Effect of Real Exchange Rates on Fruit Exports in South Africa: A Vector Error Correction Model (VECM) Approach

By

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DECLARATION

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Prof AS OYEKALE

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DEDICATION

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ABSTRACT

A country's exports occupy an important position in determining the state of national accounts. Thus, stable performance of the export sector is important for Gross Domestic Product (GDP) growth. In order to increase economic growth, export development is a critical avenue to pursue. The study examined the effect of real exchange rates (RER) on fruit exports in South Africa and determined the direction of causality between fruit exports and exchange rate changes. South African fruit producers competes fiercely in both the domestic and export markets.The study was correlational, intended to decipher the relationship between export performance and the various variables that influence it.The forty-eight (48) year period from 1971 to 2019 was chosen for econometric analysis because it contained the most complete data when all data sources were combined, and the 48 years period was appropriate for statistical/econometric analysis. The Granger Causality test was discussed and reviewed in light of the literature, as well as various factors affecting the study's level of validity and reliability.

Long run OLS regression analysis revealed that a weakening exchange rate has a positive effect on both export values and quantities.The signs of inflation,TOT, and GFCF (as control variables) coefficients were also consistent with their a priori expectations. Numerous preliminary and descriptive tests were conducted to ascertain the data table's meaning and to determine the most appropriate statistical approach. The unit root and cointegration tests indicated that the data were integrated with order 1, in addition to the long OLS model, a Vector Error Correction Model (VECM) was implemented. The long run OLS regression revealed that a weakening exchange rate have positive effect on both export values and quantities. The study discovered that government spending in the form of Gross Fixed Capital Formation (GFCF) have a small but positive effect on fruit exports. thereby boosting exports by allowing the fruit to be sold at affordable prices in foreign markets. The study discovered that government spending in the form of Gross Fixed Capital Formation (GFCF) has a small but positive effect on fruit exports. As a result, the government and other stakeholders should work to enhance transportation and related infrastructure through increased public investment to streamline logistics and boost export performance.

Keywords: Real Exchange rate, Fruit Exports Performance, Fruit South Africa, Inflation, Terms of Trade, Gross Fixed Capital Formulation, Ordinary Least Square and Vector Error Correction approach

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ACRONYMS

AFCFTA	African Continental Free Trade Area
ANC	African National Congress
ARDL	Autoregression Distribution Lag
ASGISA	Accelerated and Shared Growth Initiative of South Africa
BBBEE	Broad-Based Black Economic Empowerment
BFAP	Bureau of Food and Agricultural Policy
BOP	Balance of Payment
BPCG	Balance of Payment Constrained Growth
CA	Current Account
CBI	Centrum tot Bevordering van De Import
CEE	Central and Eastern European Countries
CEIC	Census and Economic Information Centre
CFPA	Canning Fruit Producers Association
CGA	Citrus Growers Association
CEAMC	Central African Economic and Monetary Community
COSATU	Congress of South African Trade Union
DAFF	Department of Agriculture Forestry and Fisheries
EA	Elasticity Approach
ECM	Error Correction Model
ECCAS	Economic Community for Central African States
EGARCH	Exponential Generalised Autoregression Condition Heteroskedasticity
EPA	Economic Partnership Agreement
EPS	Entry Price System

EU	European Union
FAO	Food and Agricultural Organisation
FPEF	Fresh Produce Exporter's Forum
FTA	Free Trade area
FSA	Fruit South Africa
GARCH	Generalised Autoregression Condition Heteroskedasticity
GAS	General Authority for statistics
GDP	Gross Domestic Product
GEAR	Growth and Employment and Redistribution
GMM	Generalised Method Moments
GFCF	Gross Fixed Capital Foundations
HORTGRO	Horticultural Growers
Hos	Heckscher–Ohlin
ITC	International Trade Centre
MFN	Most Favoured Nations
ML	Marshall-Learner
MRA	Mutual Agreement Accreditation
MRL	Maximum Residue Limits
NAMC	National Marketing Council
NER	Nominal Exchange Rate
NTMs	Non-Tariff Measures
OECD	Organisation for Economic Co-operation Development
OLS	Ordinary Least Squares
PPECB	Product Perishable Export Control Board
RER	Real Exchange Rates

RMB	Renminbi (Chinese Reserve Currencies)
RPS	Reference Price System
SAAGA	South African Avocado Growers Association
SAAPA	South African Apple and Pears Association
SACGA	South African Cherry Growers Association
SAFPA	South African Fig Producer's Association
SALGA	South African Litchi Growers Association
SAMGA	South African Mango Growers Association
SANAS	South African Natural Accreditation System
SAOLIVE	South African Olive Industry
SAPO	South African Plant Organization
SASPA	South African Stone Fruit Producer's Association
SATI	South African Table Grape Industry
SPS	Sanitary and Phyto Sanitary
SARS	South African Revenue Services
SS	StolperSamuelson Theory
TBT	Technical Barrier Trade
TDCA	Trade, Development and Cooperation Agreement
TOT	Terms of Trade
TRQs	Tariff Rate Quotas
VAR	Vector Autoregression
VECM	Vector Error Correction Model
UN	United Nations
UK	United Kingdom
US	United State

USA	United States of America
WB	World Bank
WDI	World Development Indicator
WTO	World Trade Organisation
WWW	World Wide Web

CHAPTER 1
INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Exports play a significant role in determining the state of a country's national accounts. Thus, the export sector's stability is critical for GDP growth. Export development is a critical path to economic growth. This necessitates an understanding of the factors affecting export performance, the most critical of which is real exchange rate fluctuations. South Africa's economy is one of the strongest in Africa, owing to its impressive manufacturing, agriculture, mining, and services sectors. Although the agricultural sector has been in steady decline[1] over the past few decades, it continues to be the country's largest employer and accounts for a sizable portion of exports. According to the 2011 National Development Plan, increased exports tend to boost domestic economic growth and job creation in South Africa. South Africa's export performance has deteriorated over the last three decades, and its share of global trade has decreased (Flowkes, Loewld and Marikov, 2016).

This study focuses on the fruit industry in South Africa. According to 2015 fruit industry statistics, agriculture contributes approximately 2.5% of the country's GDP and generates R98 billion in revenue. Gross domestic product growth in real terms slowed to 2.2 % in the first quarter of 2018, following a 3.1 % increase in the fourth quarter of 2017 (Statistics South Africa, 2018). The largest negative contributors to the growth of the GDP were agriculture, mining and manufacturing. Agriculture decreased by 24.2% and contributed -0.7 percentage points to GDP growth (Statistics South Africa, 2018). South Africa exports to high-income European countries and low-income African countries (Peter, 2017). America, Germany, Japan, the Netherlands, the United Kingdom, Saudi Arabia, and India are among South Africa's trading partners. Annually, South Africa produces approximately 4.7 million tons of fruits, with citrus accounting for 55%, pome and stone fruits accounting for 34%, table grapes accounting for 6%, and subtropical nuts accounting for 4%. (South African fruit industry statistic 2015). The fruit industry contributes significantly to agriculture's economic contribution; thus, 50% of all agricultural exports from South Africa are fresh fruit, worth more than R30 billion. This study is significant because it contributes

[1] https://www.nda.agric.za/docs/Economic_analysis/DecliningContributionOfAgricToGDP.doc

to the debate over the extent to which currency fluctuations have harmed export performance and the economy as a whole. Inconsistent exchange rate monitoring is a topic of public debate in South Africa at the moment, and the Reserve Bank has consistently denied responsibility for exchange rate volatility. By contrast, the South African Reserve Bank (SARB) sought to protect the Rand's supply and demand. Congress of South African Trade Unions (COSATU) instils the conviction that macroeconomic policies (Growth and Employment, Redistribution, and South Africa's Accelerated and Shared Growth Initiative) eliminate the relationship necessary for the realisation of a competitive exchange rate. This highlights the importance of empirical research examining the impact of exchange rate fluctuations on export performance, using the fruit sector as a case study.

1.2 PROBLEM STATEMENT

The South African rand has weakened against the US Dollar over the last few years. As De Jager and Kahn (2012) explain, a weakening Rand, on the other hand, may have a negative effect on macroeconomic variables. Over the past few years, the South African Rand has weakened against the US Dollar. Theoretically, currency depreciation should increase export demand since it increases purchasing power for foreign buyers. While international demand for South African fruits may increase, producers may face inflationary pressures in terms of wages and other farm inputs at the local level. They may struggle to invest in technology to meet this demand while also protecting the quality of their produce – highlighting the importance of examining the impact of changes in the equilibrium exchange rate on this industry. The main objective of real exchange rate policies is to preserve the value of domestic economic growth by reallocating favourable reserves and stabilizing the macro-economy. Boonzaaier and Van Rooyen (2017) correctly observe that the country has little influence over the exchange rate determination process. However, a better understanding of the magnitude of how that volatility affects specific sectors of the economy enables policymakers to make informed decisions. It raises critical questions about the extent to which the SARB should be held accountable for exchange rate shocks and also provides critical information for local fruit producers.

Data on processed fruit production is excluded. The principle of fruit types production on farms include Citrus on 42%, pome 21%, Sub – tropical fruit 15%, Table grapes 12% and stone 10%. The fruits ae produced on a total of 176 495 hectares and in terms of volumes produced and

market segment, almost 4.6 million tons of fruit are annually produced on south African fruit farms of which 62% is exported; 26%; 12% is sold a fresh product on loal market.(Daff, 2018). The volume of of fruit per fruit segmented between export, local – fresh processed market are yielded 4 574 720. FruitSA (2016) showed that p roductivity per fruit type per market contributed 118 324 067 cartoons. Sout Afriican Fruit Industry traded 570 000 tons to ocal Retilers, Supermarketsand Wholesalers; regional fresh produce markets; and local traders. FruitSA (2016) noted that the fruit industry supply 1.2 million tons is annual ls supplied for processing concentrates mainly for export, single strnegthh fruit juices and fresh fruit mainly for the export and local; cannedfruits segments and preserves, local drying and local manufacturers of other value addig fruit product anr mainly for export and local market. In addition, the Bureau for Agricultural Policy (BFAP) established that every single fruit farm and packhouse employment created 0.66 of general positions, consequently cost the fruit industry in South Africa close to 24 billion per annum (FruitSA, 2016).

Additionally, the prior empirical literature is context-specific and may not apply to the Fruit South African industries, resulting in a significant knowledge gap. Fruit exports account for a sizable portion of South Africa's agro-exports. There has been no study examining the effect of real exchange rates on South Africa's fruit export performance. By relying on similar studies conducted in other sectors, policymakers risk making incorrect decisions, given that policymaking (on the part of the SARB, for example) should be based on context-specific research. For instance, there may be reservations about the inconsistency of statistical significance for factors affecting export performance; a lack of generality to the specific country context; and the use of data that is limited to the sample country (Rwenyagila, 2013). The study will investigate the effect of real exchange rates on South African fruit exports and the causal relationship between real exchange rates and fruit exports.

1.3 RESEARCH OBJECTIVES

To accomplish these goals, the study's primary objective would be to analyse the effect of exchange rate fluctuations on South Africa's fruit export performance from 1971 to 2019 using a Vector Error Model (VECM) approach.

1.3.1. THE SPECIFIC OBJECTIVES ARE:

- Examine the effects of real exchange rates on fruit exports in South Africa.
- Establish the causal relationship between fruit exports and currency exchange rate changes.
- Evaluate the existence of long-run equilibrium.

1.3.2. STUDY HYPOTHESES

To guide the analysis and interpretation the following overarching outlined hypotheses were adopted:

H_0**: Null Hypothesis:** There is no significant relationship between South African fruit exports and real exchange rates.

H_1: Alternative hypothesis: There is a significant relationship between South African fruit exports and real exchange rates.

H_o: Null Hypothesis: There is no direct causality between real exchange rates and fruit export performance.

H_1: Alternative: There is direct causality between real exchange rates and fruits export.

H_0: Null Hypothesis: There is no existence of long-run equilibrium.

H_1: Alternative hypothesis: There is the existence of long-run equilibrium.

1.4 SIGNIFICANCE OF THE STUDY

Instability in real exchange rates has a negative effect on the overall performance of the domestic economy and export fruit industries. The purpose of this study is to ascertain the relationship between the real exchange rate and the fruit industry's export performance. Furthermore, the

study will provide information to policymakers to assist them in enacting appropriate policies. The study will contribute value and knowledge to the body of existing literature. The study will generate a developed critique for future research. By gaining a better understanding of the extent to which RER affect the fruit industry's export performance, SARB exchange control policies can be tailored to protect the viability of stone fruit exports. Exports are a significant component of national income, and by pursuing policies that increase national income (via increased exports), the government is better able to provide social services in the economy, broaden the base of social grants to combat poverty, and close inequality gaps, among other benefits. Therefore this study is of paramount importance.

1.5 KNOWLEDGE GAP

As the literature review demonstrates, there is some disagreement regarding the causal relationship between export performance and real exchange rate movements (and other determinants). Additionally, while there is some research on the effects of RER movements (and other factors) on export performance, empirical research on the specific South African fruit market context is relatively scarce. The majority of recent studies on South African fruit export have focused on the competitiveness, comparative advantage, and strategy formulation for a single fruit commodity. The study examined which variables were associated with agriculture's share of GDP. The purpose of these studies is to correlate value chain analysis areas with those of single fruit commodities. South Africa is a developing country with low agricultural investment. The international community has implemented stringent policies that have harmed agricultural economic growth. The government was hesitant to investigate and negotiate for more favourable agricultural trade reforms in Europe. South Africa's fruit industry is export-oriented and heavily reliant on foreign currency earnings. Conradie (2008), Mashabela (2007), Jafta (2014), and Boonzaaire (2017) concluded that the South African deciduous fruit industry is marginally and relatively competitive, with a smaller comparative advantage over its international counterparts. According to Ndou (2012), Sinngu (2017), and Dikilili (2018), the citrus fruit industry faces global challenges in terms of value-added products. Mjonono (2020) and Mtshiselwa (2020) later demonstrated that supply chain challenges are global economic trends and that deregulation persists.

According to Peter (2017), the debate over the real exchange rate began with the collapse of the Bretton Woods System during the World Wide Web (www) era. There are still relatively few research studies on the South African aggregated fruit industry. The study concentrated on the real exchange rate and the factors that influence aggregated fruit exports, excluding processed products. The study did not assess the fruit industry's performance in relation to the local market. The study gathered data on various aspects of determining export performance to specific international markets. Collectively, experience in fruit export contributes to the aggregate fruit farming industries' high-quality value addition. Networking skills and personal connections result in increased farm enterprise earnings, thereby boosting income distribution among niche and commercial exporters. Diversification through agro-processing allowed for the exploration of new international markets. The study gathered data on the export performance of specific continents. Peter (2017) recognized that the magnitude of exchange rate volatility's effect on export flows is still unknown. Researchers and exporters are most concerned that the phenomenon of real exchange rate mismanagement has had an adverse effect on the trade balance and fruit exports.

The regression model's variables provided direction and a clear overview of the study. The study divided the literature into theoretical and empirical sections. Chamberlian theory, Mercantilism, Cournot, Patterns of Demand, Global strategies rivalry, Porter's competitiveness, Balance of Payment, Generic strategies, Stolper–Samuelson theorem, Ricardo's theory, and Heckscher–Ohlin theory were all included in the study's theoretical literature. The research employed a quantitative methodology to address the study's research questions. The study analysed secondary data from the OECD, FAOSTAT, the World Bank, and the World Bank Institute. The Granger causality test was discussed and evaluated in terms of the various factors that affect its validity and reliability. The study then compared the results and findings of similar analyses. The multicollinearity, normality, Phillip–Perron stationarity, or Phillips–Outlarie cointegration tests were used to diagnose the data. Augment Dickey-Fuller (ADF) will confirm whether variables are stationary or not in the initial differences.The study examined the existence of Johansen cointegration within the volatility of all fruit export exchange rates. The result based on the Vector Error Correction Model (VECM) will be used to determine whether Granger Causality is negative or positive. The presence of a real exchange rate was established using a vector error correction model, and the effects of real exchange volatility on aggregated fruit export were also evaluated.

1.6 DELIMITATION AND LIMITATION OF THE STUDY

South African fruits are export-driven and usually affected by globalisation and trade liberalisation. The South African fruit industry makes significant contributions to farm and market-level decision-making. Additionally, the study will analyse historical export data and real exchange rates to conclude the agricultural sector's future. There is data available to assess the export performance of fruit over a twenty-one-year period (1997 to 2019). External trade will be excluded from the study because it has a direct impact on the growth and development of the South African economy as a whole. The focus will be solely on the relationship between real exchange rates and the fruit industry's export performance. The study will not collect data at the firm or company level to conclude, but will instead focus on the global and industry levels. The study obtained fruit export data from the Food and Agriculture Organisation (FAO), while real exchange rates and other macroeconomic indicators are obtained from the South African Reserve Bank (SARB).

1.7 LAYOUT OF THE STUDY

Six chapters will comprise the study. Chapter 1 present the study, including a statement of the problem, research objectives and questions, the study's hypotheses and significance, as well as its delimitations and limitations. Chapter 2 will provide a descriptive overview of the fruit industries, the competitiveness of South Africa's fruit exports, statistical production, export performance, market shares, industry structure, value chain, and contribution to gross domestic product. Chapter 3 reviewed the evolution of classical and neo-classical trade theories relevant to the South African fruit industries, define the determinants in the context of the South African fruit industries, evaluate various techniques used to quantify the determinants of fruit export performance, and review previous research in the area of and export performance. The theoretical framework and methodology are discussed in Chapter 4. Chapter 5 summarises and interprets the research findings and data analysis. Chapter 6 concludes and recommends how the determinants of fruit exports have a direct impact on the South African fruit industry's export performance.

CHAPTER 2
OVERVIEW OF THE SOUTH AFRICAN FRUIT INDUSTRY

2.1. INTRODUCTION

This chapter's purpose is to provide a descriptive overview of South Africa's fruit industry. The fruit industry operates within a market-driven, highly liberalised, and dynamic business environment. As with other industries, it faces enormous obstacles when it comes to international exports. To comprehend the study's analysis, a thorough understanding of the industry must be demonstrated. This section begins with a discussion of the industry's history during the pre-and post-deregulation eras.

2.2. HISTORY OF THE SOUTH AFRICAN FRUIT INDUSTRY

The Dutch East Indian Company's Jan Van Riebeek planted the first fruit tree shortly after he arrived at the Cape in 1652 to supply passing ships (Du Toit, 1981 and Stander, 1983). In 1895, the fruits were produced on a larger scale to expand exports and commercialise the industry. According to Du Toit (1981), South Africa exported its first 14 trays of fruit to the United Kingdom via ship. In 1910, a network market was established, and a railway link from Mitchell Pass to Cape Town was completed. The direct railway connection to Cape Town enables the export of a large volume of South African fruits globally, specifically to the EU markets (Olivier et al., 2006). Exports were reintroduced in 1947 as part of the channel export scheme. The development of new markets resulted in the distribution of 7.9 million packages of fruit to 34 international countries across four continents. Cold storage facilities were established along Cape Town's harbour, replacing rail with a road transport system (Rabe, 2005).

2.3. DEREGULATION OF SOUTH AFRICAN MARKETING SYSTEMS

After 1994, the fruit industry was deregulated to allow for single-channel marketing. Mashabela (2007) argued that the Kassier report advocated for the abolition of South African marketing control boards and agricultural deregulation. With the report's endorsements, the ruling African National Congress (ANC) conquered. According to Darroch (2001) and Barrientos et al. (2003), deregulation of the Marketing Act of Act No. 47. 1997 resulted in contradictory and conflicting

legislation. Additionally, they stated that fruit producers were vulnerable to external commercial risks and increased competition. By contrast, Vink (2003) believed that deregulation facilitated booming investments; increased volume and quality products as a result of new orchard replanting.

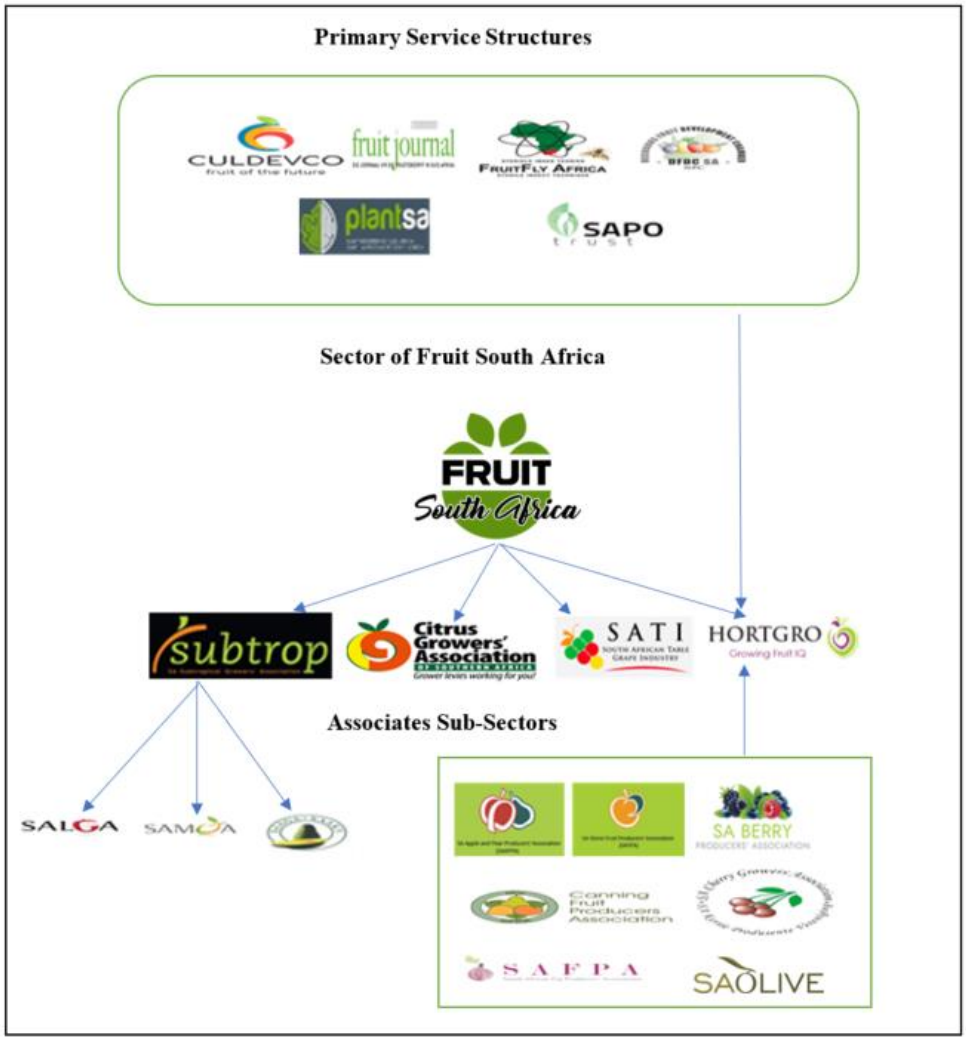
2.4. STRUCTURE OF THE FRUIT SOUTH AFRICA INDUSTRY

Fruit South Africa is responsible for the strategic direction and synergy development of its associations. Furthermore, communicates with the state, reports on its activities and leverages market access, finance, policy development, and implementation. Fruit South Africa's objectives were to engage government and public institutions; to provide guidelines on policy, legislation, and other Fruit Industry matters; to engage other strategic stakeholders; to promote BBBEE transformation and skills development; to collect and disseminate critical industry information, and to communicate industry information to the broader public and industry stakeholders.

Fruit South Africa is battling to accelerate coordination and participation of diverse stakeholders; maintain a slow pace of actions and activities, and develop effective and efficient reporting systems. The FSA contributes significantly to the country's agricultural export value (Daya, 2015; Phaleng 2020). The South African fruit industry is heterogeneous, comprising commercial agriculture, smallholder agriculture, and subsistence agriculture. Ndou (2012) and Peter (2017) postulated that South Africa's fruit industry produces agricultural products and sells them on the local, national, and international markets.The South African Fruit Industry Sector, sub-sector, associates, and primary service structures are depicted in Figure 1 below. These structures are responsible for developing and promoting new products while ensuring efficiency for both domestic and international export markets.

Fruit Industry Value Chain Round Table (FIVCRT) is a programme and in partnership with government (DAFF) , labour and the fruit industry (FPEF, CGA, SATI; Hortgro and Sub-Tropical).The FIVCRT aimed at fostering collaborative actions between government and industry (FruitSA, 2018). The organisations help secure competitive advantage of fruit sector. he FIVCRT is influencing policy and strategy development by involving trade; resources; transformation; research and development and employment and workers welfare. Furthermore, FIVCRT advocate for market access, improve trade and guide and direct research science (FruitSA, 2016).

Figure 1 Origin of the South African fruit Industry



Source: Hortgro (2017) and SATI (2014)

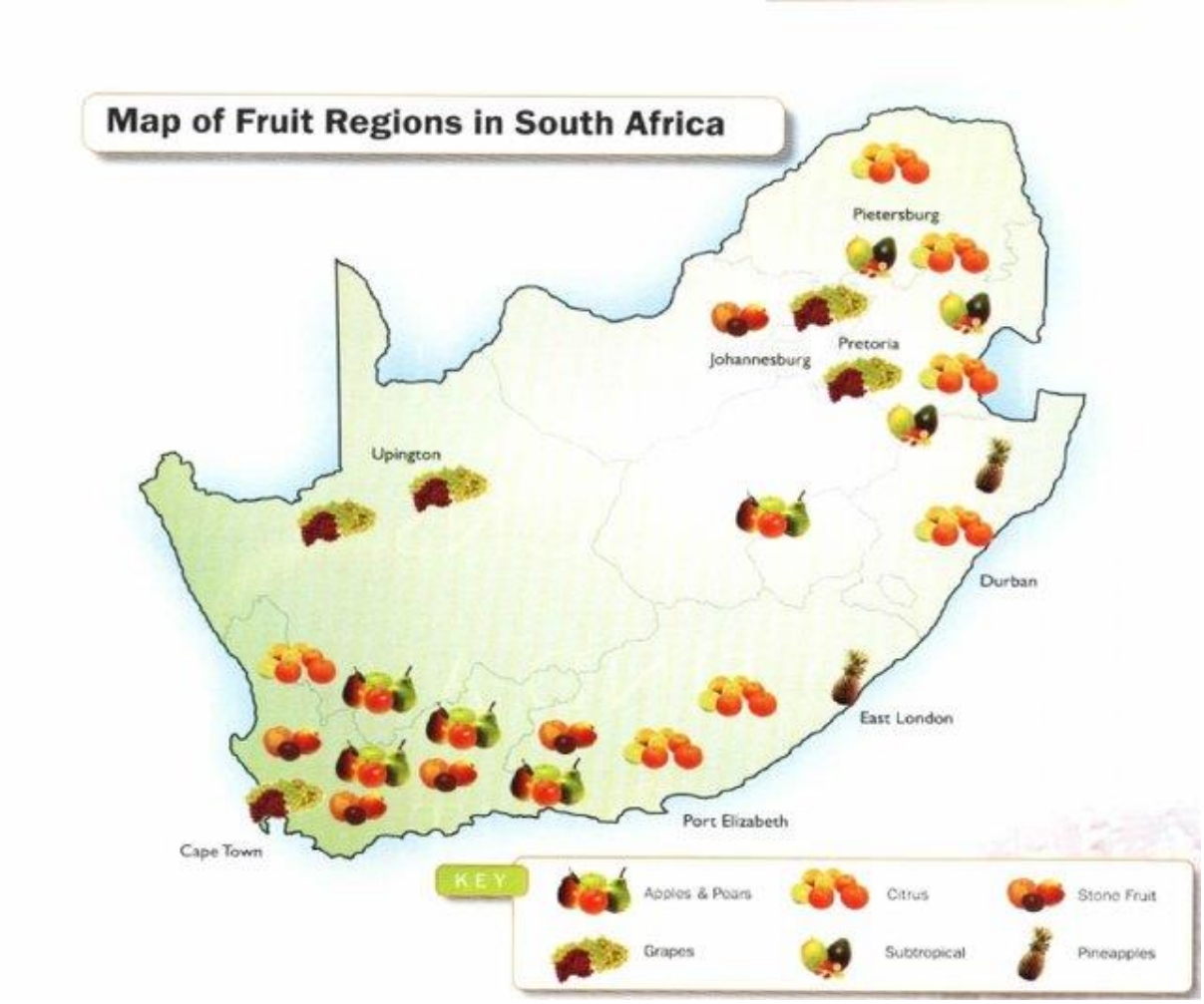
Hortgro is affiliated with four major fresh fruit producer organisations: the South African Stone Fruit Producers Association (SASPA), the South African Apple and Pear Producers Association (SAAPA), and the South African Table Grape Industry (SATI), and the Dried Fruit Technical Services Association (DFTS). Hortgro also provides operational support. Hortgro's primary apex is the reciprocal of information systems. The Fresh Producers Export Forum (FPEF) is a registered trade association comprised of 120 members who export 90% of fresh fruit. South African Macadamia Growers Association (SAMAC), South African Mango Growers Association (SAMGO), South African Litchi Growers Association (SALGA), and South African Avocado Growers Association (SAAGA) are affiliated members of the South African Subtropical Growers Association. Citrus Growers Association (CGA) is a trade association that represents producers

of citrus fruits such as oranges, lemons, grapefruit, mandarins, clementines, and tangerines. Then, the South African Table Grape Industry represent wine and table grape production.

2.5. FRUIT PRODUCTION IN SOUTH AFRICAN REGIONS

The Western Cape, Eastern Cape, Limpopo, Mpumalanga, and Northern Cape are the key provinces for fruit production. Figure 2 indicated the types and variety of agricultural production by region.

Figure 2: Map of Agricultural Regions regions in South Africa



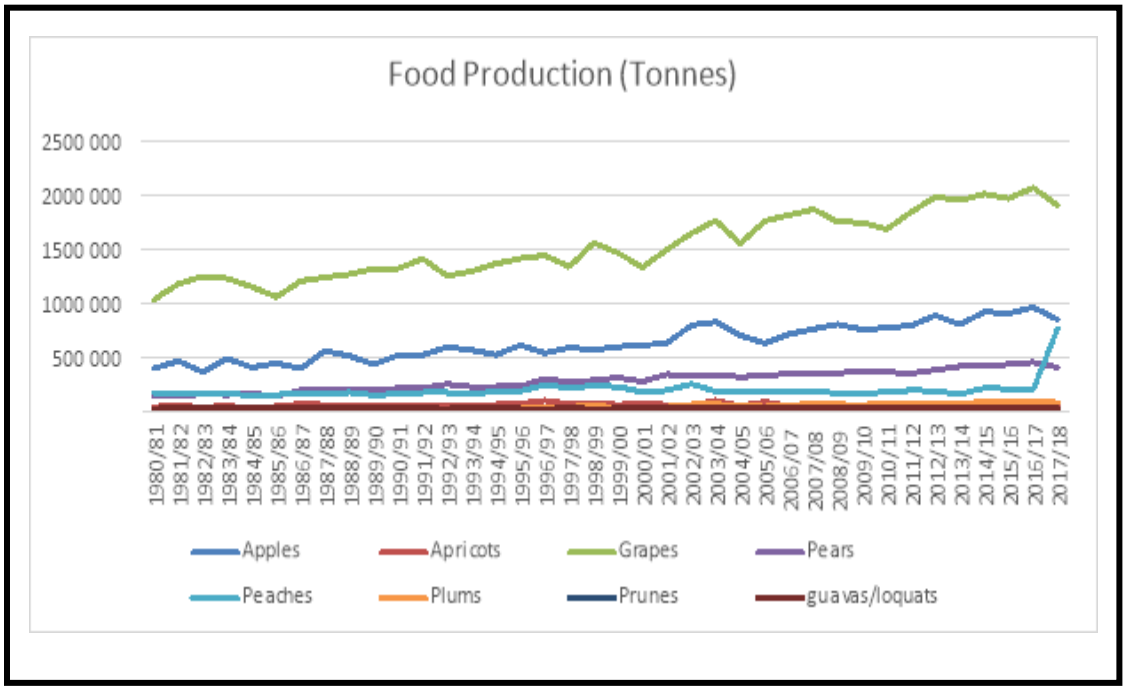
Source: Fruit South Africa (2016)

The diverse weather and climatic conditions in South Africa enable the country to cultivate and produce a wide variety of fruits (NAMC, 2019). The country is well-known worldwide as an exporter of citrus, deciduous, subtropical, and exotic fruits. South Africa's fruit industry is diverse, with large commercial growers and smallholder growers competing for the same export markets, supermarkets, retailers, and local markets (Peter, 2017). South Africa is one of the world's largest producers of fresh fruit and the largest contributor to the value of agricultural products produced in the country (Phaleng, 2017). Approximately 13% of South Africa's arable land is suitable for exportable crops. South Africa ranks fifth in wine production and tenth in fresh fruit production (SA Info, 2015, DAFF, 2015 and Phaleng, 2017).

2.6. FRUIT PRODUCTION

Figure 3 depicted the primary flow of fruit production in the country in terms of exports. The Western Cape region produces the majority of deciduous fruit, grapes, and wine, although smaller quantities are produced in Limpopo, the Eastern Cape, and Mpumalanga.

Figure 3 Fruit production in South Africa



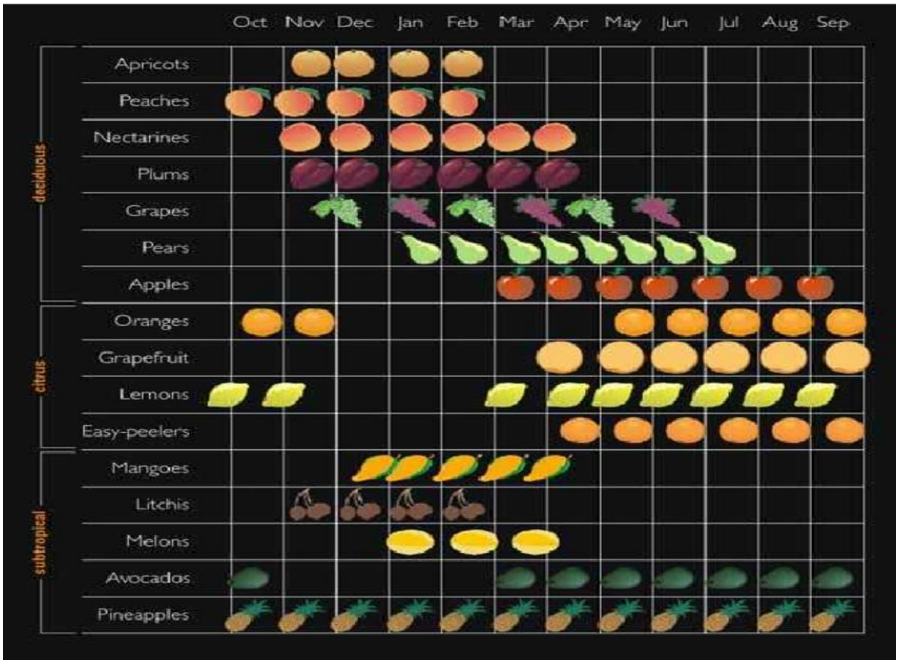
Source: Quantec Easydata (2020)

The nine provinces produce fruit, with the Western Cape producing the most (Phaleng, 2020). In comparison to deciduous, subtropical, and exotic fruit, citrus is grown in eight provinces. In total, 90% of fresh fruit is exported to international markets, with the remainder consumed locally and used in processing (Sinngu, 2014, Boonzaaier, 2015, Peter, 2017, Phaleng, 2017, and Dikilili, 2018).

