining exports have a greater role in output than agricultural exports. On the other hand, the negative sign of import parameter can be expected, which may suggest that import of consumption goods dominated total imports. Contrary to capital goods imports which boost capital stock and productivity, consumption goods imports are not productive; that is, not likely to generate capital accumulation.

5.2.3. Granger causality test

After establishing the existence of a long-run co-integrating relationship among the variables, Granger causality test can be deduced from a VEC(2) representation. The lag order of two included in the VEC was confirmed by the Akaike Information criteria (AIC), Likelihood Ratio (LR) and Hannan-Quinn (HQ) information criteria, and by the fact that residuals are white noise at two lags. Table 5.6 shows the results of Granger causality tests

Table 5.6: Granger causality test based on the VECM

Regressors	Dependent variables					
	$\Delta logYN$	$\Delta logK$	$\Delta logAX$	$\Delta logIX$	$\Delta logMX$	$\Delta logM$
ECT	**S (5.0)**	**S (2)**	NS (1.7)	**S (2.0)**	NS (1.5)	**S (2.8)**
$\Delta logYN(-2)$	-	NS (0.8)	NS (0.11)	NS (0.46)	NS (0.24)	NS (0.21)
$\Delta logK(-2)$	**S (2)**	-	NS (1.3)	NS (0.53)	NS (0.21)	NS (1.2)
$\Delta logAX(-2)$	NS (0.3)	NS (0.2)	-	NS (0.4)	NS (0.2)	NS (0.6)
$\Delta logIX(-2)$	**S (2.2)**	NS (1.6)	NS (0.8)	-	0.0	0.0
$\Delta logMX(-2)$	**S (2.1)**	NS (1.67)	NS (0.7)	NS (1.43)	-	NS (1.52)
$\Delta logM(-2)$	NS (1.1)	NS (0.4)	NS (1.2)	NS (0.82)	NS (1.08)	-

Values in parentheses are t-statistics of lagged coefficients; with **S** and NS denoting respectively significance and non-significance at 5% level. Wald tests were performed on the lagged difference terms and ECT in order to verify significance.

Looking at the results in table 5.6, one could conclude that in the long-run, economic growth adjusts to changes in manufactured exports, mining exports, imports, and capital. However, long-run causality can only be inferred from capital, manufactured exports and imports to GDP since their ECT parameters are significant. Whereas, agricultural and mining exports do not seem to Granger-cause output in the long-run because their ECT coefficients are not significant. This conclusion is supported by weak exogeneity test of the ECT coefficients[16]

On the other hand, coefficients of lagged independent variables, except the coefficient for ΔlogM(-2) and ΔlogAX(-2), are significant at 5% level. This implies that growth in capital, manufactured and mining exports Granger causes GDP growth in short-run. Focusing on sectoral exports, the results show a unidirectional causality from manufactured and mining exports to economic growth. In other words, unlike agricultural exports whose role in GDP growth appears to be insignificant, the role of manufactured and mining exports is very crucial in driving economic growth in South Africa. This is not surprising because both the share of agricultural activities in GDP and that of agricultural exports in total exports have been declining over the period under review.

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[16] Granger causality can be deduced by imposing zero restrictions on the parameters of the ECT using the Wald test. This approach is also referred to as weak exogeneity tests whereby the rejection of weak exogeneity entails long-run Granger causality (Herzer et al., 2006: 314).

Table 5.7: Granger causality test based on the Toda-Yamamoto approach

Regressors	Dependent variables					
	logYN	*logK*	*logAX*	*logIX*	*logMX*	*logM*
logYN	-	NS (0.25)	NS (0.49)	NS (0.51)	NS (0.16)	NS (0.36)
logK	S (0.00)	-	NS (0.08)	NS (0.82)	NS (0.47)	NS (0.73)
logAX	NS (0.77)	NS (0.81)	-	NS (0.97)	NS (0.18)	NS (0.27)
logIX	S (0.01)	NS (0.23)	NS (0.89)	-	NS(0.88)	NS (0.9)
logMX	NS (0.21)	NS (0.36)	NS (0.51)	NS (0.57)	-	NS (0.14)
logM	S (0.01)	NS (0.36)	NS (0.96)	NS (0.88)	NS (0.66)	-

Note: values in parentheses are p-values from Wald tests, S and NS denote significance and non-significance respectively at 5% level where significance infers Granger causality from regressors to dependent variables.

