Impact of trade liberalisation on economic growth: the case of the Southern African customs union (SACU) countries

Farai Manwa

Southern Cross University

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Impact of Trade Liberalisation on Economic Growth: The Case of the Southern African Customs Union (SACU) Countries

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FARAI MANWA (21953389)

Primary Supervisor: Dr Michael Kortt;

Secondary Supervisors: Dr Albert Wijeweera and Dr Simon Pervan
I certify that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

I acknowledge that I have read and understood the University's rules, requirements, procedures and policy relating to my higher degree research award and to my thesis. I certify that I have complied with the rules, requirements, procedures and policy of the University.

Print Name:......Farai Manwa..........................................................

Signature:…… .................................................................

Date: ………25 September 2015.................................................
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Abstract

Southern Africa’s contribution to global output remains depressed at less than 2% of global production. Furthermore, growth metrics show that many countries in the region have experienced poor growth since attaining independence over the last 50 years. This is despite ongoing globalisation, which according to the theory of international trade should stimulate growth, through a variety of mechanisms including increased investment, entry of advanced technology and human capital. Research from the International Monetary Fund and World Bank institutions has suggested that reasons for the poor growth in many developing countries has been the restrictive trade policies, which have hindered many of the positive externalities of globalisation.

The existing empirical trade literature has not been able to shed light to these assertions as it has produced inconclusive results regarding the impact of trade liberalisation on economic growth. Common justifications for these debatable results have ranged from out–dated testing methods, poor data availability, lack of theoretical foundations, and the assumption of homogenous production functions across developing countries.

The empirical literature has focussed on developing countries in Asia, Eastern Europe and South America with little research undertaken on Southern African countries. This study proposes to focus on five Southern African Customs Union (SACU) countries of Botswana, Lesotho, Namibia, South Africa and Swaziland. The study seeks to empirically investigate the impact of trade liberalisation on economic growth in SACU countries. The study employs a quantitative time–series approach using annual country–level observations between 1980
and 2011. The exact method used is the auto-regressive distributed lag (ARDL) bounds testing approach. In addition to time-series estimations, the study used fixed-effects panel data estimations to test the robustness of empirical results across all five countries.

The study found that in the case of Botswana, Lesotho, Namibia, and Swaziland trade liberalisation measured through tariffs, trade ratios, adjusted trade ratios and the real effective exchange rate had an insignificant impact on economic growth. However, turning to South Africa, the study unearthed that trade liberalisation was found to consistently have an impact on economic growth. Policy recommendations are made based on the South African econometric results. The main policy research areas are: (i) the need for alternative ways to liberalise the economy; (ii) the need for a reduction of the high import bill in South Africa; and (iii) a move towards labour-intensive export oriented activities. The recommendations from the South African empirical results are arguably relevant to Botswana, Lesotho, Namibia, and Swaziland due to their high dependence on South African exports, monetary policy and SACU policies. However, caution should be exercised as the empirical data found an insignificant impact of trade liberalisation on economic growth in the latter countries.
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<th>Description</th>
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<tbody>
<tr>
<td>ADF</td>
<td>Augmented Dickey Fuller</td>
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<tr>
<td>AfDB</td>
<td>African Development Bank</td>
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<tr>
<td>AGOA</td>
<td>African Growth and Opportunity Act</td>
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<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
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<td>ARDL</td>
<td>Auto–Regressive Distributed Lag</td>
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<tr>
<td>ATR</td>
<td>Adjusted Trade Ratios</td>
</tr>
<tr>
<td>AVE</td>
<td>Ad–Valorem Equivalent</td>
</tr>
<tr>
<td>BDP</td>
<td>Botswana Democratic Party</td>
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<tr>
<td>BLNS</td>
<td>Botswana, Lesotho, Namibia, Swaziland</td>
</tr>
<tr>
<td>BMP</td>
<td>Black Market Exchange–rate Premium</td>
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<td>CAP</td>
<td>Common Agriculture Policy</td>
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<td>CET</td>
<td>Common External Tariff</td>
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<td>CGE</td>
<td>Computable General Equilibrium</td>
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<tr>
<td>CMA</td>
<td>Common Monetary Area</td>
</tr>
<tr>
<td>COMESA</td>
<td>Common Market for Eastern and Southern African</td>
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<tr>
<td>CPI</td>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>DSGE</td>
<td>Dynamic Stochastic General Equilibrium</td>
</tr>
<tr>
<td>DTI</td>
<td>Department of Trade and Industry</td>
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<tr>
<td>EAC</td>
<td>East African Community</td>
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<tr>
<td>EBA</td>
<td>Extreme Bounds Analysis</td>
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<td>ECM</td>
<td>Error Correction Model</td>
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<tr>
<td>ECT</td>
<td>Error Correction Term</td>
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<td>EFTA</td>
<td>European Free Trade Association</td>
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<td>EGLS</td>
<td>Estimated Generalized Least Squares</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>EPA</td>
<td>Economic Partnership Agreement</td>
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<td>EPZ</td>
<td>Export–Processing Zones</td>
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<td>EU</td>
<td>European Union</td>
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<td>FDI</td>
<td>Foreign Direct Investment</td>
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<td>FEM</td>
<td>Fixed–Effects Model</td>
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<tr>
<td>FTA</td>
<td>Free Trade Agreements</td>
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<td>GATT</td>
<td>General Agreement on Tariffs and Trade</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GFC</td>
<td>Global Financial Crisis</td>
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<td>GLS</td>
<td>Generalised Least Squares</td>
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<td>HAC</td>
<td>Heteroscedasticity and Autocorrelation Consistent</td>
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<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
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<tr>
<td>I.I.D</td>
<td>Independent and identically distributed</td>
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<tr>
<td>IMF</td>
<td>International Monetary Fund</td>
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<td>ISI</td>
<td>Import Substitution Industrialisation</td>
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<td>ITD</td>
<td>International Trade Department</td>
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<tr>
<td>IV</td>
<td>Instrumental Variables</td>
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<tr>
<td>KPSS</td>
<td>Kwiatkowski–Phillips–Schmidt–Shin</td>
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<tr>
<td>LDC</td>
<td>Least Developed Countries</td>
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<tr>
<td>LNDC</td>
<td>Lesotho National Development Corporation</td>
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<td>LSDV</td>
<td>Least Squares Dummy Variable</td>
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<tr>
<td>MCIT</td>
<td>Ministry of Commerce, Industry and Trade</td>
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<tr>
<td>MDG</td>
<td>Millennium Development Goals</td>
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<tr>
<td>MFN</td>
<td>Most Favoured Nation</td>
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<td>MIDP</td>
<td>Motor Industry Development Programme</td>
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<td>NEER</td>
<td>Nominal Effective Exchange Rate</td>
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<tr>
<td>Acronym</td>
<td>Acronym Expansion</td>
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<tr>
<td>NIC</td>
<td>Newly Industrialised Countries</td>
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<td>NIPF</td>
<td>National Industrial Policy Framework</td>
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<tr>
<td>NDS</td>
<td>National Development Strategy</td>
</tr>
<tr>
<td>NTB</td>
<td>Non–Tariff Barriers</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OLS</td>
<td>Ordinary Least Squares</td>
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<tr>
<td>PCSE</td>
<td>Panel Corrected Standard Errors &amp; Covariance</td>
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<td>PP</td>
<td>Phillips–Perron</td>
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<tr>
<td>PPP</td>
<td>Purchasing Power Parity</td>
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<tr>
<td>PRSAP</td>
<td>Poverty Reduction Strategy and Action Plan</td>
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<td>PWT</td>
<td>Penn World Tables</td>
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<tr>
<td>REC</td>
<td>Regional Economic Communities</td>
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<tr>
<td>REER</td>
<td>Real Effective Exchange Rate</td>
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<td>REIPP</td>
<td>Renewable Energy Independent Power Producers</td>
</tr>
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<td>REM</td>
<td>Random–Effects Model</td>
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<td>RWM</td>
<td>Random Walk Model</td>
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<tr>
<td>R&amp;D</td>
<td>Research and Design</td>
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<tr>
<td>SARB</td>
<td>South African Reserve Bank</td>
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<tr>
<td>SAL</td>
<td>Structural Adjustment Loan</td>
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<td>SDR</td>
<td>Special Drawing Rights</td>
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<td>SPS</td>
<td>Sanitary and Phytosanitary</td>
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<tr>
<td>SUR</td>
<td>Seemingly Unrelated Regression</td>
</tr>
<tr>
<td>TCIDP</td>
<td>Textile and Clothing Industry Development Programme</td>
</tr>
<tr>
<td>TDCA</td>
<td>Trade, Development and Cooperation Agreement</td>
</tr>
<tr>
<td>TFP</td>
<td>Total Factor Productivity</td>
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<td>TR</td>
<td>Trade Ratios</td>
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</table>
TRI: Trade Restrictiveness Index
UNCTAD: United Nations Conference on Trade and Development
USA: United States of America
VAR: Vector Autoregression
VAT: Value Added Tax
VECM: Vector Error Correction Models
SACU: Southern African Customs Union
SADC: Southern African Development Community
WDI: World Bank Development Indicators
WEF: World Economic Forum
WTO: World Trade Organisation
CHAPTER ONE: OVERVIEW OF THE STUDY

1.1 INTRODUCTION

The recognition of the importance of trade to the development of economies has once again become fashionable. This is seen through the increase in the number of free trade agreements (FTAs) signed worldwide (Blyde and Sinyavskaya, 2007). Africa too has joined the “trade bandwagon” seen through the increase in the number of regional economic communities (RECs) amongst which include the East African Community (EAC), Common Market for Eastern and Southern African (COMESA), Southern African Development Community (SADC), Southern African Customs Union (SACU) and most recently the ambitious COMESA–SADC–EAC tripartite agreement. Yet despite this upsurge in integration activity across the continent, Africa’s distribution of global output still remains at approximately 3.1% (Global Outlook for Growth of Gross Domestic Product, March 2011). The question therefore arises as to whether progress is indeed being made through the increase of regional economic communities and free trade agreements or whether there needs to be a paradigm shift in the institutional structures and policy frameworks in use on the continent.

The issue of trade liberalisation has long been a divisive issue with both politicians and academics having failed to reach consensus on the general benefits of liberal trade policy. For example, tariffs in agricultural policy remain a highly political rather than academic topic epitomised in sentiments by Christine Lagarde, France’s former Finance Minister and current Chief Executive Officer of the International Monetary Fund (IMF):
“France would be reluctant to embrace any proposal by the European Commission to slash agricultural tariffs if it threatened the European Union’s Common Agriculture Policy (CAP)” (Lagarde, 2005).

On the other hand, sentiments by Pascal Lamy, former French politician and former Director General of the World Trade Organisation (WTO) recognised the necessity of liberal trade policy to boost economic growth:

“The U.S. must budge on domestic farm support, the E.U. must budge on agriculture tariffs and the G–20 must budge on industrial tariffs. We are approaching the moment of truth” (Lamy, 2006).

The nature of trade means that there will always be winners and losers. Indeed Schumpeterian growth acknowledges that creative destruction arises out of old inefficient industries being made obsolete in preference for newer more efficient technology (Ertur and Koch, 2011). The level of political support in the industry often determines the level of protection given and thus the determination of winners and losers. For example, it is generally accepted that the computer is more productive than the typewriter regardless of the loss of jobs that initially occurred in transition from one industry to the next. As the sentiments by Christine Lagarde and Pascal Lamy confer, creative destruction becomes a less readily accepted concept when applied to agriculture.
Discussions on trade, however, are not just confined to politicians. Academics – as the present study will show – have failed to provide convincing evidence on the benefits of free trade across a range of different countries. The lack of compelling empirical evidence may, in part, be due to limitations associated with earlier econometric techniques and the dearth of suitable data. This divergence in thought by politicians and academics provides the study with a unique opportunity to review the trade liberalisation thesis by exploiting a range of modern econometrics techniques and, for the first time, a new data set, which was specifically constructed to examine this issue for Southern African Customs Union countries.

1.2 STATEMENT OF THE RESEARCH PROBLEM

The empirical literature on trade liberalisation has produced inconclusive results regarding the impact of trade liberalisation on economic growth. The reasons for these differences in outcomes span from out–dated testing methods, poor data availability, a lack of theoretical foundations, and the assumption of homogenous production functions across developing countries. Furthermore, the literature has not produced any empirical evidence that has investigated within country effects of trade liberalisation in least developed countries (LDCs) such as Lesotho and Swaziland or the other Southern African Customs Union (SACU) counterparts in Botswana, Namibia and South Africa. The available literature on developing countries in southern Africa has tended to have a partial equilibrium focus portraying scenario analyses in the agriculture, mining or motor sector industries (Black, 1998; Roberts and Thoburn, 2003; Thomy et al., 2013). The relatively poor economic performance of the SACU countries, their high dependence on trade, the limited academic research on the subject in a southern African context and the previously identified
methodological weaknesses provide the justifications and rationalisation for undertaking this research. Furthermore, in light of the increasing role of trade in the economies of developed and developing markets, this study addresses the following research question:

➢ What is the Impact of Trade Liberalisation on Economic Growth in SACU Countries?