2.7. FRUIT SEASON FOR DIFFERENT CULTIVARS

Harvesting seasons for different fruit types are graphically depicted. The growing and harvesting stages on the farm have a significant impact on the final product's quality (Goeha-Gerber et.al., 2015). During harvesting, producers must have a firm grasp on the characteristics of fruit ripening and adhere to fruit physiology protocols. The structure below illustrates when fruit should be picked.

Figure 4: Calendar of fruit production in South Africa



Source: PPECB (2013) FPEF (2014)

The South African Handbook (2003), the FPEF (2003), and Ortmann (2005) specified the following schedule for fruit harvesting: Apricots are harvested from November to February, peaches from October to February, plums and nectarines from November to April, grapes from

December to June, pears from January to August, and apples from March to September, while citrus fruits such as oranges and lemons are harvested in November, December, and May to September. Between April and September, Grape Fruit and Easy – Peelers are harvested. Mangoes are harvested from December to April, Litchis from November to February, Melons from January to March, Avocadoes in October and from March to September, and Pineapples throughout the year.

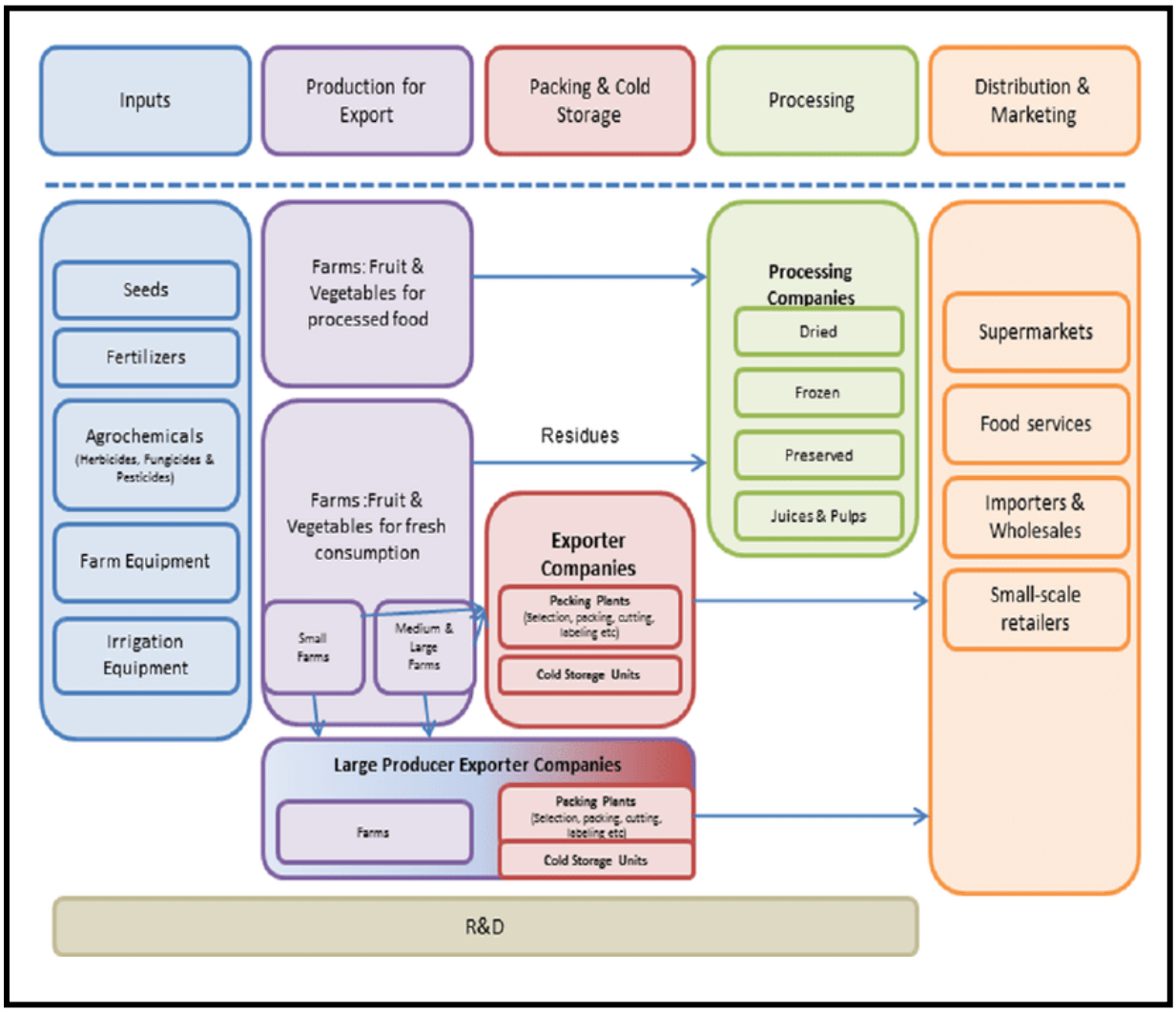
2.8 VALUE CHAIN OF THE SOUTH AFRICAN FRUIT INDUSTRY

The trade chain's structure is composed of commercial entities. The structure of the value chain begins with the primary activities. These include breeding, plant development, nursery operations, and the cultivation and maintenance of orchards. To ensure successful production, the primary activities require social, financial, and environmental sustainability (Ndou, 2012). Furthermore, it entails concerns about traceability and quality assurance. All processes involved in the South African export supply chain include fruit cultivation, harvesting, packaging, cooling, transportation to ports, handling at ports, and shipping. Estimates of production volume are made during the harvesting season. The fruits are then transported to local, communal, or regional processing facilities. The exporter matches the production to the estimates of demand provided by the importer or developed nations (Ortmann, 2005). This assists with the preparation of a provisional export plan that will be communicated to the shipping line. Container spacing has been reserved on the vessels, and a proper plan with accurate estimates will be developed during the season.

Ndou (2012) asserted that the South African fruit producers competed for business and export markets in a highly competitive environment. Consumers drive the fruit industry, as exporters are constantly improve the quality and value-added products (Fruit Industry Export Manual, 2021). The South African fruit value chain is extremely sensitive for producers due to the hash environment, disease impact, and international market picking standards. Sinngu (2014) proclaimed that the South Africa's fruit industry began by improving its economy's fundamental conditions through the development of adequate road and transportation infrastructure. Ports and airports were then primarily used to efficiently moved the perishable market (Ortmann, 2005 and Fruit Industry Export Manual, 2021). The fruit industry in South Africa established sanitary and phytosanitary systems and adhered to regulatory requirements in preventing disease spread throughout the world. South Africa's fruit industry continue to adapt to new advantageous trade

policies and standards that increased the supplier's competitiveness. The figure below illustrated the South African fresh fruit export industry's supply chain as set up by (Peter 2017).

Figure 5: Fruit Market value Chain



Source: Gereff and Ferrandez – Stark (2016)

The South African value chain was defined as the entire input-output process that takes a product from conception to the final consumer (Ferrandez–Stark, et. al., 2011; Peter, 2017). South Africa's fruit export industry entered global markets while adhering to strict regulations. It gradually improved its success rate in the value chain's packaging segment. Upgrades in packaging were contingent upon a thorough understanding of market requirements; investment in capital goods and the country's availability of supporting activities (Fernandez-Stark, et. al., 2011). During pre-season planning with producers, all export documentation is properly completed. Exporters

purchased fruit and entered into contracts with producers and service providers to ensure the fruit was delivered on time and in good condition (South African industry Fruit Export Manual, 2021). The fruit were supplied to the market satisfying the buyer under the quality control of the South African fruit industry. Seasons dictated how operations should be ran and managed. The reason for this was to ensure that the previous season's products and packaging were analysed. Following applicable legislation and standards, the exporters and DAFF ensured the inclusion of compiled documentation for export accuracy (South African Industry Fruit Export Manual, 2021). Fruit export are complicated process that requires strict adherence to health and safety standards, as well as compliance with foreign marketing, distribution logistics, and payment requirements. Exporters must be familiarised with South Africa's regulations, international agreements, and registered food business operations with DAFF (South African Fruit Export Manual, 2021).

The regulations are intended to ensure that fruit exported to other countries complies with fundamental food safety and quality standards. DAFF regulations ensure that products comply with EU and US legislation (South African Fres Fruit Export Manual, 2021). Foreign importers received compliance certification from an accredited international certification body that validates systems, products, and personnel agents (Ndou, 2012). Producers and exporters in South Africa receive compliance certification from South African National Accreditation Systems (SANAS). This accreditation body established Mutual Arrangement Accreditation (MRA), which entitles South African fruit exporters and producers to automatic recognition by foreign countries under SANAS (South Africa Fresh Export Manual, 2021). Fruit is sold directly to the final consumer from informal markets; processed fruit is then sold to wholesalers, and retailers, and directly to the final consumer (Peter, 2017). The cold chain begins when fruits are placed in a cold room shortly after harvesting, to maximize fruit quality and shelf life. The objective is to provide the highest quality fruit while maximizing return on investmen (Mjonono, 2020 and South African Fresh Export Manual, 2021).

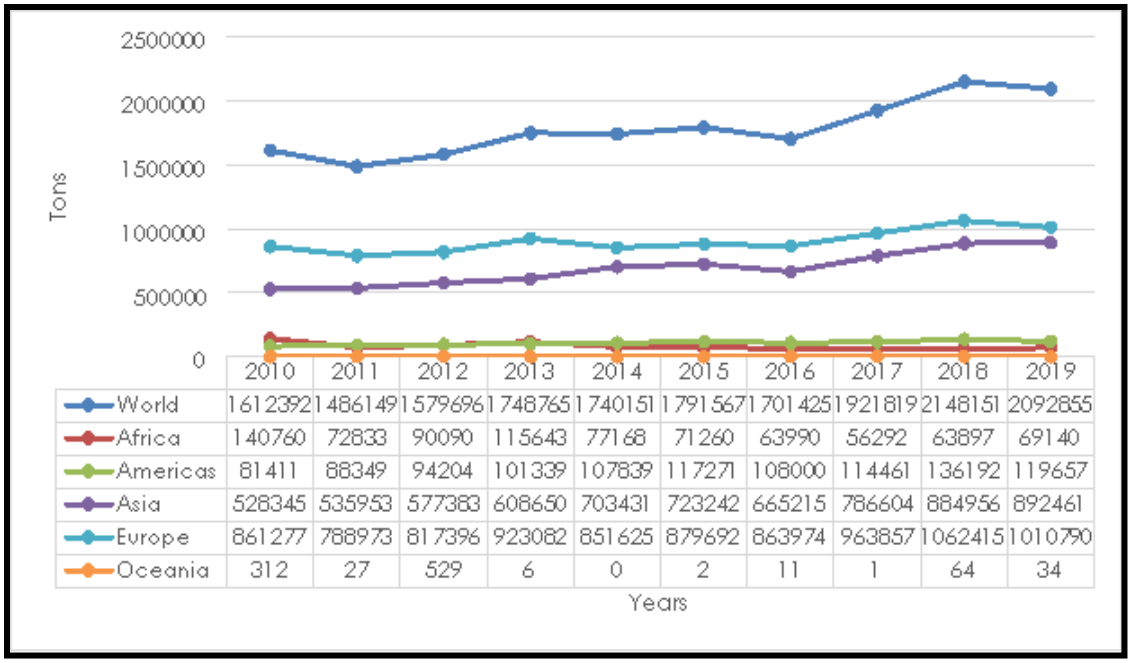
2.8. FRUIT EXPORT DESTINATION

South Africa exported fruit primarily to the EU, the UK, Asia, and Africa during the previous season (BFAP, 2019). If there is an increase in purchasing power in those exporting areas, South African industries must collaborate to establish new markets. South African exports include citrus, table grapes, deciduous, subtropical, and exotic fruit.

2.8.1. CITRUS FRUIT

Citrus is currently the third-largest horticultural industry in South Africa, behind deciduous fruits and vegetables (Ndou, 2012; DAFF, 2015; Peter, 2017; Dikilili, 2018 and Mtshiselwa, 2020). The industry is export-oriented and contributed approximately R3 billion to the South African economy in 2019. The citrus fruit industry is deregulated, with market forces dictating prices. Limpopo, the Western Cape, Mpumalanga, the Eastern Cape, and Kwazulu Natal are the primary citrus-producing provinces. Broad cultivars include lemons and limes, grapefruit, oranges, and naartjie. South Africa exported 77 million cartons of oranges, sufficient to fill 46 000 containers, retaining its position as the world's sixth-largest exporter by volume (CGA). On the full spectrum, fruit exports to Japan decreased, while demand from the Netherlands, Portugal, and Argentina increased. South Africa remains the world's largest exporter of grapefruit. According to BFAP (2020), market volatility will be driven by Asian demand. The destinations listed below in figure 6 correspond to the South African citrus fruit exporter.

Figure 6: South African Citrus fruit exporter's destinations



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
World	1612392	1486149	1579696	1748765	1740151	1791567	1701425	1921819	2148151	2092855
Africa	140760	72833	90090	115643	77168	71260	63990	56292	63897	69140
Americas	81411	88349	94204	101339	107839	117271	108000	114461	136192	119657
Asia	528345	535953	577383	608650	703431	723242	665215	786604	884956	892461
Europe	861277	788973	817396	923082	851625	879692	863974	963857	1062415	1010790
Oceania	312	27	529	6	0	2	11	1	64	34

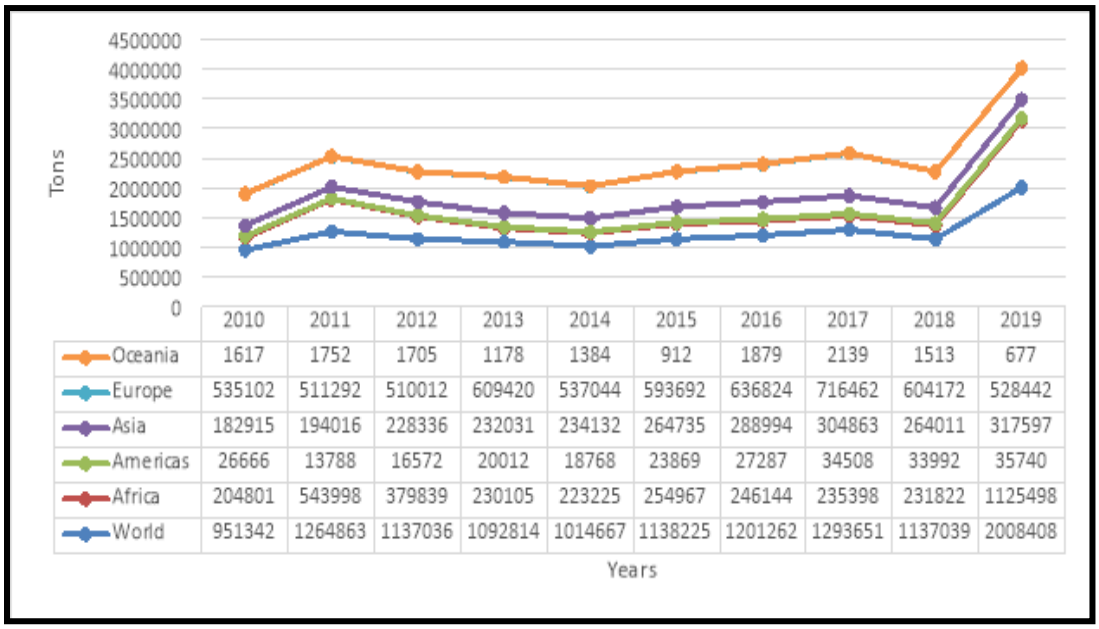
Source:(2020)

In 2010, South Africa exported 140 7760 tons of fruits, which decreased to 69 140 tons in 2019. America typically consumed 81 411 tons of South African fruit exports, with a sudden increase of 119 657 tons in 2019. Asia consumed 528 345 tons of South African fruit exports in 2010 and 892 461 tons in 2019. Europe consumed 861 277 tons in 2010 and 1 010 790 tons in 2019. Oceania is the smallest continent, consuming 312 tons of fruits from South Africa in 2010 before slowing to 34 tons in 2019.

2.8.2. DECIDUOUS FRUIT

Pome (Apples and Pears) and stone fruit (apricot, peaches, nectarines, plums and table grapes) comprise the deciduous fruit industry. The Western Cape has the highest concentration of growers at 74%, followed by the Northern Cape at 15% and the Eastern Cape at 8%. South Africa's deciduous fruit industry is export-oriented, with a significant volume exported annually. The Fresh Produce Exporters Forum (FPEF) represents exporters in the industry. South Africa’s deciduous fruit destinations are depicted in Figure 7.

Figure 7: South African Deciduous fruit exporter's destinations



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Oceania	1617	1752	1705	1178	1384	912	1879	2139	1513	677
Europe	535102	511292	510012	609420	537044	593692	636824	716462	604172	528442
Asia	182915	194016	228336	232031	234132	264735	288994	304863	264011	317597
Americas	26666	13788	16572	20012	18768	23869	27287	34508	33992	35740
Africa	204801	543998	379839	230105	223225	254967	246144	235398	231822	1125498
World	951342	1264863	1137036	1092814	1014667	1138225	1201262	1293651	1137039	2008408

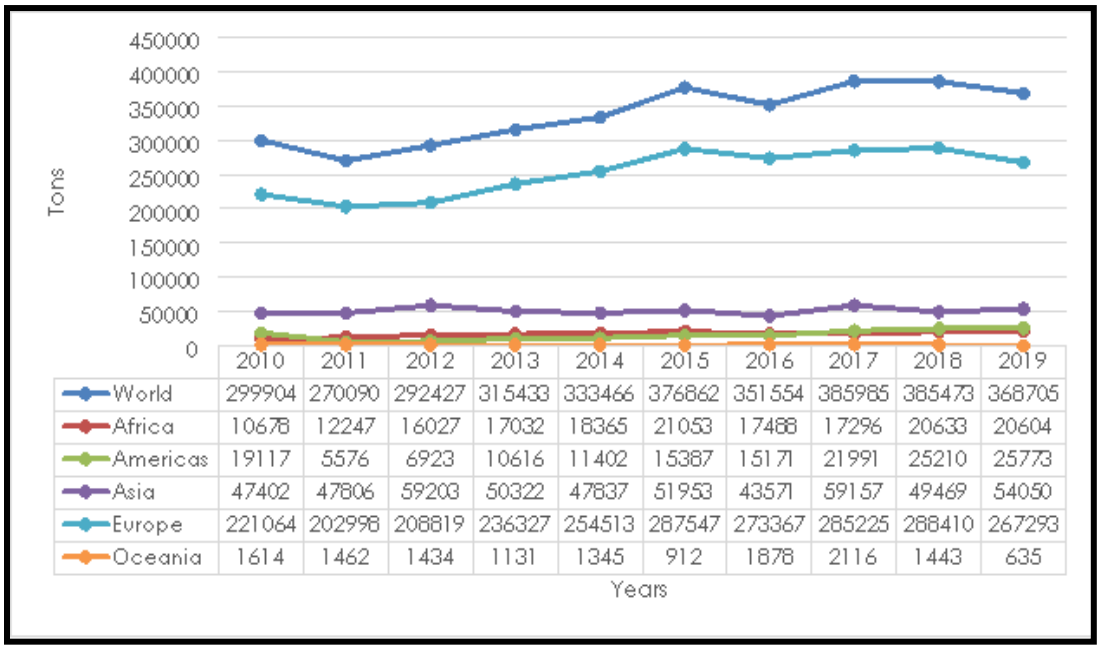
Source: Quantec Easydata (2020)

In 2010, Oceania consumed 1 617 tons of fruit from South Africa; in 2019, it consumed 677 tons. Europe consumed 535 102 tons in 2010 and 528 442 tons in 2019. Asia consumed 182 915 tons of fruit in 2010 and 317 597 tons in 2019. America consumed 26 666 tons of fruit from South Africa in 2010, and that figure increased to 35 740 tons in 2019. Africa consumed 204 801 tons of fruit from South Africa in 2010, with deciduous fruit accounting for the majority of consumption at 1 125 498 tons in 2019.

2.8.3. TABLE GRAPES FRUIT

The globalisation of table grape production has encouraged producers in developing countries to adopt and adapt new technological strategies to increase production support (Mtshiselwa, 2020; Sibulali 2018 and Peter, 2017). The following figure depicts the global production and harvesting areas for table grapes. The table grapes depicted in Figure8 are classified according to their consumable state, ranging from fresh to dried.

Figure 8 South African Table Grapefruit exporter's destination



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
World	299904	270090	292427	315433	333466	376862	351554	385985	385473	368705
Africa	10678	12247	16027	17032	18365	21053	17488	17296	20633	20604
Americas	19117	5576	6923	10616	11402	15387	15171	21991	25210	25773
Asia	47402	47806	59203	50322	47837	51953	43571	59157	49469	54050
Europe	221064	202998	208819	236327	254513	287547	273367	285225	288410	267293
Oceania	1614	1462	1434	1131	1345	912	1878	2116	1443	635

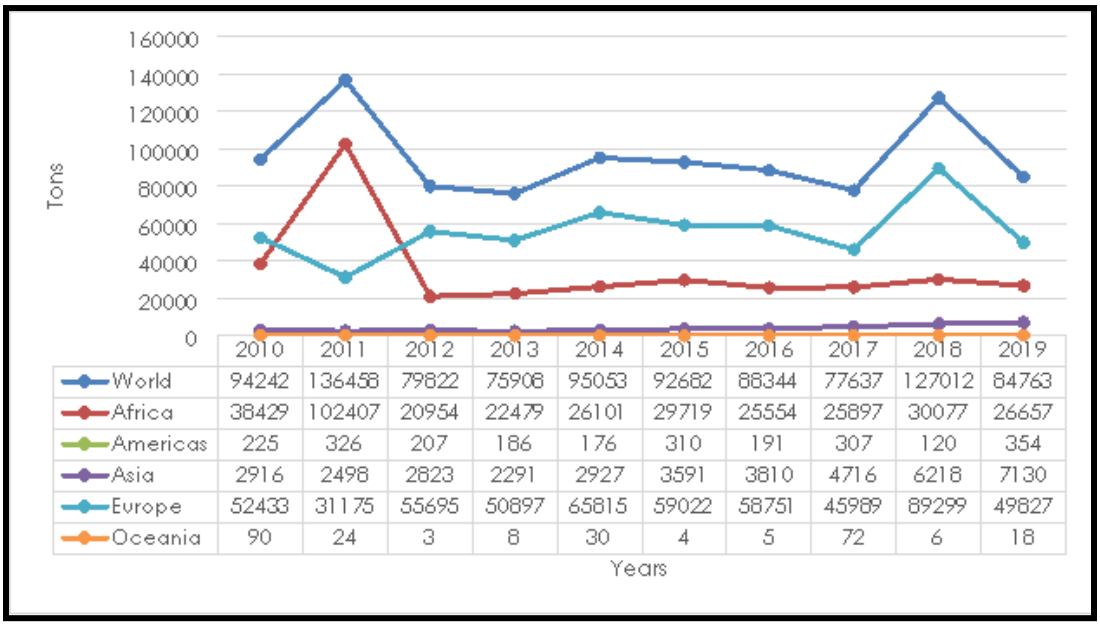
Quantec Easydata (2020)

Africa consumed 10 678 tons of table grapes from South Africa in 2010 and 20 604 tons in 2019. In 2010, America consumed 19 117 tons of fruit, increasing to 25 773 tons in 2019. In 2010, Asia consumed 47 402 tons, followed by 54 050 tons in 2019. In 2010, Europe imported 221 064 tons of fruit from South Africa, increasing to 267 293 tons in 2019. South Africa will prosper. Oceania consumed more fruit from South Africa in 2010 than it did in 2019 at 635 tons from 1614 tons.

2.8.4. SUBTROPICAL FRUIT

The Subtropical fruit industry is a component of the global fruit sector, which is well-known for generating revenue and employment in low-income countries, as well as earning foreign currency. it also contributes to nutrition and dietary requirements for the world's growing population (Sibulali, 2018 and Evans et al., 2017). South African trade history has been shaped by import substitution, the development of strategic industries, and mineral export development (Sibulali, 2018). The WTO encourages south Africa to accelerate its trade policy reforms, while key aspects of liberalisation and tariff reductions were at the forefront of negotiations (Sibulali, 2018 and Lewis, 2001). figure 9 below highlights South African subtropical exports from 2013 to 2019.

Figure 9: Symbolizes South African Subtropical Exporter's Destinations



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
World	94242	136458	79822	75908	95053	92682	88344	77637	127012	84763
Africa	38429	102407	20954	22479	26101	29719	25554	25897	30077	26657
Americas	225	326	207	186	176	310	191	307	120	354
Asia	2916	2498	2823	2291	2927	3591	3810	4716	6218	7130
Europe	52433	31175	55695	50897	65815	59022	58751	45989	89299	49827
Oceania	90	24	3	8	30	4	5	72	6	18

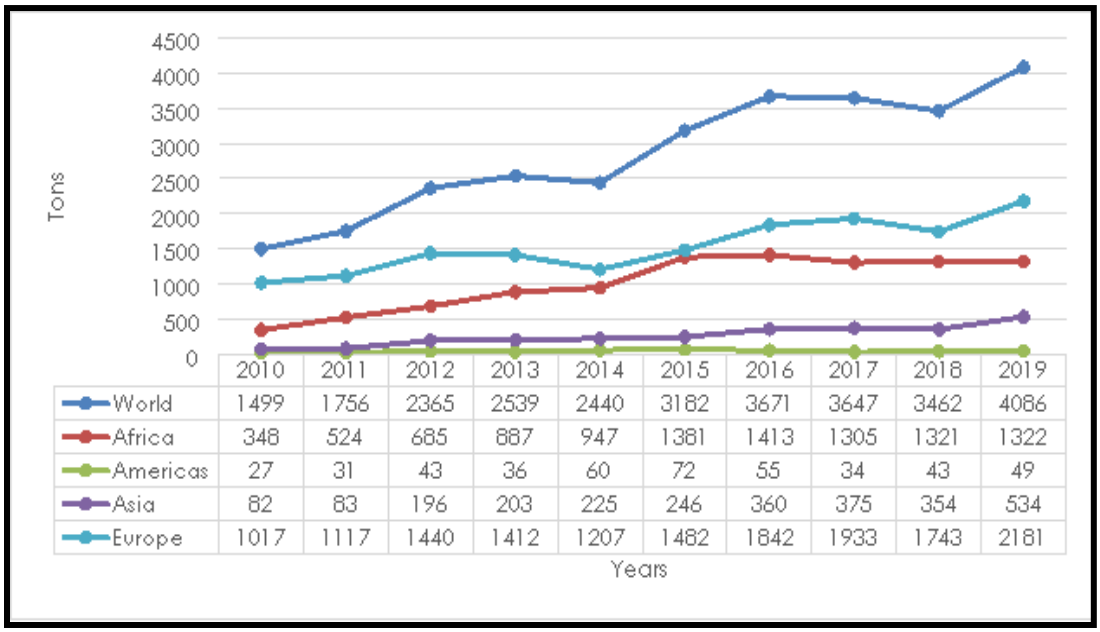
Source: Quantec Easydata (2020)

Africa consumed 38 429 tons of South Africa's Subtropical export fruit in 2010, and 26 657 tons in 2019. America consumed 225 tons of fruit from South Africa in 1999, and 354 tons in 2019. In 2010, Europe imported 52 433 tons of fruit from South Africa and 49 827 tons in 2019. Oceania consumed 90 tons of fruit from South Africa in 2010 and decreased to only 18 tons in 2019.

2.9. EXOTIC FRUIT

This is another fruit cultivar grown in South Africa for the export market. Pomegranate, granadillas, blueberries, raspberries, and blackberries are just a few examples. There is an increasing export value due to the increased demand for exotic fruit varieties, and the best seasons for supply are Christmas, Easter, and Ramadan (CBI, 2020). Europe has seen an increase in the import of exotic fruit with a high-value volume in recent years, leaving more room for exclusive products. The Netherlands, Germany, the United Kingdom, Italy, Spain, and Belgium are the best countries for exotic fruit import niche market at the entry-level. The rest of the world's destinations for the graphical exotic fruit exporter are depicted below in figure 10.

Figure 10: Signifies exotic fruit exporter destinations



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
World	1499	1756	2365	2539	2440	3182	3671	3647	3462	4086
Africa	348	524	685	887	947	1381	1413	1305	1321	1322
Americas	27	31	43	36	60	72	55	34	43	49
Asia	82	83	196	203	225	246	360	375	354	534
Europe	1017	1117	1440	1412	1207	1482	1842	1933	1743	2181

Source: Quantec Easydata (2020)

Africa consumed 348 tons of exotic fruit from South Africa in 2010 and 1 322 tons in 2019, while America consumed 27 tons in 2010 and 49 tons in 2019. Asia consumed 82 tons of fruit from South Africa in 2010, followed by 534 tons in 2019, while Europe consumed 1 017 tons of fruit from South Africa in 2010, followed by 2 181 tons in 2019.

2.10. CONTRIBUTION TO THE ECONOMY OF FRUIT SOUTH AFRICA

Fruit South Africa is labour-intensive, employing an estimated 846 000 people. 40% of agricultural employment, a large workforce in orchards and packing houses (Peter, 2017). Throughout the supply chain, an unspecified number of people are employed in services such as logistics and transportation, port handling and processing, and other functions. Fruit South Africa is a very dynamic sector that employs a majority of unskilled workers and relies on limited resources to supply first-class fruit to the global market. The South African fruit industry is estimated to employ R800 000 capital investment, compared to the national figure of 2 million.

The industry is the economic backbone of rural communities, providing a foundation for significant upstream and downstream jobs and opportunities (Sibulali, 2018 and Peter, 2017). Over a million

households in South Africa rely on the fruit industry for their livelihoods (DAFF, 2019). Economically, the fruit industry contributes 6.8 billion to the local Gross Domestic Product (GDP) and accounts for 27% of total agricultural exports, as stated in Chapter 1. Occasionally, the South African fruit industry invests in skills development and transformation through fruit industry academies, bursaries for prospective undergraduates and postgraduates, and employment equity in skills delivery.

2.11. GLOBAL OVERVIEW OF PRODUCTION OF SOUTH AFRICAN FRUIT

The global trade market as a whole has increased by an average of 40% over the last decade, from 45 million tons to 63 million tons of fruit (Boon, 2019). An Export growth must keep pace with global fruit production growth. Additionally, citrus, deciduous, subtropical, and table grapefruit are grown globally.

Fernandez-Stark, Bamper, and Gereff (2016) postulate that South Africa has diversified its development of locations and its use of value chain technologies to ensure the quality of fruit exported via road, rail, airfreight, and shipping. Production of fruit has become increasingly global. South African producers and exporters are adapting to social, environmental, production quality, plant health, and food safety requirements (Jaffee, 2005). Furthermore, the aspect of economic and technological sustainability is included.

2.12. GLOBAL TRADE PERFORMANCE

South Africa's fruit industry is one of the largest producers of fresh fruit in the world and a significant value contributor to the country's agricultural exports. According to Phaleng (2017), approximately 90% of South Africa's fruit is exported to international markets, with the remainder consumed and processed locally. The citrus fruit industry accounts for a sizable portion of South Africa's exports to the European Union (EU). From 2012 to 2015, South Africa observed an outbreak of Citrus black spot interception in the EU, causing significant concerns for the industry. South Africa is the biggest supplier of Southern Hemisphere for Agricultural Fresh Fruit Exporters

(SHAFFEE) into Asia, exporting 605 388 tons into the top 14 – Asian countries (SHAFFE, 2018). South Africa represents 32% of the total SHAFFE basket. Souuth African Pome Fruit contributed 26% snd Stone fruit 4%. The main market in Asia is Hongkongwith 21%, China 17% and Malaysia 17% (SHAFFE, 2018). Viewing from the point of global fruit import, South Africa represents 8.5%.

2.13. WORLD FRUIT EXPORTS AND IMPORTS

Table 1 bbeow the world's largest fruit exporters between 2007 and 2016 are expresed in million-dollar terms.

