The impact of trade liberalisation on economic growth in South Africa

by

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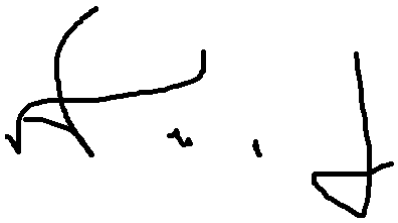
DECLARATION

I wish to acknowledge that this dissertation, except where specifically indicated to the contrary in the text, is entirely my own work and has not been submitted at any other university.



Innocent Sbusiso Khumalo

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ABSTRACT

Over the years, South Africa has embarked on significant strides towards trade liberalisation with a view to generate economic growth that enhances employment and reduces poverty. The purpose of this study is to determine whether trade liberalisation has enhanced economic growth in South Africa. The specific research objectives were to (i) provide an understanding of the country's trade liberalisation policies (ii) empirically determine the short-run and long-run effects of trade liberalisation on economic growth between 1970 and 2017 and (iii) to provide policy recommendations based on the findings. To this end, utilising three different proxies of trade liberalisation, the study employed the Autoregressive Distributed Lag (ARDL) Model to determine the long-run and short-run impact of South Africa's trade liberalisation on economic growth. The study found that trade liberalisation enhanced economic growth in South Africa and noted that the results hold only when using trade openness and real effective exchange rate as proxy for trade liberalisation. This suggest that trade liberalisation in South Africa has had a general positive effect on economic growth. Despite the positive effect on economic growth, there is still a need to ensure that within the trade policy, increased focus on sectors that have the potential for value added and job creation.

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ABBREVIATIONS AND ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARDL	Autoregressive Distribution Lag
BRICS	Brazil, Russia, India, China and South Africa
SC	Schwarz Information Criterion
CEEs	Countries in Eastern Europe
CUSUM	Cumulative Sum of Recursive Residuals
CUSUMQ	Cumulative Sum of Recursive Squared Residuals
DTI	Department of Trade and Industry
EU	European Union
FPE	Final Prediction Error
GATT	General Agreement on Tariff and Trade
GDP	Gross Domestic Product
GDPC	Gross Domestic Product Per Capita
GEAR	Growth, Employment and Redistribution
GEIS	General Export Incentive Scheme
HQ	Hannan-Quinn information criterion
IDC	Industrial Development Corporation
IPAP	Industrial Policy Action Plan
ISI	Import Substitution Industrialization
LDCs	Less Developed Countries
MENA	Middle East and North Africa
NGP	New Growth Path
NDP	National Development Plan
OECD	Organization for Economic Co-operation and Development
OLS	Ordinary Least Squares
PP	Phillips - Perron
PWT	Penn World Tables
R&D	Research and Development
REER	Real Effective Exchange Rate
RSA	Republic of South Africa
SACU	Southern African Custom Union

SARB	South African Reserve Bank
SATPST	South Africa Trade and Strategy Framework
TL	Trade Liberalisation
TO	Trade Openness
UNCTAD	United Nations Conference on Trade and Development
US	United States of America
WTO	World Trade Organization

CHAPTER 1 - INTRODUCTION

1.1 Background

Trade liberalisation as a strategy for growth and development is based on the theory that there is an existing positive relationship between trade liberalisation and economic growth (Iheanacho, 2017). The theory contends that reforms which increase trade would allow for the re-allocation of resources as well as enable or encourage export-led growth in line with the nation's comparative advantage (Jonsson & Subramaniam, 2000). Consequently, results in faster economic growth as countries benefit from efficiency gains, technology spill-over, larger market size, economies of scale and higher profit to investors (Bhatti et al., 2011).

In the 1980s, after decades of an import-substitution policy, South Africa embarked on significant strides towards trade liberalisation with a view to increase economic growth and thus reduce poverty and unemployment (Bell, 1997; Edwards, 2005; Holden, 1992). The country's approach to trade liberalisation was to substantially reduce tariffs for commodities such as processed foods, vehicles, vehicle components, tobacco, rubber and textiles (Edwards, 2005). In addition, South Africa eliminated quantitative restrictions on most commodities except certain agricultural products (Jonsson & Subramaniam, 2000).

The process of trade liberalisation, however, elicited different responses in economic growth. Over time, South Africa's economic growth fluctuated as the country moved from an import-substitution trade policy to an export promotion trade policy and then to a policy of fully-fledged trade liberalisation in 1994 (Bhorat et al*.,* 2014). With the implementation of the trade liberalisation in 1994, South Africa's real Gross Domestic Product (GDP) averaged 3.3 percent between 1995 and 2005 (Mabugu & Chitiga, 2007). This signified a slight improvement of 0.5 percent post-liberalisation compared to 2.8 percent growth rate that characterised the pre-liberalisation periods between 1970 and 1994 (African Development Bank, 2013a).

However, the contribution of trade liberalisation has been questioned as some have suggested, for instance, that liberalisation has increased the demand for imports without sufficient increase in export supply and therefore worsened the balance of payment (Herath, 2011). Tsikata (1999) contends that this deteriorating balance of payment partly added to the volatility of South Africa's economic growth and hence the country's fundamental socio-economic challenges, namely, unemployment, poverty and inequality.

Given the government's objective of tackling the triple threats of poverty, inequality and unemployment, it is important to understand the role of trade liberalisation in enhancing growth and contributing to the elimination of the triple threat. Additionally, an understanding of the effectiveness of trade liberalisation in achieving the stated macro-economic objectives is essential. The objective of this study is, therefore, to conduct a comprehensive analysis of the impact of South Africa's trade liberalisation on its economic growth, using annual time series data for the period 1970 to 2017.

This study used per capita gross domestic product (GDPC) as a dependent variable which is a measure of economic growth and includes trade liberalisation, capital formation, labour, government consumption expenditure and political stability as explanatory variables. The study applied the Autoregressive Distributed Lag (ARDL) model, developed by Pesaran et al., (2001), and found that there is a positive long-run relationship between trade liberalisation and economic growth. This result holds when trade openness and real effective exchange rate are used as alternative proxies for trade liberalisation. The use of tariffs as proxy for trade liberalisation indicated an insignificant but positive relationship between trade liberalisation and economic growth in South Africa. This results suggest that trade liberalisation in South Africa has had a general positive effect on economic growth. Despite the positive effect on economic growth, there is still a need to ensure that within the trade policy, increased focus on sectors that have the potential for value added and job creation.

1.2 Problem Statement

The key objective of South Africa's trade liberalisation has been to promote sustainable economic growth that can create jobs and improve the standard of living of South Africans (NDP, 2011). However, the economy has struggled to grow (STATS SA, 2016). This is evidenced by the adverse inflationary trend, volatile currency, unsustainable GDP growth, unfavourable balance of payment and increasing unemployment (Bhorat et al., 2014).

South Africa's economic growth has been volatile across the six (6) trade regimes that have been implemented between 1925 and 2017. According to Flatters and Stern (2007), South Africa has become more open, productive and outward-looking. However, benefits of globalization are not evenly distributed, and while some industries and consumers have benefited from higher production and/or lower costs, others have lost out to more competitive foreign industries or even lost their jobs. This is further emphasised by Roberts (2000) and Rangasamy & Harmse (2005) who argued that tariff liberalisation failed to promote economic growth, improve trade performance, and create employment in South Africa.

Although export-oriented companies in South Africa have increased their investment ratio, the contribution of increased exports to growth, especially in terms of production and employment, has been disappointing (Mabugu & Chitiga, 2007). According to the South African Development Bank (2016), South Africa's post-trade liberalisation economic growth has not statistically improved from those recorded between 1925 and 1994. The fundamental question is therefore what impact has South Africa's trade liberalisation had on the country's economic growth.

In the context of the South African economy, there are a number of studies, (Jonsson & Surbramaniam, 2000; Edwards & Lawrence, 2006); Sikwila et al., 2014; Manwa, 2015; Malefane & Odhiambo, 2018 and Shayanewako, 2018), that have examined the relationship between trade liberalisation and economic growth. The findings of these studies are mixed. The results have varied depending on the proxy of trade liberalisation employed, whether the short-run or long-run is considered and econometric technique used.

The recent developments in global trade policy such as the United State of America's (USA) imposition of tariffs on a number of countries and their subsequent retaliation has re-opened the debate as to whether trade liberalisation enhances economic growth. The debate according to Morgan and Kanchnahatakij (2015) has re-emerged and is centred on two key areas of contention. Firstly, the extent to which the effects of trade liberalisation are conditional on factors omitted from the core regression relationship and hence how the hypothesis is tested, and secondly, the measurement of trade liberalisation.

In addition, the recent USA imposition of tariffs on a number of countries and subsequent retaliations, highlights the continued ambiguity of the nexus, and also highlights the need for continued examination of the relationship between trade liberalisation and economic growth. The ambiguity in empirical evidence for South Africa, coupled with recent global trade developments and the resurgent debate on trade liberalisation and measurement issues surrounding trade liberalisation suggests that examining this nexus for South Africa is pertinent.

1.3 Research Objectives

The main objective of this study is to empirically examine the relationship between trade liberalisation and economic growth in South Africa. The specific objectives of the study are as follows:

1. To provide a detailed understanding of South Africa's trade policies between 1970 and 2017.
2. To determine the impact of trade liberalisation on economic growth in South Africa.
3. To determine whether the impact of trade liberalisation differs with the measure (proxy) of trade liberalisation utilised.
4. To provide policy recommendations based on the findings of the study.

1.4. Hypothesis of the study

H0: Trade liberalisation has a positive impact on economic growth.

H1: Trade liberalisation does not have a positive impact on economic growth.

1.5 Significance of the Study

The move towards liberalised trade was meant, in part, to enhance growth, reduce unemployment and poverty; however, despite 29 years of trade liberalisation, the South African economy has failed to fully realise the expected benefits of the shifts in trade policy. Given this, it is important to understand the successes and challenges to the effects of trade liberalisation. This is especially pertinent as the macroeconomic challenges still persist, despite trade policy changes, which suggests that although trade and trade policy alone is not responsible for ensuring growth, but that perhaps, the trade policies adopted have not been the ideal policy stance to assist in producing the desired growth results.

The study is significant especially considering:

- The global trade policy shifts (trade wars) which makes it important to revisit the nexus. The current state of SA's declining economy over the last 5 years (the economy contracted by 3.2 percent in the first quarter of 2019) makes it important to identify the contributions of macroeconomic fundamentals such as trade to growth, especially in light of the persistent triple challenges of unemployment, inequality and poverty.

- The study takes into account the challenges highlighted in the literature regarding the measure(s) of trade liberalisation and thus uses three proxies which would hopefully contribute to the literature in terms of the understanding of how different measures affect the results.

1.5 Outline of the Chapters

Chapter 1 introduces the study. This is followed by Chapter 2 which provides an overview of South Africa's trade policy and macroeconomic results. Chapter 3 provides a review of the theoretical literature on trade models and the empirical literature on the nexus between trade liberalisation and economic growth. Chapter 4 outlines the methodology adopted in the study, including the model specification, estimation technique, data and data sources. Chapter 5 presents and discusses the results from the regression analysis and chapter 6 concludes the study and provides policy recommendations.

CHAPTER 2

OVERVIEW OF SOUTH AFRICA'S TRADE POLICIES (1925-2017)

2.1 Introduction

This chapter provides historical background information on South Africa's trade policies and economic growth between 1925 and 2017. The chapter is divided into three sections. The first section provides an overview of South Africa's trade policies through these years. The second section discusses South Africa's trade liberalisation through its exports and imports performance. The last section discusses South Africa's trade liberalisation and the response of economic growth.

2.2 South Africa's Trade Policies

Table 2.1 below provides the list of major trade reforms that South Africa has implemented from 1925 to 2017. It serves as the basis of the ensuing discussion.

Table 2.1: Summary of South Africa's major trade policy reforms (1925 - 2017)

Year of Implementation	Trade Policy Reforms
1925 – 1948	Tight tariff control, Import Substitution Industrialisation policy (ISI).
1949 – 1971	Import licensing trade policy.
1972 – 1976	Export orientated industrialisation trade policy.
1980 – 1989	General Export Incentive Scheme (GEIS).
1990 – 2010	Trade liberalisation policy.
2011 – 2019	Trade liberalisation policy with strategic approach in setting tariff reforms.

Source: Bell *et al.,* (1993); IDC (1996); Jonsson & Subrumanian (2000); DTI (2010).

In 1925, South Africa adopted the Import Substitution Industrialisation (ISI) policy as the strategy for industrial development and economic growth (Matthew, 1983). The ISI

policy advocated for the replacement of foreign imports with domestic production. It is based on the premises that a country should support its local production instead of buying foreign-produced goods and services (Edwards et al*.,* 2008). During this period, South Africa effected this trade policy by imposing high trade barriers on imports such as quantitative restrictions, high tariffs and complex tariff structures with a view to protect the domestic economy and hence increase output growth (Tsikata, 1999). In addition, the industrial incentive schemes were introduced as part of the ISI to promote the beneficiation of iron ore and coal production (DTI, 2002). The ISI policy produced positive economic growth at an average of 4.5 percent between 1925 and 1946. These results were, however, accompanied by the negative balance of payment which averaged -3.3 percent for the same period (SARB, 2014). The use of ISI policy as an instrument for industrial protection in South Africa lasted until 1948 (Jenkins, 1995).

In 1949, South Africa revised its trade policy and adopted import licensing as a trade policy instrument to support South Africa's industrial development agenda (Farrell, 2001). This followed the country's new membership to the General Agreement on Tariff and Trade (GATT). Membership of the GATT required that countries substantially reduce tariffs and other barriers to trade (World Trade Organization, 1981). The import licensing trade policy was, however, not effective at improving South Africa's deteriorating current account balance. In addition, the average economic growth declined from 5.3 percent to 3.2 percent between 1949 and 1972 (SARB, 2014). Against the backdrop of the failure of the import licensing policy, South Africa opted to discard the import licencing policy and implemented the "export oriented industrialization trade policy" in 1972 (Bell, 1992). The main reason for the export oriented industrialisation trade policy was the need to diversify South Africa's exports and to resuscitate industrial production of primary and manufactured natural-resourced based commodities (Bell, 1997; Edwards & Lawrence, 2006). The export oriented industrialization trade policy consisted of high tariffs, import controls and export subsidies for primary commodities, manufactured products and agricultural produce (Tsikata, 1999). The export orientated industrialisation trade policy was, however, viewed as inconsistent with the aspiration of the GATT. In addition, the export-led growth policy was constrained by low economic growth of 2.5 percent over the period, a strong currency, the growing international hostility towards South Africa

due to worsening political situation and poor international competitiveness of the South African products. The political instability was at its worst and hence output growth was adversely affected (Tregena & Kwaramba, 2014).

In 1980, in response to the limited ability of the export orientated policy to enhance output growth and reduce balance of payment pressures, South Africa introduced the General Export Incentive Scheme (GEIS) (Jonsson & Subramanian, 2000; Mabugu & Chitiga, 2007). The GEIS was meant to help companies to offset the price disadvantage faced by the country's exporters in international markets, including the price disadvantage resulting from the anti-export orientation of the import protection system (Belli *et al.,* 1993). The GEIS, which replaced exporters and wholesale value added, granted exporters tax-exemption subsidies based on the value of exports, the level of processing of the exported product, the extent of local content of exports and the level of exports the exchange rate (Kusi, 2002). The effort was, however, unsuccessful for a number of reasons. First, the export schemes were consolidated into one scheme as its intent was impossible. Second, tariff rates remained relatively high. Third, tariff structures were complicated with more than 13 000 tariff lines and fourth, high import surcharges on certain sectors of the economy were in place (Bell et al., 1997). For instance, in manufacturing, clothing, agricultural and automotive, sector tariffs were in excess of 18 percent, 59 percent, 74 percent and 60 percent respectively (Edwards et al., 2008). South Africa had tariff lines greater than 13 000 and 200 ad valorem equivalent rate and according to Bell (1993), South Africa had a highly distorted system of protectionism.

South Africa reviewed its trade and industrial policy in 1990 and thereafter instituted the fully-fledged trade liberalisation policy. During this process, the existing GEIS was contested by some WTO members as inconsistent with the GATT and WTO rules. In response, South Africa terminated GEIS in 1997 (Mabugu & Chitiga, 2007). Trade liberalisation in South Africa’s post liberalisation period included the elimination of quantitative restrictions on all products. At that time, the tariff schedule consisted of 13 609 tariff lines and 28 percent of the tariff lines which were subject to import controls and were reconsidered from 13 609 tariff lines in 1990 to about 7 814 in 1998 and the number of tariff bands reduced from over 200 in 1990 to 72 in 1998 (Jonsson & Subramanian, 2000). Table 2.2 has reference.

Table 2.2: South Africa: Trade Policy Instruments, 1990, 1998 and 2002

	1990	1998	2002
TARIFFS			
MANUFACTURING			
Maximum tariff	1 380	72	60
Average import-weighted tariff	28	10	10
Average unweighted tariff	30	14	12
Number of tariff bands	>200	>72	>72
Standard Deviation	43	15	15
Number of tariff lines (*)	13 609	7814*	7909
Percentage of tariff lines with non-ad-valorem duties 1	28	26	26
Range of effective protection (**)	189-411	204-2	204-2
Average import weighted surcharge (***)	6	0	0
Import surcharge bands	10, 11 & 40	Eliminated	-
AGRICULTURE			
Average tariff	25	2.2	2.2
Average import surcharge	8	0	0
Export subsidy****	17	Eliminated	-
Export taxes: Diamonds	15	15	15
QUANTITATIVE RESTRICTIONS ON IMPORTS *****			
Agriculture	74	Eliminated	-
Manufacturing	14	Eliminated	-
QUANTITATIVE RESTRICTION ON EXPORTS	Diamonds 21 Agricultural products	Diamonds	Diamonds
Memorandum items			
Trade tax revenue as share of total revenue	7.9	4.0	3.5
Import taxes as share of imports	10.8	4.1	3.4
Export subsidies as a share of GDP	0.3	0.0	0.0

Source: GATT (1993); IDC, Bell, Finger & Ballivian (1993); WTO (1998); Jonsson & Subramanian (2000); WTO (2003).

* The figure for 1998 refers to June 1997.

** At ISIC three-digit level; excludes import surcharge.

*** The figure for 1990 refers to 1992.

**** Actual subsidy disbursements were 2.7 percent of exports in 1990/1991.

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

The following are other notable aspects of trade liberalisation included:

- All quantitative restrictions on agricultural imports were converted to bound ad valorem rates. This meant that all bound agricultural tariffs were lowered by 21 percent on average and the export subsidies were reduced by 36 percent.
- The import surcharges were dismantled by removing the 5 percent surcharge on intermediate and capital goods.
- For intermediate goods, the import weighted average tariff rates, excluding zero-rate tariffs, were cut from 16 percent in 1990 to 15 percent in 1998.

The rationale for tariff reduction was based on the view that South Africa's imports and exports were significantly obstructed by trade protection. Thus, the tariff reform objective was to enhance the allocation of resources through more competitive and export oriented policies (Jordan & Kanda, 2011).

In 2010, South Africa adopted a strategic approach in setting its tariff reform for trade liberalisation (DTI, 2010). According to the Department of Trade and Industry (DTI), the tariff strategic reform is attuned to incorporate South Africa's pace, sequence and strategic production possibilities and specifications in each respective sector (DTI, 2010). This means that where evidence suggests that some specific industry or sector needs tariff protection for a certain period to establish and/or maintain competitiveness and employment creation, that support is given based on sector industrial strategy. The aim of the strategy is to align South Africa's development path with accelerated and inclusive economic growth by creating a diversified industrial economy capable of producing ever more sophisticated and higher value products that create employment opportunities (NDP, 2011).

2.3 Trade Liberalisation and the Performance of Exports and Imports in South Africa

Trade liberalisation influences import and export growth, which in turn affects economic growth (UNCTAD, 2016). In this section, the performance of both trade variables are examined pre and post liberalisation. Table 2.3 provide a glimpse of the performance of imports and exports pre (1961 – 1990) and post trade liberalisation (1991 – 2017).

2.3.1 Import growth

Table 2.3: South Africa's export growth, import growth and current account

TIME PERIODS	EXPORT GROWTH	IMPORT GROWTH	CURRENT ACCOUNT
1961 – 1970	4.5	7.8	-3.3
1971 – 1980	0.9	1.9	-1
1981 – 1990	1.4	0.4	1.1
1991 – 2000	5.3	5.5	-0.7
2001 – 2010	2.2	6.4	-0.1
2011 – 2017	1.6	5	-1.2

Sources: SARB (2017); World Bank, World Development Indicators (WDI), 2017.

As shown in Table 2.3 above, South Africa's imports grew by 7.8 percent between 1961 and 1970. However, the imports for the following two decades show a decline to 1.9 percent and 0.4 percent respectively (SARB, 2017; World Bank, 2017). This decline corresponds to the decline in investment, which was associated with the tighter fiscal and monetary policies in response to the balance of payments crisis in the 1970s and 1980s (Edwards & Lawrence, 2006). In addition, in the 1980s the collapse of the gold price, a debt crisis and the considerable decline in investment by government and government parastatals contributed to the decline in import growth (Kumo, 2017).

According to Sako et al*.,* (2015), trade liberalisation is expected to have influenced import growth. With the reduction of barriers to trade, domestic prices of imported products became relatively cheaper, making these products relatively more attractive. In addition, the removal of quantitative barriers should increase the availability of these imported products in the South African economy. After the implementation of trade liberalisation, the average import growth rate increased and was above 5 percent for the two decades between 1991 and 2010 and the seven years (2011 - 2017)

thereafter. According to Edwards & Lawrence (2006), for most of this period the rand depreciated and the import producer prices followed suit and hence import demand increased. The import growth outpaced export growth rates for all decades except for between 1981 and 1990 (Development Bank of South Africa, 2016).