The study investigates this overarching aim by testing the following propositions:

➢ Tariffs have an impact on economic growth
➢ Trade ratios have an impact on economic growth
➢ Adjusted trade ratios have an impact on economic growth
➢ The real effective exchange rate has an impact on economic growth

In an attempt to find evidence for these propositions and shed further light on the methodological issues identified in previous research, this study focuses on five SACU countries with a shared history but with economies at different stages of development. The economic performance of the SACU countries over the study period 1980–2011 has been poor falling short of the estimated 7% growth rate required to eliminate extreme poverty (Hanmer et al., 1999). As of 2010, Botswana’s real GDP growth rate was 6.6%, Lesotho 5.3%, Namibia 6.2%, South Africa 2.8%, and Swaziland 1.9%. Similarly investment into the region has been poor with only Botswana recording capital growth greater than 7% in 2010 whilst Swaziland had negative capital growth.
between 2000 and 2010 (Feenstra, Inklaar, & Timmer, 2013). Trade has traditionally played an important role in all five countries with them all displaying high levels of openness. All five countries are members of the Southern African Customs Union (SACU) and have largely had their trade policy determined by the SACU trade framework. This has been of benefit to the BLNS (Botswana, Lesotho, Namibia, and Swaziland) countries due to the receipt of customs revenue. However, the downside has been the over–reliance on such revenue with it making up to 70% of some members revenue (WTO, 2009a). There is a very real recognition of the need to diversify the trade sector and move away from the reliance on SACU revenue for state budgets.

As members of SACU, all five countries are generally bound by SACU policy when it comes to tariff setting. However, the SACU Agreement allows different tariff rates to be maintained by member states that have pre–existing arrangements with third parties. For instance, import and customs controls, tariffs on protected product lines and other non–tariff barriers are also decided outside of the customs union. Therefore, whilst some most favoured nation (MFN) trade tariffs are uniformlly set and applied throughout the region, heterogeneity in non–tariff barriers and strategic protection in certain industries distorts the level of trade liberalisation that has occurred in the region.

SACU member states recognise the importance of trade to their region and have continued to pursue regional integration initiatives with the commitment of the region to preferential trade agreements with bodies such as the European Free Trade Association (EFTA) and MERCOSUR (the South American trading body). These initiatives are to be applauded as the signing of the
EFTA agreement is estimated to have reduced the average MFN manufacturing tariff from 8.5% to 5.7%. However, with the MFN tariff only covering 55% of product lines (ITED, 2010), there is still room for further liberalisation to occur.

The debate in the region on whether there has been enough liberalisation is questionable with Rangasamy and Harmse (2003) arguing that liberalisation in South Africa has occurred at a significant pace, whilst Fedderke and Vaze (2001) feel more could have been done. The debate is perhaps best summarised by Edwards (2005, p.1) who acknowledges that whilst “significant progress has been made in simplifying the tariff schedules and reducing tariff protection… further progress can be made in removing tariff peaks, reducing tariff dispersion, and lowering the anti–export bias arising from protection.”

1.3 RESEARCH DESIGN

Following a survey of the international trade literature highlighting the shortcomings of earlier trade models, the endogenous growth model was deemed the most appropriate theoretical model from which this research has been designed. An econometric approach has been adopted drawing core model variables from a general production function and augmenting them with the inclusion of four trade liberalisation variables to form four trade models from which to estimate the impact of trade liberalisation on economic growth. More specifically, the study examines the relationship between economic growth (GDP per capita) as the endogenous variable, while the

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1 See chapter 3.2 for full exposition on international trade theories
2 See Artelaris et al. (2006) and Capolupo (2005) for a closer inspection of the advantages of endogenous growth models over earlier trade models.
exogenous variables consist of physical capital (proxied through capital formation data), labour (proxied through the number of people employed), and human capital (proxied through a human capital index). The four exogenous trade liberalisation variables are comprised of (i) tariffs (proxied by the ratio of taxes on international trade to total imports); (ii) trade ratios (total exports and imports/GDP); (iii) adjusted trade ratios (trade ratios that have been controlled for policy factors), and (iv) the real effective exchange rate. These variables were individually added to the econometric models in an effort to quantify the relationship between trade liberalisation and economic growth.

The study employs a quantitative time–series approach using annual country–level observations between 1980 and 2011. The exact method used is the auto–regressive distributed lag (ARDL) bounds testing approach (Pesaran and Shin, 1999) to analyse the short–run and long–run relationships between trade liberalisation and economic growth. This will include ordinary least squares (OLS) regression analyses, unit root stationarity tests, vector autoregression (VAR) modelling, cointegration procedures, and heteroscedasticity and autocorrelation tests.

In addition to time–series estimations, the study used fixed–effects panel data estimations to test the robustness of test results across all five countries. Panel data methods were chosen in recognition of the fact that when the growth and trade policy variables were examined relative to each country they could also be viewed as cross–sectional (N) units over extended time (T) periods. Hence, the panel data approach was considered due to its usefulness in analysing data that contained both time–series and cross sectional characteristics. The study data was obtained
1.4 SUMMARY OF THE FINDINGS

In summary, the findings from this study were mixed. The panel data analysis suggested that when looking at trade liberalisation through a tariff lens there was a negative relationship between tariffs and economic growth. However, when looking at trade liberalisation through trade ratios, adjusted trade ratios and the real effective exchange rate lenses, there was an insignificant impact on economic growth. Thus different trade liberalisation proxies had a different impact on economic growth. The panel data results may have been influenced by the significant economic heterogeneity that exists within the SACU countries. For example, the BLNS are heavily dependent on South Africa with the majority of their import bill arising out of South Africa. However, SACU membership eliminates all trade tariffs within the customs union as goods originating within the customs union are permitted to move freely between all five countries. Therefore even though the BLNS had a very high South African import bill, tariffs would not have an impact on economic growth due to the free movement of goods within the customs union. The real effective exchange rate also had an insignificant impact on economic growth due to the adoption of South African monetary policy. In this arrangement, commonly known as the Common Monetary Area (CMA), the currencies of Lesotho, Namibia, Swaziland and to some extent Botswana are pegged to the South African Rand, and thus effectively eliminate the ability of the BLNS to independently set their own exchange rate policy. In addition, the extremely high levels of openness in Lesotho and Swaziland arising from foreign
aid are also cited as reasons for the insignificant impact of trade liberalisation on growth when analysed through a panel framework.

In contrast, the results from the time–series analysis were more conclusive. Trade liberalisation did not have an impact in any of the BLNS countries for the reasons stated above. Turning to South Africa, tariffs were found to have had a negative impact on economic growth. Openness (consisting of trade ratios and adjusted trade ratios) did have a positive, albeit conservative impact on economic growth. The final trade liberalisation measure, the real effective exchange rate, did contribute towards a real income increase in South Africa albeit in the opposite direction. Thus, these results would suggest that based on three trade liberalisation measures (tariffs, trade ratios and adjusted trade ratios), economic growth in South Africa could be boosted by a more liberal trade policy. However based on price distortions a more restrictive policy might aid growth. Eichengreen (2007) cautions that whilst exchange rate policy could be used to jump–start growth it cannot merely replace other growth fundamentals and therefore the real effective exchange rate would be better viewed as a complementary tool to facilitate growth as opposed to a means to growth in itself.

In summary trade liberalisation in Botswana, Lesotho, Namibia, and Swaziland did not have an impact on economic growth regardless of the measure or testing method employed. In the case of South Africa, trade liberalisation was found to consistently have an impact on economic growth.
1.5 CONTRIBUTIONS OF THE STUDY & POLICY IMPLICATIONS

Considering the different literature strands of international trade theory, economic growth theory, and the impact of trade policy, the present study makes the following key contributions and provides policy study areas.

In the first place, the study contributes to the within–country literature on trade liberalisation in small developing economies. It is demonstrated that trade liberalisation occurring through incidence and outcomes based measures has had an impact on economic growth in a small developing country.\(^3\) Price based measures suggest otherwise, although as noted by Eichengreen (2007) and Rodrik (2008) these should not be considered in isolation but rather as a complementary tool to other policies that support growth. To date there has been no macroeconomic analysis that has isolated LDC countries like Lesotho and Swaziland as well as other middle-income developing countries such as Botswana and Namibia and investigated the impact of trade policy on their economies from a general equilibrium perspective. This aspect of the research is novel in that previous work has only tackled this debate from a cross–country perspective using older less accurate data with countries like Lesotho, Namibia and Swaziland often excluded from estimations due to the lack of empirical data.

The study also makes a methodological contribution in that it finds that the newer ARDL time–series method is a better measurement tool for the impact of trade liberalisation on economic growth.

\(^3\) Whilst the physical size and population of South Africa is considered relatively large on a global scale, its GDP per capita is not in the top 60 countries in the world based on World Bank and Penn World Tables datasets. Furthermore the Central Intelligence Agency (2015) has South Africa ranked at 115 out of 230 surveyed countries in real GDP per capita terms. Hence the classification of it as a small developing country.
growth than the commonly used panel data methods. Although panel data is a useful tool for cross–country analysis (see chapter 4) it makes the implicit assumption that the production functions across all countries under investigation are similar with no significant outliers. In the case of SACU countries, Lesotho and Swaziland appear to share similar economic characteristics, whilst Botswana, post–independence Namibia and South Africa have similar levels of GDP per capita. Although the figures can be misleading as South Africa’s level of economic activity is significantly higher than the BLNS countries. Indeed, the European Union (EU) has separate market access trade agreements with South Africa and the BLNS countries even though they are all members of the same customs union in recognition of the level of heterogeneity amongst SACU member states (WTO, 2009e). Thus, panel data estimations are unlikely to produce accurate measures of economic conditions in the region, which was a major finding of this research.

The first recommended study area from this research is that policy makers should look for alternative ways to liberalise the economy. South Africa and arguably the BLNS by virtue of their high South African import bill have benefitted from tariff liberalisation. Future research could investigate the potential gains that could be achieved from liberalising the highly protected sectors, which would encourage investment and in turn bring about productivity growth and human capital retention within the region.
A further policy study area arising out of these results is the need for a reduction of the high import bill in SACU member states and a move towards labour-intensive export oriented activities. Future research in this sphere could be directed towards examining the relationship of the import demand function and GDP growth in the BLNS countries.

Future research in this sphere could look to decompose the transmission routes of trade liberalisation by industry sector using dynamic stochastic general equilibrium (DSGE) models and look at the effect of openness in such sectors’ productivity. This would provide guidance to policies aimed at boosting sector productivity and might shed further light into the effectiveness of infant industry protection policies.

Based on the evidence provided through this research the manipulation of the exchange rate as a trade policy tool is not recommended. A vast number of academics (Berg and Miao, 2010; Eichengreen, 2007; Rodrik, 2008; Haddad and Pancaro, 2010) appear to favour the IMF and World Bank institutions export–led hypothesis that an undervalued exchange rate would increase economic activity. However, the study results on the contrary indicate that an appreciation of the real effective exchange rate was accompanied by modest growth in South Africa. Hence, exchange rate policy would be best left to market forces with the focus being on incidence and outcomes based liberalisation measures.
1.6 OUTLINE OF THE THESIS

The overall objective of this study is to investigate the impact of trade liberalisation on economic growth in five SACU countries. The following issues arise out of the research question: the need to investigate the impact of trade liberalisation on economic growth and identify the cointegrated movements of the proposed variables within the SACU countries; and the need to investigate the impact of trade liberalisation on individual macroeconomic growth variables within the five countries. Based on the objectives the remainder of the thesis is structured as follows.

Chapter 2 presents an economic and geo-political background on all five Southern African Customs Union countries. Chapter 3 provides a brief overview of the progression of international trade theory and the incorporation of growth theory to provide a dynamic framework to trade modelling. The chapter also includes literature reviews of earlier research showing the unresolved debate around trade liberalisation. Chapter 4 explores the econometric techniques used to investigate the research question. The results of the study are presented and discussed in chapter 5 along with policy recommendations. Finally, chapter 6 provides a summary and conclusion of the thesis.
2 CHAPTER TWO: MACROECONOMIC BACKGROUND

2.1 INTRODUCTION

This chapter provides an overview of the geo–political, economic, and trade conditions present in the five countries (Botswana, Lesotho, Namibia, South Africa and Swaziland) under investigation. As all five countries are members of the Southern African Customs Union (SACU), which largely determines their trade policy, it is instructive to provide a brief overview of the main characteristics of the SACU. Following this summary, the chapter presents geo–political, economic and trade policy summaries for each country, which provide a deeper insight into each country’s history, achievements, and economic and political challenges. This chapter also provides context to the growth variables used in the study, which will be introduced in forthcoming chapters and used in the interpretation of the study results. The chapter draws the majority of its information from country reports and strategic papers published by the World Trade Organisation, Penn World Tables, World Bank, African Development Bank, Transparency International and Mo Ibrahim Governance Indexes.
2.2 SOUTHERN AFRICAN CUSTOMS UNION

Established in 1910, the Southern African Customs Union is the oldest operational customs union still in existence (Gibb, 2006). The entity’s legal foundation has twice been adjusted to meet the new political and economic developments in the region. The first amendment occurred in 1969 to take into account the independence of the three former High Commission territories of Botswana, Lesotho and Swaziland. The move towards a second amendment began in 1994 resulting in the negotiation of a more comprehensive 2002 Agreement that took into account recent political developments. This included the independence of Namibia and the formation of a democratic government in South Africa following the end of apartheid. The stated aims of the 2002 SACU Agreement are:

- Facilitation of regional trade and integration between member states;
- Establishment of democratic, transparent and effective institutions within the union;
- Promotion of fair competition within the union;
- Increased investment and economic development in the union;
- Facilitation of the equitable sharing of customs and excise revenue in the union; and
- Development common policies.