Table 1: Leading Exports and Imports of fruit products

EXPORTERS	EXPORT VALUE (IN MILLION US$)	SHARE VALUE (%)	GROWTH RATE (%)	IMPORTS	IMPORT VALUE (IN MILLION US$)	SHARE VALUE (%)	GROWTH RATE (%)		
	2007	2016	2016	2007-2016		2007	2016	2016	2007-2016
WORLD	*61 080*	*107 998*		*76.8*	*WORLD*	*69 227*	*116 291*		*68.0*
USA	7 420	14 062	13.0	89.5	USA	8 240	16 718	14.3	109.9

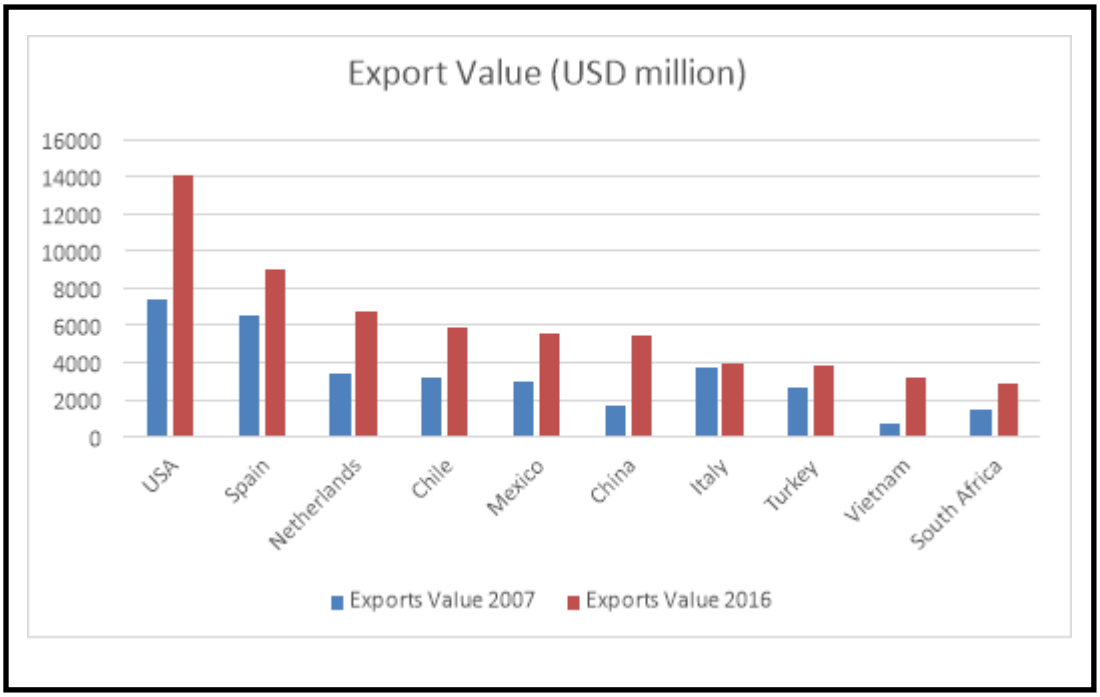
EXPORTERS	EXPORT VALUE (IN MILLION US$)	SHARE VALUE (%)	GROWTH RATE (%)	IMPORTS	IMPORT VALUE (IN MILLION US$)	SHARE VALUE (%)	GROWTH RATE (%)		
	2007	2016	2016	2007-2016		2007	2016	2016	2007-2016
SPAIN	6 519	9 058	8.4	38.9	GERMANY	7 494	10 222	8.8	36.4
NETHERLANDS	3 393	6 719	6.2	98.0	NETHERLANDS	4 066	7 104	6.1	74.7
CHILE	3 225	5 880	5.4	82.3	UK	5 412	6 294	5.4	16.3
MEXICO	2 962	5 541	5.1	168.7	CHINA	915	5 857	5.0	540.1
CHINA	1 632	5 487	5.1	236.1	FRANCE	4 163	5 397	4.6	29.5
ITALY	3 704	3 924	3.6	5.9	CANADA	2 955	4 518	3.9	52.9
TURKEY	2 671	3 874	3.6	45.1	HONG KONG	1 254	4 279	3.7	241.1
VIETNAM	762	3 151	2.9	313.**4**	RUSSIA	3 738	3 831	3.3	2.5
SOUTH AFRICA	**1 480**	**2 888**	**2.7**	**95.1**	BELGIUM	3 675	3 675	3.1	-2.4

Source: Trade Map (2017)

Spain is the world's second-largest exporter of fruit, accounting for 8.4% of total exports, followed by the Netherlands, which accounts for 6.2%of total exports. Chile, Mexico, and China all experienced growth of 82.3, 168.7, and 236.1 percent, respectively.

Fruit imports increased from 69 billion US dollars in 2007 to 116 billion in 2016, a rate of growth of 68.0 percent (Phaleng, 2017). The United States of America is classified as the world's largest importer of fruit, with an estimated value of US$16 million, a market share of 14.7%, and a growth rate of 102.9% in 2016. Germany, the Netherlands, and the United Kingdom followed with a share value of 8.8%, 6.%1, and 5.4%, respectively. No African country, including South Africa, was among the top ten largest importers (Phaleng, 2017).

Figure 11 South African Fruit Export and its destination

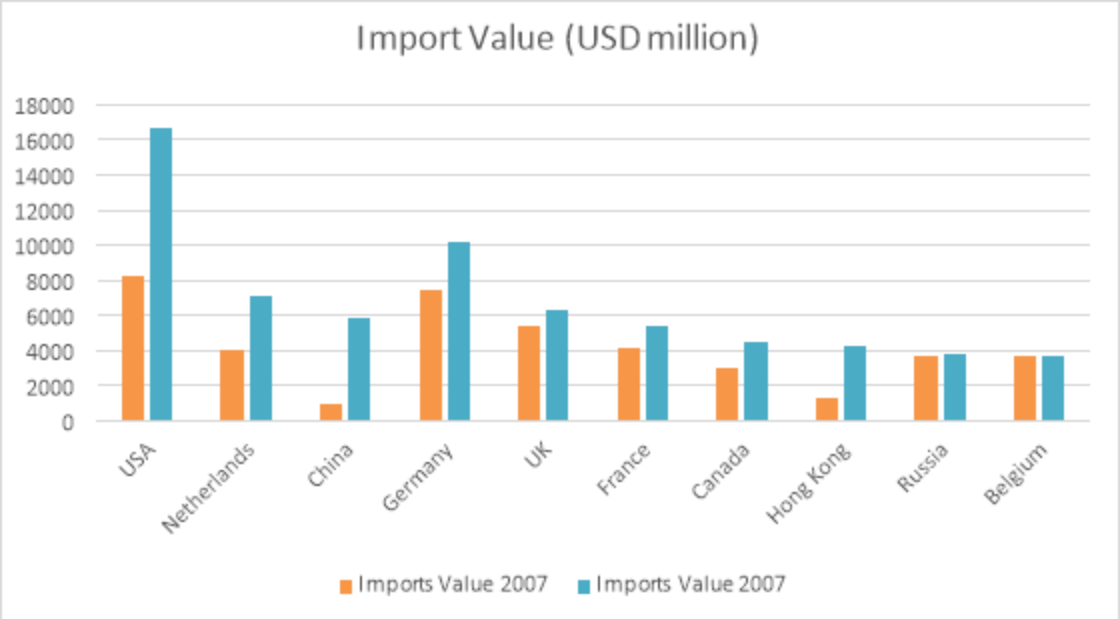


Source: Trade Map (2017)

2.14. FRUIT SOUTH AFRICAN IMPORTS

As shown in Figure 11, Mozambique was South Africa's leading fruit supplier in 2016, accounting for 21.4% of imports. The United States is the second-largest supplier, accounting for 15.2% of the market, followed by Spain (11.6%) and Vietnam (9.4%).

Figure 12: Percentage share value of leading destination of fruit exported by South Africa



Source: Trade Map (2017)

2.15. TARIFFS APPLICABLE TO FRUIT IN SOUTH AFRICA

FPEF (2016) defined tariffs as a tax added to the total amount of goods. South Africa imposed trade barriers on fruit exports in the form of tariffs and non-tariff barriers.

2.15.1. TARIFFS

South Africa signed the Trade Development and Cooperation Agreement (TDCA) in 1998 to improve market access to the European Union (Muchopa, 2019). EU and South Africa have Tariff Rate Quotas (TRQs) covering 11.3% and 36% of their agricultural tariff lines, respectively (WTO, 2015). There are 355 TRQs for exports of off-trade fruit. TRQs were analysed globally concerning 25 agricultural TRQs, indicating a high level of trade protection in the fruit sector (Abbott and Morse 2000, European Commission, 2012, Sandrey and Gill, 2013, DAFF, 2014, Dolwlah, 2015, WTO, 2015 and Muchopa, 2019). Export permits administered by DAFF promote the export of SADC-EU-EPA sensitive agricultural products. TRQs regulate a limited number of tariff lines, including fruit and fruit products. DAFF includes TRQs for wine made from grapes (1 TRQ), flowers (2 TRQs), and fruit/fruit products (6 TRQs). The WTO's market success regulation is the

primary tool used to protect the fruit sector. Cioffi et al. (2011) unearthed that tariffs on specific fruit products are determined by the date of entry (seasonality factor); the degree of processing (escalating phenomenon); moreover, the relationship with exporting countries (preferential agreements, regional and bilateral free trade agreements) (Cioffi et al., 2011).

2.16. IMPORT QUOTAS

3. Import quotas are physical restrictions on the quantities of various products that can be imported from foreign countries over a specified period, typically a year (Todorova and Kalchev, 2015). Additionally, fixed in terms of product quantity or value. DAFF (2016) extolled that in terms of international trade, the government-imposed trade restrictions that limited the quantity or value of goods imported or exported by another country during a given year. In international trade, countries use import quotas to help regulate the volume of trade between themselves and other countries (Muchopa, 2021). For example, the European Union, the United Kingdom, and the United States of America implement import quotas by limiting the number of imports allowed into their countries, such as limiting total fruit imports to 2 million tons per year (Muchopa, 2016). Quotas reduced imports and benefit domestic suppliers; other trade restrictions typically benefited from import quotas that were previously used to benefit domestic producers of goods. Estefania-Flores et. al., (2022) held the fact that economic analysis of import quotas required an aggregated information of fruit industry of the Country mapped restrictions, to the level of which the economic outcomes of interest are measured.

4.

2.17 ENTRY PRICE SYSTEM

The term "Entry Price System" refers to the European Union's tariffs on food imports, more precisely on fruit and vegetables (Götz and Grethe, 2008). Most significantly, the EPS was introduced politically to replace the Reference Price System (RPS) to restrict imports below product-specific prices. The EU must safeguard its own 15 varieties of fresh fruit and vegetable producers, who compete on a global platform. The implementation of an effective EPS serves the overarching purpose, as alluded to by Alvarez Coque and Galdaf (2007), of ensuring that there will be competition in production and marketing campaigns; EPS will serve as the basis for

determining negotiation efforts and the degree to which policy is dependent in any liberalising trade in fresh fruit and vegetables between the EU and the rest of the world. The EU EPS is structured in such a way that a gap between the producer's actual import price and the entry price is then identified. For example, when the EPS is reduced by more than 8%, the maximum specific tariff MST of 80% is charged. Götz and Grethe (2008) confirmed that the EU sought to increase fruit and vegetable exports to the EU by granting preferential market access to preferential trading partners. The EU's preference for preferential EPS is significantly lower than the most favoured MFN EPs. Preferential EPs are frequently capped in quantity at a certain export value or subject to entry price quotas (Götz and Grethe, 2008). Any country adhering to the EPS will face difficulties due to the high proportion of fruit imported into the EU on commission. EPS are highly variable across products and countries. Except for South Africa, EPS are classified as being less important for exports from distant countries. By abolishing EPS, other countries can capitalise on their competitive advantage. When the EPS is significantly higher than the EPS, the other countries will exhaust their preferential EPs for the products.

According to Götz and Grethe (2008), EPS can be eliminated for three reasons: EPS can be devalued annually due to inflation; the EU seeks to eliminate regional trade agreements (RTAs) with numerous countries; and finally, the EU's fruit import regime will be subject to the Dora Rounds agreement on agricultural products. The disadvantage of EPS is that it contradicts WTO rules on agricultural market access, which prohibit non-tariff barriers. Furthermore, EPS can be eroded through bilateral and multilateral trade liberalisation, as well as by providing additional support to liberal and transparent trading countries.

2.17.1 NON–TARIFF BARRIERS

South Africa's fruit industry is actively engaged in trade-related activities aimed at increasing export potential and economic growth through exports. Non-tariff barriers in the fruit export sector are more restrictive than in other sectors. Non – Tariff Measures (NTMs) protection should be lowered in conjunction with tariff reductions for these to be significant gains (Pal, 2008 and Muchopa, 2019). South Africa's fruit industry has been in the spotlight as a developing country arguing for the introduction of TRQs to address the complexities involved with the association of

NTMs. Carrera and De Melo (2019); Sithumparam et al. (2017) and Muchopa (2019) demonstrate in their studies that the nature of NTMs has evolved, with quantitative restrictions and voluntary export restrictions being phased out. Technical regulations have been strengthened, as have sanitary and phytosanitary (SPS) controls. Nicita and Peters (2013), Sithumparam et al. (2017), and Kareem, Martinez, and Brümmer (2018) ascertain that NTMs have demonstrated difficulties in determining whether they are simply protectionist, addressing market failures, or necessary to protect consumer health and quality.

Nicita and Peters (2013) established that NTMs are legitimately identified to protect consumers, domestic markets, and the environment. However, Neeliah and Gohurahum (2013) took a contrary position, arguing that NTMs are prevalent in fruit exports, which are primarily associated with the agricultural sector in developing countries. Moreover, Orifice (2017) expressed concern that as a result of tariff reductions, NTMs will be able to replace tariffs as a trade barrier. The WTO has consistently raised NTMs relating to fruit or fruit products that have been harmed by NTMs. According to the WTO (2012), SPS and Technical Barriers to Trade (TBT) are becoming increasingly used and targeted at food safety. According to the WTO (2012), 94% of concerns were raised regarding agriculture. The trade liberalisation processes that have occurred globally have largely eliminated the need for TRQs as a basis and replaced them with the option of TRQs. Heinig (2018) and Muchopa (2019) observed that as a source of controversy among trading partners, they have introduced a prohibition on non-tariff barriers such as voluntary export restraints and market access. There are specific categories of q similar limitations designed to limit imports and exports under non-tariff measures. These include import quotas and various methods used by administrations such as licensing and auction restrictions or export bans.

2.18 CHALLENGES

The following challenges are prominent in the South African fruit industry's export environment: a lack of relevant and reliable infrastructure in terms of rail, road, ports, pack houses, storage facilities, and port facilities required to support the fruit value chain. The industry has encountered delays in the release of containers by importing countries, which took four days rather than one day. Government policies stifle competition by enforcing self-imposed constraints. The South African fruit industry lacks sufficient scientific justification for numerous non–regulatory private standard requirements. Occasionally, the supplier exceeds the Maximum Regulation Limit (MRL),

which is the maximum level of pesticide residue permitted in or on food or feed when pesticides are applied properly. Fruit South Africa, as a developing country, is subject to phytosanitary measures, which are occasionally used as non-tariff trade barriers. The industry is unaware of the equivalence between multiple audit requirements and supplier certification. The fruit industry must adapt to and comply with a plethora of regulations, imposing a high and ever-increasing cost of compliance. The government has demonstrated limited capacity and capability in terms of enforcing various regulations and monitoring and evaluating effectively throughout the value chain. The industry will require the right people with the right skills, in the right location, and insufficient numbers to ensure the fruit export industry's strategic direction and sustainability.

According to Liphadzi (2017), DAFF is the sole government agency responsible for determining whether agricultural products can be exported and ensuring market access is maintained. Additionally, it establishes minimum quality standards for each fruit variety and establishes benchmarks. PPECB's designation was limited to that of a market-compliant assignee. The PPECB and the DAFF are the two organisations that grant producers and exporters permission to adhere to prescribed standards. Other stakeholders are uncoordinated and uninvolved. Private standards that are more stringent than applicable codex standards erect unjustifiable trade barriers (Liphadzi, 2017). Smallholder farmers, particularly the first participants, face higher compliance costs. Furthermore, it is connected with the auditing of numerous private standards. Numerous standards affect fruit producers' likelihood and ability to comply, resulting in their exclusion from export markets. If private standards are required, they must apply to the entire supply chain, including on-farm and related off-farm packaging.

2.19 SUMMARY

The purpose of this chapter was to provide an overview of South African fruit exports by examining the economy, production, and trade trends. South Africa's fruit export industry is critical for its growth and development potential, as well as job creation and significant foreign currency earnings. South Africa's fruit industry continues to make a sizable contribution to the country's GDP. South Africa's fruit industry has come a long way since the 17th and 18th centuries when sub fruit industries were established. Notably, a variety of trial consignments of fruit trees were imported from England and then experimented with to increase plant population and export

volume. South Africa's citrus, deciduous, table grapes, subtropical, and exotic fruit industries were deregulated in the early 1990s.

The South African fruit industry boomed as a result of tariff and quota challenges brought about by international market exploitation. As a result, the South African fruit industry has survived the fierce competition. The fruit industry increased production steadily as producers became more determined to integrate the domestic and international markets; additionally, trade, product quality, and diversification remained the fruit industry's top priorities. The export performance of the South African fruit industry was evaluated in light of the industry's evolution. The industry's expectations have been unpacked and streamlined to extend and maintain production over the years. The following chapter details the process of conducting a literature review. There is evidence that the European Union dominated fruit production, while China dominated orange and grapefruit production. The European Union continues to be a significant market for South African fruit exports, accounting for more than 10% of the market share for each fruit variety. South Africa is up against some stiff competition. Apples and pears are the most exported fruits. International communities' investments in new varieties, research, and infrastructure have had a sizable effect on the country's economy. South Africa's fruit industry contributes to job creation, food security, and foreign exchange earnings.

CHAPTER 3
THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.1 INTRODUCTION

This chapter summarises the findings of previous studies on the factors that influence fruit export performance. Furthermore, a review of the theoretical framework was conducted by reviewing prior and current empirical studies on fruit export performance. These studies were looking at macroeconomic variables such as exchange rate fluctuations, the comparative advantage of government policies, and the characteristics of domestic markets. The section summarises the global literature briefly before narrowing the focus to South Africa. The section concludes with a discussion of the knowledge gaps that the research is attempting to address.

3.2 THEORETICAL FRAMEWORK OF REAL EXCHANGE RATE AND FRUIT EXPORT

Classical and neo-classical theories will dominate international trade analysis. Adam Smith and David Ricardo are widely regarded as the forefathers of classical economics and international commerce. It is critical to recognise how countries involved in trade can benefit from one another when discussing economies of scale. Gibb (1994) argued that all forms of trade regulation, including tariffs and quotas, should be abolished. Heckscher and Ohlin were two economists who reorganised, deconstructed, and modified Ricardo's classical model. According to King (1997) and Phaleng (2020), models enabled a country's exports to be connected to the rest of the world. Additionally, a continuous analysis takes into account a feasible country's or region's exports.

3.2.1 NEW TRADE THEORY (NTT)

The theory was largely investigated to address relevant research gaps in intra-industry trade and oligopolistic strategic behaviour. Government policies must promote economic competitiveness by simultaneously formulating trade, industrial, and technology policies in developing countries

(Wangwe, 1993). Dixit and Stinglitz (1977) and Lancaster (1971 extended the study of the theory by developing the new trade theory, which examined economies of scale and product differentiation in a general equilibrium setting. Krugman (1979); Lancaster (1980); and Dixit and Norman (1980) all established a connection between industrial organisation and trade theory. The development of trade theories modelled the role of economies of scale by analysing market structures with imperfect competition as the primary source of strategic behaviour and intervention between firms.

The theory postulates processes of restraining the direction of new technologies and rapid change in global market conditions, as well as export orientation and reduced industrialisation. Riddel (1990) observed that performance in Africa is constrained by growth constraints, structural change, and technological dynamic exports. Phaleng (2020) demonstrated that firms that benefit from being a participant become dominant firms, and also increased significant economies of scale by encouraging competition among new and existing firms. South Africa currently trades goods and services across national and international borders. South Africa's exporting and trading practices are unique in comparison to the rest of the world. It continued to adapt to the trade structures of other nations' product portfolios and export and import patterns.

3.2.2 MERCANTILISM THEORY

Mercantilism is an ethnoeconomic theory in which the government attempts to regulate the economy and trade to benefit the domestic industry at the expense of the neighbouring country (Pettinger, 2019). For instance, production from developing countries destined for Europe was to be routed through the United States first and then re-exported to Europe. India was unable to purchase from domestic manufacturers and was forced to import salt from the United Kingdom. By policing the economy and labour markets, the French government promoted stringent regulations. In a mercantilist economy, the state is urged to acquire foreign currency assets to safeguard the exchange rate against undervaluation. The critique of mercantilism's dysfunctional doctrine was abstract and inconsistent. Mercantilism was viewed as ineffective, corrupt, monopolistic, and engaged in a zero-sum game. It slows global growth and intensifies global problems; additionally, it justifies empire building and increases poverty in colonial populations. Finally, mercantilism resulted in "tit for tat" policies characterised by high import tariffs and retaliatory measures (Pettinger, 2019). In pursuing the model in the South African context,

Phaleng (2020) emphasised the importance of accumulating fresh fruit from South Africa through a trade surplus.

3.2.3 CHAMBERLAIN THEORY

It addressed two distinct types of markets by omitting the Chamberlain assumption. To begin, it is directed toward oligopolists who face myopic competition. Markets are not required to be self-sustaining. Nonetheless, it contributes to a greater awareness of mutual reliance. Second, the theory was viewed as a vast collection of industries characterised by close but less ideal substitution. In terms of substitutability, the group must be unambiguous. The theory established the possibility of product differentiation and variety. Helpman (1981) and Lancaster (1980) demonstrated how intra-industry trade occurs as a result of the interaction of demand for product variety and economies of scale. Due to the assumption of each consumer and the primary characteristics of the variety, a broader product offering in response to market diversification became possible.

The fruit industry's marginal revenue (MR) is equal to its marginal cost (MC) in the short-run equilibrium under monopolistic competition. The fruit industry will be able to charge a price based on average revenue (AR) and average cost (AC) multiplied by the quantity (Qs) that results in total profit. An excessive profit margin may protrude through the fruit industry, easily resulting in a loss (Peter, 2017). In the long run, monopolistic competition will prevail, provided that the fruit industry continues to produce at a level of marginal cost equal to marginal revenue. The industry will stop selling goods at a premium to their average cost and will cease to claim an economic profit. The Chamberlain theory is notorious for being unsatisfying after a promising start. Africa, specifically the South African fruit industry, emphasised narrow concerns in an unremarkable manner, as Bellante (2004) alluded. The Chamberlain theory provided a methodological framework for analysing commercial industries. It is regarded as incompetent when it comes to contributing to certain analyses of significant issues. The neoclassical economics doctrine scorned Africa's economic rise.

3.2.4 PATTERN OF DEMAND

Staffan Linder (1961) developed a pattern of demand structure in international trade. According to this theory, manufactured goods must first be in high demand within a country's borders before they can be distributed and exported internationally. The theory motivates countries to develop their products, strengthen their brand, and sell exclusively within their borders. According to Linder (1961), the theory stated that a country with an identical level of income, a similar demand structure, and a propensity for trade with other countries should have an identical level of income. Linder (1961) established the following assumptions: Confining the potential trade of the country and its goods from domestic demand.

- Two countries engaged in trade with the demand that exists within the domestic market.
- The domestic demand for goods is determined by the level of per head income.
- Similar levels of income influence the potential trade between countries.

The theory's critics failed to address the following issues concurrently: product quality; concept of quality; measurement of quality; the correlation between per capita income and product quality; condition of demand overlap affecting the volume of trade; and empirical evidence from Sweden, but not from other countries (Aahana, undated). The theory's conclusive remarks were extremely unconvincing.

3.2.5 COURNOT APPROACH

Cournot (1838) was a mathematician who studied industry structures in which few firms compete for the same amount of product, an economic model based on the assumption that rival industries produce identical standardised goods without forming a cartel. The industry exercises control over the level of production, which is influenced by market prices. The model was adopted, expanded, and popularised by the Edgeworth (1897) duopoly and Walras, and has remained the de facto standard for oligopolistic competition ever since. The model had a significant advantage in that it produced low output at a high price and high output at a low price while maintaining a stable equilibrium.

The Cournot approach relies on economies of scale to explain the growth of oligopoly, with imperfect competition as the main actor. Krugman (1984) argued that trade increased competition

and inter-market penetration because oligopolists perceived a higher demand elasticity for exports than for domestic sales. Firms and industries improve their technological innovations in this dynamic process to upgrade the technological equilibrium. Cournot holds the belief that duopolies from cartels can compete for market and high prices. In comparison, game theory challenged the notion that cartel arrangements can never be in equilibrium. Industries will always deviate from agreed-upon output levels. Bertrand (1883) shifted the Cournot model's strategy variables from quantity to price. It was paradoxical, as several economists contended that the oligopolistic model's primary variable is the suitability of price and quantity. In a duopoly scenario, products are homogeneous and lack differentiation. Neoclassical and classical economists have a difficult time identifying a degree of homogeneity in the products offered by different suppliers.

3.2.6 PRODUCT LIFE CYCLE

Heckscher–Ohlin received widespread criticism from economic theorists for failing to account for the patterns of international trade. Raymond Vernon (1966) pioneered the Product Life Cycle Theory. The theory was developed to highlight the product life cycle of labour activities in the area of invention. For instance, if the USA produces a customised computer, the product becomes an item imported by the country from which it originated. Products enter the market and then gradually vanish. Each product has a distinct life cycle that begins with its development and concludes with its decline. Rogers (1976) developed the diffusion of innovation model to address the fact that the duration of a stage varies across products, similar to the Product Life Cycle. The diffusion of innovation model streamlined the duration of stages, which varied according to the product. Marketing strategies are developed in response to market demand and how marketing instruments are used. Furthermore, observations are made regarding the life cycle of product trends. The Production Life Cycle diagram illustrates four stages of production: initial stage, maturity stage, growth stage, and standardization stage. The production Life Cycle is divided into four stages. Initially, developed countries produced fruit products and consumed them exclusively within their borders. Then, during the maturity stage, a large number of production techniques were produced, and foreign demand from developing countries occurred. Finally, products were distributed to neighbouring Developing Countries during the Standardisation stage.

3.2.7 GLOBAL STRATEGIC RIVALRY

Notably, Krugman and Lancaster (1980) developed the theory of global strategy rivalry to advocate for the firm's long-term viability and competitive edge. South Africa's fruit export industry has demonstrated trends in international trade. Recent fruit export performance has necessitated efforts per other agreements. Fruit export firms have historically performed inconsistently in terms of trade integration with the European Union and the global market. The EU has liberalised bilateral trade relations with Africa despite barely enjoying a preferential treatment in their global relations. Chile viewed South African exports as an asymmetric adversary capable of undermining its grand strategic objectives. South Africa is China's largest export destination, followed by Nigeria, which receives a sizable USD 5.8 billion in outbound FDI (CEIC, 2021). South Africa's relationship with China is centred on industrialisation, job creation, and technology transfer. China, dubbed the world's factory, accumulated experience and know-how through its support of competitive manufacturing firms. Chai (2002) and Zhu (2011) caution that China's reforms began in 1978 and progressed from a planned economy to liberalisation. Africa, including South Africa, has learned that China's exports benefited enormously from efficient labour, scale economies, and integration into the global economy (Adams et al., 2004; Petri, 2013; Roy Coudhury, 2010 and Kyota, 2016).

The General Administration of Customs in China has emphasised South Africa's trade surplus. In comparison, Switzerland recorded statistical reclassification reflecting an increase in exports, whereas South Africa did not. South Africa's export basket is disproportionately composed of commodities (Bell et al., 2018). South Africa competes in the emerging market with Brazil, Malaysia, Thailand, and Vietnam, all of which have sales in China. South Africa, in particular, is China's largest supplier of goods. South African Exports to China account for 2.4% of total exports. Jappelli and Pistaferri (2010) argued that growing income disparities are influencing consumer tastes and preferences. South Africa must leverage its resources by exploring opportunities for collaboration with China in Africa. Most significantly, the African Continental Free Trade Area (ACFTA) is well-positioned to act as a catalyst for China–Africa relations. It serves as a magnet for manufacturing businesses and migration from China (CEIC, 2021). Notably, Pardesi (2021) added that China perceived India as the Imperial rival without material power asymmetry, despite India's dominance of South Asia. The implications of their rivalry include the following:

new uncertainty will be created for intersection and relations with the US, Japan, and Pakistan, as well as India's path to socio-political and economic modernisation.

3.3 PORTER'S COMPETITIVE ADVANTAGE

The South African fruit industry is competitive, with many exporting firms offering comparable products and services. Baburaj and Narayanan (2016) view the structural industry as a means of profit generation and positioning a firm favourably. Bain (1968) and Mason (1939) developed the paradigm to clarify industry-level, competition-reducing mechanisms that are not directly relevant to business policy practitioners. In the case of South Africa, the paradigm evaluated the fruit export industry's attractiveness further. Andrew (1971) identified gaps in the Bain and Mason paradigm, emphasising that the industry relationships between environmental conditions, firm strength, weakness, and societal expectations did not address day–to–day issues. Porter introduces the five forces of analysis as a backdrop to the development.

The five force framework evolved from strategic formulations based on the Bain–Manson paradigm. Porter (1980) developed a five-force framework for the fruit industry's competitiveness. The five forces framework depicts the industry's structure in terms of threat from new entrants; buyer bargaining power; pressure from substitute products; and competitive intensity. Porter (1981) emphasised the market structure's focus on the firm as a unit of analysis.

3.3.1 RIVALRY AMONG EXISTING COMPETITORS

According to Dagmar (2001), rivalry typically occurs when competitors perceive pressure or seek an opportunity to improve market segmentation. The rivalry between established competitors results in price reductions, the introduction of new products, advertising campaigns, and service enhancements, ultimately causing the industry to suffer (Porter, 1985). The intensity of rivalry varies by industry and may be influenced by a variety of factors. Price competition is a common factor that contributes to the destabilisation of profitability levels in the fruit export industry. As a result of the price distortion, the fruit export industry's profit margins are reduced. In this context, the rivalry is determined by the degree of competition, the growth rate of the fruit export industry, the availability of storage; fixed costs; the number of organisations competing against one

another; differentiation, exit barriers, and switching costs between competitors (Hill and Jones, 2007).

3.3.2 THREAT OF NEW ENTRANTS

New entrants are posing as competitors or threats amongst existing produceres by establishing the competiton in the industry. Therefore, competition affected as new entrants added new production capacity. The new entrants applies resource and production based view models to intimidate the existing competitors and affecting their market share. The existing competitors are forced to invest on new products. The environment of existing competitors was affected as the business operation became difficult forcing the existing competitors to raised barrier to entry. These barriers are implemented to discouraged new entrants. Porter (1985) noted that newcomers add capacity to the fruit export industry. The large firm industry increased the pressure on prices, costs, and investment rates. In addition, Johnson et. al., (2008) accentuated that the threat posed by new entry small firms largely determined by a high entry barrier and organisation. According to the fundamental exercise for organisations, barriers to entry exhibited a higher level of retaliation as measured by competitors. Porter (1985) maintained that the significance of new entrants in overcoming entry barriers had not been negated. Porter (1980) outlined the seven critical points as follows: capital requirements, demand-side benefits of scale; supply-side of economies of scale; customer switching costs; Restrictive government policy; Unequal access to distribution channels and Incumbency advantages independent policy. Developed markets generated profit through new entrants. EU and Asian countries blocked entry, ostensibly to reduce profitability for a large number of new entrants. Additionally, the potential entrants posed a threat to existing competitors' market share. Porter (1985) noted that newcomers add capacity to the fruit export industry. Worse yet, the large firm industry will increase the pressure on prices, costs, and investment rates. Johnson et. al., (2008), in particular, are adamant that the threat posed by new entry small firms will be largely determined by a high entry barrier and organisation. According to the fundamental exercise for organisations, barriers to entry exhibited a higher level of retaliation as measured by competitors. Porter (1985) maintained that the significance of new entrants in overcoming entry barriers had not been negated. Porter (1980) outlined the seven critical points as follows:

- Capital requirements

- Demand-side benefits of scale
- Supply-side of economies of scale
- Customer switching costs
- Restrictive government policy
- Unequal access to distribution channels
- Incumbency advantages independent policy.

3.3.3 BARGAINING POWER OF SUPPLIER

South African fruit exporters supply products and services to monopolistic international markets. The European Union and Asia are significant buyers with the bargaining to switch suppliers. Porter (1980) postulates that other factors affecting relative buyer concentrations include competitiveness, mutual dependence, and monopoly suppliers. Buyers eventually compete with the fruit industry, driving prices down. While sellers accepted a power imbalance and profits reduced to the point of accepting a rate of return close to the cost of capital (Bruijl, 2018). When buyers become powerful, sellers devise a novel method of enforcing a high payment premium on certain products and services. Buyers are aware when a buyer vacuum has been created. Sellers will seek to increase the price of their products and services. Porter (2008) argued that in industries with high fixed costs, a large volume of buyers tends to be powerful. When buyer segments are concentrated, a group of industry products tends to be powerful; purchasing a greater share of the industry's total output poses credible threats to backwards integration. Through the fog of observation, buyers in the focal industry influenced relationships by demanding higher quality prices, switching to substitutes, and product completion (Baburaj and Narayanan, 2016).

3.3.4 BARGAINING POWER OF BUYERS

When suppliers in the fruit export industry reduce profitability by increasing the prices of their products and services, the organisation faces threats. As a result of this, the organisation's prices

increase in an attempt to recover. Porter (1979) predicts that the fruit industry will be dominated by a few organisations, or that the industry will become a less valuable customer of the supplier group. The number of suppliers, their size, and the availability of substitute customers will all affect suppliers' bargaining power (Slater and Olson, 2002).

3.3.5 THREAT OF SUBSTITUTE PRODUCTS AND SERVICES

Costs associated with switching between substitute products and services are a factor in determining the threat of substitutes (Klemperer, 1995 and Hubbard and Beamish, 2011). The South African fruit industry faces a low level of threat from substitutes in terms of profitability, whereas buyers or importers of substitutes face a high level of threat. When demand's cross-price elasticity is low and switching costs are high, substitute products and services are scarce. At the moment, the fruit export industry faces competition from foreign industries that produce substitute products and services. Riley (2012) proposes that substituting reduces the potential returns of an industry's ceiling price, the profitability charge that the fruit export industry can levy, and identifies substitute products and other services. In the fruit export industry, examples of substitute products and services include wireless savings; credit; digital technology; wireless telecommunications; and teleconferencing. Additionally, Bruijl (2018) demonstrated that this substitute product and service with a low-interest rate and loan is a viable alternative to travel.

3.3.6 GENERIC STRATEGIES

Porter (1980) identified competitive, corporate, and generic strategies that can be applied and adapted by the fruit export industry for effective industry analysis. The table 2 below summarises three broad business-level strategies for increasing fruit industry competitiveness. These strategies include cost leadership, differentiation, and focus. Broad industries employ cost leadership and differentiation strategies, whereas focus industries employ a low-cost focus strategy and niche differentiation strategy (Indiatsy, 2014).

Table 2: Generic Strategies

INDUSTRY FORCE	GENERIC STRATEGIES		
	COST OF LEADERSHIP	DIFFERENTIATION	FOCUS
ENTRY BARRIER	THE ABILITY TO CUT PRICES IN RETALIATION DETERS POTENTIAL ENTRANTS	CUSTOMER LOYALTY DISCOURAGES POTENTIAL ENTRANTS	FOCUSING DEVELOPS CORE COMPETENCIES THAT CAN ACT AS AN ENTRY BARRIER
BUYER POWER	ABILITY TO OFFER LOWER PRICES TO POWERFUL BUYERS	LARGER BUYERS HAVE LESS POWER TO NEGOTIATE BECAUSE OF FEW CLOSE ALTERNATIVES TO CUSTOMERS	LARGER BUYERS HAVE LESS POWER TO NEGOTIATE BECAUSE OF FEW ALTERNATIVES
SUPPLIER POWER	BETTER INSULATED FROM POWERFUL SUPPLIERS	BETTER ABLE TO PASS ON THE SUPPLIER PRICE INCREASES TO THE CUSTOMER	THE SUPPLIER HAS POWER BECAUSE OF LOW VOLUME, BUT A DIFFERENTIATION-FOCUSED FIRM IS BETTER ABLE TO PASS ON THE SUPPLIER PRICE INCREASE
THREAT OF SUBSTITUTES	CAN USE THE LOW PRICE TO DEFEND AGAINST SUBSTITUTES	CUSTOMERS BECOME ATTACHED TO DIFFERENTIATION ATTRIBUTES REDUCING THREAT SUBSTITUTES	SPECIALISED PRODUCTS' CORE COMPETITIVENESS PROTECTS AGAINST SUBSTITUTES
RIVALRY	BETTER ABLE TO COMPETE ON PRICE	BRAND LOYALTY TO KEEP THE CUSTOMER FROM RIVALS	RIVALRY CANNOT MEET DIFFERENTIATION FOCUS AND CUSTOMER NEED

Source: Porter (2003)

Looking ahead, the fruit export industry's cost leadership strategy will see it charge the lowest possible price for its products and services. Other factors that contribute to the industry's growth; are preferential access to raw materials; economies of scale; and proprietary technology, among others (Porter, 2003 and Indiatsy, 2014). The fruit export industry's cost advantage will have to be maximised by repositioning itself above average as a price maker. When an industry embarks on a differentiation strategy, it must first demonstrate its uniqueness in terms of product and service offerings in an extremely commercialised business environment valued by clients. The fruit industry must be able to plan for both superficial and significant characteristics of its customers or buyers. In the case where the fruit export industry chose to pursue a focus strategy,

it did so by squeezing its competitive potential. The fruit export industry will then tailor its focus strategy to prioritise a specific group of segments, thereby excluding competing industries.