2.3.2 Export growth

The impact of trade liberalisation or tariff elimination on export growth manifests in two ways. First, it increases the profitability of production for export and, second, it reduces the relative output yield for the domestic market, which leads firms to abandon their production for sale in the export market (Sako et al*.,* 2015). From table 2.3 above, the highest pre-liberalisation export growth performance was between 1961 and 1970 at an average growth rate of 4.5 percent. In the following two decades, export growth was at its lowest at an average growth rate of 0.4 percent and 1.4 percent respectively (SARB, 2014; World Bank, 2017). According to Kusi (2002), this low rate of growth was associated with large swings in the movement of the gold price that adversely affected gold production. In addition, the political instability and labour unrest at the time contributed to low production of primary minerals and low production of non-gold export volumes (Feinstein, 2005).

The post liberalisation period, between 1991 and 2000, demonstrated a remarkable average export growth of 5.3 percent. This export performance was underpinned by the production of iron and steel, chemicals, machinery, motor vehicle parts and accessories, non-ferrous and food products (Bhorat et al*.,* 2014). Edwards and Lawrence (2006) support this argument, stating that South Africa was developing a comparable advantage for capital-intensive primary and manufactured products, partly because of its natural resources, but also because the protection scheme was particularly harmful to exports of manufactured goods. Consequently, trade liberalisation between 1991 and 2000 increased exports by reducing both input costs and relative profitability of domestic sales (SARB, 2014).

After 2010, South Africa recorded the lowest average export growth of 1.9 percent for the period between 2010 and 2017. This trend in export performance was attributed to the global recession of 2008, which resulted in lower export and import volumes from the market. Subsequently, imports grew much faster than exports, leading to a deterioration in the current account (Sako et al., 2015).

According to Faulkner, Leowald, & Makrelov (2013), South Africa's trade liberalisation yielded an increase in export volumes. Data for the period between 1996 and 2017 shows that non-gold export volume doubled in these years. However, in addition to a large number of South African merchandise exports, most of the exports of primary commodities and manufactured goods contain a higher proportion of primary commodities as inputs. This implies that South Africa's export continues to be dominated by natural resources and production is essentially capital intensive. Accordingly, South Africa's export strategy, which is based on labour-intensive, job creating products, is not a feature of South African economy (Bhorat et al., 2014). This means that the export strategy is unsuccessful to create jobs.

2.3.3 Current account

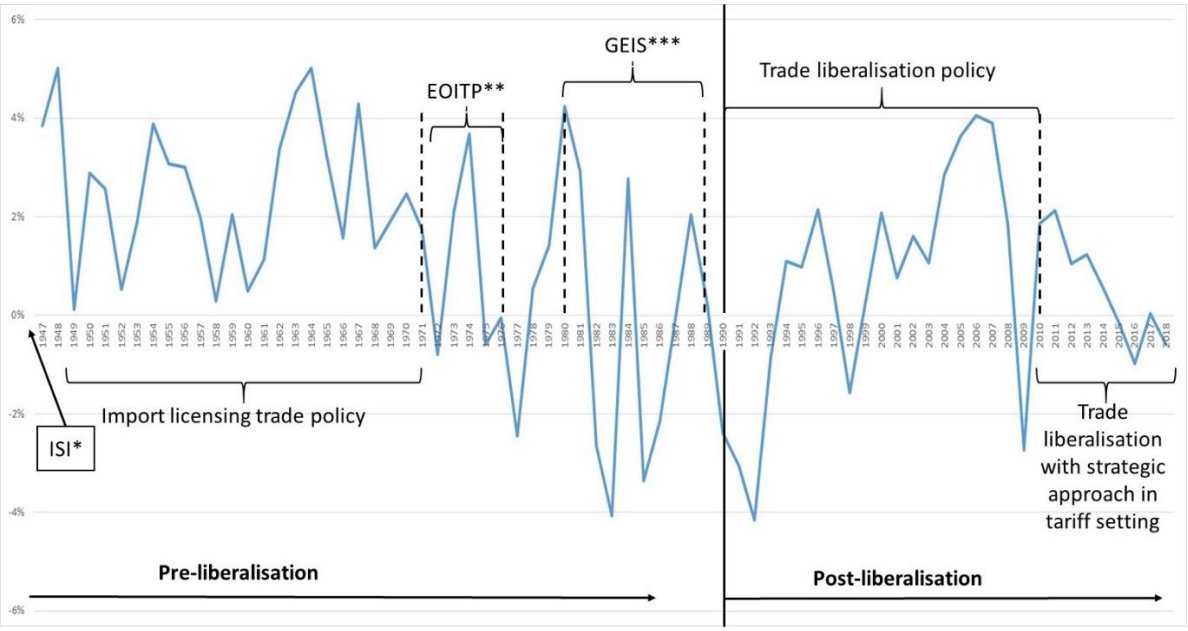
Overall, comparisons show a deterioration of the trade balance for both the pre-liberalisation and post-liberalisation periods. In Table 2.3 above it can be seen that South Africa recorded an unfavourable balance of payment in all decades except for the decade between 1981 and 1990. This suggests that although South Africa's trade liberalisation increased both exports and imports, the import growth has largely exceeded export growth.

A significant reason for South Africa's current account deficit is that South Africa's export profile contains a high share of primary commodities and hence the running current account deficit is financed through short-term capital flows (Bhorat et al., 2014). Conversely, South Africa's import profile contains high value products in relation to domestic production and it is subject to volatility of exchange rate and hence triggers the unfavourable balance of payment (Mathew & Edwards, 2008). According to SARB (2014), import and export growth, subject to volatile real effective exchange rate, have had a direct negative effect on South Africa's economic growth rate.

2.4 Trade Liberalisation and Economic Growth

South Africa's trade liberalisation is accompanied by a range of economic policies, including the Growth, Employment and Redistribution (GEAR) strategy, Accelerated and Shared Growth Initiative for South Africa (AsgiSA), New Growth Path (NGP) and National Development Plan (NDP). This strategy reflects Washington's consensus-based reforms, asserts that trade liberalisation in key markets will lead to more efficient capital allocation, thereby increasing private sector investment rates, which are needed to transform the economy into a competitive export-oriented economy (RSA, 1996). The NDP, NGP, South Africa Trade and Strategy Framework (SATPSF), and Industrial Policy Action Plan (IPAP) all reflect the same sentiment. The sentiment points out that South Africa's trade liberalisation is planned to encourage structural change through demand-side effects. In addition, trade liberalisation is intended to conquer the market initially served by imports and thus expose local companies to foreign competition and technology. The ultimate result is the significant productivity gains (Quantec, 2015). According to the Department of Trade and Industry (2016), the integration of these economic and trade policies are efforts by the South African Government to liberalise trade in order to increase economic growth, reduce unemployment inequality and alleviate poverty.

Figure 2.1: South Africa's Economic Growth



Source: World Bank, World Development Indicators (WDI), 2017.
* (ISI) Import Substitution Industrialization Policy.
** (EOITP) Export orientated industrialisation trade policy
*** (GEIS) General Export Incentive Scheme

South Africa's economic growth has exhibited some volatility over the years. Figure 2.1 above explains the country's growth pattern in conjunction with trade policy changes. In the pre-liberalisation period (1980-1990) the South African economy grew at an average growth rate of 4.6 percent, compared to the growth rate of 2.3 percent in the post-liberalisation period (1994-2017). The South African economy experienced three (3) recession episodes in 1983, 1985 and 1992 in which economic growth declined to -1.9 percent, -1.6 percent and -2.1 percent respectively. These recessions were largely attributed to political instability and sanctions in the 1980s and largely manifested in financial and trade terms (Edwards, 2003). Sanctions on both imports and exports were imposed by the United State of America and European countries. Sanctions on exports adversely affected the demand and production of coal, iron and steel, uranium, agricultural products while sanctions on imports affected petroleum, copper, computers and high technology equipment such as nuclear (Jonsson & Subramanian, 2000).

Post-trade liberalisation (1990–2017) growth trends are observed to be similar to the pre-liberalisation trends in terms of the volatility in economic growth. The highest post-liberalisation growth record was 5.2 percent in 2006. The contributing factors to this

growth included fast growing activities in telecommunications, financial and business services, and mining with annual growth of 9 percent, 7.5 percent 6.1 percent respectively (World Bank, 2014). The manufacturing sector grew marginally at 3 percent per annum (Tregenna & Kwaramba, 2014).

Table 2.4 illustrates the contribution of imports and exports to economic growth.

Table 2.4: South Africa's pre- and post-trade liberalisation trade performance (average values as a percentage of GDP).

TRADE VARIABLES	BEFORE	AFTER	% CHANGE
Imports	19.8	31.8	10
Exports	30.8	27.2	-12
Trade Balance	-2	-1.2	-40

Sources: SARB (2017); World Bank, World Development Indicators (WDI), 2017.

Trade liberalisation would have an effect on relative importance of trade in the economy. One expectation is a rise in imports as a proportion of GDP. As indicated, with the reduction of tariffs, the domestic prices of imported goods fall, making the imported goods relatively cheap (Sako et al., 2015). Observation of South Africa's trade performance before and after trade liberalisation reveals that imports increased as a proportion of GDP following trade liberalisation. As can be seen in Table 2.4, the average ratio of imports to GDP in South Africa, which was 19.8 percent pre-liberalisation, increased to 31.8 percent post-liberalisation.

Comparison of South Africa's export performance prior to and following trade liberalisation shows a contribution of 30.8 percent and 27.2 percent respectively. This indicates that South Africa's export performance in relation to gross domestic product has declined by 12 percent, when comparing both the pre and post liberalisation period. Quantec (2016) concluded that South Africa's export contribution to GDP will continue to decline as long as its export profile is driven by primary commodities and subjected to a volatile exchange rate. Moreover, this export profile has sustained the growth cycle that is built on running regular current account deficits, financed through short-term capital outflows. Short term capital outflows, in turn, have aided the volatility of the rand, which has constrained exporters (Armand et al., 2016).

South Africa's trade liberalisation does provide some significant effect on economic growth. However, this affect may not produce the NDP, NGP, SATPSF and IPAP desired results of creating employment, alleviate poverty and inequalities. According to the IDC (2011), South Africa's trade liberalisation has not in itself induced the necessary structural changes in the economy to significantly alter South Africa's export profile.

Sako et al. (2015) indicated that South Africa's homogenous export profile and volatile exchange rate are some of the growth dynamics that have constrained the South African economy and may be partly the source for the inability to create jobs. McMillan & Rodrick (2011) have pointed out that the pace and pattern with which structural change takes place in any economy is the key factor for a country to benefit from trade liberalisation. Moreover, Weiss (2005) posits that trade liberalisation itself does not lead to sustainable economic growth and employment unless its leads to structural changes. In addition, the degree of prosperity achieved by trade liberalisation depends on the trading method, trading volume and traded products of a country.

2.5 Conclusion

Trade liberalisation in South Africa has increased both imports and exports. The post-liberalisation import growth has exceeded export growth and has thus contributed to volatile economic growth and associated unfavourable balance of payments. Efforts to align South Africa's trade policies and macroeconomic policies such as GEAR, NDP, NGP, SATPSF and IPAP have proven to be unsuccessful in producing growth that can create employment, alleviate poverty and inequality. South Africa's post-liberalisation economic growth has not been significantly different from the pre-liberalisation period growth. Pre-liberalisation, the economy growth grew at 3.3 percent while and post-liberalisation growth was 3.6 percent. Factors that are considered to contribute to this challenge relate to the notion that the country's trade liberalisation policies are not aligned to its export and import profiles. This is partly due to the fact that South Africa's exports are composed of primary products and does not leave much room for value additions that significantly enhances South Africa's economic growth. The increase in economic growth due to increased exports is not as substantial as it can be, given its primary resource dominance. As a result, the unfavourable balance of payments continues to prevail and consequently hinders South Africa's growth prospects.

CHAPTER 3

LITERATURE REVIEW: TRADE LIBERALISATION AND ECONOMIC GROWTH

3.1 Introduction

Several theories have been proposed that seek to establish the basis, direction and quality of the advantages that arise from international trade (Hozorouri, 2017). International trade theories date back to the times of mercantilism (Mohtasham, 2006) and has subsequently been developed over time by economists such as David Ricardo (1817); Eli Heckscher (1919); Bertil Ohlin (1933); Paul Samuelson (1941) and through to the rise of the new trade theories (Walde & Wood, 2004). This chapter discuss the evolution of trade theories with a view to provide a link between trade liberalisation and economic growth. The first section of this chapter is the theoretical basis of trade, i.e. international trade theories. It is followed by the discussion on the theoretical literature relating to trade liberalisation and economic growth models. The last section discusses the empirical literature on trade liberalisation and economic growth.

3.2 Theoretical Basis of International Trade

Mercantilism begun in Europe during the 16th century by a group of men who wrote essays and pamphlets on international trade. The group who advocated the economic policy of mercantilism was composed of merchants, bankers, traders, government officials, and philosophers (Bidabad & Tabari, 2005; Linder, 1961). Adam Smith's seminal work in 1776 described the mercantile system as a political economy that sought to enrich the country by restraining imports and encouraging exports. Europe implemented this system by imposing high tariffs and quotas on imported goods that competed with local manufactures (Grubel & Lloyd, 1975). The core objective of this system was to maintain the favourable balance of payments on trade for Europe's prosperity (Vernon, 1966) and to protect and encourage the European industry to create jobs (Blaug, 1978). The intended outcome of these objectives was such that the European governments commanded sufficient quantities of gold and silver as a

measure of wealth and to support the military with necessary weapons that would deter attacks by other countries and aid their own territorial expansion (William, 1987).

At the time, Adam Smith refuted the mercantilist idea that the wealth and growth of the nation is measured by the size of its treasure in a form of gold and silver (Lars, 1994); however, Smith did provide an alternative theory of international trade called absolute advantage (Kilic, 2002). The theory suggested that trade should benefit nations, and gains from trade would be unevenly distributed amongst the nations but that trade would encourage specialisation in the production that allows economies of scale, which improves efficiency and economic growth (Turocy & von Sengel, 2001). In essence, trade should promote a positive sum game as opposed to a zero sum game as suggested by the mercantilist trade policy approach (Posner, 1961).

Notwithstanding, the theory of absolute advantage has its shortcomings. The major shortcoming is that the theory is not able to demonstrate gains from trade if a country has no absolute advantage in producing any goods (van Berkum & van Meijl, 1998). Against this background, David Ricardo developed the Theory of Comparative Advantage in 1817 (Guillory, 2005). This theory relies on the opportunity cost and postulates that even if one nation is less efficient in producing all goods than the other nation, there is still a basis for mutually beneficial trade (Salvatore, 2014). According to the theory, the less efficient nation should specialize in the production and export of the commodity, where the absolute disadvantage is less, and import the commodity, where the absolute disadvantage is greater (Kaemfer *et al.*, 1995).

Comparative advantage theory is still one of the most important trade theories; however, it does not explain why there is a difference in comparative costs (Krugman & Maurice, 2000). In 1919, Eli Hecksher put forward the idea that trade is caused by differences in factor endowments in different countries. Bertil Ohlin further advanced and developed this idea in his pioneering book "*Interregional and International Trade*" in 1933 (Berkum & van Meijl, 2000). This book forms the origin of what is acknowledged as the Hecksher-Ohlin theory of trade.

The basis of this theory is that the classic international trade theory led to the development of four important theories (Feenstra, 2003). These theories are the Hecksher–Ohlin Theory, the Factor Price Equalisation Theory, the Stolper-Samuelson Theory, and the Rybcynski Theory. The Hecksher-Ohlin Theory is explained in terms of factor endowments which means that some countries are relatively wealthy in capital and others are relatively well-off in labour (Sen, 2010). The factors are defined in terms of two criteria; namely, price criterion and physical criterion. Based on either of the two criteria, the Heckscher-Ohlin Theory states that "trade is caused by the fact that different countries have different factor endowments and that is why it is sometimes referred to as factor-endowment or factor-proportions theory" (Lindert, 1986). It suggests that a country exports the goods that it efficiently and plentifully produce and imports those intensively requires scarce factors for production (Leamer, 1980). According to Baldwin (1971), this idea can be extended to predict a country's exports; more labour-intensive goods will go to more generously capitalized countries. In simple terms, the Heckscher-Ohlin Theory says that capital-rich countries will export capital-intensive goods, and labour-intensive ones will export labour-intensive goods (Lam, 2015). In this way, it explains comparative rather than assuming it is in contrast with the classic Adam Smith and David Ricardo economic models (Mabugu & Chitiga, 2007). Therefore, countries with abundant agricultural land reserves, for example, tend to be net exporters of grains and agricultural products. Developing countries with low-skilled labour tend to export labour-intensive products such as clothing, footwear and consumer electronics. (van Berkum & van Meijl, 1998).

The Factor-price Equalization Theory indicates that free international trade brings about factor-price equalization between countries. According to Kaemfer et al., (1995) Factor-price Equalization Theory has shown that opening trade and raising the relative price of the exportable goods brings clear income gains to the factors of production used intensively in the export industry and also brings clear income losses to the factors used intensively in the import-competing industry (Ezeala-Harrison, 1999). According to Salvatore (2014: 118), with trade:

> [T]he labour-abundant country will increase production of the labour-intensive product, and the labour-scarce country will shift away from such production. This production shift will strengthen the demand for labour and

raise wage rates in the first country, and relieve such demand and reduce wage rates in the second country, thus bringing wage rates closer together.

Similarly, capital costs or interest rates will converge as trade increases demand for capital in the capital-abundant country and as imports of capital-intensive products alleviate the scarcity of capital in the other country (Kaemfer et al., 1995). Mabugu & Chitaga (2007) argues that most developed countries (MDCs), capital is the relatively abundant factor, international trade tends to reduce the real income of labour and increase the real income of capital. This is one reason why labour unions in these countries favour trade restrictions. On the other hand, in less developed countries (LDCs), the relatively abundant factor is labour, and international trade will increase labour incomes and reduce the real income of capital holders.

Equalization of factor prices, however, is barely perceptible in the real world because, for example, the cost of the hourly rate in Mexico is much lower than in the United States. Possible reasons are differences in the quality of factors of production, production technology from one country to another, and differences in the price of production from one country to another.Also, there is a positive relationship between wages and labour productivity (Suranovic, 2006); however, since most economists do know how well the Heckscher-Ohlin factor endowment theory explains actual trade patterns among nations, and Salvatore (2004) argues that a model must be successfully tested empirically before it is accepted as a theory.

The Stolper-Samuelson Theory envisages that an increase in the comparative price of certain goods will increase the real return to the factor used intensively in the production of that item, and reduce the real return to the other factor (Stolper & Samuelson, 1941). This means that changes in the prices of goods have a determinate effect on real factor rewards and the redistribution effect between capital and labour (Feenstra, 2004). The outcome of this theorem is equivalent to Jones's (1965) 'magnification effect' which states that trade opportunities have strong distributional consequences, making some better off and some worse off. Whilst the ultimate outcome of trade is to improve the overall wealth of a nation, it increases or decreases

people's livelihoods according to their ownership of factors of production (Chipman, 1964).

The Rybcynski Theorem shows the relationship between changes in factor endowments and changes in the outputs of two commodities when commodity prices are fixed (Lam, 2015). The theorem postulates that an exogenous increase in the supply of one production factor leads to an increase in the manufacture of the produce that uses this production factor intensively and decreases that of the other goods (Berkum & van Meijl, 1998). The theorem assumes constant commodity prices and therefore is applicable for partial exercise in comparative-static analysis as opposed to full general-equilibrium analysis (Kaemfer et al., 1995). Also, the small economy that is open to international trade where the relative goods prices are determined by the international markets (Salvatore, 2014). The possible example of this theorem is an initial labour-intensive economy that experiences comparative rapid accumulation in its capital stock. The result of this theorem is a change in trade pattern though a shift towards exports of capital-intensive goods and imports of labour-intensive goods (Corden & Neary, 1982). One case in point is Japan, which in 1960 was a labour-abundant net exporter of labour-intensive goods, such as textiles and simple consumer electronics. However, Japan is now a capital-abundant net exporter of sophisticated capital intensive goods, such as machinery and transport equipment. The similar pattern is seen in countries such as Singapore, Netherlands Hong Kong, and Korea (Joneset al., 1987).

3.3 Economic Growth Models and Trade Liberalisation

3.3.1 The Neoclassical Model

In the Neo-classical Model, the impact of trade liberalisation and economic growth is either unclear (Jonsson & Subramanian, 2000). This means that trade does not affect the equilibrium or steady state of production growth, since growth is determined on the assumption of an exogenous technological advance (Berkum & van Meijl, 1998). In a two sector model, trade policy is expected to affect the distribution of resources between sectors, and hence the level of savings and steady state capital accumulation. This can have a one-time effect on the stead-state level, but not on the growth rate stead state levels. The growth rate *steady* state levels can be positive or negative, depending on how savings and capital accumulation are influenced by trade policy (Corden & Neary, 1982).

According to Iheanacho (2017), the neoclassical growth model postulates that the link between trade liberalisation and economic growth focuses on the fact that trade stimulates output growth through production, consumption, and savings. According to this model, production of goods and services for exports stimulates the production of other industries through linkages. Biwott (2011) posits that increased income in the export sector can increase demand for domestic goods and thus stimulate production.