South Africa is responsible for setting the bulk of monetary policy in the region. This is due to the formation of a Common Monetary Area (CMA) with the currencies of Lesotho, Namibia and Swaziland pegged to the Rand at par. The main objectives of the CMA are to provide monetary
stability, financial cooperation and economic development for CMA members. This provides member countries with access to South Africa’s larger money and capital markets. Botswana follows a crawling band exchange rate pegged to the South African Rand and the Special Drawing Rights (SDR). South Africa is the only relatively diversified economy in the customs union with revenue coming from multiple industries (WTO, 2009a). The BLNS (Botswana, Lesotho, Namibia, and Swaziland) states are characterised by an over-reliance on two to three industries, SACU receipts and a high dependence on South Africa for the majority of their imports. Thus, they tend to import automatically all of South Africa’s inflation and their interest rates move in tandem with South African rates. Fiscal policy is not harmonised across the customs union. However, BLNS states are heavily dependent on SACU customs and excise revenue with it constituting between 17 and 30% of Botswana and Namibia’s revenue and between 60 and 70% of Lesotho and Swaziland’s revenue. South Africa receives less than 1% of its revenue from SACU receipts. Therefore, it is plausible that the implementation of fiscal policy in the BLNS is indirectly reliant on South African actions as it contributes over 90% to the customs and excise revenue pool.

The simple average most favoured nation (MFN) tariff in SACU was 8.1% as of 2009 and applied to 55% of all product lines. Of all tariffs, an estimated 87% carried rates as high as 20%, with the highest tariffs generally reserved for dairy, agriculture, and alcoholic beverages. Preferential Trade Agreements with different states and regional groupings imply that these rates are not consistently applied across all trading partners. For example the trade agreement with the European Free Trade Association (EFTA) signed in 2006 (EFTA, 2008) reduced the average MFN manufacturing tariff from 8.5% to 5.7%. The SACU Agreement also allows different tariff
rates to be maintained by member states that have pre–existing arrangements with third parties. This allows tariffs to differ significantly amongst SACU member states.

Currently the only harmonised trade policies in the customs union are the applied customs tariff, excise duties, duty rebates, refunds and drawbacks, customs valuation, rules of origin, and contingency trade remedies (WTO, 2009a). For example, goods entering the customs union are in practice declared at the first point of entry, which for the landlocked countries is normally at a South African port. They may also be transferred in bond and cleared at the destination country with customs and excise duties collected at the home country. The value added tax (VAT) policy, which has been excluded from the 2002 SACU Agreement, is left at the discretion of each member state. Import and customs controls, tariffs on protected product lines and other non–tariff barriers are also decided outside of the customs union. Therefore, while some MFN trade tariffs are uniformly set and applied throughout the region, heterogeneity in non–tariff barriers and strategic protection in certain industries distorts the level of trade liberalisation occurring in the region.

Since 2003, the growth rates of SACU member states have varied but nowhere near the recommended millennium development goals (MDG) rate of 7% required to eliminate extreme poverty (Hanmer et al., 1999). This is a likely indicator of the infrastructure and human capacity constraints, high dependence on the mining sector, volatile currencies, and the global financial crisis (GFC). Ironically, while all five countries are members of the same customs union, heterogeneous trade policy is also likely to have contributed to the poor economic performance
through inefficiencies occurring in protected sectors such as agriculture and transport. These concepts are further explained in the background sections of all five SACU countries.

2.3 BACKGROUND TO BOTSWANA’S ECONOMY

2.3.1 Geo–Political Environment

The Republic of Botswana is an upper middle–income country in the Southwest of Africa landlocked by Namibia, Zambia, Zimbabwe and South Africa. It has a surface area of 581,730 square kilometres (World Bank, 2014b) with a semi–arid climate that is prone to frequent droughts. The Kalahari Desert covers two thirds of the country, which makes arable agriculture difficult. There is a considerable conservational effort with one third of the territory under different types of conservation ranging from national parks to forest reserves. The population of Botswana was estimated to be 2.03 million in 2011. Although classified as an upper middle–income country, Botswana faces many of the challenges typical to developing countries. For example, 21% of the population lives in extreme poverty in comparison to Chile where only 2.7% of the population is considered to be extremely poor (AfDB, 2013a). Unemployment, which hovers between 17 and 20%, is a major economic challenge. This is in part attributable to the capital–intensive nature of mining, which only employs 5% of the labour force while accounting for around 70% of exports. Inequality is extremely high with a Gini coefficient of 0.61, which presents challenges to future development and income redistribution. Perhaps the greatest challenge that Botswana faces its high HIV infection rate. In 2013, the prevalence rate was estimated to be 17%, which is among the highest in the world.
Despite these challenges, Botswana has performed extremely well in achieving good governance, political rights and economic freedoms since it attained independence in 1966. The electoral process has been reported as regular, free and fair since independence albeit with one political party, the Botswana Democratic Party (BDP), remaining in power. Botswana was ranked 1st in good governance in Africa and 31st internationally according to Transparency International 2014 Corruption Index. This is considerably better than Lesotho and Namibia both ranked 55, South Africa ranked 67 and Swaziland ranked last of the SACU countries at 69 (Transparency International, 2014).

2.3.2 Economic Environment

Botswana has had a phenomenal change in economic fortune since it gained independence. In 1966 Botswana was a least developed country (LDC) with a GDP per capita of around US$70 (AfDB, 2013a). Through subsequent good governance, sound macroeconomic policy, and the discovery of diamonds in the 1970s it has transformed itself into an upper middle–income country with a GDP per capita of US$9900 (Feenstra et al., 2013). Average GDP per capita growth between 1980 and 2011 was 4.85%, while the real GDP growth rate was an impressive 6.6% in 2010 (Table 2.1).
The Botswana government has set itself an ambitious National Development Plan 10 based on four pillars of economic growth, social justice, economic independence, and sustainable development, which aim to have the country classified as a developed economy by 2016 (WTO, 2009b). However, looking at current economic indicators, this milestone is unlikely to be achieved partly due to the GFC and other underlying structural issues, such as the inadequate infrastructure, shortage of skilled labour, high HIV prevalence rates and the lack of a diversified economy heavily reliant on the diamond sector. This lack of diversification was felt during the GFC with the closure of diamond mines across the country due to reduced global demand (AfDB, 2009). Electricity shortages in South Africa along with weak recovery in the EU have also contributed towards the slow recovery of Botswana’s economy.
The agriculture sector’s importance to GDP has been slowly declining from a 43% contribution to GDP at independence to a more modest 2% contribution in 2009. This has mainly arisen due to the dominance of the mining sector in national revenue. Productivity in this sector is low due to the high incidence of foot and mouth disease along with harsh weather conditions typical of semi–arid regions. As is typical of the agriculture sector, it is the most highly protected industry in the country. Although it should be noted that Botswana is still a net importer of food with about 85% of cereals, 44% of fruits and vegetables, and 67% of its dairy requirements arising mostly from South African imports (WTO, 2009b). The mining of diamonds remains both a blessing and a curse to Botswana with diamond revenue contributing 30% to GDP and constituting about 70% of export revenue (WTO, 2009b). The implication of this over–reliance on diamond revenue is that large swings in the global diamond market have a substantial impact on government revenue. Furthermore, expansion of mining activities historically has done little to solve unemployment and inequality issues due to the capital–intensive nature of the industry.

The manufacturing sector is 3.8% of GDP and is comprised of three main industries: (i) food and beverages; (ii) textiles and clothing; and (iii) automobiles. The Botswana government through its Industrial Development Policy has identified the manufacturing and services sectors as future growth strategic sectors. Policy initiatives aim to attract investment into the sector, expand the industrial base, increase education and innovation, and promote entrepreneurial activity through protected manufacturing activity (MTI, 2009). The services industry comprised of transport and telecommunications, banking, finance and tourism accounts for 51% of GDP.
The Central Bank (Bank of Botswana) is responsible for exchange rate policy. The principal exchange rate policy objective is to maintain the stability of the real effective exchange rate (REER) and thus competitiveness of exports (James et al., 2009). Unlike the other four countries in the customs union Botswana is not a signatory to the common monetary area and thus has some control over its exchange rate and fiscal policy. The Bank of Botswana employs a crawling band exchange rate mechanism based on a peg of currencies consisting of the South African Rand and Special Drawing Rights (SDR).\(^4\) Despite its independent exchange rate policy, Botswana’s high dependence on imports from South Africa along with the pula having a crawling peg to the Rand, ensure that South African policies still have an impact on Botswana’s economy.

2.3.3 Trade Policy

Botswana has been a member of the Southern African Customs Union since 1910 and has thus always ceded much of the control of its trade policy instruments to SACU. Within Botswana, the institutions that play a role in trade policy formulation include the Ministries of Trade and Industry, Finance, Agriculture, Mineral and Resources, Transport and the Central Bank of Botswana (AfDB, 2013a).

While being a member of SACU limits the extent to which Botswana can impose trade barriers, the recognition of the different levels of development within the customs union provides a pathway for member states to promote their strategic interests. For example, under the Infant

\(^4\) See Williamson (2009) for an explanation of Special Drawing Rights.
Industry Protection programme Botswana is able to protect its dairy industry through additional tariffs on treated dairy products from foreign sources (Leith, 1997; Seleka, 2007). The effects of this protection is debatable with the state arguing that the protection of an industry will lead to competitiveness in the sector, which will create value–added industries in the long–term. Research by Tsheko (2005) would seem to suggest that the poor citizens of Botswana who are large consumers of agricultural products would in the short term benefit more from a reduction in tariff prices than from increased export earnings.

Trade liberalisation and the promotion of investment form the key components of Botswana’s trade policy framework and development strategy. Prior to 1998, Botswana like many developing countries pursued an import substitution strategy (Hur and Park, 2012). However, following the release of the Industrial Development Policy trade liberalisation has been at the forefront of the development agenda with the implementation of export led growth strategies. Tariffs on agricultural products average 10% and range up to 96%, due to the substantial government protection of the sector. Agricultural producers also receive further subsidies from government in the form of drought assistance, special access to inputs and price support (WTO, 2009b). The Botswana government also heavily protects the beef industry with average tariffs set at 17% and ranging up to 43%.

The investment and trade environment in Botswana is now relatively open with the exception of the strategic industries mainly in the agriculture sector identified earlier. The main inhibitors to growth as identified by WTO reports are human and institutional capacity, supply side
constraints, the ability to implement WTO agreements, and the integration of trade into the development framework (WTO, 2009b).

2.4 BACKGROUND TO LESOTHO’S ECONOMY

2.4.1 Geo–Political Environment

The Kingdom of Lesotho is a country located in the southern part of the African continent with the Republic of South Africa as its sole neighbouring country. Lesotho’s mountainous terrain makes commercial activities such as agriculture and mining difficult. The country’s total surface area is 30,360 square kilometres (World Bank, 2014b) of which only 11% is projected to be arable land (BTI, 2014). As of 2011, the population, according to World Bank estimates, was 2.2 million people with 75% dwelling in rural areas. Lesotho is classified as a least developed country (LDC) and displays many traits typical of LDCs. In particular, inequality is high with a Gini coefficient index of 0.54, whilst HIV/AIDS continues to have a serious impact on the economy with a prevalence rate of 22.9% and about 16% of the population living with HIV (UNAIDS, 2013). Other issues that continue to pose challenges to the country include food insecurity with 57.1% of the population living below the US$2 a day poverty line. These factors coupled with a high unemployment rate of about 25% has exerted further pressure on social spending within the country (AfDB, 2014a).

Since gaining its independence from Britain in 1966, Lesotho is today a stable democratic constitutional monarchy. However, the country has endured periods of political instability, which have contributed to its poor economic performance. In the years immediately following
independence (1966–1970) Lesotho was initially governed through a multiparty democratic model, before subsequently moving to a one party state model from 1970 to 1986 (Maleleka, 2009). In the ensuing years, the country experienced a turbulent political period characterised by military rule from 1986–1993; a military backed coup in 1994; and the outbreak of violence and looting following the 1998 elections. The tempestuous period in 1998 required military intervention by regional neighbours Botswana, South Africa and Zimbabwe. In the aftermath of the numerous political disputes the electoral system was changed from a first past first through system to a mixed–member proportional system (BTI, 2014). The introduction of this system appears to have led to peaceful outcomes with all subsequent elections having been pronounced free and fair by outside observers (BTI, 2014). Corruption remains persistent within the country’s governance framework with multiple senior government officials facing corruption allegations (AfDB, 2014a). The country also has a high corruption rating scoring below average in the corruption index (Transparency International, 2014).

2.4.2 Economic Environment

Lesotho’s per capita income in 2011 was US$1580 as compared to 1980 where it was US$802 (Feenstra et al., 2013). GDP per capita growth over the study period was 3.9%. Following the global financial crisis, demand for Lesotho’s commodities in major overseas markets like Europe and the United States fell and slowed Lesotho’s GDP growth to 2.8% in 2009.

The economy has shown modest recovery with real GDP growth recorded at 5.3% in 2010 and 4.1% in 2011 (Table 2.2). This growth has mainly been driven by diamond production and the
textiles and clothing industries. In addition, prudent macroeconomic policy by the government of Lesotho along with increased tax revenues from Southern African Customs Unions receipts has seen the country register a surplus in its current account balance as of 2013 although it did register deficits in the two preceding periods (AfDB, 2014a).