Thompson and Strickland (1990) stated that a focus strategy can be either target or differentiation in its target segments, with differentiation being the focus strategy. Additionally, the focus strategy will be defined by the buyer or unusual need segments. According to the assumption of a product delivery system, target segments serve the target segment best, and the target segment best serves the other targets (Indiatsy, 2014). While cost forces capitalise on differences in cost behaviour within a segment, differentiation focuses on the unique needs of buyers within that segment. Numerous academics have criticised Porter's five forces analysis for empirically underpinning and cherry-picking certain case studies. Moreover, the assumption was based on a failed original credible source derived from microeconomics theories, and porter's firm-level analysis was misunderstood.

3.4 RICARDIAN THEORY

Adam Smith published his famous book *"The wealth of nations"* in 1776 indicating the theory of absolute advantage. A country will specialise in particular production and the division of labour based on absolute advantage (Kulic, 2002). David Ricardo advanced the theory of comparative advantage by writing a book titled *Political Economy* in 1819. The theory of absolute advantage (AA) was predicated on the existence of two countries, two commodities, and a single factor of production. Internationally fixed labour will be fully employed, ensuring that product and factor prices are perfectly competitive (Rwenyagila, 2013).

Adam Smith argued against a country possessing an absolute advantage in producing a specific well in Table 3 below. Any country would conduct commerce with a product over which it has an absolute advantage. Country A has an absolute advantage in laptop production, with each laptop requiring three hours of labour. Country B will eventually have an absolute advantage in the production of wine. This is because Country B produces one ton of wine in five hours. Meanwhile, A, one ton of wine will take seven hours to produce.

Table 3: The theory of Absolute Advantage

COUNTRY	LAPTOP	JUICE
A	2	10
B	8	4

Source: Kulic (2002

The classical economists established the following assumptions, which are supported by the following conditions: factors of production cannot move between countries; there is no barrier to goods trade; exports and imports are equal; labour is the sole significant factor of production, and the applicable technological relationship between inputs and outputs is defined by consistent returns. Kulic, (2002) expanded on Adam Smith's theory by stating that the output of W is reduced by one unit in Country A and the output of L is reduced by one unit in Country B. When A specialises in L and B specializes in W, both countries benefit per unit from specialisation.

Table 4 Labour theory of value

	IN PRODUCTION OF L	**IN PRODUCTION J**
In A	+ 4	-1
In B	-1	+2.5
In World	+3	1.5

Pre-trade prices of goods are determined by their labour content; under perfect competition, the good is expressed in Autarky by expressing the cost of labour inputs used in production as:

$$P_L = W_A * L_L,\ A = W_A{}^{*2}$$

$$P_W = W_A * L_J,\ A = W_A{}^{*8}$$

Therefore, relative price ratio will be

$$(\underline{P_L})_A = \underline{W_A * 6} = 2/8 = 1/4$$

$$P_W \qquad W_A * 12$$

Similarly,

$$(\underline{P_L})_A = \underline{W_B * 10} = 10/4 = 1/4 = 2.5$$

$$P_J \qquad W_B * 4$$

Relative prices in autarky imply that L costs ¼ units of J in A in value and 2.5 units of J in B.

If country B buys some laptops, the demand for country A's laptop rises, and country A's autarky price of L is four times that of country B. Meanwhile, B's price is only ½.5 = 2.5. In the case of trade, consumers in country A will prefer to buy J from producers in country B because they are cheaper. Domestic demand for L in country A will fall, resulting in layoffs in the L industry in country A. As labour can freely move between industries in each country, they will find work in the J industry, increasing L production in country A. Similar to the process that occurs in country B, where rising demand for J causes the juice industry to expand while the electronic industry contracts, In equilibrium, country a will specialise in the production of L, while country B will specialise in the production of J.

3.5 COMPARATIVE ADVANTAGE (CA)

The theorem is the classical theory of trade proposed by Ricardo1821 in which a country produces and exports goods and enjoys a comparative advantage or lower opportunity cost. Ricardo's theory is an extension of Adam Smith's (1776) Theory of Absolute Advantage, which states that a country should produce and export goods in which it has an absolute advantage. Ricardo's unwavering model disregarded transportation costs and any other impediments to trade. According to Adam Smith's theory, countries will benefit from specialising in the goods at which they have an Absolute Advantage (Pettinger, 2019). Additionally, Ricardo emphasised that variations in climate and environment result in fluctuation in competitive advantages, resulting in trade.

The classical theory reaffirms that countries will tend to export commodities in which they have a comparative advantage and import commodities in which they have a comparative disadvantage. In pre-trade isolation, the classical theory states that a country will export the commodity with the lowest comparative cost and import products with a higher comparative advantage (Peter, 2017). When a country can be productive and reposition itself against international trade competition, free trade is critical.

According to David Ricardo's theory, country A has CA if its goods have a lower relative price in autarky than in country B. David Ricardo debated autarky, which is the study of trade patterns between countries by comparing trade situations and computing trade gains and losses. As shown in Table 4, country A is 2(12/6) times more efficient at producing J than country B, while country B is 9 times more efficient at producing l. Country A has an AA in comparison to Country L. If trade occurs in country A, production will increase.

Table 5: The theory of comparative Advantage

COUNTRY	JUICES	LAPTOPS
A	6	12
B	2	18

As per comparative advantage theory, B must increase its production of J because it is relatively cheaper to produce. The study will track the relative prices of laptops in autarky in A and B as follows:

$$\left(\frac{P_L}{P_J}\right)_A = \frac{W_A * 2}{W_A * 6} = 1/3 = 0.33$$

Similarly the relative price of L in B is:

$$\left(\frac{P_L}{P_J}\right)_B = \frac{W_B * 18}{W_B * 12} = 3/2 = 1.5$$

In autarky, L is more affordable in counties A and B, while J is more affordable in A than in B. While the opportunity cost of L is lower in A than in B, producers in A are relatively more efficient in L than in J. Once trade between the two countries is permitted, A should concentrate on L and B on J.

In terms of global output, the cost of production of L and J indicates that A produces one less unit of J and B produces one less unit of L. The following table contains the results:

Table 6: Labour theory of value

	IN PRODUCTION J	IN PRODUCTION B
IN A	-1	+3
IN B	+ 1.5	-1
IN WORLD	+0.5	+2

Source: Kulic (2002)

With free trade, demand for L will increase in A and fall in B, resulting in an increase in the relative price of L in B. J's relative price (PJ/PL) will decrease in A and increase in B. The process is repeated until a new equilibrium is reached in which no goods are in demand or supply. This new equilibrium is one of international trade. International trade liberalisation forces each country to completely specialise in the production of its comparative advantage goods. As the production of lower-priced autarky goods expands, the trade will be governed by the law of comparative advantage. The literature demonstrates that when foreign competition is based on low wages, the local economy suffers. Since the home country employs more labour to produce exports than the foreign country does, domestic labourers are demoralised. Local labourers toil and receive negligible compensation (Kulic, 2002). Under the Ricardian model, both countries benefit from trade, even though country B is less productive in absolute terms than country A. Wages are low as a result of low labour productivity. Wages for country B's workers will be lower due to the country's workers' low productivity. Country A is well-known for its J and B for L production. Each unit of Juices is manufactured and sold in international markets, whereas B receives a greater number of units of J than autarky.

3.6 HECKSCHER–OHLIN THEORIES OF TRADE (HOS MODEL)

Two Swedish economists developed the Heckscher–Ohlin model. Berlin Ohlin (1919) and Eli Heckscher (1919) (1924). According to the Heckscher-Ohlin model, both countries have the same technological endowments (Giri, 2018). Trade results in income distribution between labour and capital. Then, comparative advantage is determined by the disparity in endowments. Trade results in income distribution between labour (L) and capital (K). From Ricardo's model of two goods and

one factor of production, the Heckscher-Ohlin model added capital as a factor of production. According to the HOS model's assumptions, a country will have a comparative advantage in the good whose production makes extensive use of its abundant factor. South Africa has a comparative advantage in terms of labour-intensive products, whereas the UK has a comparative advantage in terms of capital-intensive products. This means that Capital and Labour have been elevated to the status of factors of production. According to Krugman and Obstfeld (1994), the same factors of production will be used to produce goods. In contrast to Ricardo's model, the Heckscher-Ohlin model viewed technological differences between countries as a source of comparative advantage.

3.7 COMPETITIVE ADVANTAGE

The OECD (2010) defined competitiveness in two ways: as the ability to compete and succeed in competition; and as the ability to sell products that meet demand requirements while also generating profits over time to enable the firm/industry to thrive. Two factors are critical in this regard: industry competition and human capital development. Outside of the auxiliary industry, competitive advantage occurred as a result of economies of scale.

3.7.1 ELIMINATION OF MONOPOLIES THROUGH TRADE

When monopolies are not subjected to competition, they charge higher prices and produce in greater quantities, whereas international trade has destroyed monopolies (Peter, 2017). When Marginal Revenue (MR) equals Marginal Cost (MC), production occurs. The difference between the MC and the product price is called the monopoly charge. Profit is calculated by multiplying each item by the quantity produced in the area marked "a". South Africa, as a monopolist, will seek to penetrate the Dutch market in an open free trade environment. In this context, the Netherlands will need to enter the South African market. The market will transition from monopoly to duopoly during the trade. As the prices rise, a new firm will be established on the domestic market. Prices will fall as the duopoly is established. Transport costs will affect the marginal cost of producing for the foreign market once. MC exporters will outnumber MC. Both countries see a decrease in the price of the product and both export to the other. In trading, comparable quantities

become zero. Trade liberalisation has resulted in significant benefits for both countries, as monopolies have been destroyed.

3.7.2 BALANCE OF PAYMENT: CURRENT ACCOUNT (CA)

Current Account Balance of Payments refers to the relationship between the total demand for and supply of South African fruit exports in this context (Peter, 2017). When the exchange rate affects financial flows, it complicates the supply chain for fruit exports. Interactions between equilibrium exchange rates result in an excess demand for foreign currency for trade in goods and services. A financial account is formed by the current account and foreign exchange surpluses. This demonstrates that the CA is in a balanced state of equilibrium. On the other hand, when the supply of foreign financial transactions exceeds the demand for foreign currency, a current account deficit occurs. According to Peter (2017), the deficit in the CA offset is equivalent to a surplus in the financial account at the market-clearing exchange rate. Any current account surplus will eventually be offset by a corresponding financial account deficit at the equilibrium exchange rate.

3.7.3 BALANCE OF PAYMENT MODEL

Thirlwall (1979) developed the Balance of Payments Constrained Growth (BPCG) model to examine the constraint imposed by the requirement to generate foreign currency. The model provides an economic explanation for the demand side structural parameters that constrain growth due to the Balance of Payments. The original model assumed that foreign exchange movements occurred as a result of trade in goods and services and maintained that the foreign exchange rate must be at its equilibrium level (Salvatore, 1996). A nation's trade will result in a decrease in its foreign reserves, which will eventually result in a decrease in the value of its currency. A more affordable currency makes exports more affordable on the global market while increasing the cost of imports. This results in a decline in imports as the currency returns to equilibrium.

Appleyard and Field (2001) cited by Thirlwall equation for BOP equilibrium is as follows:

$PX + EF^* = P^* EM$ **(2.1)**

Where P and P* are the domestic and foreign price levels, respectively; X is demand for exports, M is for Imports, E is the nominal exchange rate, and F* is the value of net capital inflows measured in foreign currency.

3.7.4 MARSHALL–LEARNER CONDITION (ML)

This model was developed on the assumption that a devaluation or depreciation of the exchange rate will increase trade when the absolute sum of the long-run export and import demand elasticity is greater than unity (Ogbonna, 2018). Marshall–Lerner was named in the nineteenth century after Alfred Marshall and Abba Lerner (Begg et. al., 1991; Peter 2017). Marshall–Lerner defined the real exchange rate as the product of the nominal exchange rate and the ratio of prices in two countries. Furthermore, streamlined the definition as follows::

$$Q = S. P_f / P_d \qquad (2.2)$$

Where Q denotes the real exchange rates, S denotes the foreign country's real exchange rates, and Pf and Pd denote the foreign and domestic country's price levels, respectively. The real exchange rate is calculated by dividing the domestic price by the foreign price and multiplying it by the nominal exchange rate. As Peter (2017) demonstrates, the exchange rate is the price of foreign goods in comparison to domestic goods. In due course, when the nominal exchange rate increases, the real exchange rate increases first, followed by the foreign country's price level increases, and finally the domestic country's price level decreases. Mishkin (2004) suggested that whenever there is a change in the price of foreign goods, they become more expensive. In both countries, an increase in the real exchange rate is expected to result in a shift away from foreign goods and toward domestic goods.

3.7.5 STOLPER–SAMUELSON THEOREM (SS)

In 1941, the Heckscher–Ohlin model was used to develop the theorem (Stolper and Samuelson, 1941). The model was developed to explain the relationship between relative output prices and

relative factor rewards such as real wages and real returns on capital. The model assumes that an increase in the relative price of a good will increase the real returns to that factor. The model was primarily applied to the production of goods, but it was also applied to a decline in the real returns to the other factor. Jones and Scheinkman (1977) demonstrated that, as predicted by the theorem, factor returns vary with output prices. According to Peter (2004), the theorem governing the change in real returns associated with increased international trade is that returns to scarce factors will decrease. #The Stolper–Samuelson theorem is related to the factor price equalisation theorem; both are concerned with the fact that factor prices tend to equalise across countries with comparable technology. The Stolper–Samuelson theorem considered two–beneficial economies that produce fruit and juice. Land and labour are production factors; fruit is a land-intensive industry, whereas juice is a labour-intensive industry. The equation assuming the price of each product equals its marginal cost is derived as follows:

The price of Juice should be P (J) = ar + bw (2.3)

With P(J) denoting the price of Juice, r denoting the rent paid to landowners, w denoting wage levels, and a and b denoting the amount of land and labour used, respectively, and assuming that the prices of goods remain constant.

Similarly, the price of fruit would be: P (F) fr + dw (2.4)

With P (F) indicating the price of fruit, r and w indicating rent and wages, and c and d denoting the amount of land and labour used, respectively, and also assumed to be constant.

If the price of Juice increases, at least one factor must increase in price for equation 1 to hold. However, the relative amounts of labour and land are unaffected by changing prices. You can be certain that it would be labour – the factor that was heavily utilised in the juice production process – that would increase. Rent must fall when wages increase for equation 2 to be valid. Rent decreases will also affect equation 1. It is still valid; the increase in wages must be greater than the increase in juice prices. A price increase will then more proportionately increase the return on the most intensively used factor and decrease the return on the least intensively used factor. Critically, Davis and Mishra (2000) declared the Stolper–Samuelson theorem obsolete because it was developed from the Heckscher–Ohlin model. Leontief paradox cast doubt on the validity

and reliability of the Heckscher–Ohlin model. Feenstra (2004) demonstrated that the Heckscher–Ohlin model is hopelessly inadequate for explaining historical and contemporary trade patterns.

The Stolper–Samuelson model harmed trade liberalisation in developing countries by increasing wage disparities. In contrast to what the SS theorem predicted, wage inequality should have decreased on a continent like Africa, where labour is still plentiful. Lopez - Calva and Lusting and Juarez (2013) suggested that when wage inequality declined in Latin America, trade liberations followed in the long run. Alternatively, the Stolper-Samuelson theorem was viewed as predicting the relationship between output prices and relevant wages. Beyer et al. (1999) Chile, Robertson (2004) Mexico, and Gonzaga et. al., (2006) Brazil studied a comparison of output prices, with changes in relative prices, and found moderate to strong support for the Stolper–Samuelson theorem.

3.7.6 ELASTICITY APPROACH

The Elasticity Approach is used to determine the exchange rate's effect on BOP equilibrium (Salvatore, 2007). The Elasticity Approach is used to determine how exports and imports respond to price changes caused by exchange rate movements. The reaction is simply a function of the elasticity of supply and demand. McAfee (2006) defined Elasticity as the ratio of a percentage change in the quantity demanded to a percentage change in the price. Elasticity analysis concentrated on the relationship between real exchange rates and the movement of goods and services as measured by the CA balance (Nattrass, Wakeford and Muradzikwa 2002). The approach is predominately motivated by the Bicker–Rodinson–Mertzer (BRM) and Marshall–Lerner (ML) conditions (McAfee, 2006). Willcox and Edwards (2002) defined BRM as a collection of essential conditions based on import and export supply and demand elasticity that affect a country's trade balance.

Following Willcox and Edwards (2002), Peter (2017) stated that the BRM condition reflected the exchange rate devaluation effect of relative export and import prices, thereby reducing export growth. The effect of the real exchange rate on the trade balance is determined by how exports

and imports respond to exchange rate changes. Suranovic (1999) used the following equation to illustrate the effect of the exchange rate on the trade balance:

$$\Delta B/\Delta e = \Delta (P_r X^s)/\Delta e \; \Delta (P_m M^d) /\Delta e \qquad (2.5)$$

Where B signifies the trade balance, Δe means changes in the exchange rate, P_r is the price of exports, X^s connotes exports produced and sold, P_m indicates the price of imports, and M^d is being the consumption of imports depending on price changes, Suranovic (2002) emphasised that changes in the value of exports and imports decreased on price changes. Both the price and output respectively on exports and imports depend on domestic and foreign price elasticities of supply and demand.

Demand's price elasticity is said to be elastic, while demand below the demand curve's midpoint is inelastic (Mishkin, 2006). At the midpoint of the demand curve, the price elasticity of demand is unitary. Demand for exports is elastic, resulting in a normal upward-sloping supply curve for foreign exchange. Carbough (2006) stated that a small country has no impact on international market prices. A small country's demand curve is said to be completely elastic (Willcox and Edwards, 2002). Without affecting world prices, the international market can absorb any amount of output that a small country produces. On the other hand, import supply is completely elastic, which means that changes in domestic demand do not affect international prices (Willcox & Edwards, 2002 and Peter, 2017).

In response to price changes, the volume of exports supported increases, while the volume of imports demanded decreases (Willcox and Edwards, 2002). As export quantities and prices increase, the value of exports increases by a greater percentage than the depreciation. When imports decrease in quantity, this does not necessarily imply that their value decreases as well, depending on the elasticity of export demand (Willcox and Edwards 2002). Additionally, if import demand is elastic, the domestic value of imports decreases, improving the balance of trade. Peter (2017) demonstrated that when demand for imports is inelastic, the domestic value of the imports increases. The balance of trade improves as the maximum value of imports increases by the rate of depreciation; the currency value of imports increases by a greater amount than the rate of

depreciation. Willcox and Edwards (2002) emphasised that when currency appreciation results in a downward shift in demand for exports due to a downward movement in supply, the price and value of exports decrease by a greater percentage than the appreciation as the volume and elasticity of demand for exports. The domestic value of export currencies depreciates at a faster rate than the rate of appreciation (Mishkin, 2004). If the price of imports decreases, import demand increases, the domestic value of imports increases, and the trade balance deteriorates. According to Suranovic (1999), as cited by Peter (2017), the magnitude of the effect of devaluation or appreciation is determined by the elasticity of supply and demand for exports. The greater the elasticity of supply and demand for imports, the greater the elasticity of exports. The greater the elasticity of supply and demand for imports, the greater the trade balance improvement.

3.7.7 EXCHANGE RATE AND THE CA EQUILIBRIUM

The elasticities approach concentrated on the equilibrium between Real Exchange Rates (RER) and the flow of goods and services as measured by the CA balance (Nattrass, Wakeford and Muradzikwa, 2002). According to Pingel and Lindert (1996), the nominal exchange rate (NER) changes directly after the volume of exports and imports, but the magnitude and speed of the change are debatable. As price and volume are fluctuating, the effects on the value trade balance are not immediately apparent (Nattrass et al., 2002). Willcox and Edwards (2002) used equations to demonstrate the effects of RER on exports and imports in the CA balance, whereas Bhundria and Gottschalk, (2003) assumed that if domestic goods are used as the numerator, the CA balance is as follows:

$$CA\ (Q) = Q+ - QM\ (Q) \qquad (2.6)$$

Where X represents domestic goods and services exported, M represents imports, Q represents the RER, and CA represents the current account. The magnitudes of exports and imports are determined by the RER (Q). Imports become more expensive as a result of increased demand, while exports become less expensive. As a result, domestic demand for imported goods is reduced (X) (Begg et. al., 2003). Mreover, Begg et al. (1991) emphasised the importance of multiplying imports (M) by the RER (Q) to ensure that all measurements are made in terms of domestic goods. Equation 2.4 demonstrated the effect of currency devaluation on the CA balance

through the price of import (Pm) and volume (M) of imports (Suranovic, 1999, Mishkin, 2006 and Peter, 2017).

$$CA = \downarrow Px' \uparrow X - \downarrow Pm' \quad M \tag{2.9}$$

The arrows in equation 2.4 indicated the direction of change for each variable. Mishkin (2006) recognised that in some instances, other variables may remain unchanged. Exchange rate devaluation reduces the level of exports' domestic prices. As a result, foreign countries profit from the low prices. Krenin (2002) noted that devaluation increases export flows and import prices (P_m), while imports decline as buyers seek international markets.

If changes in demand for imports affect import prices, the effect is almost certainly negative. The real value of imports decreases, but it should increase or decrease, and it should be subtracted from the export value, which may increase or decrease. The effect on the CA is not immediately apparent because it is contingent upon the elasticity of demand for exports and imports (Mishkin, 2006). Equation 2.4 is a simple and direct equilibrium condition for the RER, with CA equal to 0.

Appleyard et al. (2006) used figure 2.5 to illustrate the relationship between the CA and the exchange rate. The CA is in equilibrium at point E where the X and QM curves intersect. Price levels and foreign countries are held constant in equation 2.3. Equation 2.3 is equivalent to a condition of equilibrium for the (NER) (Appleyard and Field, 2001). Increased RER results in an increase in the export level above equilibrium, and increased RER results in domestic products being cheaper abroad, increasing the export level (Appleyard and Field, 2001). On the other hand, an increase in imports results in a decrease in imports, making foreign goods more expensive to purchase. Increases in net export are frequently referred to as CA improvements (Nattrass et al., 1997).

3.7.8 PURCHASING POWER PARITY (PPP)

The Purchasing Power Parity (PPP) theory was developed in the 1920s primarily to determine the correct value of a currency concerning gold (James, 1972 and Peter, 2017). PPP is defined

as the nominal exchange rate's long-run unit elasticity in relation to relative national prices, allowing for potentially permanent real exchange rate shocks (Coarkley, et. al., 2005). It is a relationship between a country's foreign exchange rate and the level of movement of its domestic price level concerning the price level of another country. Additionally, it is referred to as the inflation theory of exchange rates (Hoontrakul, 1999). Without excessive or insufficient evaluation of the exchange rates in the PPP model, the theory cannot be discussed. Hoontrakul (1999) and Peter (2017) argued that a country's currency's value is determined by what it can purchase. According to the theory, an equilibrium exchange rate enables people in any country to purchase the same amount of goods and services for a given amount of money (Wall and Griffhs, 2004 and Peter, 2017). When exchange rates are factored in, the average price of goods and services across countries equalises. Comparing South and North America yielded the following equation illustrating the discussed exchange rates:

$$ER/S = PR/P\$ \quad (2.8)$$

Where R/$ is the Rand price of the U.S dollar, P_R is the average price of goods and services in South Africa. $P_{\$}$ is the average price of goods and services in the U.S. Equation 2.5 represents the absolute PPP (Scott and Miles, 2002). Exchange rates can be quantified in such a way that relative price inflation determines whether a country's currency appreciates or depreciates (Walls and Griffiths, 2004)

The PPP theory accelerates country-to-country transformation. Exchange rates must be specified correctly with the prices of various countries (Suranovic, 1999). This theory presupposed that only identical goods exist, that there are no trade barriers, taxes, tariffs, or transaction costs, and that there is internal market flexibility. The theory encompasses long-run exchange rates that have been adjusted to equalise currencies' relative purchasing power (Salvatore, 1996). This law of one price is then applied to the international prices of goods and services (Asian Development Bank, 2007). The PPP is based on the premise that identical goods will sell at identical prices in a competitive market when valued in the same currencies (Appleyard and Field, 1997).

As illustrated in Equation 2.5, the price of South African goods should equal the price of goods in another country multiplied by the exchange rate (Salvatore, 2007). If exchange rates are too high or too low, goods prices will be adjusted accordingly, as there will be an excess of demand in one country and a deficit of internal prices in another (Peter, 2017). Given that the exchange rate is

endogenous in PPP theory, an explanation for why exchange rates do not fluctuate in equilibrium is required.

3.7.9 EXCHANGE RATES BELOW AND ABOVE THE EQUILIBRIUM

Two scenarios are discussed herein in which the exchange rate is either too high or too low relative to the equilibrium. Suranovic (1999) defined the condition in which the exchange rate is too low in relation to the equilibrium as follows:

$E_R/_\$ < P_R/P_\$ \rightarrow P£ ' E_R/_\$ < P_R$ (2.7)

The relative price is greater than the exchange rate in equation 2.6, which is then less than the PPP exchange rate. The right-hand side of the equation indicates that the general price level in the United States expressed in Rands (P$'ER/$) is lower than the general price level in South Africa expressed in Rands as well (Ellsworth, 1950). This indicated that it is more cost-effective and profitable to purchase goods in the United States and sell them in South Africa. Thus, the PPP theory suggested that the low price level in the United States would result in increased demand for goods and services in the United States markets by South Africa, thereby increasing the demand for foreign dollars in the foreign exchange market (Suranovic, 1999). Similarly, exporters in the United States would realise that it is more profitable to sell goods and services in South Africa at a higher price level than it is to sell domestically (Suranovic, 1999 and Swivel, 2007).

The emphasis will serve as a model for South Africa's relations with the United States. The exchange rate increases when the price differential between South Africa and the United States exceeds one. Alternatively, the exchange rate will exceed the purchasing power parity rate (Nguyen, 2005). The current price level in US markets expressed in converted currency is greater than the current price level in South African Rand markets (Peter, 2017). Additionally, US goods are more expensive than those produced in South Africa. South African consumers will purchase fewer or no US goods as a result of the price differential between the two countries. This would imply a decrease in the quantity of US goods demanded in South Africa and an increase in the quantity of locally produced goods and services demanded (Nguyen, 2005). The dollar supply in

the US market will increase as a result of South African consumers' refusal to purchase high-priced US goods. The Rand's appreciation results in an increase in the price of South African goods. The process will then be repeated until the PPP exchange rate is reached and the price levels of both countries are equal (Acaravci, 2007).

3.7.10 ADJUSTED TO PRICE LEVEL UNDER THE PURCHASING POWER PARITY

Exchange rate fluctuations are encouraged in theory by changes in the relative price levels of countries (McAfee, 2006); price changes represent inflation rates. According to theory, the difference in inflation will cause exchange rates to fluctuate. When exchange rates are set too low, the domestic price level rises relative to the foreign price level, causing foreign currencies to depreciate (Acaravci, 2007). As a result, foreign products will become more affordable, increasing the competitiveness of foreign goods and services, thereby attracting more consumers from the home country while exports will exceed imports. When exchange rates are set too high, the PPP theory predicts that domestic prices will fall relative to foreign prices, resulting in the domestic currency strengthening against the foreign currency (Taylor, 2004). Domestic goods and services will be more competitive in the international market, attracting more consumers abroad, resulting in increased exports relative to imports.

3.8 EMPIRICAL REVIEW

Numerous studies have been conducted worldwide to determine the effect of real exchange rates on fruit export performance. Similarly, a thorough empirical examination of the effects of trade policy and real exchange volatility on agricultural economic growth in developed and developing countries was conducted (Ofeh, 2020). Despite conflicting findings, numerous empirical studies demonstrate the beneficial effects of free trade, particularly in Africa. According to some analyses, the effect of real exchange rates boosted fruit exports and economic growth. The panel will conduct a similar empirical review of relevant studies. Economists have researched the impact of real exchange rates and fruit exports on trade. Agricultural producers have been more aware of and concerned about the role exchange rates play in fruit commodity prices (Kristinek and

Anderson, 2002). Real exchange rates are critical in determining a country's economic growth rate. South Africa requires an increased amount of foreign currency. As Peter (2017) implied, RER volatility exports result in decreased trade, assuming that trade flows affected the current account. Currency stimulates exports by increasing the cost of imports. Grennes (1975) lauded Schuh's classical theory, claiming that exchange rate policies ensure an equitable distribution of income among countries, producers, and consumers.

In South Africa, subsidies to agricultural export commodities are positively correlated with the degree of overvaluation. Despite this, economists have conducted studies on the effect of real exchange rate misalignment, with findings indicating either rejection or acceptance of recommendations. Ethier (1973), Clark (1973), Baron (1976), Cushman (1986), Peree and Steinherr (1989) all emphasised real exchange rate volatility and concluded that it was detrimental to trade. By contrast, Viaene and De Vries (1992), Franke (1991), and Sercu and Vanhulle (1992) examined real exchange rates and discovered that they promote trade. A criticism is that the majority of the empirical literature on the effect of real exchange rate volatility on agricultural trade is short-run. As a result, the case for studying the effect of exchange uncertainty on trade is made based on the distinction between short, medium, and long-run changes in exchange rates, particularly in developed countries.

This study examines South Africa's fruit export performance. While the country enjoys a comparative advantage in the production of fruits, export performance is influenced by a variety of factors, the most significant of which is the currency's price or exchange rate. The exchange rate is defined as the value of one nation's currency in another nation's currency (Rwenyagila, 2013). Real exchange rate movements have an effect on export performance and the number of goods and services available to foreign buyers, as they may obtain lower or higher local monetary values when switching currencies. As a result, maintaining a stable real exchange rate is a necessary condition for sustained growth. According to Elbadawi and Helleiner (2004), countries that avoided currency overvaluation achieved sustained GDP growth. Thereby, movements in real exchange rates (RER) that strengthen the Rand may be detrimental to GDP growth. Simultaneously, Calamitsis et al. (1999) emphasise the benefits of currency depreciation (loss of value), explaining that a weakening RER benefits GDP by increasing capacity utilisation (via increased exports as goods become cheaper) and increasing the returns on traded goods - a

factor that encourages private investment. However, as Rwenyagila (2014) demonstrates, export performance is influenced by a variety of factors, including inflation, GDP, inflation, and terms of trade, which the empirical analysis will investigate.

The relationship between currency exchange rate fluctuations and export performance has been extensively researched (Dincer and Kandil, 2009; Roberts and Thoburn, 2003; Hall, Hondroyiannis and Sammy, 2010; among others). According to classical economic theory, real exchange rate misalignment results in a deviation from long-run equilibrium, thereby reducing export performance and growth (Kusuma, 2010). Dincer and Kandil (2009) conducted a sectoral analysis of how exchange rate fluctuations affected export quantities in Turkey and discovered that currency appreciation harms export levels, whereas currency depreciation stimulates export demand, although the latter's effect fades over time.

As South Africa is a developing country, it is beneficial to conclude other developing country case studies. Hasan, Muktadir-Al-Mukit, and Islam (2015) examined the exchange rate fluctuation and performance of Bangladeshi exports to the United States and discovered that a stable, long-term relationship does exist. Notably, Hasan et al. (2015) discovered a positive correlation between export performance and exchange rates and a unidirectional causal relationship between the two variables, with export performance being the endogenous variable. In Vietnam, Nguyen Thi Thuy and Trinh Thi Thuy (2019) used bound testing to examine the relationship between export volumes and exchange rate oscillations and concluded that high volatility results in a decline in export volume over time. Consistent with the J curve, Nguyen Thi Thuy and Trinh Thi Thuy (2019) discovered that currency depreciation resulted in a decline in exports in the short run and an increase in exports in the long run. Thus, a longer time series enables us to determine the short- and long-term effects of exchange rate fluctuations on South Africa's fruit exports.

As Dincer and Kandil (2009) demonstrate, in the case of Turkey, any benefits of currency depreciation in terms of boosting exports erode over time. The purpose of this research is to determine whether the Rand depreciation over the last few years has resulted in an increase in fruit exports, or whether this advantage has waned over time. According to Jordaan and Netshitenzhe (2015), the effects of exchange rate changes are muted in South Africa because different sectors react differently and occasionally in ways that contradict one another. Edwards and Alves (2006), on the other hand, discovered that the real exchange rate was a significant determinant of South Africa's export sector.

The purpose of the theoretical framework will be discussed in detail, beginning with the origins, causes, and patterns of trade; the structure and volume of external theory will also be discussed (Rwenyagila, 2013, Appleyard and Cobb, 2010). Numerous schools of thought and trade theories emphasise the critical role that international trade plays in stimulating economic activity and enhancing human well-being. According to Peter (2017) and Krenin (2002), a country will engage in international trade to generate wealth from abroad. For example, local retailers and wholesalers purchase goods and services at discounted prices from international markets and resell them locally at a profit. Profits and trade benefits will be required to stimulate the economy. Eventually, the country purchases goods manufactured abroad, raising the standard of living.

3.8.1 EMPIRICAL LITERATURE REVIEW FROM DEVELOPED COUNTRIES (DC)

Developmental economists are caught in a dilemma as a result of the collapse of exchange rate volatility and the negative effect of fixed exchange rates on trade. Hooper and Kohlhagen (1978) establish that the risk of exchange rate volatility reduced export levels. Rose (2000), on the other hand, takes a contrary position, having investigated the issue using the gravity model and panel data from 186 countries. A bilateral panel of 186 countries was used to examine the effect of exchange rate volatility on trade over the period 1970 to 1990. The findings indicated a significantly negative effect of exchange rate volatility on trade.