The issue of economic growth and its sources and consequences have been discussed extensively in the literature of economics (Harrison, 1999). Jonsson & Subramanian (2000) are of the view that the discussions do not agree or are ambiguous on the determinants of economic growth. The Exogenous Growth Theory based on the Solow-Swan (1956) model (also known as the Neo-classical Exogenous Growth Model) describes sustainable long-run economic growth. Hemat et al., (2014) are of the view that a sustained economic growth is only related to technological progress which is considered as exogenous and therefore does not describe how international trade relates to economic growth. Accordingly, this means that trade does not affect the equilibrium or stable state of production growth, as growth is determined externally by given technological advances. In the two-sector model, trade influences the distribution of resources between sectors and thus influences the stable state of

saving and capital accumulation. This can have a one-time effect on the steady-state output level, but not the growth rate. Stable production levels can be positive or negative, depending on how savings and capital accumulation are impacted by trade policy.

Over and above this, the neo-classical model describes the relation between trade liberalisation and economic growth with certain assumptions. The major assumptions are constant return to scale, perfect competition, economies of scale, and product differentiation (Krugman & Maurice, 2000). These assumptions seem to suggest that the long-term economic growth of a country is determined exogenously by the rate of saving or technical progress (Leichenko, 2000). According to Frederick (2001), these assumptions are, however, invalid in today's context of world trade.

Economists, such as Romer (1986), Lucas (1988) & Aghion and Howilt (1992) have, over time, relaxed most of the neo-classical assumptions and thereafter developed new trade theory and complementary growth theories. The new trade model is based on economies of scale, imperfect competition and differences in technology amongst nations (Lam, 2015). It emanates from the new growth theory that emerged within the international trade and economic growth and development literature during the decade of the 1980s (Harrison, 1999).

3.3.2 Endogenous Growth Model

The new growth theory is referred to as Endogenous Growth Theory which provides an endogenous mechanism to explain long-run effect on growth. The long-term economic growth is the result of internal forces in a system, especially forces generating technological knowledge (Capolupo, 2005) and thereafter enhances total factor productivity within the system (Mankiwe et al., 1992).

The endogenous mechanism links the technological progress or change to the production of knowledge (Snowdon & Vane, 2005). It emphasis that economic growth results from increasing returns to the use of knowledge rather than only labour and capital (Dang & Pheng, 2015). This means that investment in human capital, innovation and knowledge are significant contributors to economic growth (Lam

,2015). The production function for endogenous growth concludes the increasing return to scale, human capital and/or physical capital and technological investment (Cornwell & Cornwell, 1993). In this model, Lucas (1988) suggests that growth happens through the development of human capital and its interface with the features of the Neo-Classical Model. The Endogenous Growth Model is as follows:

Model 1:

$$Y=AK_t^{\alpha}uhL_t^{(1-\alpha)}h_{a,t}^{\gamma} \quad (1)$$

Where (Y) is income, (K) is Capital, (L) is labour, (A) is technology or productivity, and (t) is time (Solow, 1956). In addition, (u) is the ratio of labour time spent working and (h) is the stock of human capital of the representative agent, whereas (ha) is the average human capital already existing in the system. In this model, population (n) and technology are always assumed to be constant and exogenous; however, the externalities of human capital increase the productivity of labour and capital. Capital and labour are supposed to be fully employed in the economy. According to Lucas (1988), labour is assigned either to production or activities or education programmes to improve productivity and profitability. The impact of this is the opportunity cost between the output that could be attained today from profitable effort, or expected output that would be attained at a later period due to experienced human capital and enhance future productivity.

The model envisages that more creative training and tertiary education, in the form of capacity building and investment in human capital, will enhance the marginal product of labour and therefore the future remunerations of skilled persons (Dang & Pheng, 2015). The possibility to be paid better salaries and wages in the future will afterwards afford a better encouragement to engross in education and training and hence the accretion of human capital, which will, in turn, advance the output and throughput of labour and capital and nurture the growth rate of the economy. It should be said that human capital is presumed to be tailored to the production of goods; dissimilar goods are understood to need varying levels of human capital (Lucas, 1988). Therefore, in this model the ideologies of comparative advantage across nations will decide which

goods are produced and thus the varying levels of human capital across nations and their economic growth (Mankiwe et al., 1992).

A practical example of this model is the one that provides the relationship between endogenous growth and new trade theory cited by Jonsson & Subramanian (2000). The example suggests that the discovery of new knowledge and innovations takes place in certain countries more than others. This is owing to the fact that there are differences in the development of science, new technologies and new products amongst countries. The relative levels, quality of research institutions, and quality of education systems differ amongst nations. Similarly, the diffusion of knowledge, technologies and innovations into production goods and services, also, differs amongst nations[1].According to Kravis (1956) technological and innovation differences or gaps across firms and countries are the major reasons for international trade. Also, technological differences across countries are the endogenous outcome of a firm's level product and process innovations that reduces costs of production and produces new products[2] (Berkum & van Meijl, 2000).This theory is accorded to Schumpeterian economic thinking, namely creative destruction (Lam, 2015).

Endogenous growth literature emphasises the importance of the flow of ideas in stimulating technological innovation (Romer, 1990). The more the country is exposed to the world economy, the more it is likely to gain from the research and development activities of other countries, including new ideas relating to organisation methods (Snowdon & Vane 2005). In the model developed by Ben-David & Loewy (1998), trade openness creates competitiveness pressure on domestic firms which, in response, seek to acquire foreign knowledge relating to production processes and techniques (Baumol, 2002). The key role for trade is to assist developing countries to get access to ideas that exist in the rest of the world. According to Robert Solow (1990), trade effects in the long-run economic growth is not so much whether a country is export led, but whether the country is in contact with the rest of the world.

[1] Joseph Schumpeter (1956) and Jacob Schmookler (1966) have argued forcefully that technological progress takes place because innovations find it profitable to discover new ways of doing things. Technological progress does not just happen as a result of disinterested scientists operating outside the profit sector.

[2] See Gould and Ruffin (1993), endogenous growth model finds a wider variation in the rate of growth of different nations, with no apparent correlation with their levels of per capita income.

According to Edwards (1998), economic growth depends on the rate of change of technology, capital and labour. There are two sources of technological change: the first one is a domestic source fuelled by innovation and dependent on domestic human capital, and the second is an international source related to the rate at which the country is able to imitate and/or initiate technological progress originating in the leading country.

The equation below demonstrates the innovation–based endogenous growth model:

Model 2:

$$Y = K^{\alpha} L^{\beta} Z^{1-\alpha-\beta} \qquad (2)$$

Where Y is output, K is capital (human and physical), L is labour input, and Z is an aggregate measure of intermediate inputs dependent on their quality. In this model, the forces that decide the degree of development of intermediates Z thus also affect the productivity of capital and labour. Research and Design (R&D) successes along with the cost of investment decide how a product moves along its quality hierarchy. The quality hierarchy merely defines the numerous and unrestricted legs that a product can go through via innovative modifications and improvements to each new model (Grossman & Helpman, 1993). Hereafter, productivity progress and growth is determined both by the increased specialisation of labour working with an increasing number of intermediate inputs and by the research spill-overs whereby each new innovator benefits from the existing stock of innovations (Arvanitidis, et al., 2007). In this model, the final output Y is presumed to be utilized for consumption or investment purposes and is consequently not subject to depreciation. Thus old stock continuously adds to the investment stock and through research and development investment and learning-by-doing, the economy endures to grow with marginal product never subsiding to an unprofitable level.

Innovation-based models imply that economic growth can continue to produce stably, as described in the Neoclassical Model, without the addition of labor or capital to the system. The economy grows because intermediate goods are continually refined, leading to the production of more productive end-products, ultimately increasing

overall productivity (Grossman & Helpman, 1993). At the firm level, companies are continually competing for the next generation of products to emerge and replace current leaders in the industry. This leads to random and uneven growth at the micro-level, with some industries developing rapidly due to successful innovation and others slower due to unsuccessful innovation. At the macroeconomic level, this process of random and uneven growth is stabilized and, provided there are a large number of intermediate inputs, a steady growth.

Thus, the model predicts that technological development is the engine of economic growth and that the rate of economic growth is determined by the rate of growth of human capital and research and development. It also implies that the return on human capital and successful research and development will lead to increased resources for the research and development sector to earn a percentage of the profits.

From a policy point of view, the success of endogenous growth theory also depends on the country's higher education system as a device for growth. Countries that invest more in higher education will have higher research productivity and will also reduce the opportunity cost of research by increasing the overall supply of skilled labor (Kalaitzidakis et al*.,* 2001).

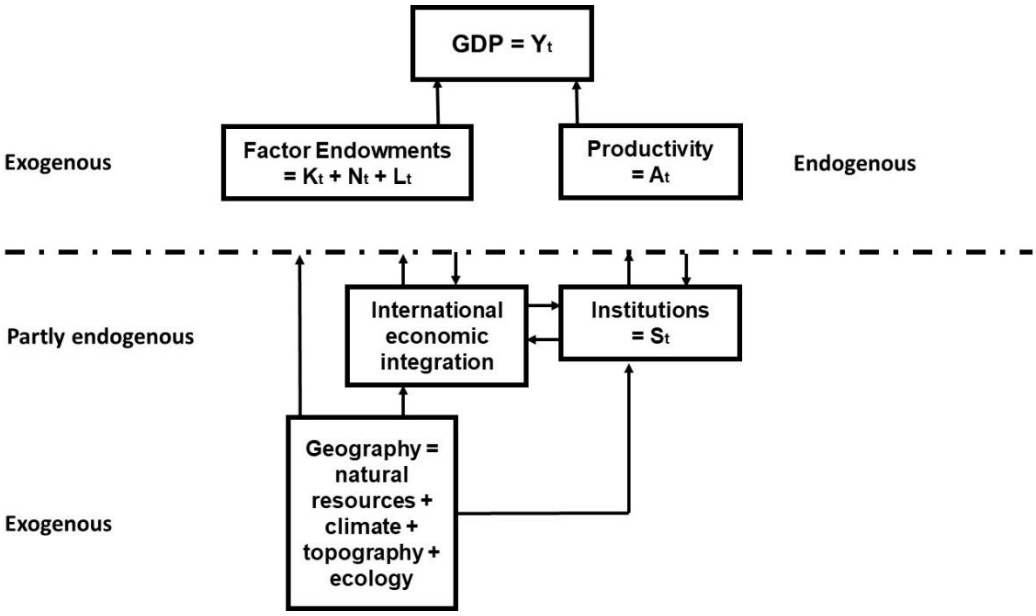
Growth increases with the size of the innovation as measured by the productivity improvement factor. A country at the forefront of technology has what Gerschenkron (1962) calls “an advantage of backwardness”. Basically, this means that the longer technology lags behind the frontier, the more productive it will be, leading to faster growth (Montias, 1963). This is similar to the convergence aspect of Neoclassical Models in that it predicts that less developed countries will find capital more productive than developed countries. However, it is different in that it does not suggest convergence because of decreasing marginal returns; but rather that the rate of growth can remain heterogeneous according to the countries, as it is determined by the rate of associated technological progress.

Other contributions to the endogenous growth theories of Romer (1994) include growth models based on innovation. Romer's (1994) product variety model is a common example of innovation-based growth models based on the belief that

innovation generates productivity growth by creating new product varieties. Also, growth model is based on innovation derived from the modern theory of industrial organization commonly referred to as the Schumpeterian growth model (Aghion & Howitt, 1992). This model emphasizes the qualitative innovations that render old products obsolete and therefore appeal to the force that Schumpeter called "creative destruction" to create new alternative products.

The Endogenous growth model brought about the recognition that technology is the ultimate determinant of economic growth. In addition, it recognises that there are many factors that could influence growth (Gould & Ruffin, 1993). These variables are considered by Grossman & Helpman (1991) to endogenously, partly endogenously and exogenously influence economic growth. These factors are illustrated respectively in Figure 3.1 below which shows that factors such as capital (K), natural resources (N) and Labour (L) exogenously influence economic growth from a neo-classical perspective. Productivity in a form of human capital development, technology and innovation plays an endogenously influence on growth. Trade in a form of international economic integration, geographical location and a country's quality institutions contribute endogenously to economic growth. In summary, growth is influenced by a number of factors

Figure 3.1: Proximate and fundamental sources of economic growth



Source: Snowdon and Vane (2005).

There is a growing evidence in the literature on the link between geography and economic performance (Krugman, 1991). In this regard, there are two pillars, one by Krugman & Venables (1995) indicating the role of increasing returns, agglomeration, size, clusters and location in the productivity performance of nations and regions. The second pillar is the impact that geography has on economic growth, through factors such as climate, natural resources, and topography (Snowdon & Vane, 2005). These factors influence health of a population, agricultural productivity, the economic structure and political stability of an economy, transport costs, and diffusion of information and knowledge (Aghion & Howitt, 1992).

These two pillars are not only critical for a country's economic activities but international economic integration as well. Rodrik (2004) provides a three-fold taxonomy of the fundamental determinants of economic growth, namely geography, international integration and institutions. Accordingly, geography is the only exogenous factor in this three-fold taxonomy, with endogenous factors such as international economic integration and institutions "co-evolving with economic growth".

Bloom and Sachs (1998) conclude that six (6) geographic factors featured in various accounts of poor economic performance of sub-Saharan African economies. These factors are:

- political instabilities as a result colonial and cold war legacies;
- volatility in primary exports terms of trade;
- internal politics as a result to authoritarian and corruption;
- economic policies aligned to import substitution and fiscal profligacy;
- rapid population growth and demographic transition; and
- ethnic diversity and low levels of social trust.

Geography serves as a framework for economic performance as it is embraces all countries resources (Snowdon & Vane, 2005). Democracies such as the USA, Canada and Norway tend to manage their resources through quality functioning governance and institutions (Acemoglu & Robinson, 2003). The results are such that resources

such as oil and other related human resources are well managed. This is contrary in some sub-Saharan African economies that are governed by predatory autocrats (Snowdon & Vane, 2005). Economies governed by predatory autocrats are affected with the presence of rent-seeking behaviour, political instability and civil wars. According to Sala-i-Martin & Subramanian (2003), Nigeria is one of those countries that has shown disastrous economic growth and development, despite having large oil resources (Sachs & Warner, 2001).

3.4 Empirical Literature Review: Trade liberalisation and Economic Growth

(a) Positive impact of trade liberalisation on economic growth

There is no universally accepted definition of trade liberalisation, however a number of studies define trade liberalisation as the “removal of tariffs and non-tariff barriers” (Atkinson, 1998; Baldwin 2004; Bhagwati & Srinivasan, 2002) “the use of a market determined exchange rate system” (Greenaway, Morgan & Wright, 2002; Harrison 1996; Hoekman & Nicita, 2011; Kneller et al., 2008); “the move towards neutrality of incentives for exports and imports” (Collier 1993; Dean, Desai & Riedel, 1994) “the establishment of transparent institutions and supporting policies” (Bhattacharyya, 2012); “the absence of government intervention” (Edwards, 1998a; Feenstra 2003) and “the move towards a free trade system” (Dollar, 1992; Dornbusch 1992).

The empirical literature highlights a number of avenues through which the nexus between trade liberalisation and economic growth has been assessed. Trade liberalisation literature suggests three main effects on societal welfare. One is that consumers are made better off with tariff reduction because the consumer surplus becomes bigger. Second, producers are worse off because the producer surplus is reduced with the reduction of the tariff. Third, the government also loses additional tax revenue with tariff reduction and the nation experiences societal loss with a rise in tariff reduction (Salvatore, 2014). On the other hand, trade liberalisation has been viewed as a potential enhancer of economic growth and therefore improves the welfare of the nations (Edwards, 2003).

Trade liberalisation has a variety of complicated effects on the economy, which can be classified into short-run effects and long-run effects. The short-run effects are the adjustment challenges arising from the required transfer of resources among the different productive sectors (Salvatore, 2014). The standard economic argument in this regard is that tariff reductions induce a reallocation of resources out of import-competing sectors into export-orientated sectors (Trefler, 2004). Stiglitz (2016) supports this sentiment and posits that trade liberalisation allows the reallocation of the resources from a lower productive sector to a higher productive sector. Gould and Ruffin (1993) suggest that in the case of labour, workers are moved from low-productivity employment to zero unemployment.

The empirical results on the nexus between trade liberalisation and economic growth are mixed. Findings of a positive relationship between trade liberalisation and economic growth has been observed by a number of studies. The study by World Bank (1987) confirmed a positive relationship between trade liberalisation and economic growth for 41 developing countries and concluded that the economic performances of outward-orientated economies are superior to that of the inward orientated economies. Focusing also on developing economies, Panagariya (2002) reviewed the economic performance of 138 developing countries between 1961 and 1999 and found that those developing countries that experienced growth did so while pursuing trade liberalisation policies. The results are consistent with the empirical findings by Hozouri (2017) who examined the nexus for 12 Middle East and North African (MENA) countries[3]. The result showed a significant positive relationship between trade openness and economic growth, but a negative relationship between tariff (as proxy for trade liberalisation) and economic growth. Sarkar (2007) investigated the relationship between trade liberalisation and economic growth for 51 countries between 1981 and 2002 using panel data estimation techniques. The results were mixed, indicating a positive relationship for the developed economies and a negative relationship between trade liberalisation and economic growth for the developing and less developed economies. Studies by Lee (1993), Harrison (1996), Edwards (1998b)

[3] Algeria, Bahrain, Djibouti, Egypt, Iran, Iran, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Yemen, Ethiopia and Sudan.

and Yanikkaga (2003) used a number of trade liberalisation measures, including trade openness index, black market exchange rate distortion, tariffs, to determine the relationship between trade liberalisation and economic growth for developing countries. The studies employed panel data analysis over the period 1976 to 2002. The findings indicated a positive relationship between trade liberalisation and economic growth when using trade volume as the measure of trade liberalisation. However, when tariffs are used as proxy for trade liberalisation, the findings pointed to a negative relationship between trade liberalisation and economic growth.

Many studies have examined the nexus for individual countries. For instance, Marelli & Signorile (2011) examined the effects of trade liberalisation on economic growth for China and India between 1980 and 2007 using panel data analysis. Their findings suggest that trade liberalisation and integration to the world economy led to higher economic growth. Studies by Wacziag (2001), Greenaway et al. (2001), Yanikkaya (2003) and Sarka (2007) found a positive relationship between trade liberalisation and economic growth for Egypt, Jamaica, Paraguay and Ethiopia respectively. According to them, the positive relationship between trade liberalisation and economic growth is based on the static and dynamic gains of trade liberalisation that are presumed to affect economic growth positively. According to Keller (2002), the static gains of trade liberalisation are dependent on whether the short-run or long-run is considered. Ben-David and Loew (1998) have pointed out that gains that relate to the short-term promote the reduction of resource-use misallocation along the lines of comparative advantage specialisation. The static long-run gains include the transfer of technology development, knowledge development and accumulation (Edwards, 1993). In the case of dynamic gains, trade liberalisation allows the generation of economies of scale, learning-by-doing, and Research and Development (R&D) that contribute positively to output growth in the long run (Grossman & Helpman, 1991). Trefler (2004) echoes this and suggests that the long-run effects include the international flow of direct investment, domestic redistribution of income, revitalisation of sluggish domestic industries due to economies of scale and improved dissemination of technology. Accordingly, economic growth is expected to benefit from increased trade through increased competition, product diversity, economies of scale and technology transfer. Krammer (2010), however, indicated that static short-term gains were not essential conditions leading to long-run efficiency gains.

Dutta & Ahmad (2004), using an endogenous growth model, empirically examined the relationship between trade liberalisation and economic growth in Pakistan between 1973 and 1995. The co-integration analysis found a positive relationship between trade liberalisation and economic growth. Ahmad, Butt and Majeed (2018) applied the ARDL technique to investigate the relationship between trade liberalisation and economic growth between 1995 and 2015 in the same country. Taking trade ratios as a proxy for trade liberalisation, the authors found results contrary to Dutta and Ahmad (2001). The study found that trade liberalisation had a negative effect on economic growth. The findings were later corroborated by Nida & Majeed (2018) who found that trade liberalisation in Pakistan has partly caused marginalization of its citizens through increasing income inequalities.

Sachs & Warner (2001); Edwards (1998) and Pilinkiene (2016) examined the effects of trade liberalisation on economic growth and competitiveness of the Central and Eastern European countries (CEEs).[4] The study applied the Granger-causality test and Vector Auto-regression Model using panel data for 11 countries in Eastern Europe (CEEs) over the period 2000 to 2014 and proxied trade liberalisation by trade openness. The results confirmed a significant positive relationship between trade openness, economic growth and competiveness.

Mercan *et al*., (2013), examined the effect of trade openness on economic growth for Brazil, Russia, India, China and Turkey (BRIC-T). The study employed a Two-way Fixed Effects Model and annual panel data for the period 1989 to 2010. The empirical evidence confirmed a positive effect of trade openness on economic growth in these countries. Additionally, Bharali & Chakraborty (2016) investigated the relationship between trade openness and long-run economic growth through heterogeneous panel data of BRICS countries over the sample period 2004 to 2012. Using the One-way Error component model and panel data analysis, the study confirmed positive relationship between trade openness and long-run economic for BRICS countries. Shayanewako (2018) further investigated the relationship between trade liberalisation

[4] CEEs is an OECD term for the group of countries which are Albania, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, the Slovak Republic, Slovenia and three Baltic States: Estonia, Latvia and Lithuania.

and economic growth for the BRICS countries using the ARDL bounds test to co-integration approach and Granger Causality tests for the period 1990 to 2017. The results confirmed a positive relationship between trade openness and the long-run economic growth.