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<tbody>
<tr>
<td>Real GDP (PPP adjusted US$ million)</td>
<td>1,052</td>
<td>1,210</td>
<td>1,562</td>
<td>1,908</td>
<td>2,314</td>
<td>2,667</td>
<td>3,336</td>
</tr>
<tr>
<td>Change in Real GDP %</td>
<td>n/a</td>
<td>3.3</td>
<td>5.8</td>
<td>2.0</td>
<td>4.9</td>
<td>2.6</td>
<td>5.3</td>
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<tr>
<td>Real GDP per capita (US$)</td>
<td>802</td>
<td>814</td>
<td>953</td>
<td>1,063</td>
<td>1,178</td>
<td>1,291</td>
<td>1,536</td>
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<tr>
<td>Total Labour Force (million)</td>
<td>0.550</td>
<td>0.626</td>
<td>0.681</td>
<td>0.759</td>
<td>0.848</td>
<td>0.849</td>
<td>0.894</td>
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<tr>
<td>CPI Inflation</td>
<td>16.27</td>
<td>13.32</td>
<td>11.63</td>
<td>9.27</td>
<td>6.13</td>
<td>3.44</td>
<td>3.60</td>
</tr>
<tr>
<td>Human Capital Index</td>
<td>1.74</td>
<td>1.79</td>
<td>1.83</td>
<td>1.90</td>
<td>1.99</td>
<td>2.10</td>
<td>2.23</td>
</tr>
<tr>
<td>Real Capital Stock (US$ million)</td>
<td>2,760</td>
<td>4,071</td>
<td>5,607</td>
<td>8,592</td>
<td>11,468</td>
<td>12,769</td>
<td>14,346</td>
</tr>
<tr>
<td>Change in Capital Stock %</td>
<td>n/a</td>
<td>7.4</td>
<td>7.6</td>
<td>7.2</td>
<td>4.1</td>
<td>0.9</td>
<td>3.1</td>
</tr>
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Source World Bank Development Indicators (2014); Penn World Tables National Account Data (2013)

The tertiary sector (transport, telecommunications, financial services, and retail) accounts for 65% of GDP. The secondary sector comprising of textiles and clothing, water, and construction only accounts for 23% of GDP, however 80% of merchandise exports arise out of this sector. In contrast to Botswana, the primary sector made up of mining, quarrying and agriculture only contributes 13% towards Lesotho’s GDP (AfDB, 2014a). Growth of the primary sector is viewed as being a short–term poverty alleviation strategy as 75% of Lesotho’s population still resides in the rural areas and this sector employs 60% of the country’s workforce.
Investment in Lesotho remains sluggish with the average growth rate of investment post 2000 being 2.64% and reaching 3.1% in 2010 (Table 2.2). The main inhibitors to the inflow of capital are structural constraints such as a poor transportation network, poor governance mechanisms, an inadequate legal framework, a rigid labour market and poor access to finance. The World Bank’s Ease of Doing Business 2009 Index ranked Lesotho 123 out of 178 economies further highlighting why the attraction of investment into the country has been so difficult (WTO, 2009c). In response, the Lesotho government has embarked on a restructuring programme called Vision 2020 to attract foreign direct investment (FDI), stimulate domestic investment, improve administrative efficiency, and diversify the economy away from clothing and textiles industries.

2.4.3 Trade Policy

Lesotho has been a member of the SACU since 1910 and has subsequently adopted most of SACU’s trade policy. The Ministry of Trade and Industry, Cooperatives and Marketing is the local department, which shapes trade policy outside of the SACU framework. The Lesotho National Development Corporation (LNDC) is the main parastatal organisation tasked with driving development in the country through activities such as the development of the mining, manufacturing, services and industrial sector.

According to the WTO Trade Policy Review, Lesotho’s trade vision is centred on being an investment destination of choice in Africa and an active participant in the global multilateral trade framework. Lesotho has recently implemented trade liberalisation measures in its agricultural trade policy. This has been characterised by a move towards market determined
pricing through the removal of price subsidies and import controls on wheat and maize products. The sector could be liberated further with the elimination of import controls on a larger range of products such as dairy, fruits, vegetables, meat and bread. The simple average applied most favoured nation (MFN) tariff in the agriculture sector was 3.7% although the tariff rates ranged from zero to 44%. In contrast, average tariff rates on manufacturing imports were 8.5% though the range was significantly higher than agriculture with the maximum manufacturing tariff rate estimated at 96%. Tariffs on textile products averaged 19.4% with an estimated maximum tariff rate of 60%. Lesotho’s main export market for textiles is the USA, which under the African Growth and Opportunity Act (AGOA) of 2000 provides duty and quota free access for clothing manufactured from fabrics originating in a third country (Tadesse and Fayissa, 2008).

2.5 BACKGROUND TO THE NAMIBIAN ECONOMY

2.5.1 Geo–Political Environment

The Republic of Namibia is an upper middle–income country located in the South West of Africa. It has a surface area of 824,290 km² and has borders with Angola, Botswana, South Africa, Zambia and Zimbabwe (World Bank, 2014b). Namibia also has two commercial ports in Luderitz and Walvis Bay giving it an added advantage over its other landlocked SACU members of Botswana, Lesotho and Swaziland. The main advantage arising from port facilities being greater access to international trade through reduced transport costs (Mizutani et al., 2005). According to World Bank (2014b) reports Namibia had an estimated population of 2.3 million people of whom 36% dwelled in urban areas.
Whilst Namibia is classified as a middle–income economy it still faces many development challenges amongst which are an unemployment rate of 27% and more than half of the population (56%) living in poverty (WTO, 2009d). In addition, Namibia faces very high inequality levels with a Gini coefficient of 0.597 and an 8.9% HIV/AIDS prevalence rate among the 15 to 24 age group. Namibia gained independence from South Africa in 1990. Since independence, it has maintained a stable multiparty constitutional democracy with free and fair elections, albeit with the ruling party SWAPO dominating the vote. Similar to Botswana, Namibia performs relatively well in various governance measures. For example, in 2014, Namibia was ranked 6th in Africa on the ‘good governance’ Ibrahim Index (IIAG, 2014) and 55 out of 174 countries in the Corruption Perceptions Index (Transparency International, 2014).

### 2.5.2 Economic Environment

Namibia’s per capita income in 2011 was US$4889 (Feenstra et al., 2013). Over the duration of the study period 1980–2011, Namibia has had positive economic performance. Real GDP per capita has risen at an average rate of 0.55% over the study period. During the period before the GFC (2002 – 2008) the economy grew at an average rate of 5% (AfDB, 2014b).
Table 2.3 1980–2010 Namibian Macroeconomic Growth Trends

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<tr>
<td>Real GDP (PPP adjusted US$ million)</td>
<td>4,170</td>
<td>4,056</td>
<td>4,575</td>
<td>5,826</td>
<td>6,924</td>
<td>8,809</td>
<td>10,967</td>
</tr>
<tr>
<td>Change in Real GDP %</td>
<td>n/a</td>
<td>0.2</td>
<td>0.3</td>
<td>4.0</td>
<td>3.4</td>
<td>2.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Real GDP per capita (US$)</td>
<td>4,117</td>
<td>3,525</td>
<td>3,233</td>
<td>3,528</td>
<td>3,652</td>
<td>4,235</td>
<td>4,803</td>
</tr>
<tr>
<td>Total Labour Force (million)</td>
<td>0.291</td>
<td>0.324</td>
<td>0.443</td>
<td>0.536</td>
<td>0.638</td>
<td>0.781</td>
<td>0.929</td>
</tr>
<tr>
<td>CPI Inflation</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>10.01</td>
<td>9.3</td>
<td>2.3</td>
<td>4.47</td>
</tr>
<tr>
<td>Human Capital Index</td>
<td>1.90</td>
<td>2.01</td>
<td>2.12</td>
<td>2.10</td>
<td>2.03</td>
<td>2.08</td>
<td>2.13</td>
</tr>
<tr>
<td>Real Capital Stock (US$ million)</td>
<td>12,434</td>
<td>13,380</td>
<td>13,875</td>
<td>15,630</td>
<td>19,107</td>
<td>24,072</td>
<td>33,809</td>
</tr>
<tr>
<td>Change in Capital Stock %</td>
<td>n/a</td>
<td>0.0</td>
<td>2.1</td>
<td>3.6</td>
<td>3.2</td>
<td>4.2</td>
<td>6.3</td>
</tr>
</tbody>
</table>

Source: World Bank Development Indicators (2014); Penn World Tables National Account Data (2013)

The GFC reduced growth to an estimated 0.3% in 2009 mainly through the reduced demand for diamonds globally. The economy has shown signs of recovery with growth recorded at 6.2% in 2010 (see Table 2.3). Growth is expected to remain under 5% in the medium term, due to Namibia’s high dependence on mineral exports, and below par economic activity from South Africa.

Namibia’s development strategy is based on the National Development Plan 4 whose main objectives are the achievement of high and sustainable growth, the reduction of income inequality, and the creation of jobs. The Namibian Central Bank (Bank of Namibia) supports these goals through price stability achieved though the maintenance of parity between the Namibian Dollar and the South African Rand. Thus similar to the other countries in the CMA monetary policy for the region is largely set by the South African Reserve Bank. Fiscal policy on
the other hand is aimed at meeting the other two objectives largely through employment and investment (AfDB, 2014b).

The agriculture sector including fishing contributed 9% towards GDP in 2012. This sector is heavily dependent on weather conditions with frequent droughts severely affecting livestock and crop production, while the fishing sector has been experiencing declining stocks and high overheads arising mainly from rising fuel costs. The sector employs the largest number of people accounting for 27% of formal employment (World Bank, 2014a). The mining sector accounts for 12% of GDP and makes up 47% of Namibia’s exports. These figures show that mining activity, in particular diamond production continue to dominate Namibia’s export structure, which poses challenges to nationwide growth initiatives. This arises due to the capital-intensive nature of mining, which does not increase employment significantly due to the majority of the investment occurring in equipment. Furthermore, the country remains exposed to external shocks such as fluctuating mineral prices. The manufacturing sector comprised mainly of construction contributed 12% to GDP mainly through investment in residential and commercial property, and cement exports to Angola and the Democratic Republic of Congo (Honde and Odhiambo, 2014). The service sector contributed about 60% of GDP with its main drivers of economic activity being retail trade, finance and business services, public administration and social spending.

Since gaining independence in 1990, Namibia has adopted sound macroeconomic policies, as well as the maintenance of good infrastructure, an independent judiciary and a stable political environment, which has ensured that investment, has continued to occur. This is seen through a
capital growth rate of 6.3% in 2010. Namibia’s development ambitions have been enhanced through its membership in SACU with customs union import revenue receipts contributing about 13% towards GDP in 2014 (World Bank, 2014a). However, similar to the Botswana economy, the Namibian economy is still faced with problems of inequality, high unemployment, a high reliance on minerals for export revenue and a high dependency on South Africa, with imports from its southern neighbour making up 78% of all its imports (WTO, 2009d).

2.5.3 Trade Policy

Namibia officially became a member of SACU after independence in 1990. Prior to this, it was still a de facto member of the customs union through its occupation by the South African government. The majority of trade policy is thus set through the SACU framework. For instance, according to the SACU common external tariff (CET), the majority of goods entering the country receive duty free access under SACU provisions. Most favoured nation (MFN) tariffs on the other hand are applied to selected goods from China and a few EU countries mostly in the transport and machinery sectors.

Whilst the SACU agreement provides clear direction in the setting of tariff policy, non–tariff policy is at the discretion of member states. The Ministry of Trade and Industry is the main body responsible for the implementation of trade policy in Namibia. Other industries that play a significant supporting role in trade policy formation include the Ministries of Agriculture, Water and Fisheries, Finance, Environment and Tourism, Foreign Affairs, and Works and Transport. Their main policy actions include the application of non–tariff barriers that are largely comprised
of standards and technical regulations, sanitary and phytosanitary measures, and public procurement controls.

Outside of the SACU CET framework, the Ministry of Trade and Industry applies infant industry protection to vulnerable industries that are less than eight years old. Its two main industries under infant industry protection have been UHT milk and pasta. The applicable tariffs for UHT milk products have ranged from 10% to 4% over the life of the scheme and those in pasta products have ranged from 40% to 0% over the life of the scheme. Average tariffs on agriculture across SACU are 4.3% with a range from 0% to 40%. A high degree of liberalisation is evident in the mining sector with equipment imports averaging 0.8% and ranging from 0% to 10%. This is in line with the Namibian government’s development objectives of attracting foreign investment into the sector and allowing the private sector to take a leading role in exploration, mining and marketing of resources (WTO, 2009d).

In general, all imports into Namibia require licenses with the government using these strategically in the fish, meat and second hand goods markets. Seasonal import controls are also applied on agricultural products such as wheat, maize, and pearl millet. Certain industries such as the diamond sector and other manufacturing are subject to export controls. As a part of these controls diamond exports are all taxed and certain amounts have to be made available to local industry for value added processing (WTO, 2009d). The government also promotes export–processing zones (EPZ) whereby tax–free status is given to manufacturing, assembly and re–
packaging firms that export the majority of their goods. This serves as an incentive for the relocation of firms to Namibia to develop the manufacturing sector and create employment.