Table 5.7 shows short-run causality results using the Toda-Yamamoto procedure. As argued in the previous chapter, Granger causality performed with this procedure does not depend on the prior existence of co-integrating relations among the variables because it is based on an augmented VAR object in level. The optimal lag order in the VAR was found to be two (k=2); this was increased by an extra lag of one (dmax=1) since the order of integration is one. Hence, a VAR(2+1) was estimated[17]. The presence of Granger causality is supported by the rejection of the null hypothesis of Granger non-causality.

From table 5.7, it can be concluded that capital, manufactured exports and imports Granger-cause GDP. As explained earlier, the positive effect of imports growth on GDP growth could be due to the indirect effects that capital goods imports have on domestic production. The positive spill-over effects of capital goods imports embedded with new technology can spread over the long run as the long-run Granger causality result indicates in table 5.6. This latter result is consistent with the Toda-Yamamoto results table in 5.7. But when considering only the effect of exports on GDP, the Toda-Yamamoto Granger causality results show that the uni-directional causal relationship runs only from manufactured exports to GDP. This causality does not run from manufactured and mining exports as in the VECM.

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[17] For the results in table 5.7, a level VAR(3) was estimated, then Granger causality Wald tests were used without including the coefficients of extra lag in the test in order to ensure that Wald tests have their normal asymptotic chi-square distribution. Another way of applying Wald tests, is to estimate the VAR(k) using Seeming unrelated regressions (SUR), then test the restrictions on the first k coefficients of the VAR(k) (Awokuse, 2003:130)

5.3. SUMMARY

This chapter discussed the empirical analysis of the study thereby answering the research questions. It applied the Johansen co-integration procedure and Granger causality techniques to both aggregate and sectoral exports. Findings from the empirical investigation reveal that the ELG hypothesis is valid for South Africa. In other words, the results suggest that exports drove economic growth over the period reviewed. By looking at sectoral exports in particular, the results show the existence of both a stable long-run equilibrium relationship between sectoral exports and output, as well as a unidirectional causality relation running from manufactured and mining exports to GDP in the short-run. Other studies on ELG for South Africa have found similar results. These studies include Rangasamy (2008) and Ziramba (2011). The policy implications of these findings are discussed in the next chapter.

CHAPTER SIX: CONCLUSION AND POLICY RECOMMENDATIONS

The relationship between export and economic growth has received a particular interest in international and development economics following the abandonment by many developing countries of ISI policies in preference for an outward-oriented strategy. This strategy suggests that promoting and increasing exports is crucial to driving economic growth. This is due to a range of direct and indirect multiplier effects linked to export. These include access to a larger market, access to imported capital goods at world prices, increased productivity, and attraction of foreign direct investments.

In South Africa, the path to an outward-oriented strategy has been somehow adopted since the 1970s when the Apartheid government decided to introduce market oriented policies in order to diversify the export sector away from gold dependency. Subsequently, liberal trade reforms were introduced in the early 1990s and they were further intensified since 1994 making the South African trade regime significantly liberalized. Consequently, the degree of trade openness has considerably improved which has led to a relatively good export performance over the years. The performance of exports is theoretically associated with high economic growth.

Against this backdrop, the main objective of this study was to investigate the empirical relationship between exports and economic growth in order to establish whether the hypothesis of ELG is valid in the case of South Africa. This study has not only focused on sectoral exports for the period 1990-2011; but it has also examined total exports for the period extending from 1970 to 2011. Using quarterly data and time series econometric techniques of co-integration and Granger-causality over the two set of periods, the key findings of the study are as follows:

First, at the aggregate level (using total exports): the technique of co-integration suggests that total exports and GDP moved together in the long-run, though deviations from the steady state might happen in the short-run. Indeed the long-run co-integration relation shows that for every 1% rise in total exports, GDP is likely to increase by 0.3% in the long-run. Furthermore, Granger causality tests inferred from the VEC model reveal that the direction of causality between export and GDP growth is bi-directional. In other words, there is evidence of ELG as well as GDP-led exports in the long run. On the other hand, the results suggest that only exports expansion are found to Granger-cause GDP growth in the short run.