In the context of the Southern African Customs Union (SACU)[5] countries, Manwa (2015) used the ARDL bound test approach to investigate the relationship between trade liberalisation and economic growth. The study found that the impact of trade liberalisation on economic growth, using tariff, trade ratios, adjusted trade ratios and real effective exchange rate, was negligible. However, by isolating South Africa, the study found that trade liberalisation had a positive impact on long-term economic growth and negative effect on short-run economic growth. Sunde & Ogbokor (2018) further investigated the effect of exports in SACU's per capita gross domestic product. The study applied multiple regression estimation technique over the period 1980 to 2016. The results confirmed that exports positively and significantly affect per capita gross domestic product in the SACU region.

Sachs & Warner (1997) investigated the sources of slow economic growth in Sub-Saharan Africa, including South Africa between 1960 and 1990. The study used the cross-country growth model and found that trade openness has a positive significant impact on economic growth of Sub-Saharan Africa countries.

Chang & Mendy (2012) investigated the empirical relationship between trade openness and economic growth in Sub-Sahara Africa using the fixed-effects panel regression models. The results showed that there is a significant positive relationship between trade openness and economic growth The study by Zahonogo (2017) examined the effects of trade openness on economic growth in 42 Sub-Saharan Africa during the period 1980 to 2012. The study applied a dynamic growth model and found that there exists a trade threshold below which increased trade openness have beneficial effects on economic growth and above which the effects of trade openness on economic growth tend to decline.

[5] Botswana, Lesotho, Namibia, South Africa and Swaziland.

(b) Negative impact of trade liberalisation on economic growth

A number of studies have provided findings that are contrary to those discussed above. The argument for negative relationship between trade liberalisation and economic growth is based on the associated macroeconomic instability characterised by unfavourable balance of payments, exchange rate depreciation, terms of trade deteriorations, and capital outflow (Feenstra, 2003; Rodrik, 1992). Trade liberalisation may increase imports and exports; however, the increase in imports and exports may not increase economic growth. This means that it mostly affects trade volumes (Grossman & Helpman 1991; Harrison 1996 & Srinivasan 2001). According to Grossman & Helpman (1993), trade liberalisation may be growth restricting in the sense that it exposes a country to volatility of output and terms of trade. Accordingly, if the volatility and trading conditions exceed the absorption capacity of a country, the power of dynamic comparative advantage will drive the economy out of the direction of activities that stimulate long-term economic growth (Iftikhar, 2012).

Read & Parton (2009) analysed trade liberalisation efforts that had been undertaken in Kenya, Tanzania and Uganda. The study employed the Autoregressive Distributive Lag Model and panel data for period 1980s to 2008. The study noted that whilst changes in international trade policy took place in the late 1980s to early 1990s, the evidence showed that economic growth and balance of trade of all three countries had deteriorated over the last three decades. Additionally, Read & Parton (2009) concluded that trade liberalisation might not be the best initiative for Sub-Saharan African countries due to the lack of infrastructure, under–developed institutions, weak policy framework and the non–reciprocal market access conditions imposed by developed countries.

Majeed et al., (1998) investigate the impact of trade liberalization on total factor productivity (TFP) in the large scale manufacturing from 1971-2007 in the case of Pakistan. They employed the ARDL approach of co-integration and found that trade liberalization is negatively related with the TFP. Hye (2012) further corroborated the results and investigated the relationship between trade openness and economic growth in Pakistan from 1971 to 2009. The study employed a composite of trade openness index JJ cointegration, Autoregressive Distributed Lag (ARDL) approach to

cointegration, Dynamic OLS, Variance Decomposition and Principal Component Analysis (PCA). The results suggested the existence of a negative and significant relationship between trade openness and economic growth. The study by Nurudeen et al., (2012) examined the relationship between trade openness and economic growth for Pakistan. The study employed Autoregressive Distributed Lag (ARDL) model for the period 1970 to 2008. The results showed that trade openness has a negative and a significant effect on economic growth.

(c) No significant impact of trade liberalisation on economic growth

The findings of no significant relations between trade liberalisation and economic growth has also been reported in the literature. Rodríguez & Rodrik (2000) reviewed studies by Dollar (1992), Ben-David (1993), Sachs & Warner (1995), Edwards (1998) and Frankel & Romer (1999) and found little evidence that trade liberalisation, with respect to lower tariff and non-tariff barriers, is significantly associated with economic growth. Eriș & Ulașan (2013) examined the long-run relationship between trade openness and economic growth of cross countries over the period 1960 to 2000. The study used the Bayesian model averaging techniques to account for model uncertainty issues in a systematic manner. The results confirmed no evidence that trade openness is directly and robustly associated with economic growth in the long run. The studies by Hamad, Mtemgwa and Babikar (2014) and Lopez (2017) for Tanzania and Mexico respectively, found no relationship between trade liberalisation and economic growth.

(d) Studies on trade liberalisation and economic growth in South Africa

Jonsson & Subramanian (2001) conducted a study to determine whether they are any dynamic gains from trade for South Africa. The study found a significant positive relationship between trade openness and total factor productivity in South Africa. This indicates that trade supports economic growth in South Africa. Additionally, Mabugu & Chitiga (2007) investigated the short-run and long-run effects of trade liberalisation in South Africa using a dynamic microsimulation computable general equilibrium approach. The study found that a complete tariff removal on imports has negative welfare and poverty reduction impacts in the short- run, however, the negative effect becomes positive in the long–run due to the accumulation effects. When the tariff

removal simulation is combined with an increase of total factor productivity, the short- and long-run effects are both positive in terms of welfare and poverty reduction. Sikwila et.al., (2014) further corroborated the above findings by investigating the effect of trade openness on economic growth in South Africa. The study employed long-run and short-run regression analysis using quarterly data for the period 1994 to 2013. This study found that trade openness has a significant positive effect on economic growth both in the long-run and short-run.

Malefane & Odhiambo (2018) examined the impact of trade liberalisation on economic growth in South Africa for the period 1975 to 2014. The study used the ARDL bounds test approach and employed four proxies of trade liberalisation. The proxies were trade openness, export to GDP ratio, import to GDP ratio, and index of trade openness. While trade openness positively impacted long-run economic growth, the export to GDP ratio, import to GDP ratio and index of trade openness, however, negatively impacted long-run economic growth. In the short-run, trade openness, export to GDP ratio, and import to GDP ratio were positively related to short-run economic growth, while the index of trade openness has a negative impact on economic growth. These results are contrary to the findings by Manwa (2015) who found a negative relationship between trade openness and economic growth in the short-run.

(e) Issues around the measures of trade liberalisation

There are many studies that have investigated the impact of trade liberalisation on economic growth. The literature shows that the choice of modelling framework and measurement variables has remained inconclusive both at the theoretical and empirical level in most countries (Morgan & Kanchanahatakij, 2015). There has been economic debate about the ability of some measures to cover aspects of a country's trade policy and the suitability of a single trade liberalisation measure, proxy and represent something as complex and diverse as a country's trade regime (Edwards, 1998; Rodrik, 1992).

According to Edward (1997), “comparative measures of trade liberalisation has proven to be controversial and elusive in the economic fraternity”. This is illustrated by the fact that studies in relation to trade liberalisation have used various measures to proxy

trade liberalisation. Many early cross country comparative studies used ready available data as proxies for trade liberalisation such as trade openness and the rate of growth of exports (Balassa, 1982). The limitation of these indicators are not related to policy as countries can distort trade, still have a high trade dependency ratio and that they are largely endogenous. In response to these problems, Johnson & Sheehy (1996) and Michaely et al., (1991) respectively constructed the “Heritage Foundation index of trade policy” and “Subjectivity index of trade”. The Heritage Foundation classifies countries into five categories according to the level of tariffs and other perceived distortions, while the latter is the index used for cross country regressions. These indexes were however not supported by economic community due underestimation of trade policies (Edward, 1997). The World Development Report constructed an “outward-oriented” index for 41 countries at two point in time. Salvatore and Hatcher (1991), using OLS examined and compared the differences in growth between outward oriented and inward oriented countries. The results showed that international trade led to increased growth for in countries with outward oriented policies. The study cautioned that the results appeared to be sensitive to the measurement instruments employed; used inappropriate assumptions regarding production functions across countries; causation was difficult to determine; and the timeframe in question was not sufficient to record the long-run dynamic effect of trade on growth.

Sachs & Warner (1995) used a number of indicators to proxy trade liberalisation. These proxies are tariffs, quotas coverage, black market premium, social organization and the existence of export marketing boards. These indicators suggest an improvement over previous attempts, however it provides only a binary classification. This means that a country is either open or close. According to Levine & Renelt (1992), some economists have opted to used observed values of variables associated with trade restrictiveness as indicators of trade liberalisation. These relate to ratio of tariff revenues to imports such as tariff averages, average coverage of quantitative restrictions (QRs) and collected tariff ratios (CTR). Additionally, Levine & Renelt (1992) consider that the black market premium for foreign exchange as good proxy for the overall degree of external sector distortions. The benefit of these indicators is that they are drawn from ready available data that allows for intermediate situations where countries are neither totally open or totally closed. However, Pritchett (1991) reviewed

the relationship between these indicators and found that correlation among themselves are fairly weak. Also, Pritchett and Sethi (1994) found that collected tariff rates underestimated true protection. Furthermore, the study by Pritchett and Sethi (1994) for Jamaica, Kenya and Pakistan found that the relationship between official tariff rate and collected tariff rates is not linear. Anderson & Neary (1994), used the welfare-equivalent average tariff for group of 23 countries as a proxy for trade liberalisation and found the welfare-equivalent average tariff tend to underestimate the degree of trade restrictions.

Morgan & Kanchanahatakij (2015) are of the view that the effects depend on a few other factors that are missing in the regression model. For trade liberalisation, a large number of variables have been used to measure the proposed heterogeneity, including education, existing levels of development, strength of domestic institutions, macroeconomic stability, and anti-corruption policies (Winter 2004). Generally, the empirical examinations have mostly used the trade ratio as the proxy for trade liberalisation. The literature raises a number of concerns about the ability of one single measure to cover aspects of the country's trade policy as well as the suitability of a single trade liberalisation proxy to encompass a variable as complex and multifaceted as the trade policy of a country (Edwards 1998; Rodrik 1999). From the literature, it is therefore clear that there is a need for careful consideration of the measure(s) of trade liberalisation that is used. To this end, and considering the discussion above, and the discussion on the suitability of particular proxies of trade liberalisation, this study employs three to proxies of trade liberalisation in the examination of the nexus. These proxies are trade openness, tariffs and real effective exchange rate.

According to Dollar (1992), recent well-known research cannot undoubtedly support the positive relationship between trade policy and economic growth, first because they do not accurately measure trade policies, and second because trade policy variables they adopt actually bring other impact, such as macroeconomic instability or regional dummy variables (Sachs & Warner, 1995). Harrison & Hanson (1999), also posit that results are dependent on the chosen measure of trade liberalisation and the specification used, and furthermore, that those measures of trade liberalisation introduced by Sachs & Warner (1995) failed to find a robust relationship between trade liberalisation policies and economic growth.

To sum up, the review presented in this section has recounted the quest for an appropriate comparative proxy for trade liberalisation. Additionally, considered various comparative methodologies and conception approaches regarding estimation of the relationship between trade liberalisation and economic performance. In spite of significant efforts and ingenuity there hasn't been convergence and conclusion for an appropriate proxy for trade liberalisation. The vast majority of proxies for trade liberalisation continue to be subject to questioning and limitations. The empirical studies on the relationship between trade liberalisation and economic growth relied on one or at most three of these proxies and have, thus, left themselves open to criticism and sceptics. Further investigation is required to determine appropriate proxies for trade liberalisation that is associated with economic results that are robust to alternative proxies of trade liberalisation. The empirical analysis presented in the rest of the study is an attempt to address the problems in relation to the measures of trade liberalisation.

Table 3.1 below provides a summary of the reviewed studies on the relationship between trade liberalisation and economic growth.

Table 3.1: Summary of reviewed studies:

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
World Bank (1987)	41 developing countries.	Ordinary Least Square techniques.	Per Capita GDP.	Trade openness, Export/GDP, Import/GDP, Capital and Human capital.	Stable long-run relationship between trade openness and per capita GDP (outward-oriented economies)
Rashid (1995)	India	Ordinary Least Square techniques.	Per capita GDP.	Capital, Human Capital, Technology, and Trade Openness (Export + Import)/GDP).	Trade liberalisation alone, in the presence of domestic restrain, cannot have positive impact on economic growth.
Sachs & Warner (1997)	Sub-Saharan Africa	Regression Estimation Technique.	Per capita GDP.	Trade openness, dummy-landlocked countries, life expectancy, government saving, Natural resource export/GDP and population growth.	Positive relationship between trade openness and economic growth. Africa need more openness to international market.
Edwards (1997)	93 Countries	Regression Estimation Technique.	Total Factor Productivity.	9 indexes of trade policies[6]	Countries that are more open to international trade

[6] (1) Sachs & Warner openness index, (2) World development report outward oriented index, (3) Leamer's openness index, (4) Average black market premium, (5) Average import tariff on manufacturing, (6) Average coverage on Non-Tariff Barriers (NTBs), (7) The heritage foundation index of distortion in international trade, (8) Collected trade taxes ratio and (9) Wolf's index of import distortions.

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
					experienced faster productivity growth.
Rodriquez & Rodrik (2000)	Cross sectional studies	Regress estimation techniques.	Per capita GDP.	Trade openness, exchange rate, tariffs and Non-tariff barriers (NTBs).	Little significant evidence between trade liberalization (lower tariff and non-tariff barriers) and economic growth.
Sachs & Warner (2001)	57 Countries	Simultaneous equations system – Three stage least square estimate.	Per capital GDP.	Tariff barrier, Non-Tariff barriers (NTBs), dummy approach – trade liberalization status or non-status.	Concluded positive relationship between trade liberalisation and GDP growth.
Panagoriya (2002)	138 developing countries	Ordinary Least Square techniques.	Per capita GDP.	Trade openness, Export/GDP, Import/GDP, Capital and Human capital.	Stable long-run relationship between trade openness and per capita GDP (outward-oriented economies).
Dutta & Ahmad (2004)	Pakistan	Error correction model.	Industry aggregate growth – Industry value added.	Real capital stock, labour force, real exports, imports tariff collection rate and secondary school enrolment ratio.	The long-run relationship among aggregate growth function is confirmed.

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
Sarkar (2007)	51 countries	Panel data estimation technique.	Per Capita GDP.	Trade openness, Export/GDP, Import/GDP, Capital and Human capital.	Trade openness is positively related to per capita GDP for developed countries. Trade openness is negatively related to per capita GDP for developing and less developed countries.
Mabuga & Chitiga (2008)	South Africa	CGE model.	Per capita GDP.	Capital, Human Capital, Investment, Export, Import and Trade Liberalisation (Export + Import)/GDP).	Mixed result, positive effect on long-run economic growth and negative effect for short-run economic growth.
Read & Parton (2009)	Kenya, Tanzania and Uganda	ARDL model.	Per capita GDP.	Capital, Human Capital, Investment, Export, Import and Trade Liberalisation (Export + Import)/GDP).	The results showed that economic growth and balance of trade of all three countries had deteriorated over the last three (3) decades.
Gries et al., (2009)	Sub-Sahara Africa	Panel Cointegration and Panel.	Per capita GDP.	Trade openness and financial proxies[7]	No evidence of cointegrating relationships

[7] Private credit, deposit money bank assets, and liquidity liabilities.

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
		Granger Causality			between trade openness and economic growth.
Marelli & Signorelli (2011)	China and India	Fixed effect model with two Ordinal Least Square.	Per capita GDP.	Trade openness, Physical capital and Human Capital.	Trade openness promotes economic growth for India and China.
Chang & Mendy (2012)	Sub-Saharan Africa – 36 African countries	Panel regression – fixed effect model.	Gross domestic product (GDP).	Trade openness, Investment, Foreign Direct Investment (FDI) and gross national savings.	Openness in trade and investment is positively related to economic growth significantly.
Gries & Redlin (2012)	158 Countries	Panel cointegration tests, panel error-corrections models and GMM estimations.	Per capita GDP.	Trade openness, average tariff rates, export taxes, total taxes on international trade and indices of non-tariff barriers (NTBs).	Trade openness benefit economic growth in the long-run and painful for economic growth in the short-run (negative short-run adjustment).
Hye (2012)	Pakistan	JJ cointegration, ARDL model, Dynamic Ordinal Least Square, Variance Decomposition and Principal Component Analysis.	Per capita GDP.	Trade openness, Trade openness index, physical capital and human capital	Negative association between trade and economic growth.

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
Iftikhar (2012)	Bangladesh	Co-integration and Granger causality techniques.	Gross Domestic Product (GDP)	Trade Openness (Export + Import)/GDP).	Trade openness is positively related to economic growth.
Taleb (2012)	Jordan	Granger Causality Model	Per capita GDP	Capital, Human Capital, Technology, and Trade Liberalisation (Export + Import)/GDP).	Moderate positive impact on economic growth with exception of services sector.
Eris & Ulasan (2013)	Cross countries	Bayesian model average estimate.	Per capita GDP.	Battery of proxies for trade openness[8].	None of the proxies is robustly associated with economic growth.
Hamad, Mtengwa & Babikar (2014)	Tanzania	Ordinary Least Square techniques.	Per capita GDP.	Exports, Imports and Trade Openness (Export + Import)/GDP	Exports and imports have no effect on economic growth.
Mercan et al., (2013)	Brazil, Russia, India, China and Turkey (BRIC-T).	Two-way Fixed Effects Model Estimation Technique.	Per capita GDP.	Trade openness, rate of external trade, export/GDP and import/GDP.	Trade openness have positive effect on economic growth.
Sikwila et al., (2014)	South Africa	Error-Correction Model (ECM)	Gross Domestic Product (GDP)	Trade openness, Export/GDP, Import/GDP and Capital investment.	Trade openness has had positive effects on growth and development in South Africa.

[8] (1) Current openness, (2) real openness, (3) the fraction of open years based on the Sachs & Warner (1995) criteria, weighted averages of tariff rates, non-tariff barriers (NTBs) and black market premium.

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
Manwa (2015)	SACU – Botswana, Lesotho, Namibia, South Africa and Swaziland	ARDL Model	Per capita GDP.	Trade liberalisation measures – (Tariffs, trade ratios, real effective exchange rate), physical capital and labour force.	Trade liberalisation measure had an insignificant effect on economic growth for all countries except for South Africa. The significant effect holds on trade ratios and real effective exchange rate.
Bharali & Chakraborty (2016)	BRICS countries	One-way Error component model and panel data estimation model.	Per capita GDP.	Trade openness.	Trade openness has a positive effect on economic growth for BRICS countries.
Pilinkiene (2016)	Central and Eastern Europe	Granger Causality and test and Vector Auto-regression (VAR).	Per capita GDP	Trade Openness (Export + Import)/GDP), Total Factor Productivity, Foreign Direct Investment, Labour Force, and Services.	Positive relationship between trade openness and economic growth.
Hozouri (2017)	12 Middle East & North African	Co-integration and Granger causality techniques.	Per capita GDP.	Trade openness, tariffs, export/GDP and import/GDP	Positive relation between trade openness and per capita GDP. Negative

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
					relationship between tariff and per capita GDP.
Lopez (2017)	Mexico	ARDL model.	Per capita GDP.	Export, Import and Trade Openness (Export + Import)/GDP).	Trade openness had a positive but insignificant effect on growth.
Majeed, Ahmed, & Butt (2017)	Pakistan	ARDL mode.l	Per capita GDP.	Capital, Human Capital, Total Factor Productivity and Trade Openness (Export + Import)/GDP).	Negative impact on total factor productivity and economic growth.
Zohonogo (2017)	Sub-Saharan Africa – 42 countries	Pooled Mean Group (PMG) estimation technique.	Per capita GDP.	Trade openness, inflation, the financial crisis, external debt, human capital and physical capital and institutional quality.	Trade openness below threshold has beneficial effects on economic growth and above threshold the trade effect on growth declines.
Malefane, & Odihiambo (2018)	South Africa	ARDL model.	Per capita GDP	Growth Rate of Real GDP Per Capita, Trade Openness, Investment, Government Expenditure, Inflation rate and level of financial development.	Positive relationship between trade openness, and long run economic growth. Also, negative effect on the short-run

Studies	Country	Estimation Techniques	Dependent Variables	independent Variables	Findings
					economic growth.
Shayanewako (2018)	BRICS[9]	ARDL model and Granger causality.	Per capita GDP.	Capital, Labour Force, Foreign Direct Investment, Real Exchange Rate.	Positive relationship between trade liberalisation and long-run economic growth. Also, negative effect on the short run economic growth.
Sunde & Ogbokor (2018)	SACU – Botswana, Lesotho, Namibia, South Africa and Swaziland	Stationary data estimation technique, fixed effects and random effects models.	Per capita GDP.	Trade openness, labour force, gross fixed capital formation as percentage of GDP, secondary school enrolment and dummy-democracy (1 if democratic and 0 otherwise).	Trade liberalization and trade openness for SACU have had a significant impact on economic growth.

Source: Compiled by the Author (2019).

[9] Federation Republic of Brazil, The Russian Federation, the Republic of India, the People's Republic of China and the Republic of South Africa.

3.5 Conclusion

This chapter considered international trade theories that underpin trade liberalisation and economic growth, namely the mercantilist trade theory, classical theory of trade, neo-classical theory of trade, and endogenous growth theory. All these trade theories, except for mercantilism, are in support of trade liberalisation as a tool to enhance a country's gains from trade. The link between trade liberalisation and economic growth is relatively more visible in the endogenous growth theory.