The SACU agreement does not make any provisions for trade in services leaving member states room to develop their own procurement policies. In this regard, Namibia has not signed the WTO plurilateral Agreement on Government Procurement. This gives the Namibian government autonomy in the procurement of goods via the Namibian Tender Board (WTO, 2009d).

Namibia sees trade liberalisation, export and investment promotion as its key trade development strategies. There has been a gradual removal of tariffs and other entry barriers across its industries with trade expected to play an ever-increasing role in achieving the Namibia Development Plan 4 objectives.

2.6 BACKGROUND TO THE SOUTH AFRICAN ECONOMY

2.6.1 Geo–Political Environment

The Republic of South Africa is a country located at the southern tip of the African continent. According to the World Bank it is classified as an upper-middle income economy (Ozturk et al., 2010). South Africa’s total surface area is estimated at 1,219,090 square kilometres (World Bank, 2014b) of which only 10% is arable land. Its neighbours are Botswana, Lesotho, Namibia, Mozambique, Swaziland and Zimbabwe. South Africa also has seven major seaports in Cape Town, Durban, Port Elizabeth, East London, Mossel Bay, Saldanha and Richards Bay with the
port in Durban being the second largest in Africa after Cairo (AfDB, 2010). As of 2011, South Africa’s real Gross Domestic Product (GDP) per capita adjusted for Purchasing Power Parity (PPP) was US$7900 (Feenstra et al., 2013). The World Trade Organisation (WTO) views South Africa as one of the most important economies in Africa (WTO, 2009e) and until March 2014 was classified as the largest economy in the continent. Following the re-basing of Nigeria’s GDP it is now the second largest economy in Africa (Adibe, 2014). South Africa’s population in 2011 was 50 million people (World Bank, 2014b).

While South Africa has experienced a relatively stable economic environment since its transition to a democratic government in 1994, job creation remains its major challenge with unemployment and labour unrest continuing to plague the country. Unemployment has decreased from an average rate of 30% in 2002 to an estimated 24% in 2008 with youth unemployment estimated at 64% (AfDB, 2013b). In addition to unemployment, extreme poverty continues to threaten growth in South Africa with 31% of the population living below the poverty line as measured in 2009 (World Bank, 2014b). South Africa’s most challenging social problems, the HIV/AIDS pandemic, high crime rate and frequent labour strikes, remain unresolved, and have had a negative impact on economic growth. As an example, labour unrest has affected productivity in key sectors of mining, agriculture and manufacturing, with the motor vehicle sector contracting by 75% in September of 2013 due to labour unrest (WTO, 2009e). The productivity of the labour force continues to be disrupted by the HIV/AIDS pandemic whilst the high crime rate has added to the country’s social problems.
Apartheid was implemented in South Africa as an official policy since the National Party took control of the country in 1948. Notable effects of apartheid on the South African economy, along with the other social injustices and human rights violations that occurred during the era, were labour market distortions due to the majority black population in the country being limited in travel and work opportunity (Levy, 1999). This along with other sanctions due to apartheid and the debt crisis in the 1980s contributed to South Africa’s distorted growth projectile. Sanctions were first symbolically imposed on South Africa in 1970 and heightened from 1985 onwards (Levy, 1999), subsequently ending in 1993 following the end of apartheid (Kumar et al., 2002).

2.6.2 Economic Environment

Under apartheid rule, South African GDP per capita grew at 1.7% between 1980 and 1993 as compared to 3.7% immediately post–apartheid and 2.3% over the period 1980 to 2011. Real growth of the economy was strongest between 2000 and 2008 where average rates were above 5%. However, in the aftermath of the global financial crisis there was a decline in global demand which led to a slowdown in the South African economy (WTO, 2009e). Growth of the economy thereafter has been modest with 2.8% real growth in 2010 and 1.9% in 2013 (AfDB, 2013b). As of 2011, South Africa’s PPP per capita income was US$7917 which is a modest improvement from 1980 levels recorded at US$6964 (Feenstra et al., 2013). Table 2.4 shows the macroeconomic trends prior to 1994 while Table 2.5 shows the trends post 1994.
Table 2.4 1980–1993 South African Macroeconomic Growth Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP (PPP adjusted US$ million)</th>
<th>Change in Real GDP %</th>
<th>Real GDP per capita (US$)</th>
<th>Total Labour Force (million)</th>
<th>CPI Inflation</th>
<th>Human Capital Index</th>
<th>Real Capital Stock (US$ million)</th>
<th>Change in Capital Stock %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>197,186</td>
<td>n/a</td>
<td>6,781</td>
<td>7.46</td>
<td>13.66</td>
<td>1.91</td>
<td>399,716</td>
<td>n/a</td>
</tr>
<tr>
<td>1983</td>
<td>203,139</td>
<td>-1.9</td>
<td>6,467</td>
<td>8.09</td>
<td>12.30</td>
<td>1.91</td>
<td>461,854</td>
<td>4.3</td>
</tr>
<tr>
<td>1986</td>
<td>210,948</td>
<td>0.0</td>
<td>6,253</td>
<td>8.80</td>
<td>18.65</td>
<td>1.98</td>
<td>493,630</td>
<td>0.9</td>
</tr>
<tr>
<td>1989</td>
<td>229,800</td>
<td>2.3</td>
<td>6,389</td>
<td>9.61</td>
<td>14.73</td>
<td>2.19</td>
<td>516,747</td>
<td>1.7</td>
</tr>
<tr>
<td>1992</td>
<td>221,892</td>
<td>-2.2</td>
<td>5,742</td>
<td>10.84</td>
<td>13.87</td>
<td>2.41</td>
<td>534,057</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source World Bank Development Indicators (2014); Penn World Tables National Account Data (2013)

Table 2.5 Post–Apartheid South African Macroeconomic Growth Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Real GDP (PPP adjusted US$ million)</th>
<th>Change in Real GDP %</th>
<th>Real GDP per capita (US$)</th>
<th>Total Labour Force (million)</th>
<th>CPI Inflation</th>
<th>Human Capital Index</th>
<th>Real Capital Stock (US$ million)</th>
<th>Change in Capital Stock %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>239,119</td>
<td>3.0</td>
<td>5,775</td>
<td>12.39</td>
<td>8.68</td>
<td>2.61</td>
<td>554,689</td>
<td>1.8</td>
</tr>
<tr>
<td>2000</td>
<td>274,355</td>
<td>4.0</td>
<td>6,129</td>
<td>15.13</td>
<td>5.34</td>
<td>2.48</td>
<td>619,930</td>
<td>1.9</td>
</tr>
<tr>
<td>2005</td>
<td>331,114</td>
<td>5.1</td>
<td>6,928</td>
<td>17.32</td>
<td>3.40</td>
<td>2.60</td>
<td>717,656</td>
<td>4.1</td>
</tr>
<tr>
<td>2010</td>
<td>387,424</td>
<td>2.8</td>
<td>7,727</td>
<td>18.54</td>
<td>4.26</td>
<td>2.64</td>
<td>934,749</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source World Bank Development Indicators (2014); Penn World Tables National Account Data (2013)

Following the end of apartheid South Africa has faced other disruptions to economic growth. These include the GFC, persistent labour unrest, the electricity shortages that have been taking place since 2008 and the on–going Euro crisis. The South African government is aiming to address the electricity shortages through the development of a new Medupi power plant and a
Renewable Energy Independent Power Producers (REIPP) Programme (AfDB, 2013b). The slowdown in the European Union (EU) area, South Africa’s largest trading group, has been transmitted to the South African economy through reduced demand for manufactured and primary exports. The government has embarked on a diversification strategy, which has seen an increase in exports to China and Japan during this period.

Despite many of the country’s social and economic problems, investment in South Africa has remained steady with the real capital stock growing at over 4% since 2005. Much of this growth is attributed to increased government spending along with infrastructure upgrades that were necessary to host the 2010 FIFA World Cup tournament (WTO, 2009e).

Turning to monetary policy, the South African Reserve Bank (SARB) adopted an inflation targeting policy in 2002 aimed at keeping inflation within a band of 3–6% (Aron and Muellbauer, 2007). From 1980 to 1992, inflation ranged between 9% and 18%. However since the inflation targeting policy was introduced in 2002 the SARB has managed to maintain inflation within the desired 3–6% range. The most recent figures suggest that CPI inflation was recorded at 5.4% in 2012 (World Bank, 2014b). More currently, the rising cost of fuel, food and commodity prices have brought about inflationary pressures to the local economy. Yet, the SARB has managed to stabilise this pressure through the consecutive raising of interest rates leading to tighter monetary policy.
Previously South Africa has pursued various exchange rate policies ranging from crawling peg exchange rates in the early 1980s to managed floats and more recently a freely floating exchange rate regime determined by forces of supply and demand in the foreign exchange market (Aron et al., 1997; Aron et al., 2000; AfDB, 2013b). While, in essence, the exchange rate system employed by the SARB is a freely floating system, the SARB intervenes in this market through the purchase of foreign currency reserves and the manipulation of exchange controls in an attempt to prevent major currency swings. The purchase of foreign currency reserves is viewed as a tool to manage liquidity as opposed to being a currency control measure. The real effective exchange rate of the Rand (Figure 1) has come under pressure due to the widening current account deficit, capital flight from emerging markets and rising global commodity and food prices (AfDB, 2013b). However, whilst this depreciation has constituted more competitive South African exports, currency risk remains a potential hindrance to increased investment in South Africa.

Figure 2.1 South African REER Movements 1980–2010

Source Darvas (2012) Bruegel dataset
2.6.3 Trade Policies

South Africa along with Botswana, Lesotho and Swaziland has been a member of the Southern African Customs Union (SACU) since 1910. Imports from SACU countries enter South Africa free of customs and excise duties with only a 10% VAT applied. Preferential tariffs are applied to imports of signatories of other trade agreements with South Africa. For example, a trade, development and cooperation agreement (TDCA) is held with the European Union (EU) allowing preferential trade arrangements between the EU and South Africa with the ultimate goal of a Free Trade Area between the two parties (WTO, 2009e).

South Africa’s Trade Policy and Strategy Framework has been formulated in line with the country’s major development objectives of economic growth, reduced inequality, and reduced poverty and job creation. The country’s National Industrial Policy Framework (NIPF) (adopted in 2007) encompasses trade policy and looks to diversify industrial activity away from traditional primary commodities and non-traded goods to value added job creating services (ITED, 2010). South Africa’s Trade Policy and Strategy Framework was developed following a review of existing trade policy, economic outcomes and changes to the global trading environment.

Although South Africa does not actively promote export subsidies, incentive schemes are in place as a key component of its Industrial Policy. Typical examples are the Motor Industry Development Programme (MIDP) aimed at stimulating the motor industry and the Textile and Clothing Industry Development Programme (TCIDP) aimed at stimulating the clothing sector (Breitenbach, 2007). The incentives stimulate development in previously disadvantaged areas.
with high unemployment and poverty levels. Looking at the main contributors to the South African economy, services contribute about 65% of GDP, manufacturing 16%, tourism 8%, mining 5%, and agriculture 2.5%. Whilst the textiles, clothing and agriculture sectors contribution to GDP is relatively small they employ a significant proportion of the unskilled workforce making them strategic areas for state intervention through incentives. However, such intervention has arguably led to inefficiencies leading to low profitability and reduced investment in the sectors.

Prior to 1990, it is widely acknowledged that South Africa like many other developing economies pursued an Import Substitution Industrialisation (ISI) strategy. Barriers to industrial imports, quantitative restrictions and tariffs were pursued in an attempt to encourage domestic production of industrial goods and reduce the reliance on foreign production (Bell, 1997; Edwards, 2005; Holden, 1992). In the aftermath of the debt–crisis in the 1980s coupled by conditions set out by the IMF structural adjustment programmes, there was increasing pressure for a switch towards a more liberalised trade policy (Edwards, 2005). Average tariffs in the agriculture sector were 3.7% although non–tariff barriers in the form of sanitary and phytosanitary (SPS) requirements and other import controls appeared to be the main non–tariff barriers thus distorting the real impact of liberalisation. Tariff rates on manufacturing imports have fallen from 2002 levels of 11.8% to 8.5% as of 2011. Tariffs in the manufacturing sector appear to offer protection towards non–export oriented industries with tariffs on textile products averaging 21.2%, which is significantly higher when compared to the industry average of 8.5%. Trade distortion is also seen in the diamond market with the South African government intervening through import controls on diamond imports and regulation of unpolished diamonds for export through taxation.
The absolute level of protection within South Africa is debatable, however the country has pursued a largely liberalised tariff setting agenda, in part due to World Trade Organisation (WTO) Uruguay round obligations and bi and multilateral trade agreements (WTO, 1986). These actions collectively have resulted in the reduction of simple average most favoured nation (MFN) tariff rates from around 24% at the start of 1994 to an average MFN tariff rate of 8% in 2006. This reduction in average tariff rates has also been followed by a simplification of the tariff regime from an estimated 13,609 lines in 1990 to 6,420 tariff lines in 2006. However, tariffs on agricultural products remain bound at ceiling rates averaging 44% compared to non-agricultural products which are bound at average ceiling rates of 18.1% (ITED, 2010).