Guzman et al. (2019) confirmed that policies' theoretical foundations have ensured competitive and stable real exchange rates. Sheldon, Mishra, Pick, and Thompson (2013) examined the effect of real exchange rate uncertainty using two sets of US bilateral trade data and an empirical gravity equation. When estimating a US export gravity equation for fresh vegetables, the results indicated a statistically significant negative effect of exchange rate uncertainty.

3.8.2 EMPIRICAL LITERATURE REVIEW FROM LEAST DEVELOPING COUNTRIES (LDC)

The Economic and Monetary Community of Central African States (CEMAC) and the Economic Community of Central African States (CEEAC) are two organisations where developing countries have largely thrived and benefited from related trade policies. Agricultural exports and imports, on the other hand, will always be critical sectors for developing countries economic growth and poverty alleviation. As Cole et. al., (2007) noted, agricultural development is the primary driver of efficiency, household income, the standard of living, and poverty reduction in African countries.

In the majority of developing countries, where agricultural commodity trade is the primary source of economic growth, the real exchange rate is critical for agricultural export profitability and tradeability. Notably, developing countries have the most robust export and import patterns in terms of GDP. To develop Africa, it is necessary to understand that the exchange rate is determined by the real effective exchange rate and the misalignment of the exchange rate (Zaki, Abdallah and Sami, 2019).

Many, if not all, countries, such as Egypt, have benefited from exports of fruit and vegetables that are susceptible to RER depreciation. Alegwa et. al., (2018) examined the effect of real exchange rate volatility on agricultural product exports in Nigeria between 1970 and 2013, using annual time series data. The effect of real exchange rate volatility on agricultural product exports was evaluated using the VECM approach. Unit root tests using augmented Dickey-Fuller (ADF) and Phillip Perron (PP) confirmed that all variables were stationary in their difference. Based on the investigation of the Johansen Cointegration tests, it was determined that there is cointegration between the volatility of exchange rates and the long-run effect on all agricultural exports studied, with the effect being strongest for. The VECM results indicate a negative from Granger–Causality. Between Cocoa and real exchange volatility, there is a bidirectional causal relationship.

Etahisoa (2019) used secondary data to examine Madagascar's agricultural exports and economic growth from 1990 to 2017. Cointegration and a VECM approach were used to estimate long and short-run impacts. The findings appear to be favourable for coffee, vanilla, and clove exports. Agriculture exports increase, which boosts GDP. In Kenya, Muthunga et al. (2017) and Wanguru (2019) conducted research on the effect of real exchange rates and fruit exportation. The results indicated an inverse relationship between the foreign exchange rate and horticultural

export performance. While it was discovered that currency volatility has a positive correlation with financial performance. The impact of real exchange rate volatility on agricultural growth in Cameroon is examined by Ofeh et. al., (2020). The Autogression Distribution Lag (ARDL) model was used to conduct the analysis.

Mekonen (2019) used Applied General Equilibrium to examine the effect of price volatility on the Ethiopian economy. The findings indicated that the country's exchange rate policy should be managed on a floating basis, while the overall developed strategy should be diversified and exports industrialised through the integration of commodity policies. Dlamini (2014) discusses Swaziland's exchange rate volatility and its impact on macroeconomic management. The Garch approach was used to estimate the volatility of the real exchange rate. The evidence indicates that positive shocks increase the volatility of the real exchange rate.

Table 7: Empirical Literature Develop Countries and Developing Countries

NAME	PSAMPLE ERIOD	METHOD USED	COUNTRIES	MAIN RESULTS
MACDONALD (1997)	1974-1993	COINTEGRATION AND VAR SYSTEM	UNITED NATIONS	NEGATIVE
SHELDON, MISHRA AND THOMPSON (2013)	1976-20006	26 COUNTRY PANEL DATA	USA	NEGATIVE
RAMOS (2001)	1865-1998	COINTEGRATION, ECM AND VAR	PORTUGAL	NEGATIVE
MORINA ET AL. (2020)	2002-2018	14 COUNTRIES PANEL DATA	CEE COUNTRIES	NEGATIVE

NOWAK-LEHMANN ET AL. (2017)	2009-2015	PANEL COINTEGRATION, ECM AND ARDL	123 COUNTRIES	POSITIVE
TANG (2014)	BASED ON 2005 RMB	COINTEGRATION AND VAR	CHINA	NEGATIVE
NIFTIYEV (2020)	2001-2018	OLS, VECM AND ARDL	AZERBAIJAN	NEGATIVE
BAKARI (2017)	1983-2015	ARDL AND VECM	GERMANY	NEGATIVE
EKANAYAKE AND GARCIA (2015)	1993-2012	COINTEGRATION AND ARDL	SPAIN	NEGATIVE
PISTORESI AND RINALDI (2011)	1863-2004	COINTEGRATION	ITALY	NEGATIVE
KIM (2017)	2000-2015	ARDL AND VECM	SOUTH KOREA	NEGATIVE
SUIGIHURT ET AL. (2020)	2006-2018	ARDL AND NARDL	INDONESIA	NEGATIVE
NORRA AND BUSH (2019)	2008-2018	OLS AND GARCH	MEXICO	NEGATIVE
CHÁVEZ (2020)	2000-2019	COINTEGRATION	LATIN AMERICA	NEGATIVE
MORINA ET AL. (2020)	2002-2018	PANEL DATA	EASTERN EUROPE	NEGATIVE
THI THY, V. N AND THI THUY D. T(2019	2000-2014	GARCH AND MASD	VIETNAM	NEGATIVE
AGUIRRE (2003)	1986-2002	COINTEGRATION, ARDL AND VAR	BRAZIL	NEGATIVE
BURAKOV (2016)	1999-2015	COINTEGRATION, VECM AND VAR	RUSSIA	POSITIVE
BARGUELLIL ET AL. (2018)	1985-2015	GARCH AND GMM	TUNISIA	NEGATIVE
SEBEGO ET AL.(2020)	1977-2018	GARCH AND GMM	BOTSWANA	NEGATIVE

SIMASIKU AND SHEEFENI (2017)	1990-2014	JOHANSEN COINTEGRATION AND ECM	NAMIBIA	POSITIVE
ZAYONE ET AL. (2020)	1980-2017	ARDL	ANGOLA	POSITIVE
RWENYAGILA (2013)	1990-2009	OLS AND ECM	TANZANIA	POSITIVE
ADJEI (2019)	1983-2010	ARCH, GARCH AND ARDL	GHANA	NEGATIVE
HATAB (2016)	1994-2016	COINTEGRATION, ECM AND VECM	EGYPT	NEGATIVE
OIRO (2016)	2005-2012	ARDL AND GARCH	KENYA	NEGATIVE
CHIPILI (2013)	1965-2008	JOHANSEN COINTEGRATION AND GARCH	ZAMBIA	NEGATIVE
MAHONYE AND ZENGENI (2019)	1990-2006	JOHANSEN COINTEGRATION AND VECM	ZIMBABWE	POSITIVE
GWANONGODZA (2020)	1990-2016	COINTEGRATION	ZIMBABWE	NEGATIVE
GBETNKOM AND KHAN (2002)	1971-1996	COINTEGRATION AND OLS	CAMEROON	POSITIVE
SENADZA AND DIABA (2017)	1993-2014	COINTEGRATION, GARCH AND EGARCH	SUB – SAHARAN COUNTRIES	NEGATIVE
AIMER (2020)	2000-2015	JOHANSEN COINTEGRATION AND VECM	LIBYA	POSITIVE
IJISHAR (2015)	1970-2012	COINTEGRATION AND ECM	NIGERIA	POSITIVE
ABDULRAHMAN (2020)	2005-2019	OLS	SAUDI ARABIA	POSITIVE
MUNTHALI ET AL. (2010)	1995-2005	COINTEGRATION	MALAWI	NEGATIVE

LANIE AND BATAKA (2018)	1980-2016	JOHANSEN COINTEGRATION AND ECM	TOGO	POSITIVE
AHMED ET AL. (2020)	1972-2008	ECM AND ARDL	PAKISTAN	NEGATIVE
KABAYIZA ET AL. (2018)	2001-2016	GARCH AND ECM	RWANDA	NEGATIVE
ANDREWS (2015)	1970-2011	GRANGER CAUSALITY AND VAR	LIBERIA	POSITIVE
DUKULY AND HUANG (2020)	2000-2019	OLS AND MACROECONOMIC VARIABLES	LIBERIA	POSITIVE
FOFANAH (2020)	1997-2012	JOHANSEN COINTEGRATION, GARCH, OLS AND GMM	SENEGAL	NEGATIVE
SANTA (2020)	1980-2017	COINTEGRATION AND NARDL	PAKISTAN	POSITIVE
BHATTARYA AND RIT (2018)	1996-2014	LM AND ARCH	INDIA	POSITIVE
DLAMINI (2014)	1990-2014	GARCH AND JOHANSEN COINTEGRATION	SWAZILAND	POSITIVE
ETAHISOA (2019)	1990-2017	VECM	MADAGASCAR	POSITIVE
PHALENG (2020)		PANEL REGRESSION DATA	WEST AFRICA	
KARGBO (2016)	1957-2004	VECM	SOUTH AFRICA	POSITIVE
MUDENDA ET AL (2014)	1980-2010	VECM	SOUTH AFRICA	POSITIVE
POONYTH AND VAN ZYL (2000)	1991-1999	ECM	SOUTH AFRICA	NEGATIVE
SIBANDA AND NCWADI (2013)	1994-2010	COINTEGRATION AND VECM	SOUTH AFRICA	NEGATIVE

MASHILANA AND HLALEFANG (2018)	1994-2016	ARDL	SOUTH AFRICA	NEGATIVE
CHIMUNORWA (2014)	2000-2011	GARCH	SOUTH AFRICA	POSITIVE
PASI AND OCRAN (2019)	1994-2015	COINTEGRATION	SOUTH AFRICA	NEGATIVE
JORDAN AND NITSHITENZHE (2015)	1988-2014	ECM	SOUTH AFRICA	POSITIVE
CHIPETA ET AL. (2017)	1995-2017	VAR	SOUTH AFRICA	NEGATIVE
PETER (2017)	1980-2015	EGARCH	SOUTH AFRICA	POSITIVE
MLAMBO ET AL. (2013)	1986-2012	COINTEGRATION AND VECM	SOUTH AFRICA	POSITIVE
MUZEKENYI (2017)	1994-2015	ADF, PP AND VECM	SOUTH AFRICA	NEGATIVE

Source: Own Compilation

3.8.3 EMPIRICAL LITERATURE REVIEW FROM SOUTH AFRICA

The effect of the real exchange rate system evolved as the current free-floating exchange rate system was adopted (Pasi, 2019). The South African Rand was established in 1961. Despite enjoying a high value due to the international situation surrounding South Africa's Apartheid, the Rand lost its footing on the global market (Bronkhorst, 2012). South Africa's ruling classes implemented an independent currency management policy, with the rand trading at 87 cents. Mboweni (2001) clarified that between 1974 and 1978, the rand's peg changed six times. Around 1983, the Apartheid government abolished the financial and exchange rate system, thereby forcing the country into a currency exchange market. Any changes in the South African Rand's value will be significant; DAFF (2015) and Peter (2017) have established that South African producers received international fruit prices.

In 2016, the World Bank (2018) reported that the South African economy remained Africa's most advanced, with a GDP of USD 294.8 billion. Khomo and Aziakpono (2020) examined the

behaviour of South Africa's real exchange rate. Using cointegration regression, a positive appreciation effect was identified. Brink and Koekemoer (2000) developed a theoretically plausible model to explain how the South African exchange rate is determined. The purpose of this study was to establish a methodology for modelling the rand/dollar exchange rate. They concluded that exchange rate overvaluation was a threat to sustained export-led growth.

Kargbo (2016) conducted research on capital flows, real exchange rate misalignment, and PPP tests in emerging market countries. The study lasted from 1957 to 2004. Finally, it was recommended that PPP be used as a reliable guide for establishing exchange rates and reforming those countries' exchange rate policies. Sibanda et. al., (2013) investigated the effect of real exchange rates on economic growth in South Africa. The study period was 1994–2010. The effect of economic growth on the real exchange rate is determined using Johansen cointegration and a vector error correction model. There was a discernible effect on the exchange rate's growth. Matlasedi (2018) investigated the effect of real exchange rates and relative prices on South Africa's import demand. For the quarterly period 1980–2014, the ARDL approach was used. Real GDP, relative prices, and the stock of foreign reserves were all positive, but REER was negative.

Mlambo, Marendza, and Sibanda (2013) conducted and evaluated a study on the effect of exchange rate volatility on the stock market in South Africa between 2000 and 2010. To establish a relationship between and stock market performance, the Generalised Autoregression Condition Heteroskedasticity model was used. The findings indicated a weak relationship between exchange rate volatility and stock market performance. Mlambo, Mukarumbwa, and Megbowan (2019) examined empirically the tests that contribute to the economic growth of unprocessed and processed agriculture exports. The study analysed time series data spanning the years 1986 to 2012. Cointegration and VECM were used to determine the relationship between processed agricultural exports and economic growth. In contrast, unprocessed agricultural exports have a detrimental effect on economic growth. Meanwhile, agricultural export manufacturing contributed significantly to economic growth.

3.9 LITERATURE GAP

There does not appear to be agreement on whether exchange rate fluctuations have a positive or negative effect. Additionally, no studies have been conducted on the relationship between fruit exports and exchange rate fluctuations in the South African context. Another significant gap that

this study seeks to fill in the direction of causality between exchange rate changes and export volume. Furthermore, the study discussed theoretical models and empirical research on the relationship between real exchange rates and fruit export performance. Economic development theories have paved the way for new theories of elasticity, Purchasing Power Parity, exchange rates below and above equilibrium, and exchange rates adjusted to the Purchasing Power Parity price level.

3.10 SUMMARY

The chapter summary discussed trade theory of Purchasing, Power Parity, Balance of payment, foreign exchange market, and trade theories of devaluation improvefruit export. South Africa exports entered international market as price takers, while suppliers exported products at high prices in the international countries. Currency appreciation depressed export competitiveness (Peter, 2017). The risks associated with the volality reduce trade. The industry experiencinng exchange rate will be expected. South African fruin industry is known for been strong competitor regarding agricultural products.

CHAPTER 4
RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter discusses the methods and approaches used to investigate the export performance of the fruit industry. The chapter begins with an overview of the research design and data sources. Following that, a brief discussion of variable measurement is followed by an examination of estimation techniques and the specification of the econometric model. Following that, the chapter discusses several significant statistical tests and procedures

4.1.1 DESCRIPTION OF THE STUDY Area

4.1.2 SOUTH AFRICA

The study was conducted only in South Africa consisting of nine Provinces that included Eastern Cape, Free State, Gauteng, Kwazulu Natal, Limpopo, Mpumalanga, Northern Cape, Northwest, Western Cape. Fruits are mostly produced by Limpopo, Mpumalanga, and the Western Cape. Although the study depended on Fruit export in South Africa, there was growing demand to improve agricultural sector (Phaleng, 2020).

South Africa lies in the southmost country in Africa and notably, bounded to the South by 2.798 kilometres of north coastline extending countries of Namibia, Botswana and Zimbabwe to the east and northeast by Mozambique and Swaziland (Eswatini). South Africa contained Lesotho. It still located at the south of equator after Tanzania. South Africa maintained significant regional influence and member of both member of the commonwealth of nations and G20. South Africa is a developing country ranked 109th of human Development Index. The World Bank classified South Africa as newly industrialised, technological, Sand advanced economy in Africa. South Africa have largely temperate climate of Atlantic and Ocean lying in Southern Hemisphere. The climate zones range from extreme desert of southern Namibia in the farthest northwest to subtropical weather and received annual rainfall of 760 mm. south Africa has mix economy, ranked 2nd after Nigeria. It has relatively a high GDP per capita to other countries burdened by poverty and unemployment. . The study area (South Africa) was reviewed with information regarding data and factors of trade models were used for this study. The essential and fundamental models were adjusted to determine the impact of global trade. The methodology applied were basically highlighted, verified, and clarified for export and imports with international countries. The macroeconomic models were then used for fulfilled the targets and goals for this study.

4.2 THE RESEARCH DESIGN

The term "research design" refers to the process by which formulated research questions are evaluated and addressed within a robust analytical framework (Sileyew, 2019). Generally, there are two types of research methodologies: quantitative and qualitative. The quantitative

methodology was used in this study because it is the most appropriate for the type of questions addressed. Quantitative research is classified into several types. Quantitative research, according to Winston-Salem (2021), can be classified as descriptive, correlational, experimental, or causal (quasi-experimental). This study was correlational, to decipher the relationship between export performance and the various variables that influence it. Correlational quantitative research identifies patterns of relationships but does not always determine the underlying transmission mechanism – that is, what causes what – in a causal manner (Scollon, 2021). There are different types of quantitative research. According to Winston-Salem (2021), quantitative research can be categorized into descriptive, correlational, experimental and causal (quasi-experimental). This study was correlational in that it sought to understand the relationship between export performance and the several variables that determine it. In a correlational quantitative design, the research identifies patterns of relationships but does not necessarily determine causally the underlying transmission mechanism – that is to say what causes what (Scollon, 2021).

However, this study was also descriptive, especially given that the initial sections of Chapter 5 included some descriptive statistics derived from the data. Quantitative research has several advantages over qualitative design. To begin with, the quantitative design is less expensive and time-consuming because it frequently relies on secondary/pre-existing data sources. This is in stark contrast to the qualitative approach, which typically requires conducting time-consuming and costly interviews with respondents. At the same time, it's worth noting that the qualitative approach has several advantages, particularly when it comes to delving into a phenomenon via probing in an interview, among other things. However, a quantitative research framework was required to analyse the determinants of fruit export performance in South Africa.

4.3. DATA SOURCES AND PERIOD OF ANALYSIS

Secondary data were gathered from a variety of sources for this study. The South African Reserve Bank (SARB) provided exchange rate data for the study, while the Organization for Economic Cooperation and Development (OECD) provided Terms of Trade (TOT) data. FAOSTAT [The Food and Agriculture Organization's (FAO) data platform] was used to obtain data on fruit export performance, while the World Bank's (WB) World Development Indicators (WDI) was used to obtain some important control variables. The research presented regression analysis results on

the correlation between exchange rate fluctuations (and other variables) and fruit exports using these data. According to Hasan et al. (2015), the researcher anticipated that estimates would be more robust if monthly export data were obtained. However, because data on fruit exports are available yearly basis, the research was conducted based on yearly recorded figures. The forty-eight (48) year period from 1971 to 2019 was chosen for econometric analysis because it contained the most complete data when all data sources were combined and the 48 year period was appropriate for statistical/econometric analysis.

4.4. VARIABLE MEASUREMENT

Variables are any characteristics of the world that can be measured and that can be taken on the several or many variables (Kabir, 2016). In this study, exchanged statistics can be a thoughtful science of understanding data, data resulting in a series of measurement of one or more variables measurement as on one or more variable for the purpose of the study. Endogenous and exogenous variables were gathered from a variety of sources. Kabir (2016) defined measurements as a process that assigned values to the variables, furthermore provide unique and unambiguous results for every individual. This section briefly discusses the various variables that were used in the study and included amongst other exchange rates, inflation, interest rates, Terms of trade, Gross fixed capital formation, Gross domestic product, Post – Apartheid Dummy and Post – minimum wage dummy.

4.4.1. EXPORT PERFORMANCE (EP)

South African's export performance has been weak due to depreciation of Rand after global financial crisis (Anand et al. 2016).The study explained several insensitivities of South African export to real exchange rate depreciations (Edwards and Garlick, 2008). In addition, South African Reserve Bank argued that weak external demand and softer commodity prices prolonged fruit south Africa's industrial action. The study quantified export performance in terms of the volume of fruit exported annually from South Africa. The quantity exported was calculated by adding the tonnage exported of various fruits (including both stone fruits and non-stone fruits). As previously stated, FAOSTAT data on fruit exports were retrieved.

4.4.2 EXCHANGE RATES (ER)

The exchange rate simply related to the value ratio of two currencies (Mahonye and Zengeni, 2019). The study used the direct exchange rate. The exchange rate has a significant indication exchange rate coefficient measured in among international countries (Phaleng, 2020). Within the South African context, the direct rate of exchange was referred to the number of Rand that was equivalent to one unit of foreign currency. The study analysed the ZAR – USD exchange rate. Exchange rates played a significant role in determining exports. Foreign buyers now purchased more in the domestic market due to the domestic currency's depreciation. Thus, when all other variables were equal, a weakening exchange rate benefits export and vice versa.

4.4.3 TERMS OF TRADE (TOT)

Terms of trade are defined by Backus and Crucini (2000) as the relationship between imports and exports. A country with a favourable TOT is one that exports more than it imports, and vice versa. A country with a negative TOT theoretically spends more money outside its borders than foreigners spend domestically. TOT helped in expanding fruit export rather than depending on single or less markets, moreover, provide greater production to larger and margins. The study. The TOT situation as a whole has a significant impact on export performance.

4.4.4 INFLATION (I)

Inflation is broad term referred to the general increase in the prices of goods and services (Ibrahim, 2019). When a country's exchange rate was pegged, there may be a disparity between the general rate of inflation and the exchange rate. Gomez-Herrera and Baleix (2010) and Phaleng (2020) perused that inflation effect on traded commodities may either show a significant or insignificant correlation on the projected structures. Expansion of inflation, the higher the imports of fresh fruit from South Africa. Phaleng (2020) indicated that a fall in inflation for importing country led to expansion of country’s international competitiveness can probably diminish imports. Additionally, there could be a mismatch if the goods driving inflation are produced domestically. Without a currency rate that responds to inflation, foreign buyers may notice that goods become

more expensive, reducing foreign demand and vice versa. As a result, inflation was considered a control variable.

4.4.5 INTEREST RATES (IR)

Gerlach (1996) related that Interest rates were another significant factor affecting export performance. Interest may be thought of as the cost of money. Increased interest rates may reflect an economic phenomenon known as inflation, but they also affecting by the cost of agricultural loans, affecting agricultural production and, ultimately, export performance.

4.4.6 GROSS FIXED CAPITAL FORMATION (GFCF)

Saleh (1997) proclaimed tht Countries competing in the global market must also constantly adapt to technological advancements to maintain their competitive edge. Government investments were in one-stop borders, port improvements, and roads, to name a few, are critical for streamlining the movement of goods and people (Nkuradabamye, 2021). This also affects the unit costs of production and the international competitiveness of fruit exports.

4.4.7 GROSS DOMESTIC PRODUCT (GDP) GROWTH

StatsSA (2021) reflect that Real gross domestic product is measured by production, increasing 1.2% in the second quarter of 2021, followed by increased of 1.0% in the first quarter. The agricultural sector increased by 6.2% and contributed 0.2 point to GDP growth. The increase is maintained to increase production of field crop and horticulture (Stats SA, 2021). A more robust economy is better equipped to produce more goods for export. GDP growth is a critical indicator of a country's prosperity. By increasing the output of goods and services (i.e., GDP growth), a country improves its ability to export excess production.

4.4.8 POST-APARTHEID DUMMY

Apartheid's collapse in South Africa in 1994 had significant economic consequences. It ushered in an era of greater worker rights and marked the end of South Africa's isolation (particularly those working on farms). This may have resulted in the development of new markets for South African fruits, while expanding worker rights may have had an adverse effect on farm profitability and overall production. This post-apartheid dummy variable was included in the analysis to ascertain whether the end of apartheid had any effect on fruit export performance.

4.4.9 POST-MINIMUM WAGES DUMMY

South Africa implemented the first minimum wage regulation for the agriculture sector nearly a decade after the end of apartheid in 2003 (Netshivhodza, 2017). Minimum wages may have increased farm operation costs, resulting in a decline in agriculture employment and output. Simultaneously, minimum wages may have increased the quality of fruit production (owing to a more motivated workforce among other reasons). The inclusion of the post-minimum wage dummy was thus critical for reducing the error term.

4.5 SAMPLE AND SAMPLING TECHNIQUES

From 1971 to 2019, annual data were used. Export volumes, exchange rates, terms of trade, inflation, interest rates, gross fixed capital formation, and GDP growth were all examined, as well as dummies for pre-and post-apartheid minimum wages.

4.6 ESTIMATION TECHNIQUES AND ECONOMETRIC MODEL

To begin, the effect of the real exchange of fruits export performance was estimated using the Ordinary Least Squares model. The study estimated a regression model in long-run levels and then an Error-Correction Model (ECM) because the data were co-integrated at first difference. Additionally, Granger Causality tests were used to determine the direction of causality between

real exchange rates and the performance of fruit exports. The following were used to specify export performance (dependent variables):

$$EP_t = \beta_0 + \beta_1 RER_t + \beta_2 TOT_t + \beta_3 INF_t + \beta_4 INT_t + \beta_5 GFCF_t + \beta_6 GDP_t + \beta_{7,8}(D)_{A,W} + \mu$$

Where EP_t is the total value of fruit exports

RER_t is the real exchange rate

TOT_t is the Terms of Trade, and

INF_t is Inflation Rate

INT_t is Interest Rate

$GFCF_t$ is Gross Fixed Capital Formation (GFCF)

GDP_t is GDP growth

$(D)_{A,W}$ are the post-apartheid and post-minimum wage dummies

$\beta_{(0,\ldots,8)}$ is the set of regression beta coefficients and

μ is a stochastic regression error term

4.6.2 GRANGER CAUSALITY TESTS

It is critical to consider the direction of causality between the independent and dependent variables, as OLS requires unidirectional causality. Grander causality is predicated on two premises (Lin, 2008). To begin, the future cannot be caused by the past is a critical supposition (Lin, 2008). According to Lin (2008), a cause contains information about an effect that is not found elsewhere. As Lin (2008) postulated: X_t (Export performance) does not Granger-cause Y_t (Exchange Rate) if all values of *m* exceed zero,

$F(Y_t+m|\Omega_t) = F(yt+m|\Omega_t - X_t)$

Where F denotes the conditional distribution and t Xt denotes all of the universe's data except the series Xt. Lin (2008) further maintains that Xt does not Granger-cause Yt if X, like in the first supposition, is incapable of assisting in the prediction of Y's future. Therefore, the Granger causality tests were critical in determining the one-way nature of the relationship between the endogenous variable and the key exogenous variable(s).

4.7 ERROR CORRECTION MODEL

Unit root tests can be used to determine whether or not variables in a model specification are stationary at the same level. If the Johansen co-integration test confirms this long-run relationship, it implies the existence of an underlying error correction model (ECM) that should account for both the short and long run confounding dynamics of the model. ECM is advantageous in that it is based on a less restrictive lag structure that does not preclude partial or complete rebalancing of the model following shocks. The ECM is a two-pronged approach that takes both short- and long-term effects into account. The ECM approach works by first estimating the model at a level and then iterating the process using the generated residual series. A critical condition, requirement, is that the residual series be of lower order integrated; otherwise, the ECM will be difficult to specify correctly. The final step is to estimate the equation at the first difference, taking into account the residual errors. The ECM was specified as follows by Francke, Vujic and Vos (2009):

Long Run: $EP_t^* = \beta_1 X_{1t} + \ldots + \beta_K X_{Kt},$

Short Run: $\Delta EP_t = \propto \Delta EP_{t-1} + \delta\left(EP_{t-1} - EP_{t-1}^*\right) + \gamma \Delta EP_t^* + \varepsilon_t,$

Where *X* in the long run equation represents the control variables exchange rates, terms of trade, inflation, interest rates, gross fixed capital formation, GDP growth, as well as the post-apartheid and post-minimum wages dummies, and in the short-run equation ΔEP_{t-1} represents market imperfections and $\propto$ is the degree of serial correlation. $EP_{t-1} - EP_{t-1}^*$ is the ECM term and the δ represents the magnitude by which the equilibrium between export performance and movements in real exchange rates is restored after a shock.

4.8 VALIDITY AND RELIABILITY

The study examined how the level of validity and reliability can affect the determinants of export performance. The Granger Causality test was discussed and reviewed in light of the literature, as well as various factors affecting the study's level of validity and reliability. The study's validity and reliability contribute to a better understanding of its roles in terms of developing measures from genuine scientific measurements to obtain valid and reliable assessment results. External validity was determined by comparing the study's findings to those of similar research conducted in a similar context (for example, by comparing the study's findings to those of a study on the determinants of fruit exports conducted in a country such as Brazil – a BRICS member but also a country that is comparable to South Africa on many economic indicators). The research's validity was established through a series of robustness checks on the findings.

CHAPTER 5
PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

5.4 INTRODUCTION

The results of the descriptive and regression analyses of the data are presented and discussed in this chapter. The chapter discussed the Ordinary Least Squares (OLS) method of the Error Correction Model (ECM). This chapter includes several diagnostic and robustness checks and ends with “chapter summary”.

5.5 DATA DIAGNOSTICS

This section summarises significant preliminary analyses of the data. Diagnostic tests are essential before conducting any further data analysis because they inform the researcher whether the data satisfy the fundamental assumptions underlying the statistical inference procedures (Eyduran et al., 2005). Zeileis and Hothorn (2002) assert that diagnostic tests are a standard procedure for detecting nonlinearities and skewness. This diagonostic tests performe in this study discumulticollinearity, variable normality, stationarity, and long-run cointegration tests.

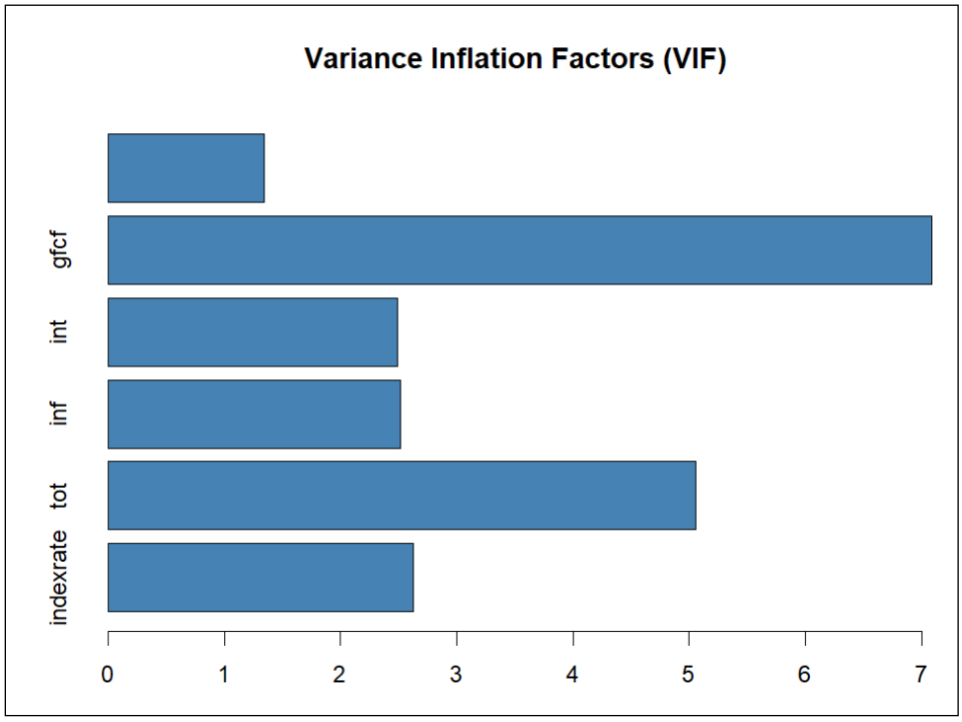
5.5.2 TESTING FOR MULTICOLLINEARITY

Table 8: Correlation Matrix

	FEDXRATE	*TOT*	*INF*	*INT*	*GDPGROW*	*GFCF*
FEDXRATE	1.00	0.63	-0.66	0.39	-0.12	0.86
TOT	0.63	1.00	-0.26	-0.16	-0.03	0.81
INF	-0.66	-0.26	1.00	-0.38	-0.27	-0.59
INT	0.39	-0.16	-0.38	1.00	-0.18	0.21
GDPGROW	-0.12	-0.03	-0.27	-0.18	1.00	-0.05
GFCF	0.86	0.81	-0.59	0.21	-0.05	1.00

Ordinary Least Squares (OLS) require the absence of multicollinearity in the explanatory variables and between them. The correlation matrix for independent variables in the model is shown in Table 10. Since the rule of thumb is 0.8, we can observe some multi-collinearity between n the variable *gfcf* (gross fixed capital formation) and *fedxrate* (direct Rand-US dollar exchange rate); as well as between tot (terms of trade) and *gfcf*. Since the correlation coefficients for the majority of the independent variables are less than 0.8, there appears to be no multicollinearity. The Variance Inflation Factor (VIF) is another critical metric for determining the degree of multicollinearity between a set of independent/explanatory variables (O'brien, 2005; Craney and Surles, 2002). The VIF values between independent variables are shown in Figure 9 for the Export Values and Export Quantities models described in Tables 11 and 12, respectively.

Table 9: VIF Values for Export Values Model



IF values greater than 5 are cause for concern, although they should not trigger a change in analysis strategy on their own. The VIF value for Gross Fixed Capital Formation (GFCF) is 7.1 in Figure 9. The researcher can employ a variety of strategies to address the issue of multicollinearity. The first possibility is that one of the problematic variables is eliminated from the regression. As an alternative, one could combine the problematic (collinear) variables into a single index, as they would not provide independent information to the regression model is introduced

separately. Both approaches are avoided in this study due to the small number of explanatory variables and the effect of dropping one variable on the model's explanatory power. The VIF value of 7.1 for the *gfcf* variable is greater than 5, but not excessively so.

5.5.3 TESTING FOR NORMALITY

Additionally, OLS assumptions imply that both dependent and independent variables have a normal distribution. Numerous tests are available to determine the normality of regression variables. However, one method is to inspect the variables' distributions using kernel density plots. The kernel density plots of the endogenous variables *Total Exports Value* and *Total Export Quantity* are shown in Figure 1A1 in the Appendix. Although their logarithmic transformations are slightly better, the variables do not appear to be perfectly normally distributed. There appears to be some evidence for bimodal distributions. This bimodality may reflect South Africa's pre-and post-democratic eras. The regressions accounted for this bimodality by including a post-apartheid dummy. The endogenous variables' raw and logarithmic transformations (except for the binomially distributed post-apartheid and post-minimum wage dummies) are shown in Appendix Figures 1A2 (i) - 1A2 (ii). The logarithmic transformation does not appear to be superior to the untransformed state of the exogenous variables. Consequence, the variables are included in the regression analysis in their original untransformed state.