The Mercantilist theory postulates a trade policy regime that restrains imports and encourages exports with a view to achieving a positive balance of payments. The rationale of the regime is said to protect local industries against foreign competition and employment creation. The protection instruments are the imposition of high tariffs and quotas for imported products and the restriction of the migration of highly skilled workers to foreign countries as a means of retaining the country's knowledge, technology and skills. Mercantilism, therefore, is trade restrictive as only one nation benefits out of trade and as such, it was refuted by Adam Smith (1776) and David Ricardo (1973) through their propositions for alternative trade theories.

The alternative classical theories are absolute and comparative advantage in that they encourage trade through specialisation from a resource and comparative cost point of view. The tacit aspect of these theories underpins trade liberalisation through tariff reduction and quotas (Berkum & van Meijl, 1998). Trade liberalisation is therefore promoting both imports and exports on the basis of a country's absolute and comparative advantage. The basis of absolute and comparative advantage is further explained in the Neo-classical trade theorems.

Neo-classical theory encourages countries to specialise in products that use their resources efficiently given identical technologies and production techniques. The theorems posit that all nations tend to export the commodity whose production requires the intensive used of the country's relatively abundant and cheaper factor and import the commodity whose production requires the intensive use of the country's relative scarce and expensive factor (Salvatore, 2014). gain from trade and world output is increased. The aspect of trade liberalisation in these theories is that it

stimulates economic growth, promotes and rewards activities in which a country has relative comparative advantage in relation to factor of productions under the assumption of constant return to scale, perfect competition, and same technologies.

Notwithstanding, these assumptions are not realistic in today's economies and more trade theories have been developed in this regard. The most important one is the endogenous economic growth. The Endogenous Growth Theory relies on technology diffusion in a form of efficiency gains, growth in market size, technological spill-over, and economies of scale that enumerate trade liberalisation as the engine for economic growth (Bhathi et al*.,* 2011). According to the Endogenous Growth Theory, trade liberalisation enhances production of new technologies, resulting from higher competition as a result of higher economic integration. Production of new technology crosses borders due to externality and technology diffusion. Also, it increases the knowledge stock for technological innovation that contributes to economic growth.

The empirical evidence demonstrates that the effect of trade liberalisation on economic growth can be positive or negative or there can be no relationship between the two variables. Morgan & Kanchanahatakij (2015) are of the view that the effects depend on a few other factors that are missing in the regression model. For trade liberalisation, a large number of variables have been used to measure the proposed heterogeneity, including education, existing levels of development, strength of domestic institutions, macroeconomic stability, and anti-corruption policies (Winter 2004). Generally, the empirical examinations have mostly used the trade ratio as the proxy for trade liberalisation. The literature raises a number of concerns about the ability of one single measure to cover aspects of the country's trade policy as well as the suitability of a single trade liberalisation proxy to encompass a variable as complex and multifaceted as the trade policy of a country (Edwards 1998; Rodrik 1999). From the literature, it is therefore clear that there is a need for careful consideration of the measure(s) of trade liberalisation that is used. To this end, and considering the discussion above, and the discussion on the suitability of particular proxies of trade liberalisation, this study employs three to proxies of trade liberalisation in the examination of the nexus.

CHAPTER 4: METHODOLOGY

4.1 Introduction

This chapter presents the methodology used in the study. The model adopted is specified and the variables included are discussed. The study applies the multivariable Autoregressive Distributed Lag (ARDL) model, developed by Pesaran (2001), for the examination of the nexus between trade liberalisation and economic growth in South Africa between 1980 and 2016. The chapter concludes with a discussion of the sources of data employed in the study and the limitations of the study.

4.2 Model Specification

The study draws its theoretical basis from the Endogenous Growth Theory. The Endogenous Growth theory, following the work of Romer (1986) and Lucas (1988), identifies a number of factors that determine economic growth. These factors, amongst others, are technology, capital formation (investment), innovations, research and development and human capital formation. In addition, it is important to note that economic activities happen in the prevailing political environment (democratic, autocratic etc.). South Africa has an experience of pre- and post-democratic dispensation, where the former was associated with political instability. The study therefore includes a political stability variable to account for the political history and environment in the country. Building on the Endogenous Growth Model and following Roubini & Sala-I Martin (1992), Coe & Moghadam (1993), Piazola (1995), Odedokun (1996), and Siddiki (2002), the model adopted is specified as follows:

$$\ln Y = \beta_0 + \beta_1 \ln TL + \beta_2 \ln K + \beta_3 \ln L + \beta_4 \ln GOVE + \beta_5 \ln PS \qquad (3)$$

Where Y is output measured as real per capita gross domestic product, L is labour proxied by the total labour force, K is the physical capital formation measured by investment in capital stock, GOVE is government consumption expenditure, and PS is an indicator of political stability. Trade liberalisation (TL) is measured by three proxies; trade openness (TO), tariffs (TARIFFS) and the real effective exchange rate (REER).

4.3 Justification and Measurement of Variables in the Model

The following section is the justification of measurement and variables in the model.

- **Per Capita GDP (Y)**

GDP per capita is the dependent variable and it is included as the proxy for economic growth. The GDP per capita (Y) measures the economy's total income per person. Theoretically, an increase in GDP per capita is taken as a sign of economic prosperity and it measures the well-being of the citizen of any country (Snowdon & Vane, 2005).

- **Trade liberalisation (TL)**

Leamer (1988), Harrison (1996) and Yanikkaya (2003) indicate four categories of measures of trade liberalisation. These are:

  - outcome-based,
  - incidence-based
  - price-based
  - composite based.

This study uses the outcome-based, incident-based and price-based measures of trade liberalisation. Outcome-based trade liberalisation measures include trade ratios and adjusted trade ratios. The former is commonly referred to as 'trade openness'. Trade openness is the main proxy for trade liberalisation and is defined as the ratio of the sum of imports and exports to GDP. Trade liberalisation is regarded as a policy measure to enhance trade openness (Biwott, 2011) and therefore trade openness is the result of trade liberalisation (Pikga-Balanika, 2006). Kneller et al*.,* (2008) indicated that trade openness is a reasonable proxy for trade liberalisation as it highlights a country's international trade policy position. The coefficient of trade openness is expected to be positive in relation to economic growth given that an increase in trade openness is associated with an increase in economic performance (World Bank, 2014b).

Trade openness as proxy for trade liberalisation has been criticised. The criticisms relate to the interpretation of results as trade openness captures a host of other factors not related to trade, such as oil shocks and terms of trade crises (Bhati et al., 2011). Wacziarg (2001) pointed out and further argued that, because of their broad coverage, trade openness measures are more reflective of the level of integration into the global economy and therefore caution should be exercised when interpreting the results. Given this, other indicators suggested by the literature as a proxy for trade liberalisation are included in the study. Specifically, adjusted trade ratio (the percentage by which the trade ratio overstates or understates economic activities resulting from trade) is included. The adjusted trade ratio is considered to be a better reflection of trade ratios; however, it has also been criticised for taking into account non–policy measures (Spilimbergo et al., 1999). The adjusted trade ratio is expected to have a positive impact on growth.

According to Yanikkaya (2003), there are other indicators that can be used to examine the effect of trade liberalisation on economic growth nexus. These indicators are based on:

- trade volumes
- trade restrictiveness (increase or reduction in tariffs rates)
- bilateral payments arrangements
- variety of trade orientation indices
- real effective exchange rate.

Following Yanikkaya (2003), real effective exchange rate and tariffs are included in this study to capture the relative prices of imports and exports as well as the relative prices of non-tradable goods. The study expects that an exchange rate misalignment in the form of undervaluation of the currency will have a positive impact on economic growth (Rodrik, 2004). The real exchange rate is one of the important economic variables, especially in the current international trade context, eliminating trade barriers and increasing direct competition between countries (Dollar & Kraay, 2003). The real exchange rate is seen as a key indicator of a country's product competitiveness. If the currency is undervalued, domestic products are cheaper than

foreign products, which may result in domestic or foreign demand shifting to relatively domestic products. This will lead to an increase in exports and a decrease in imports, and the trade balance will improve and the national economy (Razzaque et al*.,* 2017). The real exchange rate affects the economy through the impact of key economic variables such as employment, inflation, and economic growth (Deravajan & Rodrik, 1989). According to Dollar & Kraay (2003), changes in real exchange rates can affect the competitiveness of domestic products, leading to an increase in exports or imports, affecting the balance between trade and economic growth. Additionally, changes in real exchange rates affect investment and capital accumulation, which is directly related to economic growth (Crakrani, 2014). The real exchange rate is seen as a key indicator of a country's product competitiveness.

As mentioned below, this study uses taxes on international trade (tariffs) as an alternative proxy for trade liberalisation. Tariffs are a measure of trade restriction and is classified as an incidence-based liberalisation measure, which indicates the level of tariff barriers. Tariffs are a popular measure of trade restrictiveness as they are the most direct measure of trade liberalisation (WTO, 2019). Taxes on international trade is expected to have a negative impact on trade liberalisation (Manwa, 2015).

- **Capital accumulation (K)**

Capital accumulation (K) is included as a proxy for investment. Capital is one of the important explanatory variables in endogenous growth models, due to the fact that physical capital accumulation is one of the channels through which economic growth can be achieved. Investment is among the most fundamental factors for economic growth. According to Adhikary (2011), capital formation accounts for the accumulation of capital goods, including machinery and improvement of infrastructure. This contributes to economic growth and thereby increases employment.

- **Labour (L)**

Labour force (L) is included in the study as a proxy for labour. Labour is one of the primary explanatory variables in endogenous growth models. The South African economy has not been able to support employment creation since 1994 (Mabungu & Chitiga, 2007). South Africa's economic policies are, amongst other things, meant to create jobs and therefore the labour force is critical for this study[10]. An increase in economic growth is expected to increase labour force.

- **Government Expenditure (GOVE)**

Government expenditure is included in the study on the basis that there is a positive relationship between government expenditure and economic growth. This study expects a positive sign for the coefficient of government expenditure (Oladele et al*.,* 2017).

- **Political Stability (PS)**

Governance is considered an important factor for economic development and growth (Acemoglu & Robinson, 2005). According to Bloom & Sachs (1998), internal politics conducive to authoritarianism and corruption are key factors that account for poor economic performance of Sub-Saharan African countries. Acemoglu & Robinson (2005) conclude that underdeveloped nations are led by a political elite that usually block democratic economic policies, institutions and programmes that advance the notion of technological progress, innovation, economic growth and economic development. Bloom & Sachs (1998) had once concluded that internal politics conducive to authoritarianism and corruption are key factors that account for poor economic performance of Sub-Saharan African countries. Notably, South Africa has experienced major political transformation from the apartheid era to the democratic era. Policies implemented by these two divergent regimes have had implications for the economy, politically and socio-economically. The elements of continuous internal political instability and corruption, in the context of South Africa's pre-democratic and

[10] See chapter two regarding NDP, NGP and IPAP.

post-democratic dispensation has and is adversely affecting its economic performance (World Bank, 2014). The inclusion of a governance variable is thus important in the South African context. Political stability is therefore factored in the model as a proxy for governance. Theoretically, there is an expectation of positive relationship between political stability and economic growth (Bloom & Sachs, 1998).

4.4 Data and Data Sources

The econometric analysis is performed by using South African yearly time series data from 1970 to 2017. Political stability takes the form of 0 for apartheid and 1 for democracy. The table below summarises the data and data sources:

Table 4.1: Summary of data and data sources

VARIABLES	MEASURE	SOURCE
GDP per capita (Y)	Economic Growth (Gross Per Capita Domestic product) in constant Rands.	World Bank (2017)
Labour Force (L)	Total Labour Force (millions)	SARB (2017)
Capital Formation (K)	Gross Fixed Capital formation in millions of Rands.	SARB (2017)
Trade Openness (TO)	(Imports + Exports)/GDP	SARB (2017)
Political Stability (PS)	Dummy Variable	
Tariffs (TR)	Tax on international trade	World Bank (2017)
Real Effective Exchange Rate (REER)	Nominal effective exchange rate adjusted for the inflation differential between South	SARB (2017)

	Africa and its major trading-partner countries.	

Source: Compiled by the Author (2018).

4.5 Estimation Technique: Co-integration Analysis – Autoregressive Distributed Lag (ARDL) Approach

The ARDL bounds test used extensively in empirical analysis has gained popularity in recent years as a method of examining co-integrating relationships between variables through the work of Pesaran & Shin (1998) and Pesaran et al., (2001). Using time-series data on South Africa from 1970 to 2017, the study examines the impact of trade liberalisation on economic growth through the application of the Autoregressive Distributed-Lag (ARDL) technique.

There are many advantages of using the ARDL technique; first, the ARDL technique allows pre-testing of variables, which means a test on the existing relationship between variables in levels is applicable for regressors, purely on I(0), I(1) or a mixture of both (Pesaran *et al.,* 2001). It gives the flexibility to test relationships between variables that are mutually co-integrated I(0), I(1) or a mixture of both. Second, the appropriate lags in the ARDL technique are corrected for both residual correlation and endogeneity. As long as the model is free of residual correlation, endogeneity is less of a problem (Pesaran & Shin, 1999). Third, the advantage of the ARDL technique over single equation co-integration techniques such as the Engle-Granger (1987) is that the latter suffers from problems of endogeneity while the ARDL method can distinguish between dependent and explanatory variables (Shahbaz et al., 2017). According to Alam & Quazi (2003), the ARDL technique estimation procedure is possible even if the explanatory variables are endogenous. Lastly, the model is able to take sufficient numbers of lags to capture the data generating process in a general to specific modelling framework (Laurenceson & Chai, 2003).

The ARDL representation of equation 1 is provided as follows:

$$\Delta \ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \Delta \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \Delta \ln TL_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \Delta \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \Delta \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \Delta \ln GOVE_{t-j} + \sum_{j=1}^{P_6} \alpha_{6,j} \Delta \ln PS_{t-j}$$
$$\beta_1 \ln Y_{t-1} + \beta_2 \ln TL_{t-1} + \beta_3 \ln K_{t-1} + \beta_4 \ln L_{t-1} + \beta_5 \ln GOVE_{t-1} + \beta_6 \ln PS_{t-1} + \mu_t \quad (4)$$

Where Y is GDP per capita, L is total labour force, K is capital formation, GOVE is government expenditure, PS is political stability, TL is a vector of trade liberalisation variables (trade openness (TO), Tariffs (T) and Real Effective Exchange Rate (REER). The difference operator Δ is changed, while P_1 to P_6 are the number of lagged difference terms in a system selected based on the lag numbers most commonly selected by the lag selection criteria. The sign μ is the uncorrelated disturbance term that has a zero mean and finite variance (Okafor & Shaibu, 2016). The expressions with the sign (α_1 to α_6) on the right-hand side represent the short-run dynamics of the model. The signs β_1 to β_6 on the right-hand side corresponds to the long-run model (Shahbaz et al., 2017).

The objective of a bounds test is to examine the existence of a long-run relationship between per capita GDP growth and the explanatory variables TL, K, L, GOVE, and PS. The determination of Co-integration in the bounds test is achieved through the examination of the F-test which is used for testing the existence of the long-run relationship (Pesaran et al., 2001). The null hypothesis for co-integration among the variables in equation 4 is H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ against the alternative hypothesis H_1: $\beta_1 \neq \beta_2 \neq \beta_3 = \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$. The F test has a non-standard distribution which depends on (i) whether variables included in the model are mutually co-integrated or I(0), I(1) or mixture of both, (ii) the number of regressors, and (iii) whether the model contains a model intercept and/or a trend (Okafor & Shaibu, 2016).

Pesaran et al., (2001) developed asymptotic critical values bounds where variables are mutually co-integrated or I(0), I(1) or a mixture of both. Two sets of critical values are generated with one set referred to the I(0) series and the other for the I(1) series. Critical values for the I(1) series are referred to as upper bound critical values, while the critical values for I(0) series are referred to as the lower bound critical values. If the F statistic is below the lower bounds, the null hypothesis of no cointegration cannot

be rejected. If it is found that the calculated F-statistic is above the upper bounds of the critical values, it would confirm the presence of co-integration between the variables of the model, which would give evidence of a long-term relationship between the variables. If the F-statistic falls within these bounds, the inference is in-conclusive and prior knowledge of the co-integration rate (r) is needed. If the F-statistic is below the upper bound of critical values, the null hypothesis cannot be rejected (Afzal et al., 2017).

Once co-integration is established, the lag length is selected for each variable. The ARDL method estimates $(P + 1)^k$ number of regressions in order to obtain optimal lag length for each variable, where *P* is a maximum number of lag to be used and k is the number of variables in the equation.

Model 1:

If there is evidence of a long-run relationship (co-integration) between the variables, the following long-run model will be estimated for trade openness (TO) as proxy for trade liberalisation. In line with Pesaran et al*.,* (2009), the ARDL specification of model 1 of the study is specified as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln TO_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \mu_t \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} + \mu_t$$

$$\beta_1 \ln Y_{t-1} + \beta_2 \ln TO_{t-1} + \beta_3 \ln K_{t-1} + \beta_4 \ln L_{t-1} + \beta_5 \ln GOVE_{t-1} + \beta_6 \ln PS_{t-1} + \mu_t \quad (5)$$

The ARDL specification of the short-run dynamic is derived by conducting an error correction model (ECM) is as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln TO_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} + \alpha_7 ECT_{t-1} \quad (6)$$

Model 2:

If there is evidence of a long-run relationship (co-integration) between the variables, the following long-run model will be estimated for tariffs (International trade tax) as proxy for trade liberalisation. In line with Pesaran et al*.,* (2009), the ARDL specification of model 2 of the study is specified as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln TARIFFS_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \mu_t \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} + \mu_t$$

$$\beta_1 \ln Y_{t-1} + \beta_2 \ln TARIFFS_{t-1} + \beta_3 \ln K_{t-1} + \beta_4 \ln L_{t-1} + \beta_5 \ln GOVE_{t-1} + \beta_6 \ln PS_{t-1} + \mu_t \quad (7)$$

The ARDL specification of the short-run dynamic is derived by conducting an error correction model (ECM) is as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln TARIFFS_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} +$$

$$\alpha_7 ECT_{t-1} \quad (8)$$

Model 3:

If there is evidence of a long-run relationship (co-integration) between the variables, the following long-run model will be estimated for real effective exchange rate (REER) as proxy for trade liberalisation. In line with Pesaran et al*.,* (2009), the ARDL specification of model 3 of the study is specified as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln REER_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \mu_t \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} + \mu_t \quad (9)$$

$$\beta_1 \ln Y_{t-1} + \beta_2 \ln REER_{t-1} + \beta_3 \ln K_{t-1} + \beta_4 \ln L_{t-1} + \beta_5 \ln GOVE_{t-1} + \beta_6 \ln PS_{t-1} + \mu_t \quad (10)$$

The ARDL specification of the short-run dynamic is derived by conducting an error correction model (ECM) is as follows:

$$\ln Y_t = \alpha_0 + \sum_{j=1}^{P_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{P_2} \alpha_{2,j} \ln REER_{t-j} + \sum_{j=1}^{P_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{P_4} \alpha_{4,j} \ln L_{t-j} + \sum_{j=1}^{P_5} \alpha_{5,j} \ln GOVE_{t-j} + \sum_{j=1}^{P_6} \alpha_{6,j} \ln PS_{t-j} + \alpha_7 ECT_{t-1}$$

$$(11)$$

4.6 Diagnostic Tests

The ARDL Bounds test is based on the assumption that the variables are I(0) or I(1). The objective is that all variables should not be I(2) so as to avoid spurious results. In the presence of variables integrated of order of I(2), the study cannot interpret and/or conclude the values of F-statistics as guided by Pesaran *et al.,* (2001). Therefore, before applying this test, the study determines the order of integration of all variables using unit root tests. It is important to ensure that none of the variables is integrated of the order two I(2).

4.6.1 Unit root tests

A time–series is understood to be stationary if its mean and variance are constant over time (Gujarati, 2004). Consequently, the series tend to drift around its mean due to the limited variance. According to (Studenmund, 2011), the series can be of a stochastic nature or a deterministic nature. Alternatively, a nonstationary time–series or a random walk model is one where the mean and variance continually change over time and has a simple correlation coefficient between the X variable and its lagged variable which is influenced by factors other than solely the length of the lag between the two (Studenmund, 2011).

The study tests all variables for the presence of unit roots. Unit root tests allow for determining whether a times series is stationery or not. If a particular series is stationary, then the mean, variance and autocorrelations can be well approximated using long-term averages based on a single set of realisations (Enders, 2004). However, if a series is non-stationery, it will tend to drift away from its long-term mean, which could lead to inference being based on spurious results. A major weakness with nonstationary time-series is that they are usually suitable for analysis in the current time-frame and generalisation cannot be drawn from past periods. Also, the results may not be used to make accurate predictions (Studenmund, 2011). Consequently, Ordinary Least Squares (OLS) regressions produce unreliable results in the presence of unit roots. Thus, it is essential to subject time–series data to unit root testing before undertaking regressions. There are a number of non-stationarity tests that exist which test the hypothesis that the variable under investigation has a unit root and is likely to

benefit from being specified in its first or second differential form should the first differential be found to contain unit roots (Gujarati, 2004). Therefore, this study employs the conventional Augmented Dickey and Fuller (ADF) (1979) test, the Phillips Perron (PP) (1988) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test.