The South African government recognises that agriculture contributed 8% to formal employment and therefore remains a significant employer within the domestic economy supporting about four million households in the country. The South African government further believes that the agriculture industry is also subject to significant distortion and anti-trade policies by many of its trading partners. Hence the most recent trade policy has adopted a strategic approach to tariff liberalisation within this sector as compared to other sectors and thus the noticeably higher tariff rates (WTO, 2009e).
2.7  BACKGROUND TO SWAZILAND’S ECONOMY

2.7.1  Geo–Political Environment

The Kingdom of Swaziland is a landlocked country located in the southern part of the African continent with the Republics of Mozambique and South Africa as its two neighbours. Its surface area of 17,360 square kilometres makes it the smallest country in Southern Africa. The landscape is varied with mountainous regions, woodlands, and cultivated areas. Frequent floods and droughts, however, pose challenges to agricultural development. The capital of Swaziland is Mbabane with a population of about 100,000 people while the overall population was estimated to be 1.2 million in 2011 (WTO, 2009f). Swaziland is a lower middle–income economy and had a GDP per capita of US$4089 in 2011 (Feenstra et al., 2013).

The highest HIV/AIDS prevalence rate in the world is found in Swaziland with a prevalence rate of 26%. Although classified as a lower middle–income economy, the challenges faced by Swaziland are typical of least developed countries (LDC). For example, life expectancy is about 45 years, while unemployment hovers around 28% and approximately 63% of the population live in extreme poverty (Mafusire and Leigh, 2014).

Swaziland’s political and governance system is unique in that it exercises both modern and traditional systems concurrently. The modern system is mainly in parliament with a judiciary and an executive whilst traditionally a monarchy based on chiefdoms still exists. The King is the Head of State and holds power over the executive, judiciary and legislature. The majority (84%)
of the seats in the House of Assembly are based on a non–party political system. The King appoints the remaining 14% of the House of Assembly and two thirds of the senate (AfDB, 2013c).

Within the SACU region, Swaziland ranked the lowest on political rights and good governance measures. The Transparency International Corruption Perceptions Index ranked Swaziland 69th in 2014 (Transparency International, 2014), whilst the Ibrahim Index ranked Swaziland 24th in Africa on good governance standards (IIAG, 2014). This is well below its SACU counterparts scores of which Botswana was ranked 3rd, Lesotho was ranked 10th, Namibia was ranked 6th and South Africa which was ranked 4th on good governance in Africa.

2.7.2 Economic Environment

In the last 15 years, Swaziland has experienced the lowest GDP per capita growth rates of all the SACU countries with its average growth rate recorded at less than 1% between 2000 and 2011. Real GDP growth was similarly constrained at 1.9% in 2010 (Table 2.6). The main contributors to the economy are agriculture, manufacturing and services each contributing 13%, 32%, and 50%, respectively. Agriculture is a significant employer accounting for 70% of all livelihoods, although it is prone to adverse weather conditions. Manufacturing is comprised of value-added services in the sugar sector. There is further opportunity to develop the textiles industry for access to the larger American market, which is currently under–utilised.
Table 2.6 1980–2010 Swaziland Macroeconomic Growth Trends

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Real GDP (PPP adjusted US$ million)</strong></td>
<td>1,549</td>
<td>1,739</td>
<td>2,896</td>
<td>3,366</td>
<td>3,874</td>
<td>4,300</td>
<td>4,858</td>
</tr>
<tr>
<td><strong>Change in Real GDP %</strong></td>
<td>n/a</td>
<td>1.9</td>
<td>8.3</td>
<td>4.6</td>
<td>1.7</td>
<td>2.4</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Real GDP per capita (US$)</strong></td>
<td>2,567</td>
<td>2,464</td>
<td>3,355</td>
<td>3,494</td>
<td>3,642</td>
<td>3,892</td>
<td>4,096</td>
</tr>
<tr>
<td><strong>Total Labour Force (million)</strong></td>
<td>0.176</td>
<td>0.204</td>
<td>0.250</td>
<td>0.285</td>
<td>0.315</td>
<td>0.332</td>
<td>0.367</td>
</tr>
<tr>
<td><strong>CPI Inflation</strong></td>
<td>18.68</td>
<td>20.46</td>
<td>13.09</td>
<td>12.29</td>
<td>12.21</td>
<td>4.77</td>
<td>4.51</td>
</tr>
<tr>
<td><strong>Human Capital Index</strong></td>
<td>1.91</td>
<td>1.91</td>
<td>2.27</td>
<td>2.61</td>
<td>2.48</td>
<td>2.60</td>
<td>2.64</td>
</tr>
<tr>
<td><strong>Real Capital Stock (US$ million)</strong></td>
<td>14,589</td>
<td>17,125</td>
<td>20,996</td>
<td>25,222</td>
<td>25,470</td>
<td>28,388</td>
<td>24,341</td>
</tr>
<tr>
<td><strong>Change in Capital Stock %</strong></td>
<td>n/a</td>
<td>1.4</td>
<td>4.4</td>
<td>2.4</td>
<td>-2.2</td>
<td>-4.0</td>
<td>-2.6</td>
</tr>
</tbody>
</table>

Source World Bank Development Indicators (2014); Penn World Tables National Account Data (2013)

Investment has been constrained with an average capital growth rate of fewer than 2% for the study period and a negative (−0.76%) growth rate occurring from 2000 to 2011. This represents capital flight from the economy due to many unresolved structural constraints. One of Swaziland’s main challenges is the over reliance on SACU revenue, which constitutes about 60% of total revenue. In addition, an over-reliance on sugar exports, which are affected by unpredictable weather conditions and fluctuating market prices, mean export revenue fluctuates frequently. A sizeable government wage bill that determines consumption spending and private sector activity, a lack of institutional capacity, a weak judiciary and legislature coupled with low investment into the country highlight further issues faced by the Swaziland economy.

The GFC affected Swaziland through reduced demand for its exports and probably more severely through a reduction in SACU receipts. This led to a fiscal crisis with government unable to meet...
its debt obligations in 2011. Stronger performance by the South African economy in subsequent years have meant increased SACU revenue which has alleviated much of the short term government debt obligations (AfDB, 2013c).

Similar to Namibia and Lesotho, Swaziland’s monetary policy is mostly determined by South Africa by virtue of their being a member of the Common Monetary Area (CMA) and the pegging of the Swazi Emalangeni to the South African Rand. The central bank’s main roles are the regulation of the financial sector, the promotion of price stability and economic growth.

The main development strategy employed by the Swazi government is the National Development Strategy (NDS) 1997–2022. The guiding document for the implementation of the NDS is the Poverty Reduction Strategy and Action Plan (PRSAP). The PRSAP aims to eradicate poverty by 2022 through a variety of strategies that include the promotion of macroeconomic stability and economic growth, equitable distribution of wealth, and the strengthening of institutional capacity and governance structures (Poverty Reduction Task Force, 2007).
2.7.3 Trade Policies

Swaziland’s main trade destinations are South Africa and the EU with the former accounting for 45% of merchandise exports in 2007 and the latter 14%. Being a member of SACU Swaziland follows the customs union trade policy mainly shaped by South African trade and industrial policy. The International Trade Department (ITD) formulates trade policy within the Ministry of Commerce, Industry and Trade (MCIT). Other ministries that play a role in trade policy are the Ministries of Finance; Economic Planning and Development; and Justice and Constitutional Affairs. Trade plays an especially important role to the country’s growth as it along with Lesotho have derived over 50% of their revenue from trade tariffs. Ironically, WTO (2009f) reports suggest that Swaziland does not have an integrated trade policy with the responsibility being shared across many government departments.

Swaziland has many trade and administrative barriers giving it the lowest ranking amongst SACU countries with a score of 123 in the global competitiveness report (Schwab, 2014) . Botswana ranks 74, Lesotho 107, Namibia 88 and South Africa 56 in global competitiveness. The average tariff for non–SACU imports is 11% across 157 tariff bands. The tariffs on meat and dairy products are 17% and 23% respectively, whilst forestry products average 4%. Tariffs in the mining sector, which only account for 0.2% of GDP range from 0 to 10% with an average MFN tariff of 0.8% (WTO, 2009f).
2.8 CHAPTER SUMMARY

This chapter has reviewed the macroeconomic conditions in the SACU countries to provide a deeper understanding of the different economic and political forces at play within the region. The economic growth rates of SACU member states have been relatively low since 2003 falling short of the recommended millennium development goal (MDG) of 7% required to eliminate extreme poverty (Hanmer et al., 1999). This is a likely outcome of the infrastructure and human capacity constraints, high dependence on the mining sector, volatile currencies, and the global financial crisis.

The notion that all five SACU countries recognise the importance of trade to their region’s development is a promising one with programmes such as the Trade Policy and Strategy Framework in South Africa and the National Development Strategy (NDS) in Swaziland placed at the core of development. Yet worryingly, the chapter has also identified the lack of homogenous trade policy across all areas of the customs union. Therefore, while average MFN trade tariffs do exist and are applied on imports to the union, they do not appear to tell the full story regarding the level of protection occurring in each country, as they appear to only cover 55% of product lines. This has left room for further distortion of trade policy evidenced through heterogeneous non–tariff customs and import barriers. Strategic protection in certain industries such as beef, dairy and agriculture has also compounded the matter.

Therefore, while all five countries are members of the same customs union, heterogeneous trade policy is also likely to have affected economic performance in the region. Government and
independent body reports whilst clearly showing a multitude of structural deficiencies provide little guidance on the impact of trade policy on economic growth. The development process is further hindered by the lack of data and systematic processes to measure and analyse how well previous policy actions have fared against set targets. WTO reports suggest that this is a result of both a lack of capacity by member states to undertake such activities as well as the lack of political will (WTO, 2009a).

The academic literature provides few clues as to the impact of trade liberalisation on economic growth. Much of the earlier analysis has been hindered by the lack of available data on the smaller countries, whilst the narrative on South Africa is questionable considering the out–dated estimation techniques used as well as the structure of the cross–country frameworks that have been employed. The next chapter reviews the theoretical and empirical literature on international trade and trade liberalisation with the view of developing an empirical model that is best suited to test the macroeconomic conditions that have been identified in this chapter.
3 CHAPTER THREE: LITERATURE REVIEW

3.1 INTRODUCTION

The research in this thesis draws upon two strands of economic enquiry: (i) economic growth; and (ii) international trade. The study analyses the economic growth process by employing international trade models that draw on key variables from economic growth theory, while incorporating trade liberalisation as an additional variable. This requires a deeper understanding of the salient elements of economic growth and international trade, which inform the development of the subsequent econometric models. In addition, this chapter will also examine the concept of trade liberalisation, as opinions on its impact on economic growth remain at best unresolved.

According to Acemoglu (2008); Aghion and Howitt (1992); Aghion and Howitt (1998); Anderson (2008); Feenstra (2003) the endogenous growth model is a better representation of the macroeconomic growth process in comparison to simpler and earlier models.\(^5\) The initial part of this chapter introduces the theoretical framework from which this study’s trade model is developed in chapter 4. This involves a brief discussion on the progression of trade models. This chapter does not attempt to set out every trade model ever developed, as many models have unrealistic assumptions beyond the boundaries of this study. Variants of classical, imperfect competition, Marxist, neoclassical, and new growth contributions are also absent from this

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\(^5\) Section 3.25 discusses the benefits of the endogenous growth model and the manner in which it addresses earlier model deficiencies
Rather an attempt is made to show how trade models have evolved from early perfect competition scenarios, to incorporate imperfect competition scenarios under the static framework. The chapter then explains the move from a static framework to a dynamic modelling approach, which begins to view trade as part of the economic growth process and thus merge the two concepts together. The theoretical roots of the trade model developed in chapter 4 arise out of the endogenous growth model and subsequently more attention is devoted to this model than earlier models. The next subsection presents discussions on trade liberalisation and its key indicators as theoretically defined. Section 3.4 provides an empirical analysis of the performance of several trade liberalisation indicators under different specifications and section 3.5 presents the chapter conclusions.

3.2 INTERNATIONAL TRADE THEORY

3.2.1 The Early Trade Theories (1700s – 1770s)

International trade is defined as the movement of goods and services across international borders (Krugman and Obstfeld, 2008). Many scholars credit the study of this field of economics to the classic Adam Smith book of 1776, The Wealth of Nations (Lee, 1993b; Myint, 1977; Smith, 1776; Syrquin & Chenery, 1989). This area of study has grown significantly with the development of a multitude of international trade theories ranging from Mercantilism, Comparative Advantage, Heckscher–Ohlin Theory, Exogenous and Endogenous Growth, and Gravity Trade models amongst others. According to the pure theory of international trade,

6 Similarly the trade models should not be confused with general economic models such as Monetarist models or Keynesian models, as these are better suited to model internal economic activity as opposed to the impact of trade policy.
international trade leads to improved economic growth through increased GDP (Anderson, 2008). In addition, trade is also expected to lead to positive externalities such as economies of scale, which lower production costs and increase efficiency. In addition, competition can lead to both efficient production and innovation and the transfer of knowledge, which improves the wellbeing of trading partners (Smithies, 1952; Anderson, 2008). There is also the protectionist view of trade where nations prefer to limit the amount of interaction with foreign nations for a variety of reasons. These range from national defence, large size of the domestic market therefore preferring a state of autarky for production, protection from external shocks in global markets, increase in domestic employment and infant industry protection amongst others (Smithies, 1952).