Second, at the sectoral level (using the main component of exports): export-growth link emerges as a long-run behavioural relationship since a co-integrating relation was found among output and agricultural, manufactured and mining exports. This relationship demonstrates that manufactured exports have the greatest positive impact on output growth. Indeed the long-run co-integrating vector represented by equation (8) in the previous chapter shows that output rose by 0.59% in response to a rise of 1% in manufactured exports.

Third, sectoral level Granger-causality tests based on the ECM reveal the existence of a long run causality running from manufactured exports to GDP. This is evidenced by a significant error correction term (ECT) as shown in table 5.6. However, the short-run causality runs from manufactured and mining exports to GDP as denoted by significant lagged terms in table 5.6. On the other hand, the Toda-Yamamoto Granger tests (table 5.7), confirm only short-run causality from manufactured exports to GDP. In both cases, there is evidence of a uni-directional causality from exports to GDP.

Fourth, the hypothesis of export-led growth is valid for South Africa at both aggregate and sectoral levels. This implies that exports, particularly manufactured and mining exports play a key role in driving economic growth. One of the proximate reasons for positive effects of exports on growth is associated with increased productivity gains in the tradable sectors compared to non-tradable sectors. As argued in chapter three, exporting sectors can realize higher levels of productivity due to the fact that their exposure to foreign market and competition compels them to embrace innovation and new technologies, product upgrading, and new management practices much faster than non-exporting sectors.

The economic interpretations of the above results suggest that exports explain both short-run and long-run fluctuations in output. Hence, policy measures which aim at stimulating production for exports and shifting the content of exports will boost growth and employment prospects in South Africa. These policy measures form part of the key policy implications and they include the following:

First, government policy programs relating to export promotion initiatives appear to be on the right track. These initiatives should be aimed at boosting South African export and competitiveness. Therefore, strategic trade agreements with various partners should ensure that South Africa expand its export share in various markets without comprising the scope for using tariff policy. In terms of increasing competiveness, South Africa should move up the

ladder of traditional comparative advantage in order to export high technology manufactured products. This move requires government intervention to support the industrial sector through measures that encourage, inter alia, the provision of Information and Communication Technology, education and skill development.

Second, with the European crisis and the slow recovery of the US economy, other markets for South African products should be expanded. Among these markets, the Sub-Saharan Africa appears to be the region which is showing a favorable economic outlook. But since the region is known to be dependent on primary commodity exports, South Africa needs to diversify its export content to the region. This implies increasing the volume of manufactured production and exports in order to take advantage of this market. Furthermore, the increase of manufactured exports into SADC and the rest of Africa will address the smallness of the local market, thereby allowing an expansion of the domestic manufacturing sector. A sustained growth of the manufacture sector will drive GDP and employment growth.

Third, government's intention is to use trade policies to boost economic growth, diversify export production, create employment, and alleviate poverty. Given this intention, it is desirable to expand liberalization in the service sector and other manufactured sectors where nominal and effective rates of protection are still high. In other words, the scope for more trade liberalization does exist; this could include implementing a broad tariff reform strategy whereby government pledges further simplification and tariff rates reduction. This is because tariff liberalization can make the economy benefit dynamic gains such as productivity, export performance and diversification.

Other government policy interventions that could play a key role in boosting exports include: the provision of sound infrastructures (physical and institutional), education (investment in technical education and training), a competitive exchange rate, a tax credit for investment in R&D, a reduction in levels of anti-export bias, and the implementation of international trade shows.

However, the emphasis placed on export does not mean that South Africa's development strategy should only be about promoting export for achieving growth. It is argued that a heavy reliance on external market can render a country vulnerable to external shocks (e.g. sudden decline in foreign demand). Hence, the role of domestic demand (saving and investment) must not be neglected because demand-led initiatives are also important for achieving growth. Therefore, the task of policy makers is to apply policy strategically and

effectively in order to get the economy close to a balance between export-led growth and domestic demand-led growth. The achievement of a balanced growth should be in line with the ultimate goal of reducing poverty and inequality by creating employment.

With respect to employment creation, the manufactured sector has a substantial potential of driving economic growth and creating employment. Also manufactured exports have the highest share in total exports. Future studies that dig into the role of the major components (as shown in table 2.6) of manufactured exports in driving growth and employment will be very informative with regard to policy direction.

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