(a) The Augmented Dickey Fuller

The Augmented Dickey Fuller (ADF) test investigates whether a time–series has a unit root. The ADF test takes into consideration situations where the error terms may be correlated with previous terms by adding lagged difference values of the dependent variable to the regression (Fuller, 1976). Note that the test as specified in equation 12 below is used to test a random walk model with a drift and a stochastic trend. It may also be used to test a random walk model with or without a drift. Using equation 12 as the basis for the test one obtains:

$$\Delta Y_t = \beta_1 t + \beta_2 Y_{t-1} + \sum_{i-1}^{\rho} C_1 \Delta Y_{t-1} + \varepsilon_t \qquad (12)$$

where Δ is the first difference, Y_t is the time–series being tested, t is the time trend variable, and p is the number of lags added to the model to ensure ε is a white noise. The number of lags is determined using Schwarz Bayesian Criterion and/or Akaike Information Criterion. The ADF tests the hypothesis of $\beta_2 = 1$ against the alternative hypothesis of $\beta_2 < 1$. If the computed test statistic exceeds the critical value at the selected significance level, then the hypothesis of the presence of a unit root cannot be rejected. Rejection of the null hypothesis indicates that the time–series is stationary whereas non–rejection of the null hypothesis indicates that the time–series is nonstationary (Gujarati, 2004).

(b) Phillips–Perron

Similar to the ADF the Phillips–Perron (PP) test investigates whether a time–series has a unit root. The test equation is stated as*:*

$$\Delta Y_t = \beta_0 + \beta_1 t + \beta_2 Y_{t-1} + \varepsilon_t \qquad \varepsilon_t \sim I(0) \qquad (13)$$

The main difference between the PP test and the ADF test is that the ADF test accounts for any serial correlation in the error terms by introducing a lagged difference term of the dependent variable. The PP test approximates and adjusts the t–ratio of the β_2 coefficient in order to prevent serial correlation from affecting the asymptotic distribution of the test statistic. In essence, the PP test corrects for serial correlation through the modification of the test statistics by using nonparametric statistical methods. The two tests are very similar in that the asymptotic distribution of the two tests is identical though it may differ in small samples due to the different methods used to correct for serial correlation (Gujarati, 2004). Thus, interpretation of the t–statistic follows the same procedure as per the ADF test.

The PP and ADF tests have received criticism over their failure to determine whether a process is stationary when the root lies close to 1 (i.e. has very persistent alternative roots), especially in small data samples (Nelson & Plosser, 1982; DeJong, et al., 1992;). For example, in equation 12 if β_2 was found to be 0.95 as opposed to 1, the PP and ADF tests may incorrectly fail to reject the null hypothesis and find the time–series in question to be nonstationary. Further criticism has been received for their low power and size problems, which is typical in economic data (Schwert, 1989). The power of the test is reduced upon the addition of trend and constant variables to the regression equations. Although, the size distortions result from the test rejecting the null hypothesis of non-stationarity in the presence of a large moving average root that is negative.

(c) Kwiatkowski–Phillips–Schmidt–Shin

Kwiatkowski et al. (1992) propose a different test, which has been found to have greater power against persistent alternatives. The Kwiatkowski–Phillips–Schmidt–Shin (KPSS) test differs from the ADF and the PP test in that its null hypothesis tests for stationarity. Therefore, rejection of the null hypothesis indicates that the time–series is nonstationary. This test is used as an alternative test to the first two as researchers have noted that standard unit root tests sometimes failed to reject the null hypothesis of a unit root when referring to economic data (DeJong et al., 1992; Nelson & Plosser, 1982). The test equation is written as follows:

$$Y_t = \delta t + r_t + \varepsilon_t \qquad where\, r_t = r_{t-1} + \mu_t \qquad (14)$$

with μ_t being [i,i,d (0, δ^2)]. The initial value of r_0 serves as the intercept with δ_t denoting the deterministic trend value and ε_t being a stationary error. In this analysis the null hypothesis of stationarity is tested by using a Lagrange Multiplier (LM) test which evaluates whether $\delta^2 = 0$ in the random walk (r_t) variable. If the computed test statistic, which in this case is the Lagrange Multiplier statistic, is below the selected critical value, then the hypothesis of stationarity cannot be rejected. If it exceeds the critical value, then the series is nonstationary Phillips & Perron (1988).

4.6.2 Diagnostic and Stability tests

To ensure the goodness of fit of the model, diagnostic and stability tests are performed. Diagnostic tests examine the model for serial correlation, heteroscedasticity and non-normality.

(a) Serial correlation test

The Breusch–Godfrey test assess the autocorrelation in the errors in a regression model. It uses residuals from the model being considered in a regression analysis, and a test statistic is derived from these residuals. Serial correlation is the relationship between a variable and a lagged version of itself over various time intervals. Repeating patterns often show serial correlation when the level of a variable affects its future level (Gujarati, 2004). When error terms from different (usually adjacent) time periods (or cross-section observations) are correlated, it means that the error term is serially correlated. Serial correlation occurs in time-series studies when the errors associated with a given time period carry over into future time periods. If the test reveals the presence of serial correlation in a model structure, it means incorrect conclusions would be drawn proposed regression.

Before using the estimated equation for statistical inference, the study examines the residuals for evidence of serial correlation. Durbin-Watson (DW) statistic is a test for first-order serial correlation. This means that the DW statistic measures the linear association between adjacent residuals from a regression model (Gujarati, 2004). The DW is a test of the hypotheses $\rho = 0$ in the specifications:

$$\mu_t = \rho\mu_{t-1} + \varepsilon_t \tag{15}$$

If there is no serial correlation, the DW statistic will be around 2. The DW statistic will fall below 2 if there is positive serial correlation (in the worst case, it will be near zero). If there is negative correlation, the statistic will lie somewhere between 2 and 4 (Gujarati, 2004).

(b) Heteroskedasticity test

Heteroskedasticity refers to a systematic change in the spread of the residuals over the range of measured values. This is a challenge because ordinary least squares (OLS) regression assumes that all residuals are drawn from a population that has a constant variance. According to Studenmund (2011), heteroskedasticity causes the OLS estimates of the Standard Errors to be biased and lead to unreliable hypothesis testing. The study applies White test of the null hypothesis of no heteroskedasticity against heteroskedasticity of unknown. The t-statistic is computed by an auxiliary regression, where the study regresses the squared residuals on all possible (non-redundant) cross products of the regressors. The white test thus has the distinct advantage of not assuming any particular form of heteroskedasticity (Studenmund, 2011).

(c) Normality test

Normality test is used to determine if the data set is well-modelled by a normal distribution. Also, to determine the likelihood of a random variable underlying the data set to be normally distributed. The study applies the Jarque-Bera(J-B) test to determine the goodness of fit. The test assesses whether the data have the skewness and kurtosis matching a normal distribution. The associated t-statistics is always non-

negative. If it is far from zero, it signals that the data does not have a normal distribution. If the data comes from the normal distribution, the Jarque-Bera statistic asymptotically has a chi-square distribution with two degrees of freedom (Gujarati, 2004). The test is used to examine the hypothesis that the series are normally distributed. The null hypothesis is a joint hypothesis of the skewness being zero and the excess kurtosis being zero. This means that the sample from the normal distribution have an expected skewness of zero and an expected excess kurtosis of zero.

(d) Stability test

The stability test is performed using the Cumulative Sum of the Recursive Residuals (CUSUM) and the Cumulative Sum of the Recursive Squared Residuals (CUSUMSQ) as suggested by Brown *et al.*, (1975). The CUSUM and CUSUMSQ statistics are recursively updated and plotted against the breakpoint. If the graphs of the CUSUM and CUSUMSQ statistics remain within the critical limits of a significance level of 5 percent, the null hypothesis of all coefficients in the given regression is stable and cannot be rejected (Okafor & Shaibu, 2016).

4.7. Conclusion

This chapter explained the methodology adopted in the study. The model to be estimated is specified and the variables included in the model are explained and justified. In addition, the estimation technique and the various diagnostic and stability tests to be undertaken are explained and substantiated. The discussion in the preceding sections of the chapter expands on the unit root tests used, namely the Augmented Dickey Fuller (ADF), the Phillips Perron test (PP) and the Kwiatkowski-Phillips-Schmidt-Shin test. The post estimation diagnostic tests to be utilised are also discussed, including the test for serial correlation, heteroskedasticity and the normality test. In the next chapter, the model is estimated, subjected to the tests discussed above and the results are discussed.

CHAPTER 5

ESTIMATIONS AND RESULT ANALYSIS

5.1 Introduction

This chapter provides estimation results and result analysis regarding the impact of trade liberalisation on economic growth in South Africa. The chapter is arranged into five (5) sections. Section one provides the descriptive statistics and associated analysis. Section two, three and four respectively provides and discusses the unit root test results, bounds test result and the long-run and short-run results. Section five concludes the chapter.

5.2 Descriptive Statistics

Table 5.1: Descriptive statistics of variables

Details	GDPC	Capital formation	Labour Force	Trade Openness	Tariffs	REER	GOVE	DUMMY
Mean	0.012166	0.171970	18.44271	0.497539	3.926655	98.23500	0.172984	0.500000
Median	0.008678	0.177194	89.77500	0.523034	2.774707	98.53000	0.184605	0.500000
Maximum	0.042303	0.217975	108.3000	0.635616	8.805431	136.7800	0.209343	1.000000
Minimum	1.000006	0.125555	47.90000	0.353001	1.697823	72.50000	0.111117	0.000000
Std. Dev.	0.013014	0.027213	16.11915	0.085235	1.340871	12.88117	0.029360	0.505291
Skewness	0.823681	-0.228071	-0.745814	-2.11187	-1.554689	-0.554737	-0.758687	0.000000
Kurtosis	2.536981	1.639938	2.799793	1.737067	6.463203	3.780765	2.188050	1.000000
Jarque-Bera	5.856375	4.115668	4.530075	3.546797	43.32401	3.681051	5.923376	8.000000
Probability	0.053494	0.127730	0.103826	0.169755	0.000000	0.018734	0.051732	8.000000
Sum	0.583964	8.254544	4101.250	23.88189	188.4794	2.433814	23.88189	24.00000
Sum Sq. Dev.	0.007960	0.034805	12211.87	0.341459	84.50299	0.039584	0.341459	12.00000
Observation	48	48	48	48	48	48	48	48

Table 5.1 above provides the descriptive diagnostics of the data series. Kurtosis is defined as the flatness or peak of the distribution of the series. A kurtosis with a value of 3 is said to be normally distributed, while the kurtosis with the value less or greater than 3 is referred to as platykurtic (flat) and leptokurtic (peak) distributed relative to the normal distribution (Brooks, 2008). Table 5.1 indicates that the Kurtosis is leptokurtic in most variables with the exception of tariffs and real effective exchange rate that are platykurtic relative to normal distribution. According to Brooks (2008), a normally distributed series has a skewness of zero and this skewness can be either positive or negative. From Table 5.1, with the exception of the tariff variables, all other series have a long right-tail distribution, which means that the null hypothesis of normal distribution cannot be rejected. The Jarque-Bera values for GDPC, Tariff, Investment and GOVE are greater than the 5% level of significance, meaning that the null hypothesis of normal distribution cannot be rejected.

5.3 Unit Root Test Results

The order of integration of the series is determined using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) unit root tests. This step is important because the ARDL bounds test requires the dependent variable to be integrated of order one I(1) and the independent variables to be integrated of order zero I(0) or order one I(1) (Pesaran & Shin 1999). The results show that all variables are integrated of order one.

Table 5.2: ADF and PP unit root test results

Variables	ADF: intercept		PP: intercept		KPSS: intercept		Con clus ion
	Levels	First difference	Levels	First difference	Levels	First difference	
Ln (GDPC)	-0,653	-4,637***	-0.384	-4,573***	-0.198	-4,461***	I(1)
Ln (TRADE OPENNESS)	-0,666	-5,522***	-0,821	-5,522***	-0,776	-5,352***	I(1)
Ln (TARIFFS)	0,952	-5,137***	-0,926	-4,918***	-0,876	-5,031***	I(1)
Ln (REER)	-2,130	-5,913***	-2,129	-5,906***	-2,087	-5,620***	I(1)
Ln (CAPITAL FORMATION)	-1.831	-4,477***	-1.081	-4,227***	-1.053	-4,312***	I(1)
Ln (LABOUR)	-2.385	-3,360***	-2,604	-3,591***	-2,535	-3,342***	I(1)
Ln (GOVE)	-1.417	-7.074***	-1.415	-7.701***	-1.333	-6.886***	I(1)
(PS)	-0,978	-6,782***	-0,978	-6.782***	-0,961	-6,541***	I(1)

Note: ADF = Augmented Dickey-Fuller. *, **, and *** denote statistical significance at 10%, 5% and 1% levels respectively. The ADF critical values for intercept at the 10%, 5% and 1% levels of significance are -2.601, -2.927, -3.581 respectively. The PP critical values for intercept at the 10%, 5% and 1% levels of significance are -2.601, -2.926, -3.578 respectively. The KPSS critical values for intercept at the 10%, 5% and 1% levels of significance are -2.601, -2.926, -3.578 respectively.

The unit root test results show that all variables that were non-stationarity in levels become stationarity after the first differencing. Having confirmed that none of the variable were integrated of higher orders of integration, the bounds test for co-integration can be performed in order to establish if there is any long-run relationship among the variables.

5.4 Co-integration Analysis: Bounds test estimation results

5.4.1: Cointegration analysis of model 1: Bounds test estimation results:

Table 5.3 below provides the bounds test results using trade openness (TO) as proxy for trade liberalisation.

Table 5.3: ARDL Bounds tests results of model 1

Model	**Function**	**Dependent Variable**	**F-statistics**
Model 1 - TO	GDPC	TO, K, L, GOVE and PS	**4.159**

Asymptotic Critical Values

Pesaran *et al*. (2001). Table ci (iii)	**1%**		**5%**		**10%**	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3,41	4,68	2,62	3,79	2,26	3,35

Note: Model 1: Trade Openness as a proxy for trade liberalisation. Table (iii) unrestricted intercept and no trend. Table ci (iii), k = 5 and T = 48

The results of the ARDL bounds test for co-integration reported in Table 5.3 show that the calculated F-statistics of Model 1 is higher than the critical value at both the 5 percent and 10 percent levels of significance. Accordingly, the null hypothesis of no co-integration is rejected and the alternative hypothesis of a long-run relationship among the variables is accepted.

Following the co-integration test, the long-run and short-run coefficients are then estimated using the ARDL technique. The optimal lag length is determined by using the Akaike Info Criterion (AIC). Table 5.4 below shows the results of the lag length criteria and indicates that four lags is the optimal maximum lag length.

(a) Lag Length Selection

Table 5.4: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-215.0756	N/A	0.000932	10.04889	10.29219	10.13912
1	70.01584	479.4719	1.155268	-1.273447	**0.429643***	**-0.641860***
2	120.9351	**71.74984***	6.380022	-1.951595	1.211287	-0.778646
3	158.6866	42.89940	7.602227	-2.031207	2.591466	-0.316897
4	-212.0707	46.10447	**5.020009***	**-2.821395***	3.261070	-0.565723

*Indicates lag order selection by the criteria
LRL sequential modified LR test statistics (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

(b) Long- and short-run estimation results of model 1

Table 5.5: Long-run and short-run ARDL estimation results of model 1

Repressors	Panel 1: Long-run coefficients		
	Model 1: TRADE OPENNESS		
	coefficient	**Standard error**	**probability**
Ln (TRADE OPENNESS)	0.197	0.125	**0.072***
Ln (INVESTMENT)	0.481	1.118	**0.000****
Ln (LABOUR)	-0.029	0.263	0.911
Ln (GOVE)	0.400	0.324	0.150
(POLITICAL STABILITY)	0.068	0.052	**0.011****
	Short-run coefficients		
Ln D(TRADE OPENNESS)	0.124	0.049	**0.022****
Ln D(TRADE OPENNESS) -1	-0.272	0.048	**0.000****
Ln D(TRADE OPENNESS) -2	-0.039	0.067	0.569
Ln D(TRADE OPENNESS) -3	0.131	0.036	**0.002****
Ln D(INVESTMENT)	0.079	0.045	0.101
Ln D(INVESTMENT) -1	-0.009	0.048	**0.084****
Ln D(INVESTMENT) -2	-0.156	0.041	**0.001*****
Ln D(INVESTMENT) -3	-0.122	0.044	**0.012****
Ln D(LABOUR)	0.508	0.104	**0.000*****
Ln D(LABOUR) -1	0.211	0.096	**0.041****
Ln D(LABOUR) -2	-0.317	0.100	**0.005*****
Ln D(GOVE)	-0.021	0.047	0.664
Ln D(GOVE) -1	-0.149	0.044	**0.003*****
Ln D(GOVE) -2	0.041	0.057	0.469
Ln D(GOVE) -3	0.163	0.043	**0.001*****
D(POLITICAL STABILITY)	0.007	0.013	0.623
D(POLITICAL STABILITY) -1	-0.018	0.011	0.122
$ECT_{(-1)}$	-0.438	0.070	**0.000*****
Test statistics	**DIAGNOSTIC TESTS**		
R^2	0.916		
Adjusted R^2	0.851		
S. E. Regr.	0.001		
F-statistics	53.42		
Prob (F-statistics)	0.000		
RSS	0.005		
DW	2.633		
AIS	-6.082		

DIAGNOSTIC TESTS	**F-STATISTIC**	**P-VALUE**
Serial Correlation: Breusch-Godfrey serial correlation LM test	1.624	0.223
Autoregressive conditional heteroscedasticity: White test	1.010	0.500
Normality: Jarque-Bera test	0.075	0.963

Note: * denotes statistical significance at 10% level.
** denotes statistical significance at 5% level.
*** denotes statistical significance at 1% level.

Table 5.5 above, shows that the model has a good explanatory power in terms of the adjusted R^2, which indicates that 85 percent of the variation in per capita GDP is explained by the independent variables. The F-statistics of 53.42 (0.000) is highly significant indicating that all variables jointly contribute to the determination of per capita GDP.

The error correction term (ECT (-1)) indicates the speed of adjustment to restore equilibrium in the model. The coefficient of the ECT shows how quickly variables converge to equilibrium and it must have a statistically significant negative coefficient (Okafor & Shaibu, 2016). Table 5.5 shows that the ECT is negative and statistically significant for model 1. The coefficient of ECT (-1) is -0.438, which implies that the deviation from the long term growth rate is corrected by 43.8 percent for model 1.

After the estimation of the ARDL (3, 4, 4, 3, 4, 2) model, additional diagnostic and stability tests are conducted which are meant to enhance the credibility of the model. The model was tested for autocorrelation (Breusch-Godfrey serial correlation LM test), heteroscedasticity (White test), normality (Jarque-Bera test) and specification error/omitted variables (Ramsey RESET test). The results of the respective diagnostic tests are presented in Table 5.5. The diagnostics indicate that the residuals are serially uncorrelated, homoscedastic and normally distributed based on Breusch-Godfrey serial correlation ML test, ARCH ML test, and Jarque-Bera test respectively. The diagnostic tests confirm the validity of Model 1 and implies that the results can be used for policy formulation and recommendation without re-specification (Okafor & Shaibu, 2016). The plots for a cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMQ) are included in figure A1 of the appendix. The plot of these tests lies within the 5 percent critical bound, indicating that the variables and their parameters do not suffer from any form of structural instability for the period under examination.

The long-run results show that trade openness has a positive and significant effect on economic growth. Specifically, a one percent increase in trade openness results in a 0.197 percent increase in economic growth in the long-run. This result is consistent with the findings of Manwa (2015), Feddersen et al*.,* (2017) and Malefane & Odhiambo (2018) who found that trade openness has a positive and significant effect in explaining South Africa's economic growth. Sikwila et al*.*, (2014), concluded that trade openness has been an important factor that led to economic growth in South Africa and other similar less developing countries, and posits that a rise in trade openness improves the balance of payment, employment, and thereby economic growth and development.

The long-run results also reveal that the coefficient of the investment variable is positive and statistically significant. This means that a 1 percent increase in investment enhances economic growth by 0.48 percent. This result is in line with the standard theory of growth which suggests the existence of a positive relationship between investment and economic growth (Snowdon & Vane, 2005). Chipaumire et al*.*, (2014) and Leshoro (2017) found a positive relationship between investment and South Africa's economic growth in the long-run.

Government consumption expenditure has a positive but statistically insignificant effect on economic growth in the long-run. The result is consistent with the findings of Leshoro (2017) for South Africa. The insignificant effect of South Africa's government expenditure on economic growth is partly attributed to inefficient public programs and possible corruption, which leads to wastage and losses (Maia, 2017).

The long-run coefficient of labour is negative and statistically insignificant indicating that there is negative relationship between labour and economic growth. This result is consistent with the findings of Manwa (2015) for the South African economy. This finding may be attributed to the fact that South Africa has been prone to both civil unrest (industrial action) and low labour productivity which would explain the negative impact of labour on economic growth (Manwa, 2015). Interestingly, Auty (2004) explains that conflict is likely to arise when the majority of the resource wealth is limited to capital-intensive sectors such as mining, automotive, agriculture and manufacturing (Maia, 2017). South Africa's economy is similar in that majority of the resources are

devoted to capital intensive sectors for the production of primary and mineral products. However, while the output growth has risen, the growth has not led to additional employment as labour components were substituted by machinery and technology, which is common practice in the mining, automotive, agriculture, and manufacturing (De Soysa, 2000).

The coefficient of the political stability dummy variable, which represents the effect of political stability on South Africa's economic growth, is positive and statistically significant at the 5 percent level of significance. This suggests that political stability enhances economic growth in South Africa. This result is consistent with the expectation of the study and in line with the conclusion made by Acemoglu & Robinson (2003) who posited that countries governed by democratic principles experienced growth in the long-run.