Academic thought in the Mercantilist era believed that trade was a zero sum game with the main objectives being economic growth through country unification and state power (Johnson, 1936). These were thought to be attainable only through protectionist policies, which whilst increasing exports and tradable currency would limit the amount of imports entering a nation and hence the zero–sum definition. David Hume (1752) in his book *Political Discourse* criticised mercantilist through stating that nations could not continually export products without importing as this would lead to equilibrium imbalances. This would in turn cause money to accumulate in the exporting nation, which would be followed by inflation of prices and subsequently the cost of living would rise ultimately resulting in greater demand for imports as they would be cheaper offshore than onshore.
3.2.2 The Classical Theories (1770s – 1900s)

Adam Smith further refuted the mercantilist ideas with his theory of absolute advantage stating that nations could gain from trade as long as each had an absolute advantage in one of the traded products (Myint, 1977). The central tenet of Smith’s theory of absolute advantage was that gains could be realised from trade by one country exporting the goods it could produce more efficiently than its competitors and importing the goods it could produce less efficiently. Such a condition would lead to the efficient production of commodities through specialisation and subsequently increase the utility of trading nations. Whilst his theory was in stark contrast to the Mercantilist view of one nation gaining at the expense of another, Smith failed to create a compelling case for the general acceptance of his theory of international trade (Irwin, 1991). This was likely due to the fallacy of absolute advantage, which suggests that it is impossible to sustain absolute advantage in all goods as wages and prices in trading countries will tend to adjust to refer comparative advantage (Anderson, 2008).

David Ricardo’s theory of comparative advantage (termed Ricardian theory) expanded on Smith’s work by proposing that international trade would be possible, as long as there existed a difference in comparative production costs across nations (Krugman and Obstfeld, 2008). This model was driven by opinion that even if a country had absolute advantage in production of two goods, it was better off producing and trading the single good in which it had comparative advantage (i.e. the good with the lowest opportunity cost when compared to its trading partners) (Lee & Wilhelm, 2010). The Ricardian theory relied on the following assumptions:
Homogenous labour as the only factor of production;

Identical labour within countries but not across;

Factors of production are fully employed;

The existence of identical goods;

Conditions of perfect competition;

No barriers to trade; and

Fixed technology within countries though the levels could vary across countries and therefore technology was essentially the main driver of trade due to this variance (Salvatore, 2011).

The Ricardian model’s main downfalls were that it assumed the world to operate in a perfectly competitive environment where labour could easily move within industries and ignore the impact of capital input. Yet in the case of Lesotho, it is highly unlikely that a textile factory worker would instantly be able to move from working in a manufacturing factory to become an engineer on the Lesotho Highlands Water Project. The model further assumes that the value of each good is determined solely by the labour component of the good. It fails to recognise the effect capital and other factors might have should producers move output to the production of the good with the cheaper factor price ratio (Salvatore, 2011). It has received further criticism for its assumption of extreme specialisation, which is not seen in the real world. It also doesn’t account for the gains from economies of scale as a means for trading as opposed to pure specialisation (Krugman and
Obstfeld, 2008). The notion that the whole country would benefit from trade has drawn significant criticism due to the gains from trade rarely passed through to all countries or all citizens. This has been evidenced by the classification of some nations as rich and others as poor nations without any convergence occurring between the two groups as a result from trade (Ron and Sunley, 1998; Eicher and Turnovsky, 2001; Easterly, 2001). More recently, the rising inequality within nations has also gained prominence suggesting the benefits of trade through capital might be exacerbating the rich poor divide (Piketty, 2014) also predicted in the Stolper–Samuelson theory. The Ricardian model also failed to address the terms of trade and general equilibrium\(^7\)\(^8\) as it only addressed the production side.

### 3.2.3 The Pure Theory of International Trade (1900s – 1960s)

The Heckscher–Ohlin model (Ohlin, 1933) built on earlier trade models in that it adopted a long–term approach to how the different factors of production would interact when trade was taken into account. It took into account capital, which the Ricardian model failed to do. It specifically analysed how a country’s resources, technology and the factors of production were utilized. The basic premise being that:

- All factors of production were freely mobile between sectors but not internationally;
- There were two countries that both produced the same two goods using two factors of production;

\(^7\) See Negishi (2001) for a discussion on John Mill’s theory of reciprocal demand.
\(^8\) See articles by (Davis, 1995; Dixit and Norman, 1980) for an in depth analysis on general equilibrium.
There was balanced international trade between both countries;

There was full employment in both countries;

The same technology was readily available in both countries;

Good X and good Y were labour and capital intensive respectively;

Constant returns to scale were prevalent;

Tastes were identical;

Perfect competition existed in all markets, and

There was convergence of prices of goods as a result of trade (Krugman and Obstfeld, 2008).

The Heckscher–Ohlin model predicted a positive correlation between the relative price of goods and the relative price of the factors used in the production process. Implying that an increase in the price of one good would be simultaneously followed by the increase in the factor used abundantly in the production of that good. Hence, if the relative price of a pair of jeans produced in the labour intensive textiles industry in Lesotho increased, this would result in an increase in the real wage of labour employed in textiles as compared to the capital-intensive sector. The model also predicted that an increase in the supply of a factor would sharply increase the production possibilities of the good, which used that factor more intensively, whilst reducing the output of the good intensive in the other factor (Krugman and Obstfeld, 2008). Hence, nations would tend to specialize in the production and export of goods in which they were abundantly endowed.
Ethier (1974) expanded the model to include four propositions of the Heckscher–Ohlin model:

- **The Factor Price Equalisation theorem.** International trade would bring about an equalisation of factor prices regardless of the immobility of the factors of production (Samuelson, 1949). Hence, homogenous labour and capital would receive the same return across trading nations. Thus, traded goods are perfect substitutes for traded factors of production.

- **The Stolper–Samuelson theory.** An increase in the relative price of a commodity would stimulate a real return to the factor of production used most intensively in the production of the commodity (Stolper and Samuelson, 1941). The main outcome being that trade whilst improving the overall wealth of a nation could increase/reduce the livelihood of people depending on their ownership of the factors of production in question.

- **The Rybczynski theorem.** An increase in the endowment of a factor would increase the output of the industry that uses the factor intensively and reduce the output of the other industry (Rybczynski, 1955).

- **The Heckscher–Ohlin theorem.** A nation would tend to export the good which intensively used its relatively abundant and cheap factor of production and import the good which used the relatively scarce factor (Jones, 1956).

The Heckscher–Ohlin model has been criticized in its predictions of factor price equalization as it fails to take into account real world scenarios of transportation costs and other import barriers to trade such as tariffs and quotas. The Heckscher–Ohlin model also implies that only final goods
are traded and not inputs which in modern society is incorrect. The assumption that technology is the same across nations is also extremely unrealistic. Perhaps most famously the biggest criticism of the model has been through empirical testing where the Leontief Paradox showed that the United States – a capital abundant nation – tends to export more labour-intensive goods and import more capital abundant goods, which was in direct contradiction to the model’s prediction (Feenstra, 2004; Krugman & Obstfeld, 2008; Leamer & Levinsohn, 1995; Salvatore, 2011).

However, it does provide an alternative analysis where comparative advantage encompasses the relationships between commodity and factor prices, factor supplies, rewards, and factor endowments in predicting trade patterns.

The classical models provided a good lens to examine trade through initially. However, in their basic stipulations, their main deficiencies were their static nature with capital and labour assumed constant over time and their tendency to present unrealistic conditions of perfect competition. The major decline in significance of the classical models as noted by Findlay (1984) was likely due to their inability to link international trade to economic growth, which led to the development of newer trade models.

3.2.4 Imperfect Competition Models (1950s – 1980s)

In addition to technology and comparative advantage discussed in the earlier trade theories, there has also been the recognition of economies of scale as an additional reason for international trade. Economies of scale are based on the idea of producing fewer product lines at a reduced cost through the use of larger manufacturing operations capable of producing greater quantities of
each product line. This alone may lead to consumer welfare loss due to reduced product variety (Dixit & Stiglitz, 1977). However, openness to trade is thought to enhance this prospect through the creation of larger markets and wider product lines (Anderson, 2008). Scale economies are also thought to provide specialised labour markets, where highly concentrated research and production activity in large enough quantities reduces the overall production costs making global trade attractive. Perhaps the most widely accepted theory of imperfect competition is Chamberlin’s monopolistic competition model.9 This model is characterised by the following:

- Products are heterogeneous;
- There are multiple buyers and sellers;
- Firms are classified by their significantly different products, which are viewed by consumers as imperfect substitutes for other products;
- There is a large number of firms in the market;
- Entry is unrestricted and generally attracts new firms until profits are reduced;
- Labour and capital are utilised depending on firm specific requirements; and
- Assumption of increasing returns to scale under monopolistic competition.

---

9 The main purpose of this section is to show the advancements in trade theory from the classical models and not to give an in depth discussion on imperfect competition. Hence only the monopolistic competition model is presented. The interested reader is referred to literature from (Dixit and Stiglitz, 1977; Anderson, 2008; Krugman, 1979; Krugman and Obstfeld, 2008; Helpman, 1981; Hart, 1985) for a deeper theoretical analysis on imperfect competition and monopolistic competition.
The classical trade theories provided adequate explanations of why rich and poor countries traded. For example, Botswana having comparative advantage in the production of diamonds might trade with Japan, which has comparative advantage in the production of vehicles. However, as Krugman (1979) and Ethier (1982) have shown there is significantly more trade amongst similar countries than between rich and poor countries. Their monopolistic competition models offered a credible explanation of this two way trade based on market size and economies of scale. The monopolistic competition framework also changed economic thinking to accept that gains from trade could occur in the production of intermediate products and not only be limited to the sale of final products. Bernard et al. (2003) and Melitz (2003) also modelled scenarios where under conditions of monopolistic competition trade would bring about productivity gains through the exit of weak inefficient firms, which would be replaced by larger more productive chains.

Whilst the imperfect competition models made advances on international trade theory through the inclusion of scale economies, increasing returns to scale and an explanation of why rich nations may trade similar products, their main criticism arose from their inability to model the dynamic growth framework.

3.2.5 Neoclassical Trade Models (1950s – 1990s)

The aim of neoclassical growth theory is to provide a framework for the analysis of the relationship between international trade and economic growth. Within the neoclassical framework the main emphasis is on the role of capital accumulation (Bleaney and Nishiyama, 2002). This model describes how economic policy raises an economy’s growth rate through
household saving. The model further predicts that in the long run, the country’s growth rate will diminish and return to the rate of technological development, which neoclassical theory takes as being independent of economic forces (Brock and Durlauf, 2001). Underlying this view is the principle of diminishing marginal productivity, which puts an upper limit to how much output a person can produce simply by working with more and more capital, given the state of technology.

Perhaps the best–known neoclassical model is the Solow–Swan model, which were independently developed by Solow (1956) and Swan (1956). In developing the model, the economy’s aggregate production function is defined as:

\[
Y_t = F(K_tL_t) = AK_t^x L_t^{(1-x)}
\]  

(3.1)

where \((Y)\) is income, \((K)\) is capital, \((L)\) is labour, \((A)\) is technology or productivity, and \((t)\) is time (Solow, 1956). Capital and labour are assumed to be fully employed in the economy. With the supply of labour and of technology being given and constant over time, the per capita aggregate production function is expressed as:

\[
y_t = f(k_t) = Ak_t^x
\]  

(3.2)

A crucial property of this production function (equation 3.2) is that the maximum output depends on capital, which also displays positive and diminishing returns to scale. Therefore one would expect that the continuous accumulation of capital without the invention of new uses for it would bring about a situation where it would add no further contribution to output and be kept solely as spare stock (Aghion and Howitt, 1998). Equations 3.3 through to 3.6 jointly confirm this relationship.
\[
F'(K, L) = \frac{\partial Y}{\partial K} > 0 \quad F'(K, L) = \frac{\partial Y}{\partial L} > 0
\]

(3.3)

where equation 3.3 postulates that the per worker and/or per capital production function is characterised by positive returns to scale.

\[
F''(K) < 0 \quad F''(L) < 0
\]

(3.4)

While equation 3.4 implies that positive returns to scale may be exist, they are increasing at a decreasing rate:

\[
\lim_{K \to \infty} F'(K) = 0 \quad \lim_{K \to 0} F'(K) = \infty
\]

(3.5)

\[
\lim_{L \to \infty} F'(L) = 0 \quad \lim_{L \to 0} F'(L) = \infty
\]

(3.6)

Imposing the Inada conditions in equations 3.5 and 3.6 will ensure that when the capital or labour stock approaches infinity, an additional unit of either labour or capital will have no effect on output. The Inada conditions also make the assumptions that if the capital or labour stock is initially zero then the return to adding infinitely small units of capital or labour to the system is infinite (Barelli and de Abreu Pessôa, 2003). Thus in everyday terms capital and labour are most effective in under–developed places.
A further assumption is that if capital or labour is equal to zero then aggregate output is equal to zero:

\[ F(0, 0) = 0; \quad F(0, L) = 0; \quad F(K, 0) = 0 \]  \hspace{1cm} (3.7)

Furthermore, equation 3.8 states that capital and labour are complimentary in the production process:

\[ F_{KL} > 0 \]  \hspace{1cm} (3.8)

According to the assumption that labour and technology are exogenous to the system the only way growth can be experienced is through the accumulation of capital (Kenny and Williams, 2001). The model takes on further assumptions that people save a constant percentage (s) of their gross income and that depreciation (\( \delta \)) erodes the economy of a constant percentage of capital each year. Hence, the rate at which new capital is accrued is equal to the aggregate flow of savings plus existing stock of capital minus the net depreciation rate. This is represented as:

\[
\dot{K} = sF(K) - \delta K
\]  \hspace{1cm} (3.9)

with \( \dot{K} \) simply being equal to \( (K_{t+1}) - (K_t) \) or the rate of change of capital with time, which is also the Law of Motion of Capital and explains how capital changes with time. Equation 3.9 is also the fundamental (Solow–Swan) neoclassical growth theory equation. Converted to per capita terms the Law of Motion of Capital can be rewritten as (equation 3.10):
\[ \dot{k} = sy_t - \delta k_t \]  

(3.10)

In the steady state the value of \( \dot{k} \) is equal to zero. This means that the aggregate savings rate will be equal to the depreciation rate.