5.5.4 PHILLIP-PERRON STATIONARITY TESTS

Table 10: Phillips-Perron Unit Root Test

Variable	Levels		First Difference	
	DF Test Statistic	*P-Value*	*DF Test Statistic*	*P-Value*
totxval	-1.034	0.9236	-5.4379**	0.01
totxqty	-1.4735	0.7849	-8.2473**	0.01
indexrate	-1.0061	0.928	-5.307**	0.01
tot	-2.1919	0.4974	-5.1552**	0.01
inf	-3.1224	0.125	-6.1768**	0.01
int	-3.9809**	0.01789		
gfcf	-1.4114	0.8098	-4.0768**	0.0142
gdpgrow	-4.619**	0.01		

NOTEΣ*: $\pi < 0.10$, ** $\pi < 0.05$, *** $\pi < 0.01$

Stationarity is essential for time series analysis. The disadvantage of non-stationary series is that they can result in spurious regressions. The results of the Phillip-Perron stationarity tests on the data are shown in Table 10 if the p-value is less than 10%, a variable is stationary (that is, the existence of a random walk or unit root). Only interest rates (*int*) and GDP growth (*gdpgrow*) are stationary at their current levels, as shown in Table 10. At first difference, the remaining variables are stationary. This implies that an Error Correction Model (ECM) can be run with variables that are stationary at the first difference, as ECM requires all variables to be stationary at the first difference. This is referred to as long-run co-integration of order 1 – I(1). Given the study's use of multiple regression analysis, the short-run estimation procedure is formally known as the Vector Error Correction Model (VECM).

5.5.5 PHILLIPS-OULIARIS COINTEGRATION TEST

Both ECM and VECM are appropriate only when the variables under investigation exhibit long-run cointegration. I(1) is required for the VECM, which means that the variables must be stationary at the initial difference. The Phillips-Ouliaris Test quantitatively examines the long-run relationship between and among the differenced variables. A p-value of less than 10% for the Phillips-Ouliaris test statistic indicates the existence of long-run cointegration. The results in Table 11, confirm the existence of long-run cointegration, allowing for the continuation of VECM estimation.

Table 11: Phillips-Ouliaris Cointegration Test

Dependent Variable	*Independent Variables*	*Phillips-Ouliaris Statistic*	*Test*	*P-Value*
Dtotxval	Dfedxrate, Dtot, Dinf, Dgfcf	-41.527**		0.02563

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

5.6 RESULTS AND DISCUSSION

This section includes the long run (lr) equation in levels (without differencing) and the vecm model's results. while the lr model has several shortcomings because the variables are not stationary at their current levels (except for interest rates and gdp growth), it does demonstrate significant relationships between export performance and its determinants.

5.6.2 LONG RUN ESTIMATION RESULTS

Table 12: Long Run Estimation Model (Totxval)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Export Value)	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*

Indirect Exchange Rate	-1.622***	-1.305***	-1.093***	-0.989***	-0.877***	-0.872***	-0.812***	-0.755***
	[0.171]	[0.109]	[0.097]	[0.131]	[0.108]	[0.109]	[0.138]	[0.148]
Terms of Trade		0.044***	0.042***	0.045***	0.017**	0.017**	0.017**	0.018**
		[0.005]	[0.004]	[0.005]	[0.007]	[0.007]	[0.007]	[0.007]
Inflation			-0.052***	-0.050***	-0.022**	-0.024**	-0.018	-0.011
			[0.010]	[0.010]	[0.010]	[0.012]	[0.014]	[0.016]
Interest Rates				0.015	0.003	0.003	0.001	0.004
				[0.013]	[0.011]	[0.011]	[0.011]	[0.011]
GFCF					0.000***	0.000***	0.000***	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.006	-0.011	-0.014
						[0.017]	[0.018]	[0.018]
Post-Apartheid							0.129	0.188
							[0.178]	[0.187]
Minimum Wages								0.219
								[0.206]
Constant	13.972***	10.072***	10.663***	10.302***	11.458***	11.485***	11.365***	11.310***
	[0.115]	[0.433]	[0.369]	[0.478]	[0.449]	[0.459]	[0.490]	[0.492]
N	49	49	49	49	49	49	49	49
R2	0.656	0.877	0.922	0.924	0.952	0.952	0.953	0.954
adj R2	0.649	0.872	0.917	0.917	0.947	0.945	0.945	0.945

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

Table 13: Long Run Estimation Model (Totxqty)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Export Quantity)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*

Indirect Exchange Rate	-1.079***	-0.904***	-0.721***	-0.701***	-0.611***	-0.615***	-0.501***	-0.450***
	[0.108]	[0.082]	[0.066]	[0.090]	[0.066]	[0.067]	[0.081]	[0.084]
Terms of Trade		0.025***	0.022***	0.023***	0.001	0	0.001	0.002
		[0.004]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Inflation			-0.045***	-0.044***	-0.022***	-0.021***	-0.01	-0.003
			[0.007]	[0.007]	[0.006]	[0.007]	[0.008]	[0.009]
Interest Rates				0.003	-0.006	-0.006	-0.009	-0.007
				[0.009]	[0.007]	[0.007]	[0.006]	[0.006]
GFCF					0.000***	0.000***	0.000***	0.000***
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						0.005	-0.004	-0.006
						[0.010]	[0.010]	[0.010]
Post-Apartheid							0.242**	0.295***
							[0.104]	[0.106]
Minimum Wages								0.198
								[0.117]
Constant	14.456***	12.302***	12.809***	12.738***	13.663***	13.644***	13.419***	13.369***
	[0.073]	[0.325]	[0.250]	[0.329]	[0.276]	[0.282]	[0.286]	[0.281]
N	49	49	49	49	49	49	49	49
R2	0.68	0.839	0.916	0.916	0.957	0.958	0.963	0.965

adj R2	0.673	0.832	0.91	0.908	0.952	0.952	0.956	0.958

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.0

In Table 12, Model 1 is the simplest specification, regressing Total Export Value (the dependent variable) on the exchange rate. Additional controls are gradually added until Model 8 is reached (the full specification). Additional controls include Terms of Trade, Inflation, Interest Rates, GFCF, and GDP Growth, as well as dummy variables for Post-Apartheid and Minimum Wages. Even when additional independent variables are included in the specification, the effect of exchange rate fluctuations on Total Export Value remains robust. By increasing the number of variables in the specification from Model 2 to Model 8, the coefficient of interest (Indirect Exchange Rate) remains robust but shrinks, reducing the amount of noise in the regression. The coefficient of determination (adjusted R2) also increases to 0.945, indicating that the model accounts for 94.5% of the Total Export Value (Model 8). As a result, a high degree of goodness of fit can be observed.

In Model 8, the coefficient of the Indirect Exchange Rate is -0.755, which is statistically significant at the 1% level. Given that the equation's Left-Hand Side (LHS) is logged (that is, the logarithm of Export Value), the coefficients on the Right-Hand Side (RHS) must be manipulated to be interpreted as elasticities. This is accomplished by first expressing the coefficient as a power of exponent, then subtracting one and multiplying by 100. As a result, a one-unit weakening of the exchange rate increases Total Export Value by 53%. This negative relationship is visible across all columns in Table 5.4, which is consistent with a priori expectations. This finding is consistent with Hasan et al. (2015), who discovered a positive correlation between export performance and exchange rates. Hasan et al. (2015) used the direct exchange rate, which results in a positive relationship rather than a negative relationship as in our study. Our findings are also consistent with Muthunga et al. (2017) and Wanguru (2019), who examined the effect of real exchange rates on fruit exportation in Kenya and discovered a negative relationship between the foreign exchange rate and horticultural export performance. While currency depreciation may temporarily reduce exports, it is expected to increase in the long run (Nguyen and Thuy, 2019). Hence, the positive effect of a weakening currency on export performance observed in our long-run estimates is consistent with a priori expectations, although Dincer and Kandil (2009) assert that this relationship may lose some traction over time (at least in the case of Turkey). Whereas Jordaan and Netshitenzhe (2015) assert that the effects of currency movements may be felt differently across sectors in South Africa, our findings indicate that depreciating the currency improves export performance in the fruit sector and vice versa.

Rwenyagila (2013) demonstrates that export performance is influenced by a variety of other factors – including inflation, GDP, interest, and terms of trade – in addition to exchange rate

movements. The Terms of Trade (TOT) coefficient is positive, statistically significant, and robust across all specifications. The TOT coefficient in Model 8 is 0.018, which is statistically significant at 5%. The TOT coefficient of 0.018 indicates that increasing the TOT by one unit increases the Total Export Value by 1.82%. As a result, a stronger TOT position benefits Total Exports Value as well. Inflation has a negative and significant effect on Models 3–6, which means that as prices rise in the domestic economy, the Total Export Value decreases – possibly reflecting production bottlenecks that drive prices up (cost-push inflation) and reduce exports out of South Africa. The result for TOT is consistent with Mendoza (1995) who argued that a "worsening TOT" results in decreased net exports and savings. Samimi et al. (2011) argue that changes in the TOT have a greater impact on trade performance than changes in the level. Nonetheless, our findings demonstrate the critical nature of TOT in South African fruit exports. In Model 6, the coefficient of inflation is -0.024, indicating that a unit increase in inflation reduces the value of fruit exports by 2.37%, highlighting the critical nature of reining in inflation. The coefficient of GFCF is 0.000, making it statistically significant at 1%. As a result, it has a negligible positive effect on Total Export Value, implying that increases in government investment can have a negligible effect on fruit export value. Unsurprisingly, GFCF (investment) has a beneficial effect on fruit export performance. Mukhtarov et al. (2019) discovered a positive relationship between investment and exports, though their focus was on FDI in this case. Interest rates, GDP growth, post-apartheid, and minimum wage dummies (introduced in 2003) are all statistically insignificant.

The same models and specifications are presented in Table 5.5, with the dependent variable changed to Total Export Quantity. The findings are largely consistent and robust. Exchange rates have a negative relationship with export performance. The only difference between Models 7 and 8 is that the post-apartheid dummy is positive and becomes statistically significant at 5% and 1%, respectively. In Model 8, the coefficient for the Post-Apartheid dummy is 0.295, indicating that fruit exports increased following South Africa's democratic transition. The end of international isolation and the opening up of more sectors of the economy to the majority of South Africans resulted in a positive effect on Total Export Quantity.

Table 14: Long Run Estimation Model (Stonexval)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Fruit Export Val)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*
Indirect Exchange Rate	-2.432***	-2.137***	-1.819***	-1.746***	-1.631***	-1.604***	-1.401***	-1.448***
	[0.207]	[0.173]	[0.160]	[0.217]	[0.208]	[0.209]	[0.261]	[0.282]
Terms of Trade		0.041***	0.037***	0.039***	0.011	0.012	0.013	0.013
		[0.008]	[0.006]	[0.008]	[0.013]	[0.013]	[0.013]	[0.013]
Inflation			-0.078***	-0.076***	-0.048**	-0.059**	-0.04	-0.046
			[0.017]	[0.017]	[0.020]	[0.022]	[0.026]	[0.030]
Interest Rates				0.011	-0.001	-0.005	-0.01	-0.012
				[0.021]	[0.020]	[0.021]	[0.021]	[0.022]
GFCF					0.000**	0.000**	0.000**	0.000*
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.035	-0.049	-0.047
						[0.032]	[0.034]	[0.035]
Post-Apartheid							0.432	0.384
							[0.336]	[0.355]
Minimum Wages								-0.18
								[0.392]
Constant	11.071***	7.442***	8.326***	8.070***	9.256***	9.402***	9.000***	9.045***

	[0.139]	[0.688]	[0.603]	[0.792]	[0.867]	[0.876]	[0.923]	[0.938]
N	49	49	49	49	49	49	49	49
R2	0.747	0.844	0.894	0.895	0.909	0.912	0.915	0.916
adj R2	0.741	0.837	0.887	0.885	0.899	0.899	0.901	0.899

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

Table 15: Long Run Estimation Model (Stonexqty)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Stone Fruity Export Qty)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*
Indirect Exchange Rate	-2.036***	-1.865***	-1.574***	-1.598***	-1.501***	-1.493***	-1.258***	-1.314***
	[0.148]	[0.137]	[0.115]	[0.157]	[0.146]	[0.148]	[0.179]	[0.192]
Terms of Trade		0.024***	0.020***	0.020***	-0.004	-0.004	-0.003	-0.003
		[0.006]	[0.005]	[0.006]	[0.009]	[0.009]	[0.009]	[0.009]
Inflation			-0.071***	-0.072***	-0.048***	-0.052***	-0.03	-0.038*
			[0.012]	[0.013]	[0.014]	[0.016]	[0.018]	[0.020]
Interest Rates				-0.003	-0.014	-0.015	-0.021	-0.023
				[0.015]	[0.014]	[0.015]	[0.014]	[0.015]
GFCF					0.000***	0.000***	0.000**	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.012	-0.029	-0.026
						[0.023]	[0.023]	[0.024]
Post-Apartheid							0.498**	0.439*
							[0.231]	[0.243]
Minimum Wages								-0.218
								[0.268]

Constant	11.014***	8.908***	9.716***	9.799***	10.798***	10.847***	10.383***	10.438***
	[0.100]	[0.543]	[0.436]	[0.574]	[0.610]	[0.622]	[0.634]	[0.640]
N	49	49	49	49	49	49	49	49
R2	0.801	0.851	0.915	0.915	0.932	0.932	0.939	0.94
adj R2	0.797	0.844	0.91	0.908	0.924	0.922	0.928	0.928

NOTES*: $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

The long-run results for Stone Fruit Export Value and Stone Fruit Export Quantity are presented in Tables 14 and 15, respectively. The results corroborate those of the major long-run regressions that take into account total export values and quantities for all fruits. When both Stone Fruit Export Values (Table 14) and Stone Fruit Export Quantity (Table 15) are used as endogenous variables, the results are broadly consistent with those in Tables 12 and 13. The coefficient of the Indirect Exchange Rate is negative and statistically significant at the 1% level in both Table 14 and Table 15 eight columns. This illustrates the expected inverse relationship between export performance and exchange rate fluctuations. The terms of trade (TOT) are largely positive and significant, while the inflation rate (INF) is negative and significant – also in line with expectations.

Table 16: VECM estimates

	Totxval *β/[S.E]*	**Totxqty** *β/[S.E]*	**Stonexval** *β/[S.E]*	**Stonexqty** *β/[S.E]*
Indexrate (-1)	-13029.9510	66116.9969	-1671.4377	6057.8561
	[308882.4231]	[266068.7990]	[25878.2770]	[18201.1744]
Tot (-1)	1757.5781	-4720.8413	-175.2878	-287.3548
	[5128.7600]	[4468.6719]	[437.3513]	[309.3739]
Inf (-1)	3727.4175	15884.2020	191.8555	821.3330
	[7974.6937]	[7700.5196]*	[673.8813]	[495.2657]
Totxval (-1)/Totxqty (-1)	0.1258	-0.1031	-0.1335	-0.0980
	[0.1749]	[0.1430]	[0.1654]	[0.1733]
ECT	-0.1193	-0.2178	-0.2136	-0.1463
	[0.0936]	[0.0664]**	[0.1247]	[0.1187]
Constant	-378549.6732	-176945.8923	-38347.0560	-2932.0629
	[329648.6002]	[76114.5167]*	[24039.0848]	[4215.2527]
N	49	49	49	49
AIC	1036.276	1043.77	818.7302	788.0282
BIC	1086.23	1093.724	868.6842	837.9822
SSR	606484571403	475445674193	4516716511	2281213983

The VECM estimation was carried out using the VECM function included in the tsDyn package of R. In contrast to ECM, which uses a single equation, VECM estimates a set of equations equal to the number of variables in the dataset. In other words, the VECM function solves equations by treating each variable as a dependent variable. The results in Table 14 are only for the equations in which the dependent variables are Total Export Value (Totxval), Total Export Quantity (Totqty), Stone Fruit Export Value (Stonexval), and Stone Fruit Export Quantity (Stonexqty) (see Figure 3A to 3D in the Appendices for full VECM results). The Totxval, Stonexval, and Stonexqty columns in Table 15 is not statistically significant, which means that changes in exchange rates, TOT, inflation, and total export value from the previous year do not affect the current year's Total Export Values, Stone Fruit Export Values, and Stone Fruit Export Quantities. However, for Total Export Quantity (Totxqty) (the final column in Table), inflation from the previous year [Inf (-1)] has a positive effect on the current year's Total Export Quantity. Inf (-1) has a positive coefficient of 15884.2020 in the Totxqty column, which is significant at the 10% level.

The study's findings emphasize the critical importance of prudent currency management, given the statistically significant and robust relationship between currency movements and fruit export performance. Exports' sensitivity to currency depreciation enables the South African Reserve Bank (SARB) to devalue the currency to boost fruit export revenue and contribute to GDP growth within an expansionary monetary/fiscal policy framework.

Additionally, the findings underscored the critical nature of a favourable Terms of Trade (TOT) position. Increases in the TOT may indicate increased demand for the country's exports, which results in higher prices. Given the significance of TOT in increasing fruit export performance, South African fruit farmers may be motivated to improve the quality of their products to increase the country's fruit's international market price, and thus increase TOT, which is the ratio of export to import prices. The TOT is essentially a measure of what a country can purchase in terms of exports per rand.

Additionally, the study established the importance of inflation in the domestic market, demonstrating that an increase in the price of goods and services results in a decrease in exports, as inflation reduces the competitiveness of goods relative to substitutes and alternatives from other countries. As a result, inflation is a critical variable that policymakers such as the SARB and the departments of Finance and Agriculture may need to consider carefully.

5.7 SUMMARY

This chapter discussed the findings, analysis, and interpretation. Numerous preliminary and descriptive tests were conducted to ensure that the data table was understood and that the appropriate statistical approach was chosen. Unit root and cointegration tests indicate that the data was of order 1, implying the use of a Vector Error Correction Model (VECM) in addition to the long OLS model. The long-run OLS regression revealed, among other things, that a weakening exchange rate has a positive effect on both export values and export quantities. The signs of inflation, TOT, and GFCF (as control variables) coefficients were also consistent with their a priori expectations. The following chapter summarises the study's findings, conclusions, and policy recommendations.

CHAPTER 6
SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATIONS

6.4 INTRODUCTION

The study examined the effect of real exchange rates on the factors affecting South African fruit exports from 1971 to 2019. This chapter summarises the findings of the study and makes policy recommendations. Finally, suggestions for future research are made.

6.5 SUMMARY

Exports are a critical component of modern economies. They are significant factors that contribute to national income, and countries must seek ways to increase exports and, ultimately, national income by improving citizens' living conditions. As a result, it is critical to have a firm grasp of the factors that influence export performance. According to economic theory, exchange rate movements and exports have an inverse relationship. Regardless, an empirical case exists to examine how this relationship manifests in the real world. There has already been empirical research on the determinants of export performance in both developed and developing economies. However, little research has been conducted in South Africa on the determinants of the value and quantity of fruit exports.

Following the formulation of research questions and the articulation of the research contribution in Chapter 1, Chapter 2 of the study provided an overview of fruit farming in South Africa to help establish the broader context within which events transpire. Chapter 3 discussed the study's theoretical and empirical contributions. Chapter 4 described the methodology for addressing the stated research questions, as well as a description of each variable considered and/or used in the descriptive and regression analyses. Finally, Chapter 5 discussed the study's findings, as well as the analysis and interpretation of the OLS and VECM estimation. Chapter 6 concludes and recommends how the determinants of fruit exports have a direct impact on the South African fruit industry's export performance.

6.6 CONCLUSIONS

South Africa has gone through periods of major changes in the past years. Tis country has both negeative and positive trade balance from 1971 t0 2019, until the trade balance became better in 2020. South Africa has experienced structural changes as the agricultural employment declined over the years. Positive significant relationship with fruit export and real exchange rates of the hypotheses. South Africa as developing country produce fresh fruit classified as of low – value. The country do not earn as much foreign currency as expected. A change in weather patterns influenced the quantity and quality of supply. South African government formulated policies on industrialization focusing on value addition, export diversification and boosting export performance.

The study examined the effect of the real exchange rate and its determinants on South Africa's fruit export performance. The objectives of this study was to determine wether the real exchange rates have positive or negative relationships on fruit expots performance and commercial economic growth. The study included other vriables of terms of trade, inflation, interest rates gross fixed capital formationand gross domestic product. The objectives were addressed by empirical nalysis of the secondary data by World Bank from 1971 to 2019. To examine the data, the study ran the regression analysis and Johansen cointegration to establish if there are long run relationships amongst variables. The granger causality test was used to test the direction of the variables.

The long-run OLS estimation indicated that the inverse relationship between a country's currency value and export performance is indeed true. It was discovered that a depreciating real exchange rate improves export performance and vice versa. Additionally, the study discovered that a strong Terms of Trade (TOT) benefited exports, whereas high rates of inflation harmed them. Moreover, it was discovered that Gross Fixed Capital Formation (GFCF) has a small but significant effect on stimulating exports. Given that the data were not stationary at the levels but were co-integrated at the first difference, the study implemented a VECM model to account for this. The VECM results were insufficiently robust, implying that short-run dynamics may have a negligible effect on South Africa's export performance.

6.7 POLICY RECOMMENDATIONS

The following policy recommendations are made in light of the study's findings:

- The study recommends availability on South African DAFF and DTI website as most of data is not update, however, the data from ITC is used for South Africa's fruit export performance and competitiveness.
- The study considered only South Africa, would deliberate on implementing the study on trading partners to improve sthe impact of agricultural export sector.
- Where necessary, authorities may consider the voluntary devaluation of the Rand to boost exports, as this increases exports.
- Government should make policy changes to reflect on performance with major trading partners of Europe, Asia, Middle East, East Africa and West Afrca.
- An estimation of the impact of the exchange rate volatility on exports, has both positive and negative relationships to be expected irrespective of the country's technique used and the estimation period.
- South African data restricted the number of years for the study.
- The study should further consider increasing the number of years of the study as this study only used data from 1971 – 2019..
- Addressing structural restrictions throughout the fruits value chain, from cultivation to processing, may also contribute to cost-push inflation reduction, thereby boosting exports by allowing fruits to be sold at affordable prices in foreign markets.
- The study found that government spending in the form of Gross Fixed Capital Formation (GFCF) has a small but positive effect on fruit exports. Therefore as result, the government and other stakeholders should work to improve transportation and associated infrastructure through increased public investment to streamline logistics and boost export performance.
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6.8. SUGGESTIONS FOR FUTURE RESEARCH

Given the study's relatively small time series sample size of 49 years, future research on the determinants of export performance in several countries in Sub-Saharan Africa may generate more variation and statistical power. Further research may implement this using a longitudinal analysis procedure, which may address some of the difficulties associated with time series analysis, such as the study's weak VECM estimation results.

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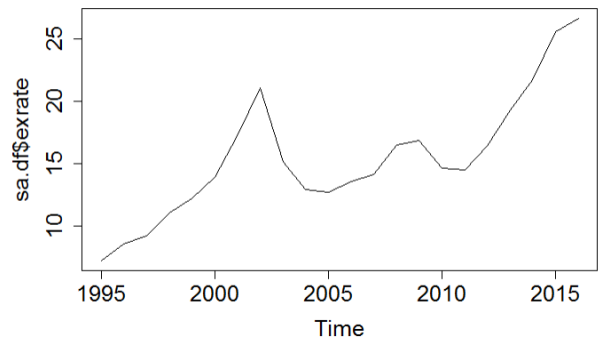
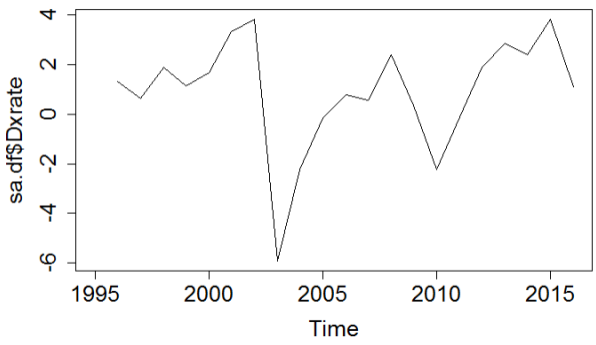
APPENDIX 01

Table A Stationarity

Exchange Rate	
	
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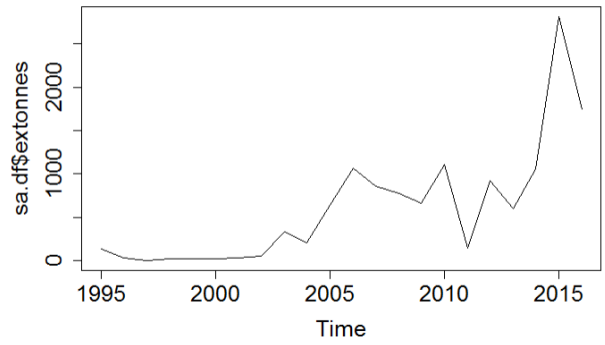	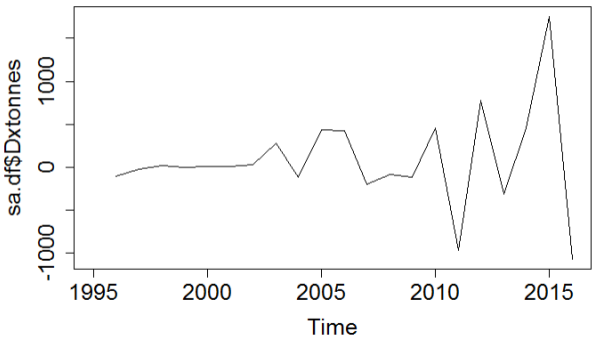
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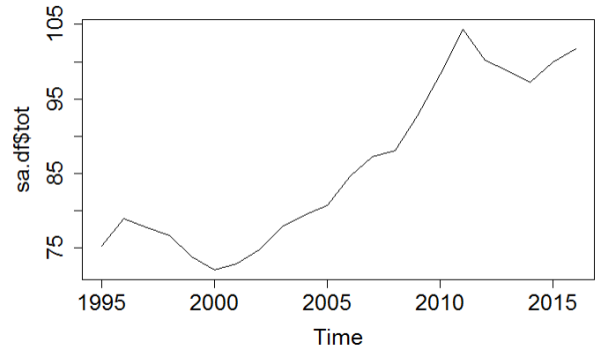
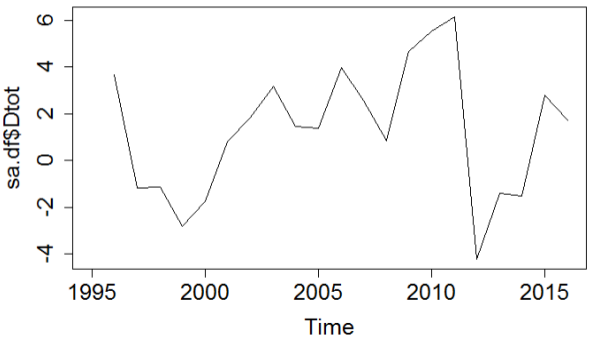
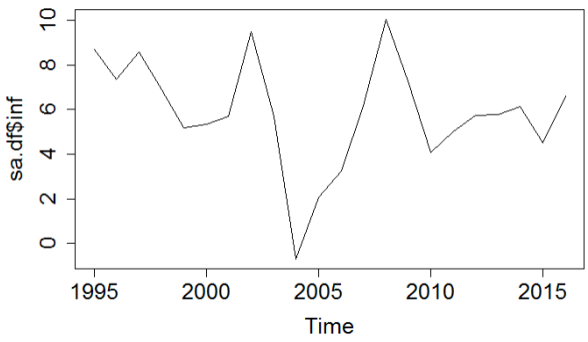
	
Inflation	



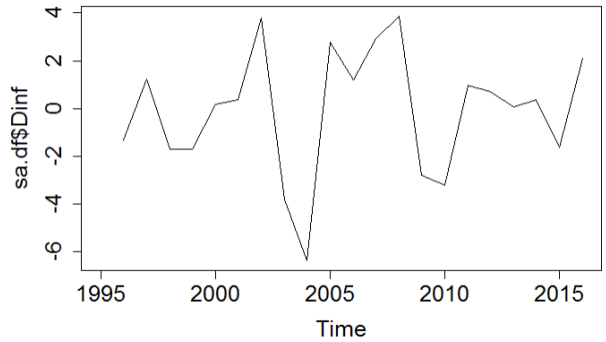
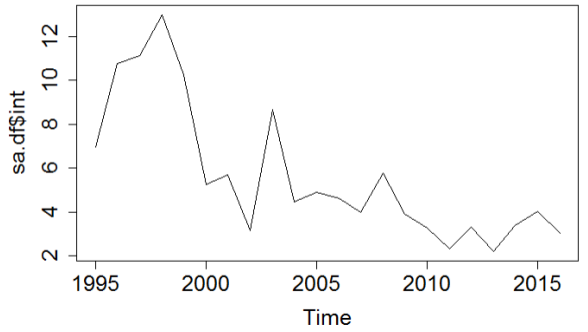
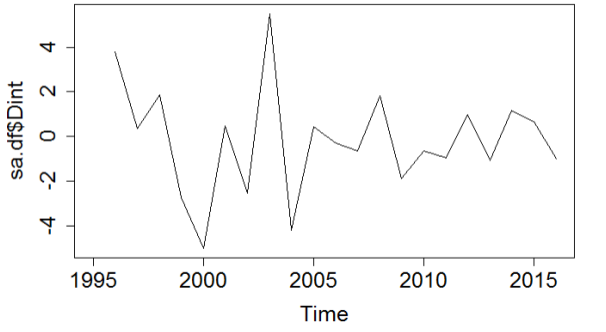
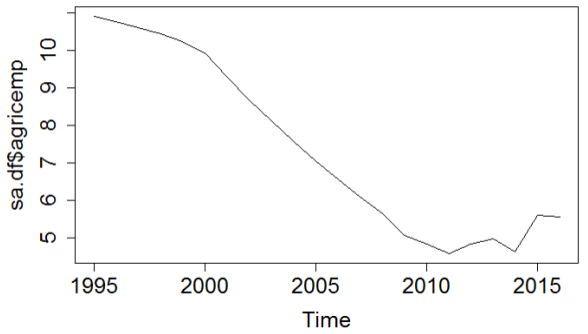
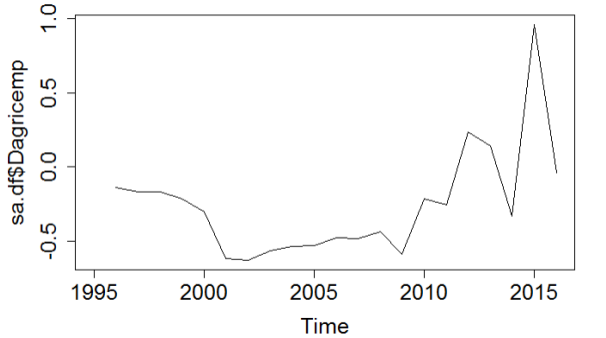
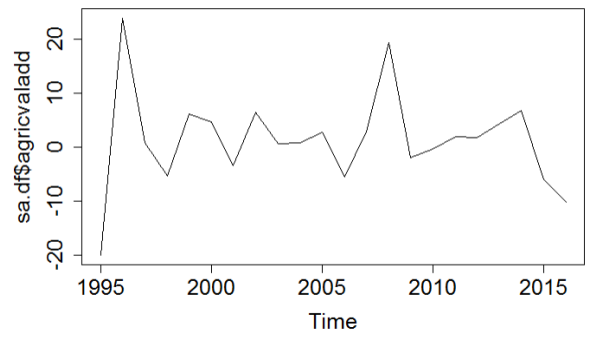
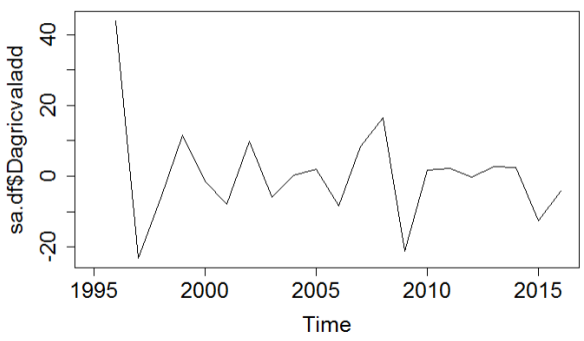


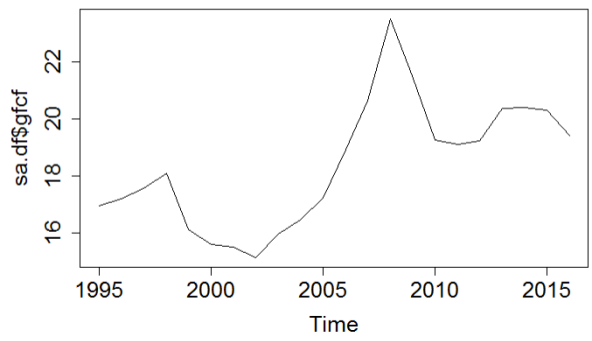
Table 5.1B Stationarity

Real Interest Rates	
	
Employment in Agriculture	
	
Agriculture Value Added	





Gross Fixed Capital Formation



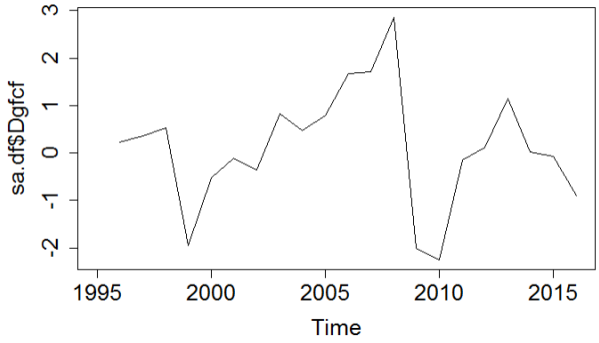
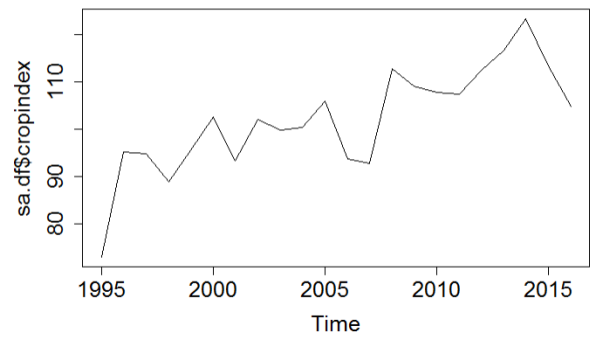
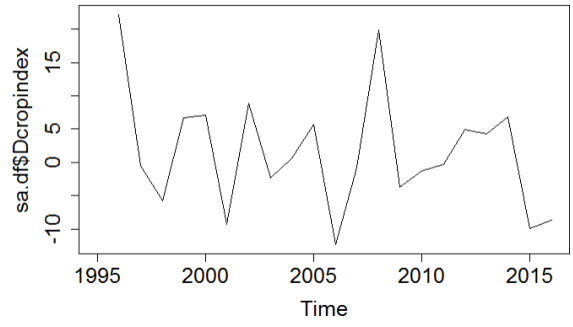