The short-run results show that the net effect of trade openness on economic growth is negative and statistically significant at the 5 percent level of significance. This implies that a 1 percent increase in trade openness results in a 0.057 percent decline in economic growth in South Africa. The result is partly attributed to South Africa's trade profile that is dominated by imports of high value-added goods and exports which are mostly primary and agricultural products (Bhorat *et al.*, 2014). In addition, some South African agricultural produce has been denied access to the European and American markets on the basis of Sanitary and Phyto-Sanitary (SPS) measures and Technical Barriers to Trade (TBT) (DTI, 2018). These measures have adversely affected South Africa's export volumes since 1996 (Maia, 2017). According to UNCTAD (2018), countries are increasingly using protective measures in the form of Non-Tariff Barriers (NTBs) to protect their markets. These actions have reduced trade potential for many countries, including South Africa. The result is consistent with the findings of Manwa (2015) and Malefane & Odhiambo (2018) who found a negative relationship between trade openness and economic growth in South Africa in the short-run.

Turning to the other explanatory variables, the results show that the coefficient of investment is negative and statistically significant at the 5 percent level of significance. The net effect indicates that, for a 1 percent increase in investment, South Africa's GDP per capita declines by 0.208 percent. The negative impact of investment contradicts the expectations of the study. However, this result is consistent with the findings of Chang & Mendy (2012), Manwa (2015), Nyasha & Odhiambo (2015) and Malefane & Odhiambo (2018). They found a negative relationship between investment and economic growth in South Africa. A plausible explanation for this result is that South Africa has been unable to invest in productive economic programmes that stimulate economic growth in the short-run (DTI, 2017).

The coefficient of government consumption expenditure is positive and statistically significant at the 1 percent level of significance. The net effect of government consumption expenditure on economic growth is 0.034 percent. This means that a 1 percent increase in government consumption expenditure leads to a 0.034 percent increase in economic growth in the short-run. This result is in line with the expectations of the study as the Keynesian theory suggests that an increase in government expenditure leads to an increase in economic growth. In addition, this result is similar to findings of d'Agostino et al*.,* (2012), Chipaumire et al*.,* (2014) and Oladele et al*.*, (2016) who found a positive relationship between government expenditure and economic growth in South Africa in the short-run.

The result shows that the coefficient of the labour variable is positive and statistically significant at the 5 percent level of significance. The effect of labour on economic growth is a 0.402 net employment impact on economic growth in South Africa. Specifically, a 1 percent increase in labour force results in a 0.402 percent increase in economic growth. This result is consistent with findings of Edward (2013), Leshoro (2013), Bhorat et al., (2016), Banda (2016), and Makaringe & Khobai (2018) who found a positive relationship between labour and economic growth in South Africa.

Lastly, the results show that the short-run coefficient of the political stability dummy variable is negative, however its impact on economic growth is insignificant. A similar result is provided by Thaver & Ekanayeka (2010) who found that peace as a result of democracy had an insignificant impact on economic growth in South Africa.

5.4.2: Cointegration analysis of model 2: Bounds test estimation results:

This section of the chapter provides the estimation results and discussion of the findings using tariffs (taxes on international trade) as an alternative proxy for trade liberalisation. The unit root tests were conducted and reported previously in table 5.2. The tests established that none of the variables are integrated of higher orders. The study then proceeds to the bounds test for cointegration. The ARDL bounds test results are presented in table 5.6 below.

Table 5.6: ARDL bounds tests results for model 2

Model	**Function**	**Dependent Variable**	**F-statistics**
Model 2 - TR	GDPC	TR, K, L, GOVE and PS	**4.241**

Asymptotic Critical Values

Pesaran *et al.* (2001). Table ci (iii),	**1%**		**5%**		**10%**	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3,41	4,68	2,62	3,79	2,26	3,35

Note: Model 2: Tariffs as a proxy for trade liberalisation. Table (iii) unrestricted intercept and no trend. Table ci (iii), k = 5 and T = 48

The result of the ARDL bounds test for co-integration reported in Table 5.6 above show that the calculated F-statistics of Model 2 is higher than the critical value at both the 5 percent and 10 percent levels of significance. Accordingly, the null hypothesis of no co-integration is rejected and the alternative hypothesis of a long run relationship among the variables is accepted.

Following the co-integration test, the long-run and short-run coefficients are then estimated using the ARDL estimation technique. The optimal lag length is determined by using the Akaike Info Criterion (AIC). Table 5.7 below shows the results of the lag length criteria and indicates that four lags are the optimal maximum lag length, following the AIC selection criteria.

(c) Lag Length Selection

Table 5.7: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-371.6773	N/A	1.150196	17.16715	17.41045	17.25738
1	-126.5333	412.2876	8.690035	7.660605	**9.363695***	**-8.292192***
2	-83.76266	60.26772	7.310025	7.352848	10.51573	8.525797
3	-51.17495	37.03149	0.000106	7.507952	12.13063	9.222262
4	10.40888	**53.18603***	**5.760005***	**6.345051***	12.42752	8.600722

*Indicates lag order selection by the criteria,
LRL sequential modified LR test statistics (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

(d) Long-run and short-run estimation results of model 2

Table 5.8: Long-run and short-run ARDL estimation results of model 2

Repressors	Long-run coefficients		
	Model 2: TARIFFS		
	coefficient	**Standard error**	**probability**
Ln (TARIFFS)	0.066	0.110	0.193
Ln (INVESTMENT)	0.391	0.238	0.115
Ln (LABOUR)	0.569	0.528	0.293
Ln (GOVE)	-0.595	0.699	0.404
(POLITICAL STABILITY)	0.159	0.141	0.271
	Short-run coefficients		
Ln D(TARIFFS)	0.027	0.008	**0.001****
Ln D(TARIFFS) -1	0.006	0.007	0.406
Ln D(TARIFFS) -2	0.018	0.007	**0.017****
Ln D(TARIFFS) -3	0.015	0.008	**0.061***
Ln D(LABOUR)	0.614	0.101	0.000***
Ln D(LABOUR) -1	0.222	0.122	**0.081***
Ln D(LABOUR) -2	-0.452	0.116	**0.001*****
Ln D(LABOUR) -3	-0.236	0.129	**0.081***
Ln D(GOVE)	-0.088	0.056	0.132
Ln D(GOVE) -1	-0.040	0.054	0.459
Ln D(GOVE) -2	0.069	0.057	0.236
Ln D(GOVE) -3	0.144	0.050	**0.008****
D(DUMMY)	0.007	0.013	0.623
D(POLITICAL STABILITY) -1	-0.018	0.014	0.122
D(POLITICAL STABILITY) -2	-0.003	0.015	**0.004****
$ECT_{(-1)}$	-0.215	0.034	**0.000*****
Test statistics	**DIAGNOSTIC TESTS**		
R^2	0.854		
Adjusted R^2	0.768		
S. E. Regr.	0.010		
F-statistics	78.79		
Prob(F-statistics)	0.000		
RSS	0.003		
DW	2.00		
AIS	-5.655		

DIAGNOSTIC AND NORMALITY TESTS	**F-STATISTIC**	**P-VALUE**
Serial Correlation: Breusch-Godfrey serial correlation LM test	0.961	0.454
Autoregressive conditional heteroscedasticity: White test	0.489	0.948
Normality: Jarque-Bera test	3.911	0.1415

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

Table 5.8 above shows that the model has a good explanatory power in terms of the adjusted R^2 value which indicates that 85 percent of the variation in per capita GDP is explained by the independent variables. The F-statistics of 78.79 (0.00) is highly significant, indicating that all the included variables jointly contribute to the determination of economic growth.

The error correction term (ECT (-1)) indicates the speed of adjustment to restore equilibrium in the model. The coefficient of the ECT shows how quickly variables converge to equilibrium and it must have a statistically significant negative coefficient (Okafor & Shaibu, 2016). Table 5.5 shows the expected negative sign of ECT and is highly significant for model 2. The coefficient of ECT (-1) is -0.215, and implies that 21.5 percent of the deviation from the long term growth rate is corrected within the first year for model 2.

After the estimation of the model, diagnostic tests are conducted which are meant to confirm the validity of the model. The model was tested for (i) autocorrelation (Breusch-Godfrey serial correlation LM test), (ii) heteroscedasticity (White test), (iii) normality (Jarque-Bera test) and (iv) specification error/omitted variables (Ramsey RESET test). The results of the respective diagnostic tests are presented in Table 5.8. The diagnostics indicate that the residuals are serially uncorrelated, homoscedastic, normally distributed based on Breusch-Godfrey serial correlation ML test, ARCH ML test, Jarque-Bera test and Ramsey test respectively. The result of the diagnostic tests confirms the validity of the model. The plots for a cumulative sum of a recursive residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMQ) are illustrated in Figure A2. These plots provide further insights on the stability of the model. The plot of these tests lies within the 5 percent critical bound, indicating that the variables and their parameters do not suffer from any form of structural instability for the study period.

According to the results from table 5.8, tariffs do not have a statistically significant effect on economic growth in South Africa in the long-run. While unexpected, this result is consistent with findings of Roberts (2000) and Cassim & van Seventer (2004) who posited that tariff reduction poses considerable challenges in providing accurate effect on economic growth in South Africa. According to Rangasamy & Harmse (2005), tariff

liberalisation failed to provide any support or link to economic growth, trade performance, and employment creation in South Africa. Further confirmation is noted from Silajdzic & Mehic (2017) and Osakwe et al., (2018) who found that the impact of tariff liberalisation is not confirmed with accuracy for Sub-Saharan Africa. Accordingly, Harrison (1999), Hemat et al., (2014) and Morgan & Kanchanahatakij (2015) are of the view that there is no causal relationship between tariff liberalisation and economic growth[11].

The long-run results show that investment, labour and political stability have a positive sign and government expenditure has a negative sign, however the coefficients are statistically insignificant. This implies that when tariffs are considered as proxy for trade liberalisation, the variables have no long-run impact on economic growth.

Thirlwall (2000), generalised that trade liberalisation in the form of unilateral tariff reductions (or the reduction of non-tariff barriers to trade) is expected to improve growth performance. The short-run results show that the net effect of tariffs on economic growth is positive and statistically significant. Specifically, a 1 percent increase in tariffs results in a 0.066 percent increase in economic growth. This result implies that tariff liberalisation has a negative effect on economic growth in South Africa. It shows that tariff liberalisation requires the support of other complimentary economic policies to have a significant contribution to economic growth (UNCTAD, 2018). The result is consistent with the findings of Manwa (2015) who also found a positive relationship between tariffs and economic growth in South Africa.

The short-run results also show that the coefficient of government consumption expenditure is positive although statistically significant. The net effect of government consumption expenditure on per capita GDP is 0.085 percent. In the short-run, the net effect of labour force is positive and statistically significant. The positive coefficient of the labour force variable is in line with the expectations of the study and findings from the literature. The finding adheres to the standard theory of growth which posits the existence of a positive relationship between labour and economic growth (Lam, 2015). The result is consistent with findings by Feddersen et al., (2017) who found a

[11] See Chapter, page 39.

significant positive long-run relationship between labour and economic growth in South Africa.

The coefficient of the political stability dummy variable has a negative sign and is statistically significant. This suggests that political stability had a significant negative effect on economic growth in South Africa. Although this finding contradicts expectations, it is plausible in the South African context as explained by Masaki & van de Walle (2014) who found that the regime transition contributed to negative impact on economic growth in the short-run.

5.4.3: Cointegration analysis of model 3: Bounds test estimation results

This section of the chapter provides the estimation results and discussion of the findings using real effective exchange rate as an alternative proxy for trade liberalisation. The unit root tests were conducted and reported in table 5.2. The tests established that none of the variables are integrated of higher orders. The study then proceeds to the bounds test for cointegration. The ARDL bounds test results are presented in table 5.9 below.

Table 5.9: ARDL bounds tests results for model 3

Model	**Function**	**Dependent Variable**	**F-statistics**
Model 3 - REER	GDPC	REER, K, L, GOVE and DUMMY	**4.018**

Asymptotic Critical Values

Pesaran *et al*. (2001). Table ci (iii)	**1%**		**5%**		**10%**	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3,41	4,68	2,62	3,79	2,26	3,35

Note: Model 3: Real effective exchange rare as a proxy for trade liberalisation. Table (iii) unrestricted intercept and no trend. Table ci (iii), k = 5 and T = 48

The result of the ARDL bounds test for cointegration reported in Table 5.9 show that the calculated F-statistics for model 3 is higher than the critical value at 5 percent and 10 percent levels of significance. Accordingly, the null hypothesis of no co-integration is rejected and the alternative hypothesis of a long-run relationship between the variables is accepted.

Following the co-integration test, the long-run and short-run coefficients are then estimated using the ARDL estimation technique. To begin, the optimal lag length is determined by carrying out the lag length selection test. The conclusion is reached, based on the Akaike Info Criterion (AIC), that the maximum lag length is four lags.

(e) Lag length section

Table 5.10: VAR lag order selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-260.8690	N/A	0.007470	12.13041	12.37371	12.22064
1	3.190681	444.1004	2.930037	1.764060	**3.467150***	**2.395648***
2	46.98712	**61.71217***	1.810027	1.409676	4.572558	2.582625
3	75.47207	32.36925	3.340107	1.751270	6.373943	3.465580
4	133.5592	50.07980	**2.140007***	**0.751855***	6.834319	3.007525

*Indicates lag order selection by the criteria,
LRL sequential modified LR test statistics (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

(f) Long-run and short-run results

Table 5.11: The long- and short-run ARDL estimation results of model 3

Repressors	Panel 1: Long-run coefficients		
	Model 3: REER		
	coefficient	Standard error	probability
Ln (REER)	-0.250	0.060	**0.005*** **
Ln (INVESTMENT)	0.390	0.091	**0.000*** **
Ln (LABOUR)	0.435	0.249	**0.011** **
Ln (GOVE)	-0.222	0.202	0.285
(POLITICAL STABILITY)	0.015	0.029	0.536
	Short-run coefficients		
Ln D(REER)	-0.026	0.021	0.236
Ln D(REER) -1	0.141	0.031	**0.000*** **
Ln D(REER) -2	-0.003	0.027	0.906
Ln D(REER) -3	0.065	0.024	**0.013** **
Ln D(INVESTMENT)	0.088	0.041	**0.044** **
Ln D(INVESTMENT) -1	-0.070	0.049	0.163
Ln D(INVESTMENT) -2	-0.062	0.045	0.187
Ln D(INVESTMENT) -3	-0.088	0.036	**0.023** **
Ln D(LABOUR)	0.735	0.110	**0.000*** **
Ln D(LABOUR) -1	0.224	0.111	**0.056* **
Ln D(LABOUR) -2	-0.216	0.116	**0.077* **
Ln D(GOVE)	-0.152	0.052	**0.007*** **
D(GOVE) -1	-0.009	0.049	**0.086* **
D(GOVE) -2	0.029	0.049	**0.061* **
D(GOVE) -3	0.133	0.042	**0.004** **
D (POLITICAL STABILITY)	-	-	**-**
$ECT_{(-1)}$	-0.553	0.092	**0.000** **
Test statistics	DIAGNOSTIC TESTS		
R^2	0.871		
Adjusted R^2	0.802		
S. E. Regr.	0.001		
F-statistics	49.79		
Prob(F-statistics)	0.000		
RSS	0.003		
DW	2.147		
AIS	-5.824		

DIAGNOSTIC AND NORMALITY TESTS	F-STATISTIC	P-VALUE
Serial Correlation: Breusch-Godfrey serial correlation LM test	0.857	0.508
Autoregressive conditional heteroscedasticity: White test	1.409	0.214
Normality: Jarque-Bera test	0.633	0.729

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

Based on Table 5.11 above, the results show that the model has a very good explanatory power in terms of the adjusted R^2 value, which means that 80 percent of the variation in GDP per capita is explained by the explanatory variables. The F-statistics of 49.79 (0.000) is highly significant indicating that all variables jointly contribute to the determination of economic growth.

The error correction term (ECT (-1)) indicates the speed of adjustment towards long-run equilibrium in the model. The coefficient of the ECT shows how quickly variables converge to equilibrium. ECT coefficient must have a statistically significant coefficient with a negative sign (Okafor & Shaibu, 2016). Table 5.11 shows the expected negative sign of ECT and it is highly significant for model 3. The coefficient of ECT (-1) is -0.553 and implies that the deviation from the long term growth rate is corrected by 55.3 percent annually to reach the steady state.

After the estimation of the ARDL (1, 4, 4, 3, 4, 0) model, the study conducts additional diagnostic and stability tests are conducted which are meant to enhance the credibility of the model. The model is tested for autocorrelation (Breusch-Godfrey serial correlation LM test), heteroscedasticity (White test), and normality (Jarque-Bera test). The results of the respective diagnostic tests are presented in Table 5.11. From the results reported in Table 5.11, the diagnostics indicate that the residuals are serially uncorrelated, homoscedastic, normally distributed based on Breusch-Godfrey serial correlation ML test, ARCH ML test and Jarque-Bera test respectively. This means that the model is valid and can be used for policy formulation and recommendation without re-specification (Okafor & Shaibu, 2016). The result of the diagnostic tests confirms the validity of the model. The plots for a cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMQ) are illustrated in figure A3 of the appendix. These plots provide further insights on the stability of the model. The plot of these tests lies within the 5 percent critical bound. This indicates that the variables and their parameters do not suffer from any form of structural instability for the period under examination.

When the real effective exchange rate is used to proxy trade liberalisation, the long-run results show that the real effective exchange rate has a significantly negative impact on economic growth. Specifically, a 1 percent appreciation in the exchange rate results in a 0.250 percent decline in economic growth. This result supports the theory that a strong Rand makes South African produced goods and services relatively expensive to the international market (SARB, 2017). The coefficient of the real effective exchange rate has the expected sign and is consistent with the findings of Edwards & Garlick (2008), Anand et al*.,* (2016), Ogbokor & Meyer (2017) and Feddersen *et al.*, (2017) who found a negative relationship between real effective exchange rate and economic growth in South Africa. According to these studies, an increase in the exchange rate (depreciation of the rand) is expected to have the opposite effect. A depreciation of the Rand does not lead to a substantial and sustained improvement in South Africa's export performance.

The long-run results also reveal that investment has a positive and statistically significant effect on economic growth at the 1 percent level of significance. Specifically, a 1 percent increase in investment results in a 0.39 percent increase in economic growth. The positive coefficient of the investment variable is in line with the expectations of the study and findings from the literature which posits the existence of a positive relationship between investment and economic growth (Lam, 2015). In addition, the result is consistent with findings by Chipaumire et al., (2014); Manwa (2015) and Feddersen et al*.,* (2017) who found a significant positive long-run relationship between capital formation and economic growth in South Africa.

The long-run results further show that labour has a positive and statistically significant effect on economic growth at the 10 percent level of significance. The positive coefficient of labour variable is in line with the expectations of the study and findings from the literature. The literature in the standard theory of growth which posits the existence of a positive relationship between labour and economic growth (Lam, 2015). The result is consistent with findings by Feddersen et al*.,* (2017) who found a significant positive long-run relationship between labour and economic growth in South Africa.

The long-run result indicates that the coefficient of government expenditure is negative and statistically significant at the 5 percent level of significance. This implies that government expenditure has a negative effect on economic growth in South Africa in the long-run. This result is similar to the findings of Landau (1983) and Malefane & Odhiambo (2018) who found a negative effect of government consumption expenditure on economic growth in South Africa. A number of factors has been suggested to explain this finding. One plausible reason according to Chipaumire *et al.,* (2014) has to do with the inefficiencies in government institutions and projects. South African government has provided significant finance towards the bail out of corrupt and inefficient institutions such as South African Airways (SAA), ESKOM and the South African Broadcasting Corporation (SABC) (National Treasury, 2018). Additionally, according to Maia (2017), South Africa's government consumption expenditure is composed of overspending of revenue on subsidies, administration, defence services, mismanagement of funds and corruption (Maia, 2017). According to Oladele et al*.,* (2017), government consumption expenditure results in debt burdening for the national budget which leads to inflation as well as increased taxation. An increase in inflation and taxation adversely affect investors and ultimately on economic growth.

The coefficient of the political stability variable indicates that political stability has an insignificant effect on economic growth. This result is consistent with the findings of Thaver & Ekanayeka (2010) who found that peace as a result of democracy had an insignificant impact on economic growth in South Africa.

Turning to the short-run analysis, the results of the short-run model show that the coefficient of the real effective exchange rate is positive but statistically insignificant. This means that the real effective exchange rate has no significant impact on economic growth in South Africa in the short-run. Additionally, although the positive coefficient of the real effective exchange rate is contrary to the expectation of this study, the result is consistent with the findings of Methew & Edwards (2008) who observed an insignificant positive relationship between real effective exchange rate and economic growth in South Africa. The volatility of the real effective exchange rate contributes to the insignificant impact on economic growth in South Africa (Bhorat et

al., 2014; SARB 2014). The observed short-run result is potentially due to the volatility of the exchange rate (Bhorat et al., 2014; SARB, 2014)

In the short-run, investment has a negative effect on economic growth and the coefficient is statistically significant at the 5 percent level of significance. The net effect of the investment is -0.132. This means that a 1 percent increase in investment leads to about 0.13 percent decrease in economic growth in South Africa. Although the result is inconsistent with the expectations of this study, a similar result is found by Manwa (2015) and Malefane & Odhiambo (2018) who also found a negative relationship between investment and economic growth in South Africa. The negative coefficient of investment variable contradicts the expectations of the study. However, these results are consistent with the findings of Chang & Mendy (2012) and Nyasha & Odhiambo (2015) and, who found a negative relationship between investment and economic growth in Sub-Saharan Africa, respectively. A plausible explanation for the negative impact of investment in the short-run is attributed in part to the financial crisis of 2008/2009, where growth in aggregate real gross capital formation in South Africa decelerated to mere 0.6 percent from 9.2 percent per year (STATS, 2019). After the same period, gross fixed capital formation as a ratio of nominal GDP has also fallen from a recent peak of 23.5% in 2008 to 19.6% in 2016 (SARB, 2018). Other contributing factors relate to the declining investment in non-residential buildings, factories, office buildings and employment creation infrastructure (IMF, 2018). Persistently low consumer and business confidence in the domestic economy have also resulted in the postponement of a number of key domestic private sector expansion projects. Additionally, capital investment in mining and exploration activities have to a large extent been delayed by a number of high-profile labour strikes as well as policy uncertainty in general, thus contributing to the deferment of fixed capital investment. Weak output growth in mining and construction furthermore contributed to a contraction in gross fixed capital formation in manufacturing. Manufacturing was also negatively affected by rapidly rising electricity prices, sporadic labour unrest and loss of international competitiveness (SARB, 2018).

The short-run results further show that the coefficient of labour is positive and statistically significant at 5 percent level of significance with a net effect of 0.743 percent. This means that a 1 percent increase in labour force leads to 0.743 percent increase in economic growth in South Africa. Mkhize (2016) found a similar positive effect of labour on economic growth in South Africa in most sectors of the economy such as manufacturing, transport, utilities, business services, and finance services. This result is supported by Meyer (2017) who found a positive relationship between labour and economic growth in South Africa.

Government consumption expenditure has a positive and statistically significant impact on economic growth at 1 percent level of significance. The net effect of government consumption expenditure is 0.001. This implies that a 1 percent increase in government consumption expenditure results in a marginal 0.001 percent increase in economic growth. This result is consistent with findings of Leshoro (2017) who found a positive relationship between government consumption expenditure and economic growth in South Africa.

Table 5.12 below summarises the results:

Table 5.12: Summary of the result findings

Variables	Model 1	Model 2`	Model 3
Trade openness	Positive and significant long-run effect on economic growth.	-	-
	Negative and significant short-run net effect on economic growth.	-	-
Tariffs	-	Positive but insignificant long-run effect on economic growth.	-
	-	Positive and significant short-run net effect on economic growth.	-
Real effective exchange rate	-	-	Positive and significant long-run effect on economic growth.
	-	-	Positive and significant short-run net effect on economic growth.
Investment	Positive and significant long-run effect on economic growth.	Positive but insignificant long-run effect on economic growth.	Positive and significant long-run effect on economic growth.
	Negative and significant short-run net effect on economic growth.	_	Negative and significant short-run net effect on economic growth.
Labour	Negative, but insignificant long-run effect on economic growth.	Positive but insignificant long-run effect on economic growth.	Positive and significant long-run effect on economic growth.
	Positive and significant short-run net effect on economic growth.	Positive and significant short-run net effect on economic growth.	Positive and significant short-run net effect on economic growth.
Government Expenditure	Positive but insignificant long-run effect on economic growth.	Positive but insignificant long-run effect on economic growth.	Negative and significant long-run effect on economic growth.
	Positive short-run net effect on economic growth.	Positive but insignificant short-run net effect on economic growth.	Positive and significant long-run effect on economic growth.
Political Stability	Positive long-run and significant effect on economic growth.	Positive but insignificant long-run effect on economic growth.	Positive but insignificant long-run effect on economic growth.
	Negative but insignificant short-run net effect on economic growth.	Negative but insignificant short-run net effect on economic growth.	-

Source: Compiled by the Author (2019).

5.5 Chapter Conclusions

This chapter provided empirical estimation results and the results analysis regarding the impact of trade liberalisation on economic growth in South Africa. The study applied the ARDL technique in examining the long-run and short-run relationship between trade liberalisation and economic growth in South Africa between 1970 and 2017. The ARDL model comprised of per capita GDP growth as a dependent variable and investment, government consumption expenditure, political stability, and trade liberalisation as the explanatory variables. The ambiguity in the myriad of earlier empirical studies has been attributed in part to measurement issues around the trade liberalisation variable. This study departed from previous studies and examined the effect of three proxies for trade liberalisation, which are considered to provide a more robust understanding of the nexus. The proxies used are (i) trade openness, (ii) tariffs and (iii) real effective exchange rate.

The empirical results show that depending on the proxy used to measure trade liberalisation, the impact on economic growth varies between the short - run and the long- run. Taking trade openness as a proxy for trade liberalisation, the results indicated that trade liberalisation has a positive and statistically significant impact on economic growth in the long-run. In the short-run trade liberalisation has a statistically significant negative impact on economic growth. Using the real effective exchange rate as an alternative proxy for trade liberalisation, the study found a statistically significant and negative effect on economic growth in the long-run. Additionally, the effect of real effective exchange rate on economic growth in the short-run is positive and significant. Lastly, when tariffs are used as proxy for the trade liberalisation, the study found a positive but insignificant impact on economic growth in the short-run and a significant negative impact on economic growth in the long-run.

Therefore, the study concludes that overall, the effect of trade liberalisation on economic growth in the long-run is positive, while in the short-run the impact of trade liberalisation on economic growth is mixed. This means that the effect of trade openness on economic growth is negative and statistically significant. While the effect of tariffs on economic growth is positive and statistically significant, the effect of real effective exchange rate on economic growth is positive but statistically insignificant.

The mixed results, depending on the proxy for trade liberalization, is attributed to potential misalignment of South Africa's economic policies (including misalignment of economic activities in relation to trade openness, tariffs and real effective exchange rate) in South Africa (Mkhize, 2016). Also, the continued economic debate and investigation of an appropriate proxy for trade liberalisation is possible a relevant factor (Kanchnahatakij).

The negative relationship between trade liberalisation and economic growth in South Africa in the short-run is attributed to South Africa's trade profile that is composed of high value-added products as imports, while exports are mostly primary commodities. South Africa exports are primary products such as gold, platinum, coal briquettes, and agricultural products. On the other hand, South Africa's imports comprise of products such as mineral fuels, machinery including computers, electrical machinery, vehicles, plastics including plastic articles and pharmaceuticals (DTI, 2017). According to IDC (2011), these products are used as input to extract primary commodities and for agricultural produce. Also, South Africa's exports have been affected by countries that are increasingly using protective measures in the form of NTBs to protect their markets and ultimately reduce the country's trade potential (UNCTAD, 2018). Additionally, the gradual decline in South Africa's exports, especially in the last few years are as a result of the recent development in global trade such as the United State of America's (US) imposition of tariffs on a number of countries and their subsequent retaliation (Arregui and Chen, 2018). Also, the volatility of the real effective exchange rate contributes to the insignificant impact on economic growth in South Africa. The observed short-run result is potentially due to the volatility of the exchange rate. Exchange rate policy could be used to influence the economy; however other economic growth fundamentals are critical. Therefore, the real effective exchange rate would be better if viewed as a complementary tool to facilitate economic growth (Eichengreen, 2007).

CHAPTER 6: CONCLUSION AND POLICY RECOMMENDATIONS

Trade and trade liberalisation remain topical issues in development economics. The discussion is even pertinent in 2019, given the current environment of protectionist policies increasingly adopted globally and in the context of the current trade war between two of the world's largest economies, the United States of America and China.

South Africa's trade policies have broadly and generally evolved in three phases: namely, import industrialisation trade policy, export orientation policy, and trade liberalisation. The implementation of these policies coincided with volatility in the country's economic growth and the inability of the economy to respond to many economic challenges such as unemployment and poverty. It is against this background that this study investigated the impact of trade liberalisation on economic growth in South Africa, using annual time series data for the period 1970 to 2017. To achieve this objective, the study applied multivariate Autoregressive Distributed Lag (ARDL) estimation technique to determine the long-run and short-run impact of trade liberalisation on economic growth in South Africa

Although there are many studies that have investigated the relationship between trade liberalisation and economic growth in the context of the South African economy (see Manwa 2015; Malefane & Odhiambo, 2018; and Shayanewako 2018), the findings of these studies have been largely inconclusive. A significant basis of the ambiguity stems from the measures of trade liberalisation used. Given the challenges regarding the measures of trade liberalisation expounded on in the study, three proxies of trade liberalisation, namely: trade openness, tariffs, and real effective exchange rate were used in the estimations. Taking trade openness as a proxy for trade liberalisation, the results indicated that trade liberalisation has a positive and statistically significant impact on economic growth in the long-run. Using tariffs as an alternative proxy for trade liberalisation, the study found an insignificant positive impact on economic growth in the long-run. Lastly, when the real effective exchange rate is used as a third alternative proxy for trade liberalisation, the study found a statistically significant and positive effect on economic growth in the long-run. Therefore, the study concludes that overall, the effect of trade liberalisation on economic growth is positive in the long-run.

The study further concludes that the effect of trade liberalisation on economic growth in the short-run is mixed. The short-run long-run the impact of trade liberalisation on economic growth is mixed. This means that the effect of trade openness on economic growth is negative and statistically significant. While the effect of tariffs on economic growth is positive and statistically significant, the effect of real effective exchange rate on economic growth is positive but statistically insignificant. There are a number of factors contributing to the mixed results. First, South Africa's trade profile is composed of high value-added products as imports, while exports are mostly primary commodities. This means that South Africa imports manufactured goods such as mineral fuels, machinery including computers, electrical machinery, vehicles, plastics including plastic articles and pharmaceuticals. While on the other hand, South Africa exports are primary products such as gold, platinum, coal briquettes, and agricultural products (DTI, 2017). Second, South Africa is affected by countries that are increasingly using protective measures in the form of NTBs to protect their markets and ultimately reduce the country's trade potential (UNCTAD, 2018). Lastly, the decline in South Africa's exports as a result of the recent development in global trade such as the United State of America's (US) imposition of tariffs on a number of countries and subsequent their retaliation (Arregui and Chen, 2018). Ultimately, this has a negative effect on export performance and eventually economic growth.

Given the findings of the study, in terms of the policy recommendation, South Africa should continue to improve its trade policy in order to enhance economic growth and development whilst continually evaluating the implementation with a view to safeguard against policy reversals. Of the three proxies, real effective exchange rate and trade openness yields the largest positive effect on economic growth in the long-run and therefore are important instruments to increase economic growth. Thus if government's policy is to increase long term growth, increasing trade openness and ensuring that the rand is stable and not overvalued will assist in achieving economic growth objective. This should be aligned to South Africa's industrial development policy, fiscal policy, and its employment creation programmes. Also, South Africa should strengthen its trade relations with the rest of the world by enlarging trade openness and market access that is driven by exports of high value-added products. Moreover, South Africa should develop policies that will improve upon the

competitiveness of its export in domestic, regional and international markets. This may include mobilization of resources for the purposes of investing on infrastructure that will enable the country to unleash the full export potentials. The exportation of high value-added products has the potential to increase economic growth and thereby creating jobs and hence alleviate poverty.

For the implementation of trade policy, South Africa should consider investing more in agricultural, agro-processing, manufacturing, ocean economy, energy, attracting more of FDIs and infrastructural development to harness export opportunities and thereafter provide for labour intensive programmes (DTI, 2018). This will have a positive effect on the economic growth in the short-run. The implementation of these policies should encompass the following:

- Drive technology and innovation through technology absorption and diffusion and research and development.
- Support and enables the growth of national skills capacity and capabilities and the movement towards a knowledge economy.
- Drive the diversification of the economy to produce stronger value-added products.
- Increase the exports of value-added products and hence long-run economic growth.
- Encourage employment creation.

APPENDICES

Table 5.13: APPENDIX A - DATA

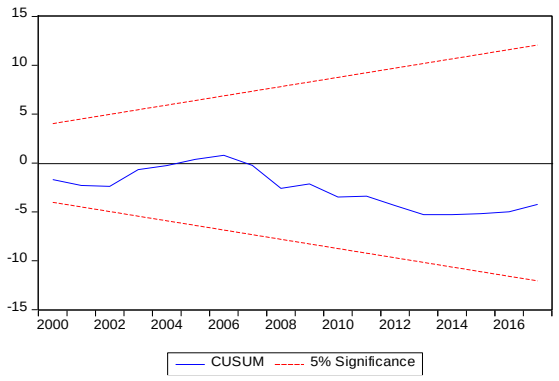
TIME	GDP-C	TLTO1	TLTR2	TLREER3	INVESTMENT	GOVE	L	DUMMY
1970	0,024593533	0,534779587	4,37284921	1,0374	0,168634368	0,119033141	47,9	0
1971	0,017339366	0,543671531	4,47798428	1,039	0,179196951	0,12906553	50,05	0
1972	0,000864701	0,514725071	4,64339909	0,9443	0,186578368	0,120782068	51,5	0
1973	0,020866455	0,498619825	4,731182796	0,9906	0,187737819	0,111116576	55	0
1974	0,036791902	0,495605642	4,966757919	1,0135	0,188478573	0,114354258	58,05	0
1975	0,000862227	0,476619416	5,243820975	1,0185	0,20342057	0,128716384	63,95	0
1976	0,000507581	0,453926472	4,73834158	1,0033	0,196486563	0,135788118	65,55	0
1977	0,004503937	0,438136467	8,027372023	1,0521	0,184946324	0,130498741	65,55	0
1978	0,005424254	0,433879646	6,252791425	0,9994	0,174556001	0,138080358	66,4	0
1979	0,014193963	0,421132718	4,933110368	1,0516	0,175191229	0,137497682	68,15	0
1980	0,042302577	0,424059364	3,292123906	1,1761	0,192373123	0,129680634	72,2	0
1981	0,029122871	0,413830307	4,477984283	1,2725	0,198934883	0,136892777	76,1	0
1982	0,000001	0,375471504	4,880462524	1,2232	0,195408325	0,153782016	78,9	0
1983	0,000001	0,353001085	3,263767583	1,3678	0,192034188	0,150785502	80,5	0
1984	0,027646662	0,367483614	2,496789303	1,1879	0,17999553	0,167776765	83,2	0
1985	0,000001	0,370810324	2,89457004	0,9284	0,169401111	0,170873963	83,6	0
1986	0,000001	0,358767757	3,754501165	0,8937	0,137910775	0,175242564	85,75	0
1987	0,000001	0,366202396	3,794912264	1,0015	0,12816165	0,18299425	87,15	0
1988	0,02037672	0,398122547	5,895876594	0,9616	0,138473084	0,177839089	89,65	0
1989	0,002615852	0,394390164	8,805430613	0,9816	0,144030265	0,177367687	90,65	0
1990	0,000001	0,385465276	3,61238756	1,0365	0,141107824	0,18561332	91	0
1991	0,000001	0,388909936	3,716672095	1,0798	0,132026697	0,186585633	90,9	0
1992	0,000001	0,419000166	2,328278222	1,099	0,127813309	0,189657644	91,15	0
1993	0,000001	0,451409751	3,509053187	1,0848	0,125555478	0,196411808	90,75	0
1994	0,010923418	0,470975993	1,697823303	1,0632	0,131652407	0,197985624	91,35	1
1995	0,009755187	0,517764108	4,111411621	1,0475	0,14132456	0,181176512	91,1	1
1996	0,021401992	0,535333635	3,836122196	0,9825	0,147694583	0,191452717	93,15	1
1997	0,00513656	0,549347146	2,527356336	1,0471	0,15214792	0,192919528	93,1	1
1998	0,000001	0,561365015	2,644069149	0,949	0,158577783	0,189117688	91,3	1
1999	0,00242452	0,532817012	2,615641779	0,8865	0,143157816	0,185808257	89,9	1
2000	0,020741113	0,547962613	2,958826061	0,8783	0,142760819	0,183869372	87,95	1
2001	0,007600313	0,54160855	2,737200952	0,8027	0,142918392	0,185340641	86,95	1
2002	0,016039933	0,536504059	2,7336946	0,725	0,142676876	0,188051903	87,45	1
2003	0,010677322	0,538374754	2,356169872	0,9067	0,152777208	0,19057888	86,9	1
2004	0,028474518	0,556898798	3,25625011	0,9673	0,164938079	0,191575643	88,8	1
2005	0,036340721	0,579784909	3,829822293	0,9881	0,173878671	0,194781895	92	1
2006	0,040458093	0,61686954	4,228108978	0,9563	0,184648546	0,181535283	94,55	1
2007	0,039021254	0,635615504	4,120966999	0,9226	0,199366819	0,178140149	97,65	1
2008	0,018524768	0,629235029	3,1552595	0,8264	0,217974969	0,186579251	100,5	1
2009	0,000001	0,528304547	2,702089863	0,8907	0,206599026	0,198644802	99,65	1
2010	0,018641887	0,559889928	3,434822702	1	0,192659919	0,202296354	100	1
2011	0,021273433	0,583343727	3,933815703	0,9662	0,196865472	0,198622265	103,3	1
2012	0,010460632	0,585184256	4,15902401	0,9109	0,19761978	0,202599267	104,95	1
2013	0,012404803	0,596786063	4,177064129	0,8191	0,206682013	0,205749803	106,3	1
2014	0,00563736	0,594320512	3,403064202	0,7917	0,204348616	0,207956773	108,3	1
2015	0,000001	0,610975611	3,556431776	0,8008	0,208689998	0,204603403	107,35	1
2016	0,000001	0,59855702	3,355511897	0,7708	0,198988449	0,20806858	108,25	1
2017	0,000001	0,596052913	3,838459	0,8525	0,197142489	0,20934335	106,9	1

Source: SARB 2017, Wold Bank (2017) and Penn Tables (2017).

APPENDIX B - CUSUM AND CUSUMQ

Figure A1: Model 1: CUSUM and CUSUMQ tests

Plot of Cumulative Sum of Recursive Residuals: Model 1



Plot of Cumulative Sum of Recursive Squared Residuals: Model 1

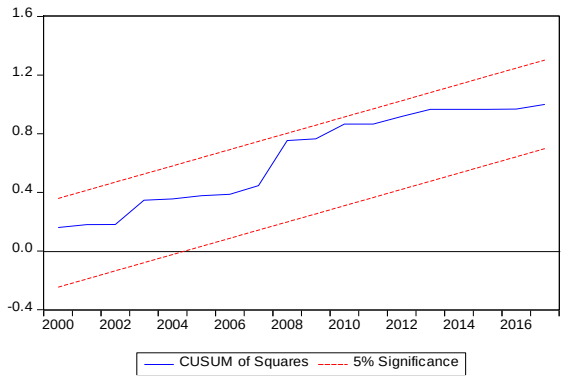
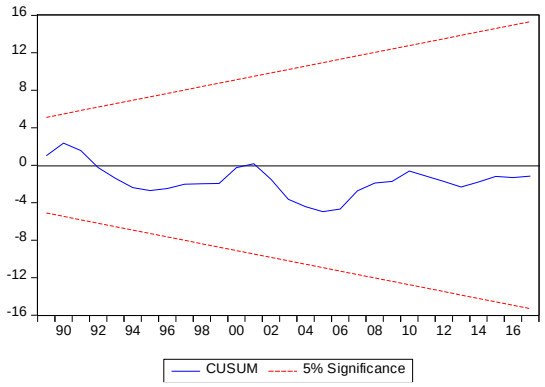


Figure A2: Model 2: CUSUM and CUSUMQ tests

Plot of Cumulative Sum of Recursive Residuals: Model 2



Plot of Cumulative Sum of Recursive Squared Residuals: Model 1

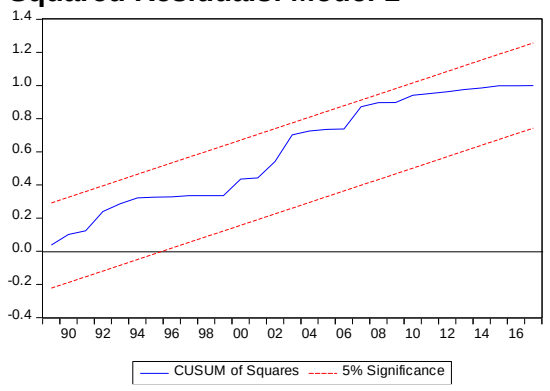
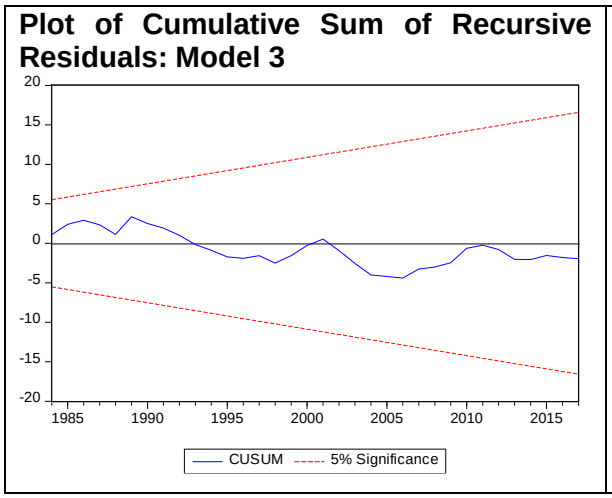
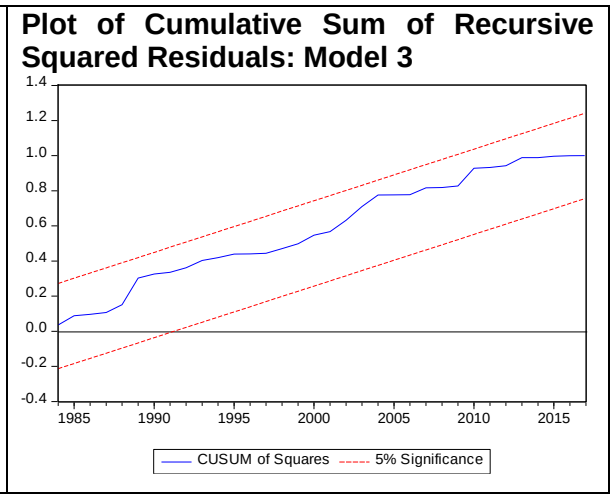


Figure A3: Model 3: Plot of CUSUM tests





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