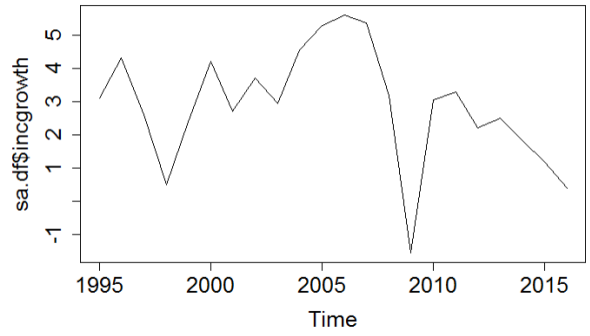
Table 5.1C Stationarity

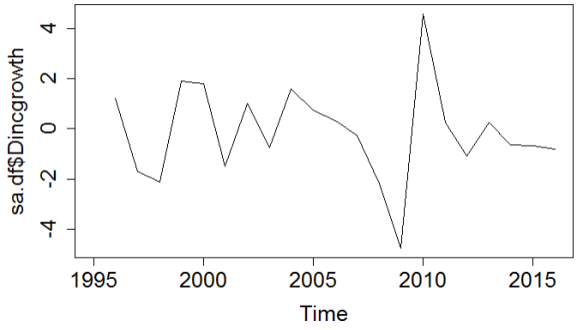
Crop Production Index



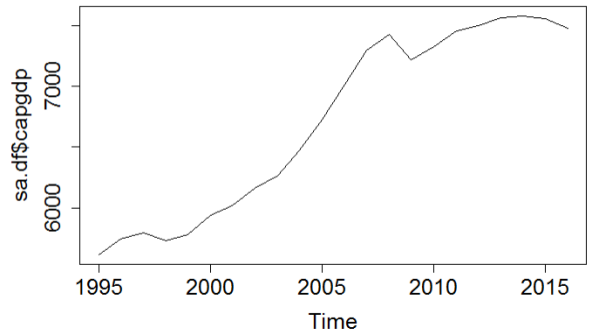


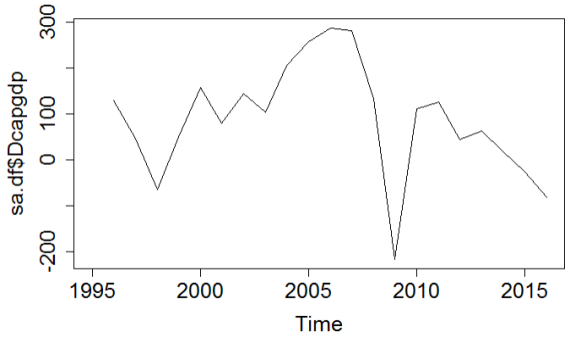
GDP Growth



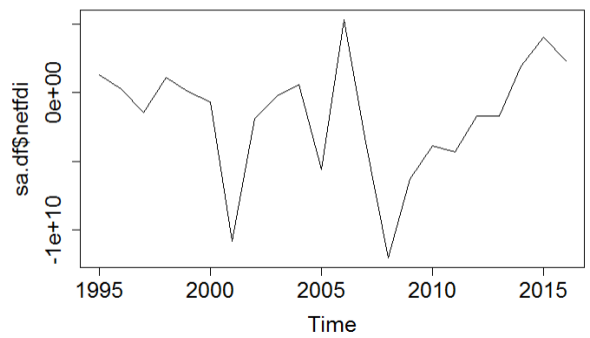


Per Capita GDP





Net FDI



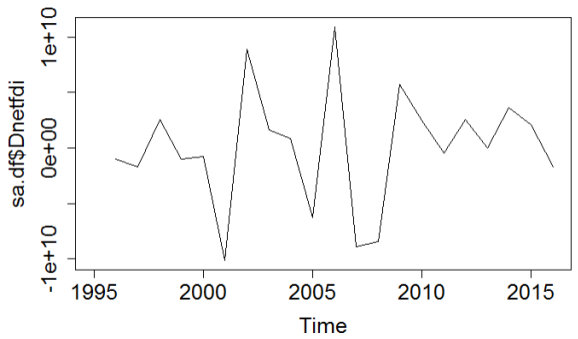
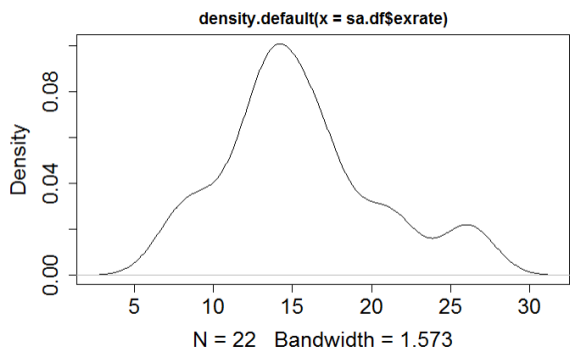


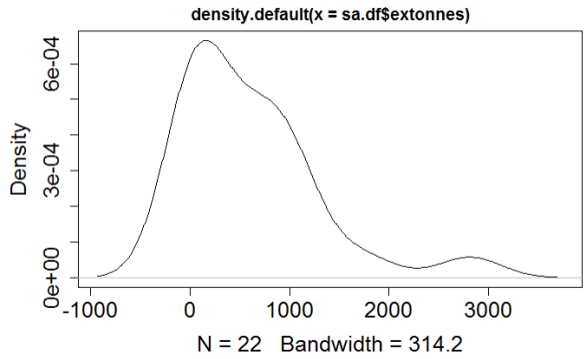
Figure 1A1 Testing for Normality

A

Exchange Rates

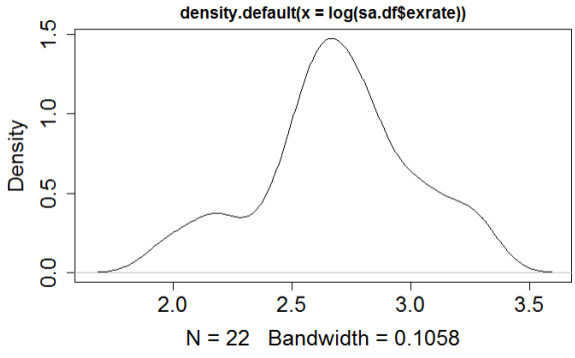


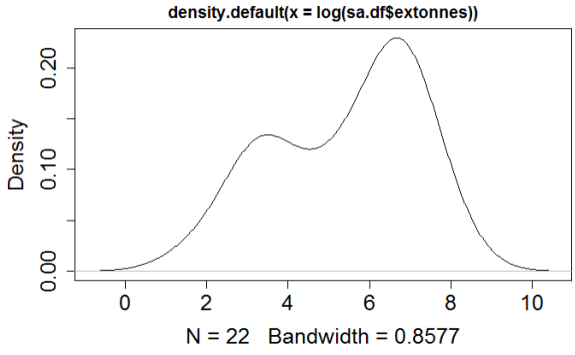
Export Tonnes

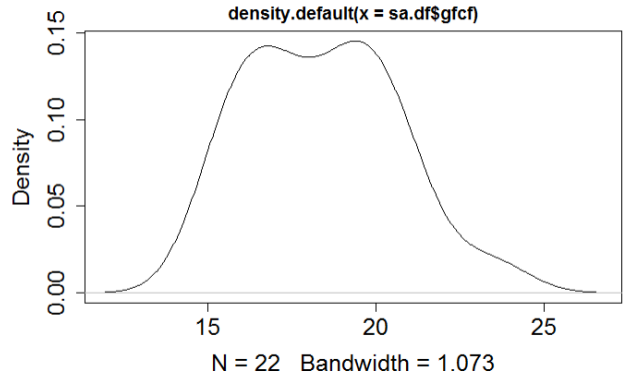


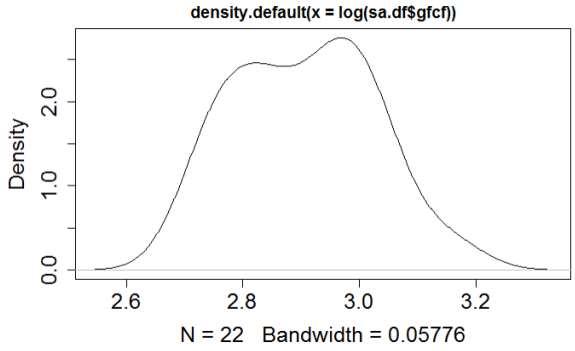
Gross Fixed Capital Formation

B









ANNEXURE 2:

Imprting Countries

Importers	Select your indicators											
	Value exported in 2019 (USD thousand)	Trade balance 2019 (USD thousand)	Share in South Africa's exports (%)	Growth in exported value between 2015-2019 (%, p.a.)	Growth in exported value between 2018-2019 (%, p.a.)	Ranking of partner countries in world imports	Share of partner countries in world imports (%)	Total imports growth in value of partner countries between 2015-2019 (%, p.a.)	Average distance between partner countries and all their supplying markets (km)	Concentration of all supplying countries of partner countries	Average tariff (estimated) faced by South Africa (%)	
World	3,425,443	3,241,357	100	6	-8		100	5				

Netherlands	621,128	620,720	18.1	4	-15	4	5.5	9	6,397	0.05	2.8
United Kingdom	466,624	466,109	13.6	2	-13	5	4.7	1	5,164	0.06	2.8
China	242,930	240,844	7.1	48	8	2	8.6	19	8,297	0.14	14.6
Hong Kong, China	179,954	179,953	5.3	-2	-15	9	3.4	4	11,150	0.16	0
United States of America	178,576	157,858	5.2	14	-1	1	14.5	6	4,656	0.22	0
United Arab Emirates	160,093	159,441	4.7	-4	-4	16	1.7	1	6,647	0.1	1.4
Russian Federation	147,987	147,935	4.3	7	-15	7	3.8	9	6,500	0.09	3.4
Germany	119,987	119,624	3.5	8	-3	3	7.9	3	4,767	0.08	2.8
Saudi Arabia	117,280	116,561	3.4	4	9	19	1.2	3	6,727	0.07	1.4

Canada	108,459	108,310	3.2	10	2	8	3.6	2	4,445	0.2	1.1
Malaysia	101,324	101,083	3	1	5	30	0.6	5	6,821	0.1	5.9
Bangladesh	75,025	75,025	2.2	23	17	41	0.4	15	4,328	0.29	22.3
Viet Nam	61,407	52,081	1.8	3	-6	15	2.2	18	7,691	0.12	17.4
Portugal	57,223	57,114	1.7	12	-20	27	0.6	11	3,358	0.29	2.8
Italy	47,029	44,392	1.4	8	-15	10	2.8	2	4,578	0.09	2.8
France	45,047	44,836	1.3	2	-6	6	4.3	3	3,647	0.12	2.8
Nigeria	39,831	39,801	1.2	-9	15	101	0.04	-9	4,975	0.59	19.1
Iraq	38,536	38,536	1.1		75	44	0.4	4	3,864	0.16	
Singapore	37,035	36,882	1.1	-1	-12	35	0.5	0	6,470	0.08	0
Japan	34,119	34,118	1	1	-22	12	2.6	4	7,963	0.16	8.9
Spain	33,361	12,528	1	21	-20	11	2.6	6	5,678	0.08	2.8

Botswana	31,136	31,133	0.9	8	6	114	0.02	4	535	0.99	0
Kuwait	25,548	25,548	0.7	-8	0	39	0.4	1	5,695	0.09	1.4
India	24,323	22,396	0.7	21	-10	14	2.2	3	8,015	0.12	32.2
Senegal	23,050	23,050	0.7	16	18	110	0.03	19	4,199	0.26	19.1
Namibia	21,818	15,579	0.6	2	-1	116	0.02	1	1,512	0.93	0
Kenya	20,925	20,849	0.6	4	-5	115	0.02	9	3,690	0.35	24.9
Qatar	18,519	18,518	0.5	33	-1	56	0.2	11	5,813	0.06	1.4
Ireland	18,443	18,443	0.5	7	-19	43	0.4	4	3,566	0.1	2.8
Norway	17,891	17,891	0.5	10	-22	32	0.6	0	5,665	0.07	3.8
Oman	17,651	17,634	0.5	19	4	58	0.2	15	2,797	0.17	1.4
Mauritius	16,628	16,628	0.5	9	-6	111	0.03	10	5,556	0.31	0
Belgium	14,921	14,665	0.4	7	-11	13	2.5	1	5,419	0.07	2.8

Mozambique	14,262	-28,814	0.4	6	15	149	0	4	1,316	0.86	0
Indonesia	14,201	12,749	0.4	22	7	20	1.1	23	6,193	0.33	6.7
Taipei, Chinese	14,145	14,145	0.4	-1	-8	26	0.7	1	9,845	0.22	35.8
Algeria	12,074	12,035	0.4	0	0	67	0.2	-7	7,341	0.25	30
Zambia	11,944	11,639	0.3	-3	-3	130	0.01	-3	1,650	0.91	0
Israel	11,797	10,362	0.3	55	43	51	0.3	8	8,166	0.25	23.9
Switzerland	11,324	11,324	0.3	15	-53	21	0.9	0	3,921	0.12	16.7
Denmark	9,046	9,046	0.3	23	-14	28	0.6	4	1,937	0.16	2.8
Angola	8,510	8,189	0.2	-10	-32	121	0.01	-3	4,208	0.39	50
Côte d'Ivoire	7,679	7,458	0.2	9	7	126	0.01	4	4,621	0.28	19.1
Sri Lanka	7,392	7,152	0.2	16	14	88	0.05	-4	5,590	0.14	30.1
Bahrain	7,364	7,364	0.2	-7	-1	71	0.1	3	5,414	0.07	1.4

Eswatini	7,159	499	0.2	3	4	148	0	5	632	0.88	0
Lesotho	6,920	6,558	0.2	6	-10	162	0	-4	369	1	0
Korea, Republic of	6,755	6,754	0.2	-4	-45	18	1.3	2	9,744	0.24	46.6
Sweden	6,694	6,694	0.2	-17	1	24	0.8	-1	3,178	0.09	2.8
Togo	6,646	6,646	0.2	30	17	186	0	-7	3,564	0.39	19.1
Australia	6,120	4,766	0.2	-3	-47	31	0.6	-2	10,212	0.14	1.2
Ghana	5,856	5,854	0.2	-8	-33	146	0	1	4,923	0.5	19.1
Greece	5,398	4,439	0.2	8	-3	48	0.3	5	6,577	0.13	2.8
Cameroon	5,334	5,334	0.2	7	-7	154	0	7	4,712	0.56	30
Zimbabwe	5,265	-4,515	0.2	-18	-28	191	0	-45	1,131	0.96	1.8
Finland	5,083	5,083	0.1	3	8	42	0.4	3	5,346	0.08	2.8
Ukraine	4,360	4,360	0.1	-6	-18	36	0.5	9	5,087	0.11	4.9
Gabon	4,012	4,012	0.1	-3	-6	158	0	-3	4,106	0.44	30
Maldives	3,381	3,381	0.1	22	27	92	0.05	11	3,565	0.15	1.7

Uganda	3,269	3,267	0.1	10	-2	141	0	11	3,186	0.36	24.9
Congo, Democratic Republic of the	3,024	3,024	0.1	4	-11	168	0	1	3,387	0.53	10
Congo	2,868	2,868	0.1	3	54	178	0	-14	3,928	0.48	20
Lithuania	2,625	2,625	0.1	-11	34	49	0.3	-7	2,583	0.08	2.8
Malawi	2,587	-6,595	0.1	16	20	169	0	15	1,674	0.54	11
Seychelles	1,931	-2,610	0.1	2	-26	137	0	10	5,315	0.17	4.4
Turkey	1,792	-1,587	0.1	15	-12	46	0.3	1	7,401	0.1	62.9
Jordan	1,790	1,715	0.1	-2	54	55	0.2	-3	4,448	0.1	31.1
Tanzania, United Republic of	1,728	580	0.1	-7	-36	142	0	3	3,495	0.25	0
New Zealand	1,552	-515	0	2	4	54	0.2	0	9,843	0.13	0.1
Austria	1,547	1,547	0	25	115	22	0.9	4	3,372	0.08	2.8
Ethiopia	1,374	1,252	0	28	67	153	0	27	3,150	0.27	30

Luxembourg	1,270	1,270	0	24	99	65	0.2	-3	4,792	0.15	2.8
Gambia	1,161	1,161	0	43	18	203	0	1	5,806	0.18	19.1
Mali	1,096	1,096	0	5	-4	144	0	7	2,857	0.16	19.1
Belarus	1,042	1,042	0	35	515	34	0.5	-17	2,966	0.11	3.2
Bulgaria	1,040	1,039	0	7	-5	62	0.2	13	2,557	0.16	2.8
Thailand	1,028	758	0	-3	-50	25	0.7	1	5,422	0.22	51.7
Georgia	974	941	0	-43	57	105	0.04	8	5,330	0.17	11.2
Poland	959	349	0	25	153	17	1.3	8	4,743	0.06	2.8
Myanmar	954	898	0	80	146	96	0.04	4	3,304	0.69	14.8
Area Nes	918	260	0	101	-29						
Benin	909	-1,096	0	-38	-18	181	0	-9	3,221	0.2	19.1
Romania	900	900	0	-7	-24	33	0.5	9	1,413	0.1	2.8
Djibouti	899	899	0	25	46	135	0	10	2,570	0.29	3.8
Madagascar	880	-365	0	8	-16	176	0	8	4,606	0.33	19.7

Guinea	877	877	0	40	120	165	0	17	5,044	0.18	19.1
Lebanon	855	831	0	-25	-32	72	0.1	-2	5,303	0.1	60.8
Burkina Faso	833	256	0	40	-3	173	0	-5	2,432	0.4	19.1
Somalia	746	746	0		209	123	0.01	10	2,610	0.4	
Mexico	691	682	0		46	23	0.9	5	2,720	0.66	19.1
Slovenia	683	683	0	-10	-17	59	0.2	5	3,733	0.08	2.8
Azerbaijan	649	649	0	5	-51	77	0.09	34	5,369	0.14	17.3
Niger	618	618	0	19	689	151	0	16	2,296	0.45	19.1
Brazil	588	-388	0	-29	-82	38	0.5	-3	5,561	0.17	10.4
Philippines	525	-2,040	0	81	-21	45	0.4	20	4,620	0.48	7.5
Cambodia	474	474	0	-36	48	139	0	0	6,685	0.11	7
Malta	386	386	0	4	9	109	0.03	3	3,030	0.22	2.8
Liberia	369	369	0	-35	213	180	0	-16	4,944	0.15	7.5
Morocco	330	198	0	34	-52	53	0.2	23	4,258	0.11	31.8

Montenegro	313	313	0	-10	-6	112	0.02	3	4,840	0.08	12.5
Guyana	300	300	0	186	-4	172	0	20	5,390	0.81	37.7
Czech Republic	295	295	0	39	-69	29	0.6	5	3,528	0.07	2.8
Latvia	273	273	0	5	-59	68	0.2	3	1,690	0.1	2.8
Guinea-Bissau	270	-146	0	22	-32	204	0	13	5,734	0.56	19.1
Egypt	251	-7,355	0	-41	-72	37	0.5	-4	2,889	0.15	37.8
Mongolia	182	182	0		347	118	0.02	9	5,842	0.15	5
Tunisia	180	175	0	-9	-44	104	0.04	20	7,680	0.19	34.9
Syrian Arab Republic	165	165	0			94	0.05	9	1,388	0.25	32.6
Moldova, Republic of	162	162	0	17	78	89	0.05	3	4,547	0.11	11
Sudan	161	161	0	4	-13	124	0.01	-22		0.28	
Saint Helena	150	150	0	-9	-9	214	0	-8	4,172	0.85	

Equatorial Guinea	146	146	0	-27	27	175	0	-7	4,379	0.7	29.9
Mauritania	145	145	0	-34	-3	138	0	-1	2,947	0.12	5
Kazakhstan	127	127	0	-13	-50	47	0.3	0	2,609	0.24	3.2
Comoros	109	109	0	29	5	211	0	-8	3,222	0.32	5
Timor-Leste	96	96	0	142	-52	177	0	-7	4,590	0.37	2.5
Croatia	90	90	0	-27	-40	60	0.2	6	1,875	0.1	3.4
Cyprus	71	71	0	-34	47	90	0.05	8	2,853	0.29	2.8
Uruguay	63	63	0	4	9	102	0.04	7	4,491	0.19	9.9
French Polynesia	61	61	0		337	156	0	8	7,798	0.24	6.5
Peru	61	49	0		-52	78	0.09	3	3,398	0.41	5.9
Serbia	61	47	0			61	0.2	7	4,276	0.07	12.6
Brunei Darussalam	58	58	0		-21	108	0.03	7	3,641	0.3	0

Estonia	57	57	0	60	18	74	0.1	6	4,168	0.06	2.8
Chad	45	45	0	565	-51	193	0	6	3,420	0.18	30
Albania	39	39	0	-38	-69	106	0.03	10	5,089	0.26	9.8
Rwanda	39	39	0	-4	106	155	0	4	1,389	0.49	24.9
Sierra Leone	36	36	0	-12	-7	196	0	-5	4,231	0.23	17.7
Argentina	33	-205	0	12	-87	57	0.2	-1	3,490	0.32	9.9
British Indian Ocean Territory	20	20	0		631	213	0			0.83	
Nepal	18	18	0			69	0.1	17	2,151	0.36	10.7
Chile	18	-1,663	0	-29	-96	63	0.2	5	4,742	0.27	6
Armenia	17	17	0	-8	-81	93	0.05	26	4,771	0.16	3
Uzbekistan	15	15	0	4	-87	100	0.04		9,654	0.36	60.7
Ship stores and bunkers	12	12	0	44	-93	147	0	30		0.47	

British Virgin Islands	10	10	0	21		179	0	6	2,740	0.55	
Costa Rica	10	-22	0			82	0.07	0	3,832	0.16	12.2
Papua New Guinea	8	8	0	54	-14	160	0	-8	3,966	0.51	13.3
Hungary	2	2	0			52	0.2	6	1,127	0.1	2.8
Burundi	1	1	0	6		215	0	-26	1,683	0.31	24.9
French Southern and Antarctic Territories	1	1	0	76		219	0	97		0.62	
Guatemala		-2				84	0.06	1	4,147	0.29	13.1
Colombia		-9				66	0.2	1	4,686	0.35	14.4
Suriname		-26				170	0	-7	6,266	0.34	37.7
Afghanistan		-274				97	0.04	44	2,031	0.28	26.9

Bolivia, Plurinational State of		-401				120	0.02	-3	2,113	0.4	14.3
Iran, Islamic Republic of		-487				40	0.4	6	2,667	0.52	41.9
South Africa		-687				70	0.1	7	5,857	0.1	
Ecuador		-2,858				76	0.10	11	4,037	0.53	20.5
Pakistan		-5,738				64	0.2	-9	1,589	0.6	17.6
Slovakia						50	0.3	5	3,455	0.06	2.8
Yemen						73	0.1	46	1,679	0.64	23.1
Palestine, State of						75	0.1	7	403	0.87	20.5
Bosnia and Herzegovina						79	0.09	7	4,941	0.08	7.8

El Salvador						80	0.08	8	1,981	0.18	13.1
Libya, State of						81	0.08	-4	3,060	0.2	0
Kyrgyzstan						83	0.06	37	3,073	0.26	3.4
Panama						85	0.06	11	3,645	0.26	9
Macao, China						86	0.06	17		0.14	0
Dominican Republic						87	0.06	6	3,804	0.51	19.6
Korea, Democratic People's Republic of						91	0.05	3	842	1	
Iceland						95	0.04	6	6,094	0.07	0
Lao People's Democratic						98	0.04	200	591	0.5	12

Republic												
Honduras						99	0.04	5	2,995	0.22	13.1	
Macedonia, North						103	0.04	5	5,544	0.14	20.9	
Free Zones						107	0.03	6		0.69		
Trinidad and Tobago						113	0.02	2	5,025	0.39	38	
Turkmenistan						117	0.02	10	1,899	0.6		
Aruba						119	0.02	9	3,318	0.48	0	
Barbados						122	0.01	2	4,111	0.43	27.2	
Curaçao						125	0.01	7		0.26		
Tajikistan						127	0.01	-5	8,403	0.39	8.1	
Bermuda						128	0.01	7	2,124	0.98	2.9	

Bahamas						129	0.01	8	2,108	0.97	8.6	
Paraguay						131	0.01	2	1,679	0.52	9.9	
Cabo Verde						132	0.01	16	3,121	0.6	0.3	
Nicaragua						133	0	-4	3,517	0.24	13.1	
Haiti						134	0	0	482	0.85	18.2	
Fiji						136	0	9	4,579	0.33	5.3	
Andorra						140	0	6	356	0.97		
Jamaica						143	0	7	5,416	0.44	37.7	
New Caledonia						145	0	1	6,705	0.28		
Venezuela, Bolivarian Republic of						150	0	-32	7,821	0.33	12.4	
Antigua and						152	0	9	2,838	0.46	36.9	

Barbuda											
Greenland						157	0	5	3,361	0.97	
Cayman Islands						159	0	15	2,458	0.9	18.3
Faroe Islands						161	0	4	1,244	0.96	
Cuba						163	0	10	4,675	0.38	6.1
South Sudan						164	0	58		0.88	
Turks and Caicos Islands						166	0	37	2,592	0.92	
United States Minor Outlying Islands						167	0	9		0.22	
Saint Lucia						171	0	4	4,217	0.8	37.6
Gibraltar						174	0	0	688	0.72	

Central African Republic						182	0	28	5,648	0.29	30	
Samoa						183	0	4	5,522	0.44	14.8	
Saint Kitts and Nevis						184	0	-6	1,901	0.22	24.3	
Tonga						185	0	31	3,148	0.65	1.6	
Saint Vincent and the Grenadines						187	0	5	4,526	0.4	37.7	
Dominica						188	0	15	4,873	0.45	41.1	
Northern Mariana Islands						189	0	63	2,719	0.54		
Bhutan						190	0	7	1,751	0.69	50	
Belize						192	0	-11	1,659	0.63	42.7	
Montserrat						194	0	95		0.64	20.9	

Grenada						195	0	21	5,250	0.43	37.8	
Vanuatu						197	0	-4	3,311	0.57	20.2	
Norfolk Island						198	0	-35	11,053	0.77		
St. Pierre and Miquelon						199	0	0	1,854	0.99	0	
Marshall Islands						200	0	52	15,140	0.77		
Micronesia, Federated States of						201	0	81	11,273	0.98	3	
Cook Islands						202	0	-1	3,266	0.89	0	
Solomon Islands						205	0	-4	3,355	0.5	10	
Sao Tome and Principe						206	0	-3	4,775	0.88	14.8	

Sint Maarten (Dutch part)						207	0	49		0.75	
Nauru						208	0	-3	4,229	0.89	0.1
Palau						209	0	39	2,904	0.5	0
Bonaire, Sint Eustatius and Saba						210	0	21		1	
Falkland Islands (Malvinas)						212	0	7	7,193	0.5	
Wallis and Futuna Islands						216	0	20	3,621	0.91	4
Kiribati						217	0	0	5,039	0.56	30
Anguilla						218	0	-6	2,593	0.49	4.1
Tuvalu						220	0	7	3,083	0.42	0
Niue						221	0	5	2,962	0.93	
Tokelau						222	0	-25	515	1	

Eritrea						223	0	-12	3,071	0.55	23.7
Christmas Island						224	0	-53		1	

ANNEXURE 03

Preliminary Estimates and Dataset

OLS Estimates: Dependent Variable: Volume of Stone fruits

```
. reg tonnes exrate i.fruit_name
```

Source	SS	df	MS	Number of obs	=	44
				F(2, 41)	=	14.61
Model	5562416.9	2	2781208.45	Prob > F	=	0.0000
Residual	7803228.99	41	190322.658	R-squared	=	0.4162
				Adj R-squared	=	0.3877
Total	13365645.9	43	310828.974	Root MSE	=	436.26

tonnes	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
exrate	96.98523	26.91665	3.60	0.001	42.62597	151.3445
fruit_name						
Apricots	-530.1364	131.5373	-4.03	0.000	-795.7813	-264.4914
_cons	-185.9169	228.6559	-0.81	0.421	-647.6969	275.8631

Annexure 04

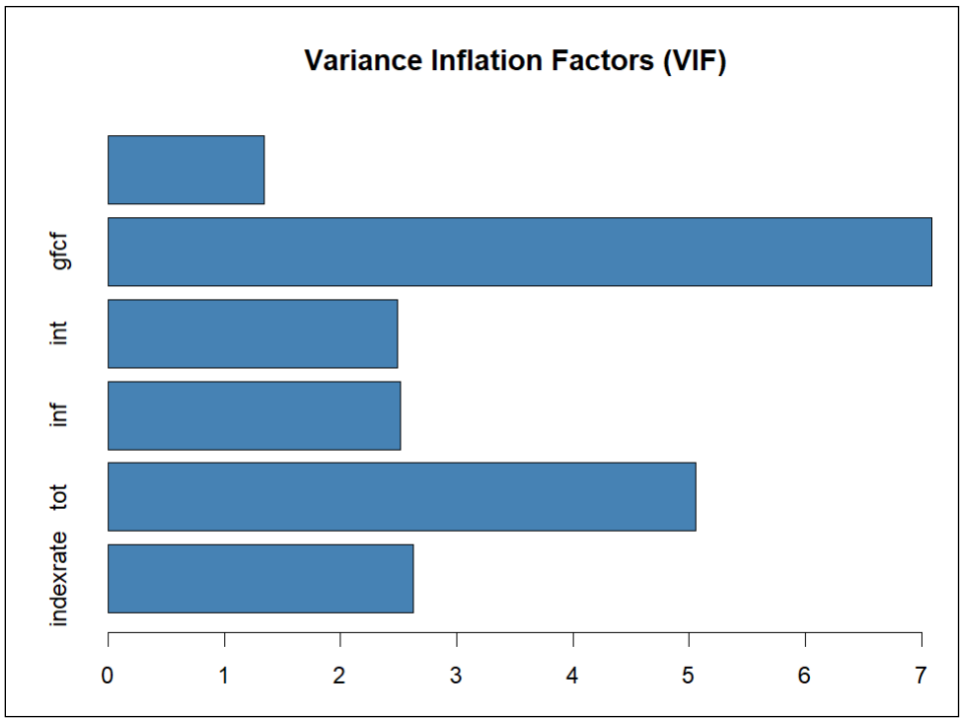
Data

Year	Exchange Rate	Fruit	Tonnes
1995	3,632	Peaches and nectarines	81
1996	4,294	Apricots	0
1997	4,609	Peaches and nectarines	2
1998	5,549	Peaches and nectarines	26
1999	6,122	Apricots	4
2000	6,955	Peaches and nectarines	25
2001	8,617	Peaches and nectarines	1
2002	10,539	Apricots	17
2003	7,584	Apricots	291
2004	6,4616	Peaches and nectarines	174
2005	6,3806	Peaches and nectarines	645
2006	6,7796	Apricots	40
2007	7,0625	Apricots	92
2008	8,264	Peaches and nectarines	670
2009	8,444	Apricots	2
2010	7,3324	Peaches and nectarines	1077
2011	7,2702	Apricots	17
2012	8,2206	Peaches and nectarines	880
2013	9,6588	Apricots	0
2014	10,8605	Apricots	1
2015	12,7721	Peaches and nectarines	2811
2016	13,3209	Peaches and nectarines	1714

1995	3,632	Apricots	58
1996	4,294	Peaches and nectarines	29
1997	4,609	Apricots	4
1998	5,549	Apricots	0
1999	6,122	Peaches and nectarines	17
2000	6,955	Apricots	0
2001	8,617	Apricots	28
2002	10,539	Peaches and nectarines	39
2003	7,584	Peaches and nectarines	39
2004	6,4616	Apricots	35
2005	6,3806	Apricots	0
2006	6,7796	Peaches and nectarines	1025
2007	7,0625	Peaches and nectarines	769
2008	8,264	Apricots	107
2009	8,444	Peaches and nectarines	658
2010	7,3324	Apricots	34
2011	7,2702	Peaches and nectarines	126
2012	8,2206	Apricots	38
2013	9,6588	Peaches and nectarines	602
2014	10,8605	Peaches and nectarines	1058
2015	12,7721	Apricots	4
2016	13,3209	Apricots	33

ANNEXURE 05

VIF Values for Export Values Model



ANNEXURE 06

TESTING FOR MULTICOLLINEARITY

Table 5.1 Correlation Matrix

	Fedxrate	*Tot*	*inf*	*Int*	*Gdpgrow*	*gfcf*
fedxrate	1.00	0.63	-0.66	0.39	-0.12	0.86
tot	0.63	1.00	-0.26	-0.16	-0.03	0.81
inf	-0.66	-0.26	1.00	-0.38	-0.27	-0.59
int	0.39	-0.16	-0.38	1.00	-0.18	0.21
gdpgrow	-0.12	-0.03	-0.27	-0.18	1.00	-0.05
gfcf	0.86	0.81	-0.59	0.21	-0.05	1.00

ANNEXURE 07

Table 5.2: Phillips-Perron Unit Root Test

Variable	**Levels**		**First Difference**	
	DF Test Statistic	*P-Value*	*DF Test Statistic*	*P-Value*
totxval	-1.034	0.9236	-5.4379**	0.01
totxqty	-1.4735	0.7849	-8.2473**	0.01
indexrate	-1.0061	0.928	-5.307**	0.01
tot	-2.1919	0.4974	-5.1552**	0.01
inf	-3.1224	0.125	-6.1768**	0.01
int	-3.9809**	0.01789		
gfcf	-1.4114	0.8098	-4.0768**	0.0142
gdpgrow	-4.619**	0.01		

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 08

Table 5.3: Phillips-Ouliaris Cointegration Test

Dependent Variable	*Independent Variables*	*Phillips-Ouliaris Test Statistic*	*P-Value*
Dtotxval	Dfedxrate, Dtot, Dinf, Dgfcf	-41.527**	0.02563

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 09

Table 5.4: Long Run Estimation Model (*Totxval*)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Export Value)	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*	*β/(S.E)*
Indirect Exchange Rate	-1.622***	-1.305***	-1.093***	-0.989***	-0.877***	-0.872***	-0.812***	-0.755***
	[0.171]	[0.109]	[0.097]	[0.131]	[0.108]	[0.109]	[0.138]	[0.148]
Terms of Trade		0.044***	0.042***	0.045***	0.017**	0.017**	0.017**	0.018**
		[0.005]	[0.004]	[0.005]	[0.007]	[0.007]	[0.007]	[0.007]
Inflation			-0.052***	-0.050***	-0.022**	-0.024**	-0.018	-0.011
			[0.010]	[0.010]	[0.010]	[0.012]	[0.014]	[0.016]
Interest Rates				0.015	0.003	0.003	0.001	0.004
				[0.013]	[0.011]	[0.011]	[0.011]	[0.011]
GFCF					0.000***	0.000***	0.000***	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.006	-0.011	-0.014
						[0.017]	[0.018]	[0.018]

Post-Apartheid							0.129	0.188
							[0.178]	[0.187]
Minimum Wages								0.219
								[0.206]
Constant	13.972 ***	10.072 ***	10.663 ***	10.302 ***	11.458 ***	11.485 ***	11.365 ***	11.310 ***
	[0.115]	[0.433]	[0.369]	[0.478]	[0.449]	[0.459]	[0.490]	[0.492]
N	49	49	49	49	49	49	49	49
R2	0.656	0.877	0.922	0.924	0.952	0.952	0.953	0.954
adj R2	0.649	0.872	0.917	0.917	0.947	0.945	0.945	0.945

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 10

Table 5.5: Long Run Estimation Model (*Totxqty*)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Export Quantity)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*
Indirect Exchange Rate	-1.079***	-0.904***	-0.721***	-0.701***	-0.611***	-0.615***	-0.501***	-0.450***
	[0.108]	[0.082]	[0.066]	[0.090]	[0.066]	[0.067]	[0.081]	[0.084]
Terms of Trade		0.025***	0.022***	0.023***	0.001	0	0.001	0.002
		[0.004]	[0.003]	[0.003]	[0.004]	[0.004]	[0.004]	[0.004]
Inflation			-0.045***	-0.044***	-0.022***	-0.021***	-0.01	-0.003
			[0.007]	[0.007]	[0.006]	[0.007]	[0.008]	[0.009]
Interest Rates				0.003	-0.006	-0.006	-0.009	-0.007

				[0.009]	[0.007]	[0.007]	[0.006]	[0.006]
GFCF					0.000***	0.000***	0.000***	0.000***
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						0.005	-0.004	-0.006
						[0.010]	[0.010]	[0.010]
Post-Apartheid							0.242**	0.295***
							[0.104]	[0.106]
Minimum Wages								0.198
								[0.117]
Constant	14.456***	12.302***	12.809***	12.738***	13.663***	13.644***	13.419***	13.369***
	[0.073]	[0.325]	[0.250]	[0.329]	[0.276]	[0.282]	[0.286]	[0.281]
N	49	49	49	49	49	49	49	49
R2	0.68	0.839	0.916	0.916	0.957	0.958	0.963	0.965
adj R2	0.673	0.832	0.91	0.908	0.952	0.952	0.956	0.958

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 11

Table 5.6: Long Run Estimation Model (*Stonexval*)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Total Fruit Export Val)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*
Indirect Exchange Rate	-2.432***	-2.137***	-1.819***	-1.746***	-1.631***	-1.604***	-1.401***	-1.448***

	[0.207]	[0.173]	[0.160]	[0.217]	[0.208]	[0.209]	[0.261]	[0.282]
Terms of Trade		0.041***	0.037***	0.039***	0.011	0.012	0.013	0.013
		[0.008]	[0.006]	[0.008]	[0.013]	[0.013]	[0.013]	[0.013]
Inflation			-0.078***	-0.076***	-0.048**	-0.059**	-0.04	-0.046
			[0.017]	[0.017]	[0.020]	[0.022]	[0.026]	[0.030]
Interest Rates				0.011	-0.001	-0.005	-0.01	-0.012
				[0.021]	[0.020]	[0.021]	[0.021]	[0.022]
GFCF					0.000**	0.000**	0.000**	0.000*
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.035	-0.049	-0.047
						[0.032]	[0.034]	[0.035]
Post-Apartheid							0.432	0.384
							[0.336]	[0.355]
Minimum Wages								-0.18
								[0.392]
Constant	11.071***	7.442***	8.326***	8.070***	9.256***	9.402***	9.000***	9.045***
	[0.139]	[0.688]	[0.603]	[0.792]	[0.867]	[0.876]	[0.923]	[0.938]
N	49	49	49	49	49	49	49	49
R2	0.747	0.844	0.894	0.895	0.909	0.912	0.915	0.916
adj R2	0.741	0.837	0.887	0.885	0.899	0.899	0.901	0.899

NES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 12

Table 5.7: Long Run Estimation Model (*Stonexqty*)

Dep. Variable	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
Log(Stone Fruity Export Qty)	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*	*β/[S.E]*
Indirect Exchange Rate	-2.036***	-1.865***	-1.574***	-1.598***	-1.501***	-1.493***	-1.258***	-1.314***
	[0.148]	[0.137]	[0.115]	[0.157]	[0.146]	[0.148]	[0.179]	[0.192]
Terms of Trade		0.024***	0.020***	0.020***	-0.004	-0.004	-0.003	-0.003
		[0.006]	[0.005]	[0.006]	[0.009]	[0.009]	[0.009]	[0.009]
Inflation			-0.071***	-0.072***	-0.048***	-0.052***	-0.03	-0.038*
			[0.012]	[0.013]	[0.014]	[0.016]	[0.018]	[0.020]
Interest Rates				-0.003	-0.014	-0.015	-0.021	-0.023
				[0.015]	[0.014]	[0.015]	[0.014]	[0.015]
GFCF					0.000***	0.000***	0.000**	0.000**
					[0.000]	[0.000]	[0.000]	[0.000]
GDP Growth						-0.012	-0.029	-0.026
						[0.023]	[0.023]	[0.024]
Post-Apartheid							0.498**	0.439*
							[0.231]	[0.243]
Minimum Wages								-0.218
								[0.268]

Constant	11.014***	8.908***	9.716***	9.799***	10.798***	10.847***	10.383***	10.438***
	[0.100]	[0.543]	[0.436]	[0.574]	[0.610]	[0.622]	[0.634]	[0.640]
N	49	49	49	49	49	49	49	49
R2	0.801	0.851	0.915	0.915	0.932	0.932	0.939	0.94
adj R2	0.797	0.844	0.91	0.908	0.924	0.922	0.928	0.928

NOTES*: p < 0.10, ** p < 0.05, *** p < 0.01

ANNEXURE 13

Table 5.8 VECM estimates

	Totxval *β/[S.E]*	**Totxqty** *β/[S.E]*	**Stonexval** *β/[S.E]*	**Stonexqty** *β/[S.E]*
Indexrate (-1)	-13029.9510	66116.9969	-1671.4377	6057.8561
	[308882.4231]	[266068.7990]	[25878.2770]	[18201.1744]
Tot (-1)	1757.5781	-4720.8413	-175.2878	-287.3548
	[5128.7600]	[4468.6719]	[437.3513]	[309.3739]
Inf (-1)	3727.4175	15884.2020	191.8555	821.3330
	[7974.6937]	[7700.5196]*	[673.8813]	[495.2657]
Totxval (-1)/Totxqty (-1)	0.1258	-0.1031	-0.1335	-0.0980
	[0.1749]	[0.1430]	[0.1654]	[0.1733]
ECT	-0.1193	-0.2178	-0.2136	-0.1463
	[0.0936]	[0.0664]**	[0.1247]	[0.1187]
Constant	-378549.6732	-176945.8923	-38347.0560	-2932.0629
	[329648.6002]	[76114.5167]*	[24039.0848]	[4215.2527]
N	49	49	49	49
AIC	1036.276	1043.77	818.7302	788.0282
BIC	1086.23	1093.724	868.6842	837.9822
SSR	606484571403	475445674193	4516716511	2281213983

ANNEXURE 14

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
1	801110000	MFN duties (Applied)	0%	0%
2	801120000	MFN duties (Applied)	0%	0%
3	801190000	MFN duties (Applied)	0%	0%
4	801210000	MFN duties (Applied)	0%	0%
5	801220000	MFN duties (Applied)	0%	0%
6	801310000	MFN duties (Applied)	0%	0%
7	801320000	MFN duties (Applied)	0%	0%
8	802111000	MFN duties (Applied)	0%	0%
9	802119000	MFN duties (Applied)	5.60%	5.60%
10	802119000	Preferential tariff for South Africa	0%	0%
11	802121000	MFN duties (Applied)	0%	0%
12	802129000	MFN duties (Applied)	3.50%	3.50%
13	802129000	Preferential tariff for South Africa	0%	0%
14	802210000	MFN duties (Applied)	3.20%	3.20%
15	802210000	Preferential tariff for South Africa	0%	0%
16	802220000	MFN duties (Applied)	3.20%	3.20%
17	802220000	Preferential tariff for South Africa	0%	0%
18	802310000	MFN duties (Applied)	4.00%	4.00%
19	802310000	Preferential tariff for South Africa	0%	0%
20	802320000	MFN duties (Applied)	5.10%	5.10%
21	802320000	Preferential tariff for South Africa	0%	0%
22	802410000	MFN duties (Applied)	5.60%	5.60%
23	802410000	Preferential tariff for South Africa	0%	0%
24	802420000	MFN duties (Applied)	5.60%	5.60%
25	802420000	Preferential tariff for South Africa	0%	0%
26	802510000	MFN duties (Applied)	1.60%	1.60%
27	802510000	Preferential tariff for South Africa	0%	0%
28	802520000	MFN duties (Applied)	1.60%	1.60%

29	802520000	Preferential tariff for South Africa	0%	0%
30	802610000	MFN duties (Applied)	2.00%	2.00%
31	802610000	Preferential tariff for South Africa	0%	0%
32	802620000	MFN duties (Applied)	2.00%	2.00%
33	802620000	Preferential tariff for South Africa	0%	0%
34	802700000	MFN duties (Applied)	0%	0%
35	802800000	MFN duties (Applied)	0%	0%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
36	802901000	MFN duties (Applied)	0%	0%
37	802905000	MFN duties (Applied)	2.00%	2.00%
38	802905000	Preferential tariff for South Africa	0%	0%
39	802908500	MFN duties (Applied)	2.00%	2.00%
40	802908500	Preferential tariff for South Africa	0%	0%
41	803101000	MFN duties (Applied)	16.00%	16.00%
42	803101000	Preferential tariff for South Africa	0%	0%
43	803109000	MFN duties (Applied)	16.00%	16.00%
44	803109000	Preferential tariff for South Africa	0%	0%
45	803901000	MFN duties (Applied)	132 EUR/1000 kg net	15.77%
46	803909000	MFN duties (Applied)	16.00%	16.00%
47	803909000	Preferential tariff for South Africa	0%	0%
48	804100030	MFN duties (Applied)	7.70%	7.70%
49	804100030	Preferential tariff for South Africa	0%	0%
50	804100091	MFN duties (Applied)	7.70%	7.70%
51	804100091	Preferential tariff for South Africa	0%	0%
52	804100099	MFN duties (Applied)	7.70%	7.70%
53	804100099	Preferential tariff for South Africa	0%	0%
54	804201000	MFN duties (Applied)	5.60%	5.60%
55	804201000	Preferential tariff for South Africa	0%	0%

56	804209000	MFN duties (Applied)	8.00%	8.00%
57	804209000	Preferential tariff for South Africa	0%	0%
58	804300010	MFN duties (Applied)	5.80%	5.80%
59	804300010	Preferential tariff for South Africa	0%	0%
60	804300090	MFN duties (Applied)	5.80%	5.80%
61	804300090	Preferential tariff for South Africa	0%	0%
62	804400010	MFN duties (Applied)	4.00%	4.00%
63	804400010	Preferential tariff for South Africa	0%	0%
64	804400090	MFN duties (Applied)	4.00%	4.00%
65	804400090	Preferential tariff for South Africa	0%	0%
66	804500000	MFN duties (Applied)	0%	0%
67	80510201101	MFN duties (Applied)	10.40%	10.40%
68	80510201102	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
69	80510201103	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
70	80510201104	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
71	80510201105	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%
72	80510201106	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
73	80510201107	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%

	Product code	Tariff regime	Applied tariff	Ad valorem equiv. tariff
74	80510201108	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
75	80510201109	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
76	80510201110	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
77	80510201111	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
78	80510201901	MFN duties (Applied)	10.40%	10.40%
79	80510201902	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
80	80510201903	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
81	80510201904	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
82	80510201905	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%

83	80510201906	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
84	80510201907	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
85	80510201908	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
86	80510201909	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
87	80510201910	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
88	80510201911	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
89	80510209201	MFN duties (Applied)	10.40%	10.40%
90	80510209202	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
91	80510209203	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
92	80510209204	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
93	80510209205	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%
94	80510209206	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
95	80510209207	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
96	80510209208	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
97	80510209209	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
98	80510209210	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
99	80510209211	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
100	80510209401	MFN duties (Applied)	10.40%	10.40%
101	80510209402	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
102	80510209403	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
103	80510209404	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
104	80510209405	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%
105	80510209406	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
106	80510209407	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
107	80510209408	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
108	80510209409	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
109	80510209410	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
110	80510209411	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
111	80510209601	MFN duties (Applied)	10.40%	10.40%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
112	80510209602	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
113	80510209603	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
114	80510209604	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
115	80510209605	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%
116	80510209606	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
117	80510209607	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
118	80510209608	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
119	80510209609	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
120	80510209610	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
121	80510209611	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
122	80510209801	MFN duties (Applied)	10.40%	10.40%
123	80510209802	MFN duties (Applied)	10.4% + 0.7 EUR/100 kg	11.34%
124	80510209803	MFN duties (Applied)	10.4% + 1.4 EUR/100 kg	12.28%
125	80510209804	MFN duties (Applied)	10.4% + 2.1 EUR/100 kg	13.22%
126	80510209805	MFN duties (Applied)	10.4% + 2.8 EUR/100 kg	14.15%
127	80510209806	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
128	80510209807	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
129	80510209808	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
130	80510209809	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
131	80510209810	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
132	80510209811	MFN duties (Applied)	10.4% + 7.1 EUR/100 kg	19.92%
133	805108010	MFN duties (Applied)	12.00%	12.00%
134	805108010	Preferential tariff for South Africa	0%	0%
135	805108090	MFN duties (Applied)	12.00%	12.00%
136	805108090	Preferential tariff for South Africa	0%	0%
137	805201005	MFN duties (Applied)	16.00%	16.00%
138	805201005	Preferential tariff for South Africa	0%	0%
139	805201099	MFN duties (Applied)	16.00%	16.00%

140	805201099	Preferential tariff for South Africa	0%	0%
141	805203005	MFN duties (Applied)	16.00%	16.00%
142	805203005	Preferential tariff for South Africa	0%	0%
143	805203099	MFN duties (Applied)	16.00%	16.00%
144	805203099	Preferential tariff for South Africa	0%	0%
145	805205007	MFN duties (Applied)	16.00%	16.00%
146	805205007	Preferential tariff for South Africa	0%	0%
147	805205029	MFN duties (Applied)	16.00%	16.00%
148	805205029	Preferential tariff for South Africa	0%	0%
149	805205037	MFN duties (Applied)	16.00%	16.00%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
150	805205037	Preferential tariff for South Africa	0%	0%
151	805205089	MFN duties (Applied)	16.00%	16.00%
152	805205089	Preferential tariff for South Africa	0%	0%
153	805207005	MFN duties (Applied)	16.00%	16.00%
154	805207005	Preferential tariff for South Africa	0%	0%
155	805207099	MFN duties (Applied)	16.00%	16.00%
156	805207099	Preferential tariff for South Africa	0%	0%
157	805209005	MFN duties (Applied)	16.00%	16.00%
158	805209005	Preferential tariff for South Africa	0%	0%
159	805209009	MFN duties (Applied)	16.00%	16.00%
160	805209009	Preferential tariff for South Africa	0%	0%
161	805209091	MFN duties (Applied)	16.00%	16.00%
162	805209091	Preferential tariff for South Africa	0%	0%
163	805209099	MFN duties (Applied)	16.00%	16.00%
164	805209099	Preferential tariff for South Africa	0%	0%
165	805400011	MFN duties (Applied)	1.50%	1.50%
166	805400011	Preferential tariff for South Africa	0%	0%

167	805400019	MFN duties (Applied)	1.50%	1.50%
168	805400019	Preferential tariff for South Africa	0%	0%
169	805400031	MFN duties (Applied)	1.50%	1.50%
170	805400031	Preferential tariff for South Africa	0%	0%
171	805400039	MFN duties (Applied)	1.50%	1.50%
172	805400039	Preferential tariff for South Africa	0%	0%
173	805400090	MFN duties (Applied)	1.50%	1.50%
174	805400090	Preferential tariff for South Africa	0%	0%
175	80550101001	MFN duties (Applied)	6.40%	6.40%
176	80550101002	MFN duties (Applied)	6.4% + 0.9 EUR/100 kg	7.34%
177	80550101003	MFN duties (Applied)	6.4% + 1.8 EUR/100 kg	8.29%
178	80550101004	MFN duties (Applied)	6.4% + 2.8 EUR/100 kg	9.33%
179	80550101005	MFN duties (Applied)	6.4% + 3.7 EUR/100 kg	10.28%
180	80550101006	MFN duties (Applied)	6.4% + 25.6 EUR/100 kg	33.22%
181	80550109001	MFN duties (Applied)	6.40%	6.40%
182	80550109002	MFN duties (Applied)	6.4% + 0.9 EUR/100 kg	7.34%
183	80550109003	MFN duties (Applied)	6.4% + 1.8 EUR/100 kg	8.29%
184	80550109004	MFN duties (Applied)	6.4% + 2.8 EUR/100 kg	9.33%
185	80550109005	MFN duties (Applied)	6.4% + 3.7 EUR/100 kg	10.28%
186	80550109006	MFN duties (Applied)	6.4% + 25.6 EUR/100 kg	33.22%
187	805509011	MFN duties (Applied)	12.80%	12.80%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
188	805509011	Preferential tariff for South Africa	0%	0%
189	805509019	MFN duties (Applied)	12.80%	12.80%
190	805509019	Preferential tariff for South Africa	0%	0%
191	805509091	MFN duties (Applied)	12.80%	12.80%
192	805509091	Preferential tariff for South Africa	0%	0%
193	805509099	MFN duties (Applied)	12.80%	12.80%

194	805509099	Preferential tariff for South Africa	0%	0%
195	805900000	MFN duties (Applied)	12.80%	12.80%
196	805900000	Preferential tariff for South Africa	0%	0%
197	806101005	MFN duties (Applied)	Not available	
198	806101091	MFN duties (Applied)	11.50%	11.50%
199	806101091	Preferential tariff for South Africa	0%	0%
200	806101099	MFN duties (Applied)	11.50%	11.50%
201	806101099	Preferential tariff for South Africa	0%	0%
202	806109000	MFN duties (Applied)	14.40%	14.40%
203	806109000	Preferential tariff for South Africa	0%	0%
204	806201000	MFN duties (Applied)	2.40%	2.40%
205	806201000	Preferential tariff for South Africa	0%	0%
206	806203010	MFN duties (Applied)	2.40%	2.40%
207	806203010	Preferential tariff for South Africa	0%	0%
208	806203090	MFN duties (Applied)	2.40%	2.40%
209	806203090	Preferential tariff for South Africa	0%	0%
210	806209000	MFN duties (Applied)	2.40%	2.40%
211	806209000	Preferential tariff for South Africa	0%	0%
212	807110000	MFN duties (Applied)	8.80%	8.80%
213	807110000	Preferential tariff for South Africa	0%	0%
214	807190050	MFN duties (Applied)	8.80%	8.80%
215	807190050	Preferential tariff for South Africa	0%	0%
216	807190090	MFN duties (Applied)	8.80%	8.80%
217	807190090	Preferential tariff for South Africa	0%	0%
218	807200000	MFN duties (Applied)	0%	0%
219	808101000	MFN duties (Applied)	Not available	
220	80810801001	MFN duties (Applied)	0%	0%
221	80810801002	MFN duties (Applied)	3% + 1.1 EUR/100 kg	4.16%
222	80810801003	MFN duties (Applied)	3% + 2.3 EUR/100 kg	5.42%

223	80810801004	MFN duties (Applied)	3% + 3.4 EUR/100 kg	6.58%
224	80810801005	MFN duties (Applied)	3% + 4.5 EUR/100 kg	7.74%
225	80810801006	MFN duties (Applied)	3% + 5.7 EUR/100 kg	9.00%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
226	80810801007	MFN duties (Applied)	3% + 6.8 EUR/100 kg	10.16%
227	80810801008	MFN duties (Applied)	3% + 8 EUR/100 kg	11.42%
228	80810801009	MFN duties (Applied)	3% + 23.8 EUR/100 kg	28.06%
229	80810809001	MFN duties (Applied)	0%	0%
230	80810809002	MFN duties (Applied)	3% + 1.1 EUR/100 kg	4.16%
231	80810809003	MFN duties (Applied)	3% + 2.3 EUR/100 kg	5.42%
232	80810809004	MFN duties (Applied)	3% + 3.4 EUR/100 kg	6.58%
233	80810809005	MFN duties (Applied)	3% + 4.5 EUR/100 kg	7.74%
234	80810809006	MFN duties (Applied)	3% + 5.7 EUR/100 kg	9.00%
235	80810809007	MFN duties (Applied)	3% + 6.8 EUR/100 kg	10.16%
236	80810809008	MFN duties (Applied)	3% + 8 EUR/100 kg	11.42%
237	80810809009	MFN duties (Applied)	3% + 23.8 EUR/100 kg	28.06%
238	808301000	MFN duties (Applied)	Not available	
239	80830901001	MFN duties (Applied)	0%	0%
240	80830901002	MFN duties (Applied)	2.5% + 1 EUR/100 kg	3.44%
241	80830901003	MFN duties (Applied)	2.5% + 2 EUR/100 kg	4.37%
242	80830901004	MFN duties (Applied)	2.5% + 3.1 EUR/100 kg	5.40%
243	80830901005	MFN duties (Applied)	2.5% + 4.1 EUR/100 kg	6.34%
244	80830901006	MFN duties (Applied)	2.5% + 5.1 EUR/100 kg	7.28%
245	80830901007	MFN duties (Applied)	2.5% + 6.1 EUR/100 kg	8.22%
246	80830901008	MFN duties (Applied)	2.5% + 7.1 EUR/100 kg	9.15%
247	80830901009	MFN duties (Applied)	2.5% + 23.8 EUR/100 kg	24.80%
248	80830909001	MFN duties (Applied)	0%	0%
249	80830909002	MFN duties (Applied)	2.5% + 1 EUR/100 kg	3.44%

250	80830909003	MFN duties (Applied)	2.5% + 2 EUR/100 kg	4.37%
251	80830909004	MFN duties (Applied)	2.5% + 3.1 EUR/100 kg	5.40%
252	80830909005	MFN duties (Applied)	2.5% + 4.1 EUR/100 kg	6.34%
253	80830909006	MFN duties (Applied)	2.5% + 5.1 EUR/100 kg	7.28%
254	80830909007	MFN duties (Applied)	2.5% + 6.1 EUR/100 kg	8.22%
255	80830909008	MFN duties (Applied)	2.5% + 7.1 EUR/100 kg	9.15%
256	80830909009	MFN duties (Applied)	2.5% + 23.8 EUR/100 kg	24.80%
257	808400000	MFN duties (Applied)	7.20%	7.20%
258	808400000	Preferential tariff for South Africa	0%	0%
259	809100000	MFN duties (Applied)	20.00%	20.00%
260	809100000	Preferential tariff for South Africa	0%	0%
261	809210000	MFN duties (Applied)	12.00%	12.00%
262	809210000	Preferential tariff for South Africa	0%	0%
263	809290000	MFN duties (Applied)	12.00%	12.00%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
264	809290000	Preferential tariff for South Africa	0%	0%
265	809301000	MFN duties (Applied)	17.60%	17.60%
266	809301000	Preferential tariff for South Africa	0%	0%
267	809309000	MFN duties (Applied)	17.60%	17.60%
268	809309000	Preferential tariff for South Africa	0%	0%
269	809400500	MFN duties (Applied)	6.40%	6.40%
270	809400500	Preferential tariff for South Africa	0%	0%
271	809409000	MFN duties (Applied)	12.00%	12.00%
272	809409000	Preferential tariff for South Africa	0%	0%
273	810100000	MFN duties (Applied)	11.20%	11.20%
274	810100000	Preferential tariff for South Africa	0%	0%
275	810201000	MFN duties (Applied)	8.80%	8.80%
276	810201000	Preferential tariff for South Africa	0%	0%

277	810209000	MFN duties (Applied)	9.60%	9.60%
278	810209000	Preferential tariff for South Africa	0%	0%
279	810301000	MFN duties (Applied)	8.80%	8.80%
280	810301000	Preferential tariff for South Africa	0%	0%
281	810303000	MFN duties (Applied)	8.80%	8.80%
282	810303000	Preferential tariff for South Africa	0%	0%
283	810309000	MFN duties (Applied)	9.60%	9.60%
284	810309000	Preferential tariff for South Africa	0%	0%
285	810401000	MFN duties (Applied)	0%	0%
286	810403000	MFN duties (Applied)	3.20%	3.20%
287	810403000	Preferential tariff for South Africa	0%	0%
288	810405010	MFN duties (Applied)	3.20%	3.20%
289	810405010	Preferential tariff for South Africa	0%	0%
290	810405090	MFN duties (Applied)	3.20%	3.20%
291	810405090	Preferential tariff for South Africa	0%	0%
292	810409000	MFN duties (Applied)	9.60%	9.60%
293	810409000	Preferential tariff for South Africa	0%	0%
294	810500010	MFN duties (Applied)	8.80%	8.80%
295	810500010	Preferential tariff for South Africa	0%	0%
296	810500090	MFN duties (Applied)	8.80%	8.80%
297	810500090	Preferential tariff for South Africa	0%	0%
298	810600000	MFN duties (Applied)	8.80%	8.80%
299	810600000	Preferential tariff for South Africa	0%	0%
300	810700000	MFN duties (Applied)	8.80%	8.80%
301	810700000	Preferential tariff for South Africa	0%	0%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
302	810902010	MFN duties (Applied)	0%	0%
303	810902090	MFN duties (Applied)	0%	0%

304	810907530	MFN duties (Applied)	8.80%	8.80%
305	810907530	Preferential tariff for South Africa	0%	0%
306	810907550	MFN duties (Applied)	8.80%	8.80%
307	810907550	Preferential tariff for South Africa	0%	0%
308	810907560	MFN duties (Applied)	8.80%	8.80%
309	810907560	Preferential tariff for South Africa	0%	0%
310	810907590	MFN duties (Applied)	8.80%	8.80%
311	810907590	Preferential tariff for South Africa	0%	0%
312	811101100	MFN duties (Applied)	20.8% + 8.4 EUR/100 kg	25.34%
313	811101100	Preferential tariff for South Africa	0%	0%
314	811101900	MFN duties (Applied)	20.80%	20.80%
315	811101900	Preferential tariff for South Africa	0%	0%
316	811109000	MFN duties (Applied)	14.40%	14.40%
317	811201100	MFN duties (Applied)	20.8% + 8.4 EUR/100 kg	23.59%
318	811201100	Preferential tariff for South Africa	0%	0%
319	811201900	MFN duties (Applied)	20.80%	20.80%
320	811201900	Preferential tariff for South Africa	0%	0%
321	811203100	MFN duties (Applied)	14.40%	14.40%
322	811203100	Preferential tariff for South Africa	0%	0%
323	811203900	MFN duties (Applied)	14.40%	14.40%
324	811203900	Preferential tariff for South Africa	0%	0%
325	811205100	MFN duties (Applied)	12.00%	12.00%
326	811205100	Preferential tariff for South Africa	0%	0%
327	811205900	MFN duties (Applied)	12.00%	12.00%
328	811205900	Preferential tariff for South Africa	0%	0%
329	811209000	MFN duties (Applied)	14.40%	14.40%
330	811209000	Preferential tariff for South Africa	0%	0%
331	811901100	MFN duties (Applied)	13% + 5.3 EUR/100 kg	15.66%
332	811901100	Preferential tariff for South Africa	0%	0%

333	811901912	MFN duties (Applied)	20.8% + 8.4 EUR/100 kg	24.37%
334	811901912	Preferential tariff for South Africa	0%	0%
335	811901990	MFN duties (Applied)	20.8% + 8.4 EUR/100 kg	24.37%
336	811901990	Preferential tariff for South Africa	0%	0%
337	811903100	MFN duties (Applied)	13.00%	13.00%
338	811903100	Preferential tariff for South Africa	0%	0%
339	811903912	MFN duties (Applied)	20.80%	20.80%

	Product code	Tariff regime	Applied tariff	Ad valorem equiv. tariff
340	811903912	Preferential tariff for South Africa	0%	0%
341	811903990	MFN duties (Applied)	20.80%	20.80%
342	811903990	Preferential tariff for South Africa	0%	0%
343	811905000	MFN duties (Applied)	12.00%	12.00%
344	811905000	Preferential tariff for South Africa	0%	0%
345	811907000	MFN duties (Applied)	3.20%	3.20%
346	811907000	Preferential tariff for South Africa	0%	0%
347	811907500	MFN duties (Applied)	14.40%	14.40%
348	811907500	Preferential tariff for South Africa	0%	0%
349	811908000	MFN duties (Applied)	14.40%	14.40%
350	811908000	Preferential tariff for South Africa	0%	0%
351	811908500	MFN duties (Applied)	9.00%	9.00%
352	811908500	Preferential tariff for South Africa	0%	0%
353	811909520	MFN duties (Applied)	14.40%	14.40%
354	811909520	Preferential tariff for South Africa	0%	0%
355	811909530	MFN duties (Applied)	14.40%	14.40%
356	811909530	Preferential tariff for South Africa	0%	0%
357	811909540	MFN duties (Applied)	14.40%	14.40%
358	811909540	Preferential tariff for South Africa	0%	0%
359	811909570	MFN duties (Applied)	14.40%	14.40%

360	811909570	Preferential tariff for South Africa	0%	0%
361	811909590	MFN duties (Applied)	14.40%	14.40%
362	811909590	Preferential tariff for South Africa	0%	0%
363	812100000	MFN duties (Applied)	8.80%	8.80%
364	812100000	Preferential tariff for South Africa	0%	0%
365	812902511	MFN duties (Applied)	12.80%	12.80%
366	812902511	Preferential tariff for South Africa	0%	0%
367	812902519	MFN duties (Applied)	12.80%	12.80%
368	812902519	Preferential tariff for South Africa	0%	0%
369	812902590	MFN duties (Applied)	12.80%	12.80%
370	812902590	Preferential tariff for South Africa	0%	0%
371	812903000	MFN duties (Applied)	2.30%	2.30%
372	812903000	Preferential tariff for South Africa	0%	0%
373	812904000	MFN duties (Applied)	6.40%	6.40%
374	812904000	Preferential tariff for South Africa	0%	0%
375	812907000	MFN duties (Applied)	5.50%	5.50%
376	812907000	Preferential tariff for South Africa	0%	0%
377	812909811	MFN duties (Applied)	8.80%	8.80%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
378	812909811	Preferential tariff for South Africa	0%	0%
379	812909819	MFN duties (Applied)	8.80%	8.80%
380	812909819	Preferential tariff for South Africa	0%	0%
381	812909820	MFN duties (Applied)	8.80%	8.80%
382	812909820	Preferential tariff for South Africa	0%	0%
383	812909890	MFN duties (Applied)	8.80%	8.80%
384	812909890	Preferential tariff for South Africa	0%	0%
385	813100000	MFN duties (Applied)	5.60%	5.60%
386	813100000	Preferential tariff for South Africa	0%	0%

387	813200000	MFN duties (Applied)	9.60%	9.60%
388	813200000	Preferential tariff for South Africa	0%	0%
389	813300000	MFN duties (Applied)	3.20%	3.20%
390	813300000	Preferential tariff for South Africa	0%	0%
391	813401000	MFN duties (Applied)	5.60%	5.60%
392	813401000	Preferential tariff for South Africa	0%	0%
393	813403000	MFN duties (Applied)	6.40%	6.40%
394	813403000	Preferential tariff for South Africa	0%	0%
395	813405000	MFN duties (Applied)	2.00%	2.00%
396	813405000	Preferential tariff for South Africa	0%	0%
397	813406500	MFN duties (Applied)	0%	0%
398	813409500	MFN duties (Applied)	2.40%	2.40%
399	813409500	Preferential tariff for South Africa	0%	0%
400	813501200	MFN duties (Applied)	4.00%	4.00%
401	813501200	Preferential tariff for South Africa	0%	0%
402	813501500	MFN duties (Applied)	6.40%	6.40%
403	813501500	Preferential tariff for South Africa	0%	0%
404	813501900	MFN duties (Applied)	9.60%	9.60%
405	813501900	Preferential tariff for South Africa	0%	0%
406	813503120	MFN duties (Applied)	4.00%	4.00%
407	813503120	Preferential tariff for South Africa	0%	0%
408	813503180	MFN duties (Applied)	4.00%	4.00%
409	813503180	Preferential tariff for South Africa	0%	0%
410	813503920	MFN duties (Applied)	6.40%	6.40%
411	813503920	Preferential tariff for South Africa	0%	0%
412	813503940	MFN duties (Applied)	6.40%	6.40%
413	813503940	Preferential tariff for South Africa	0%	0%
414	813503960	MFN duties (Applied)	6.40%	6.40%
415	813503960	Preferential tariff for South Africa	0%	0%

Product code		Tariff regime	Applied tariff	Ad valorem equiv. tariff
416	813503970	MFN duties (Applied)	6.40%	6.40%
417	813503970	Preferential tariff for South Africa	0%	0%
418	813503980	MFN duties (Applied)	6.40%	6.40%
419	813503980	Preferential tariff for South Africa	0%	0%
420	813509120	MFN duties (Applied)	8.00%	8.00%
421	813509120	Preferential tariff for South Africa	0%	0%
422	813509140	MFN duties (Applied)	8.00%	8.00%
423	813509140	Preferential tariff for South Africa	0%	0%
424	813509160	MFN duties (Applied)	8.00%	8.00%
425	813509160	Preferential tariff for South Africa	0%	0%
426	813509170	MFN duties (Applied)	8.00%	8.00%
427	813509170	Preferential tariff for South Africa	0%	0%
428	813509180	MFN duties (Applied)	8.00%	8.00%
429	813509180	Preferential tariff for South Africa	0%	0%
430	813509920	MFN duties (Applied)	9.60%	9.60%
431	813509920	Preferential tariff for South Africa	0%	0%
432	813509940	MFN duties (Applied)	9.60%	9.60%
433	813509940	Preferential tariff for South Africa	0%	0%
434	813509950	MFN duties (Applied)	9.60%	9.60%
435	813509950	Preferential tariff for South Africa	0%	0%
436	813509960	MFN duties (Applied)	9.60%	9.60%
437	813509960	Preferential tariff for South Africa	0%	0%
438	813509970	MFN duties (Applied)	9.60%	9.60%
439	813509970	Preferential tariff for South Africa	0%	0%
440	813509980	MFN duties (Applied)	9.60%	9.60%
441	813509980	Preferential tariff for South Africa	0%	0%
442	814000000	MFN duties (Applied)	1.60%	1.60%
443	814000000	Preferential tariff for South Africa	0%	0%