Figure 3.1. Solow–Swan Diagram
Figure 3.1 further examines this relationship. Depreciation erodes the economy of a constant percentage of capital each year and is thus represented as the straight line \( (\delta k_t) \), which runs through the origin and is dependent on the stock of capital in the economy. The rate of depreciation in the economy is shown by the slope \( (\delta) \) of the ray “depreciation per worker”. Investment in the economy consists of the stock of existing and new capital. This is represented by the curve \( sf(k_t) \) investment per worker which demonstrates how new investment (savings) is dependent on the capital stock. The slope of this curve is concave because of the diminishing marginal product of capital. Hence, capital is initially highly productive but as more units are added without newly, defined uses it becomes less productive up to a point where it no longer contributes to output. Hence, the rate of increase in the capital stock is the difference between the “investment per worker” and “depreciation per worker” curves.

At point \( (k_0) \) in Figure 3.1, the capital stock is increasing and will continue to do so until it intersects with the depreciation stock at point \( (k^*) \). At this point (A) the economy reaches its steady state of production where any additional unit of investment is exactly offset by depreciation. Therefore from Figure 3.1 when capital is scarce (i.e. to the left of \( (k^*) \)) it is very productive and will thus induce people to save more and invest in the capital stock in anticipation of greater returns. Diminishing returns will ensure that national income does not grow as fast as the capital stock and a point will be reached where depreciation will surpass any return from saving. Thus points to the right of \( (k^*) \), in the absence of technological progress and population growth, will ensure that the economy will not grow any further as the rate of wear and tear of capital will be greater than the return to capital. Thus past this point people will be lack the incentive to save. Therefore according to the Solow–Swan Model at point (B) the economy’s
growth rate will be influenced solely by technological progress and capital accumulation will have no further effect (Nelson & Winter, 1974). The implication of this is that it will not be possible to increase the growth rate by inducing the population to save as any such policies would only increase growth in the short term with depreciation catching up to the capital stock in the long term.

Two important features arise out of the Solow–Swan model. The first is that since output converges to a steady state where capital accumulation through investment and savings is equal to depreciation, economic growth can only occur through an exogenously determined factor, technology. Hence, no economic policies can affect the long run rate of economic growth. The second feature of the model is that economic growth rates will vary depending on the different amounts of capital already in the system (Helpman, 2004). For example, countries with high levels of capital (developed countries) will experience slow rates of growth and countries with low levels of capital will experience higher growth rates. This should be evident with globalisation connecting markets. One would intuitively expect that capital would move to regions where it can earn the highest rate of return, which would be from capital intense to moderate capital regions, thus raising the standard of living in moderate capital (developing) regions. Therefore, neoclassical theory suggests convergence between nations as rich countries are predicted to have slower growth rates than poorer nations.

However, cross country research undertaken by Barro and Sala–i–Martin (1992) indicates the presence of conditional convergence in that convergence in income levels between countries is
only observed between countries that share similar initial characteristics. This is further confirmed by research undertaken by Arvanitidis et al. (2007) which suggests that conditional cross–country convergence will ensue based on countries having the same technology and fundamental variables such as saving rates, depreciation rates, and population growth rates. This offers a plausible explanation why convergence has occurred amongst rich countries and not across developed and developing countries income levels.

The neoclassical model made significant gains on previous models of international trade such in its ability to model trade in a dynamic process. However, the model draws its main criticism from the inability to provide a satisfactory account of the rate of growth of technological progress, which it takes as given through an undetermined innovative process. Hence, although the model details a succinct account of a country’s growth path and shows how that path can be raised or lowered using savings and population growth, it offers no credible economic explanation for continuously observed cross–country differences in growth across countries, except for speculation that some countries are more technologically advanced than other countries. In so doing it offers an explanation of why growth rates have been steadily increasing over time but places its emphasis on everything but the very factor it uses to explain continuous growth (Lucas, 1988).

3.2.6 Endogenous Growth Models

The transition to market scenarios with imperfect competition, increasing returns to scale and a greater role for technology led to the development of the endogenous growth models. These
models in contrast to neoclassical theory explains long–run economic growth as emanating from forces internal to a system in particular those forces that create technological knowledge (Capolupo, 2005). The main idea being that long–term growth arises as a result of an increase in total factor productivity, which in turn arises out of technological advancements within the system (Mankiw et al., 1992). The main point of departure between neoclassical and endogenous models is that neoclassical growth theory assumes technological advancements to be exogenous to the system whilst endogenous growth theory questions this and provides channels through which technological advancements may occur mainly in the form of internal innovations (Artelaris et al., 2006).

The technological failings of the neoclassical growth model are tackled by Lucas (1988) who endogenises the growth aspects of the model through the introduction of the concept of human capital. In this model Lucas (1988) postulates that growth occurs through the process of human capital accumulation and its interaction with the main elements of the neoclassical model as seen in equation 3.11:

\[
Y_t = AK_t^\alpha uhL_t(1-\alpha)h_{a,t}^\gamma
\]  

(3.11)

where \(Y\), \(A\), \(K\), and \(L\) are as previously defined whilst \((u)\) is the proportion of labour time spent working and \((h)\) is the stock of human capital of the representative agent and \((h_a)\) is the average human capital already in existence in the system. In this model whilst population and technology are still presumed to be constant and thus exogenous, externalities from human capital raise the productivity of both labour and physical capital. Put simply Lucas (1988) assumes that people
devote their time to either production or to activities that further their education. This results in a trade–off between the income that could be gained today from productive work or the anticipated income that will be achieved at a later stage due to higher levels of human capital and increased future productivity.\footnote{See Lucas 1988 for a complete exposition.}

The model predicts that more productive training in the form of human capital accumulation will increase the marginal product of labour and hence the future earnings of higher trained people. The potential to earn a higher wage rate in the future will subsequently provide a greater incentive to engage in training and hence the accumulation of human capital which will in turn improve the productivity of labour and capital and thus raise the growth rate of the economy. It should be noted that human capital is assumed to be specific to the production of certain goods and different goods are thought to require different levels of human capital. Therefore, in this model the principles of comparative advantage across countries will determine which goods are produced and thus the different levels of human capital across countries and growth levels.

The \textit{AK} model is widely attributed to Rebelo (1991) and appears to fall between the neoclassical and endogenous growth models in its prediction of growth. It assumes that when people accumulate capital, learning by doing creates technological progress that tends to raise the marginal product of capital, thus offsetting the tendency for the marginal product to diminish when technology is unchanged (Aghion and Howitt, 2009). The model is expressed via a production function of the form:

\footnote{See Lucas 1988 for a complete exposition.}
\[ Y = AK \] (3.12)

where \( Y \) is representative of total income, the constant \( A \) indicative of the level of technology and \( K \) the total (human and physical) capital in the economy. The model derives its name from the constant \( A \) and capital \( K \) (Aghion and Howitt, 2009). The \( AK \) model predicts that long–run growth will depend on savings and the efficiency of resource allocation. The \( AK \) model in contrast to the neoclassical model can explain why persistently positive growth rates of GDP per capita have occurred in the developed world, though it is not able to explain cross–country or cross–regional convergence (Turnovsky, 2003). Its main criticism is that it does not make an explicit distinction between capital accumulation and technological progress. In essence, it groups physical and human capital whose accumulation is studied by neoclassical theory with the intellectual capital that is accumulated when technological progress is made.

The inability of these earlier models to provide a convincing model of long run growth and convergence motivated the development of additional endogenous growth theories, comprising of innovation–based growth models. Romer’s (1994) product–variety model is a common example of innovation–based growth models that is dependent on the belief that innovation causes productivity growth by creating new, but not necessarily improved varieties of products (Romer, 1994). A second innovation–based growth model which grew out of modern industrial organization theory is the Aghion and Howitt (1992) growth model, commonly referred to as the Schumpeterian Growth model. This innovation model focuses on quality improving innovations that render old products out–dated and hence involves the force that Schumpeter coined creative destruction (Aghion and Howitt, 1992).
The equation below reflects the innovation–based endogenous growth model:

$$Y = K^\alpha L^\beta Z^{1-\alpha-\beta}$$  \hfill (3.13)

where $Y$ is final output, $K$ is total capital (human and physical), $L$ is labour input, and $Z$ is an aggregate measure of intermediate inputs dependent on their quality. In this model, the forces that determine the rate of improvement of intermediates $Z$ therefore also influence the productivity of capital and labour. Research and design (R&D) profitability along with the cost of investment determine how a product moves along its quality ladder. The quality ladder simply describing the many unlimited stages that a product can go through via innovative refinements to each new model (Grossman & Helpman, 1993). Hence, productivity growth is driven both by the increased specialization of labour working with an increasing number of intermediate inputs and by the research spill overs whereby each new innovator benefits from the existing stock of innovations (Arvanitidis et al., 2007). In this model, the final output $Y$ is assumed to be used for consumption or investment purposes and is therefore not subject to depreciation. Thus old stock continuously adds to the investment stock and through R&D investment and learning–by–doing, the economy continues to grow with marginal product never falling to an unprofitable level.

When examining the innovation–based growth models the following assumptions are drawn:

- Consumer goods are comprised of several intermediate inputs to produce one final homogenous product;
- The intermediate inputs are the only inputs into the production of the final good;
The production function is Cobb–Douglas by nature as described in the neoclassical model;

Each intermediate input has an unlimited number of potential improvements that make newer versions of the inputs function better than old versions;

The existence of imperfect competition;

An effective patent system that protects the property rights of innovators;

The supply of savings in the economy matches the demand for funds by investors;

Supply matches demand in the homogenous consumer good market;

The labour market determines an equilibrium wage that equates the demand by manufacturers and researchers to the available supply; and

The value of producers on national asset markets reflects the expected present discounted value of their anticipated profits (Grossman & Helpman, 1993).

Therefore, for R&D investment to be profitable, a potential inventor would require an appropriate incentive to innovate and produce a new input that would lead to an improved final good. Property–rights protection is assumed to increase growth as stronger patent protection increases the cost of imitating the current technology in the intermediate sector. This stimulates more intense research in the anticipation of potential profits accruing to the successful innovator, which in turn should result in higher growth. Similarly in this model growth decreases with the degree of product market competition as a lower property–rights protection may reflect an increased ability of other firms to compete against the incumbent monopolist, which lowers the value of a
successful innovation (Aghion and Howitt, 2009). Ideas are assumed to be non–rival; meaning innovators in the research process can freely use them. They are also excludable in the sense that each innovation is rewarded by monopoly rents. It is the anticipation of these rents that motivates research activity aimed at discovering new product varieties (Aghion and Howitt, 2009). Thus firms at the forefront of technological development would earn monopoly profits for the life of their patents or until an innovation displaced their product from the consumer chain. The multiplier effect of this process would be further incentive for firms to re–invest their profits into R&D activities and continue the innovation process. The model also assumes that an expansion of the population would result in an increase in economic growth by raising the supply of labour, which would not only increase the market size but also raise the supply of potential researchers. Rosenberg (1963) and Young (1993) caution that profitability from research is not always guaranteed and in practice does not occur instantaneously, with the few successful innovators having had to go through periods of learning by doing before commercial success was realised. This would infer that firms do not blindly invest in knowledge production but do so based on calculations of likely success and therefore commit their resources accordingly.

The implications of the innovation–based models are that economic growth can continue in the steady state of production described in the neoclassical model without the addition of labour or capital to the system. The economy grows because intermediate goods are continually being refined leading to the production of more productive final goods, which ultimately raise overall productivity (Grossman & Helpman, 1993). At the firm level, there is continuous competition amongst firms to bring out the next generation of products and displace the current industry leaders. This leads to random and uneven growth at the micro–level of the economy with some
industries expanding rapidly due to successful innovation and others less rapidly as a result of unsuccessful innovation. At the macroeconomic level, this random and uneven growth process is stabilized and provided there are a large number of intermediate inputs steady growth occurs in the economy.

Thus, the model predicts that technological development is the engine of economic growth and the rate of economic growth is determined by the rate of growth of R&D. This further implies that profitability from successful R&D will bring about an increase of resources directed towards the R&D sector in an attempt to gain a percentage of the profits.

From a policy perspective, the success of endogenous growth theory is also dependant on the country’s higher education system, as a growth-enhancing device. Countries that invest more in higher education will achieve a higher productivity of research, and will also reduce the opportunity cost of research by increasing the aggregate supply of skilled labour (Kalaitzidakis et al., 2001).

Growth increases depending on the size of innovation, which is measured by the productivity improvement factor. A country that trails the world technology frontier has what Gerschenkron (1962) calls an advantage of backwardness. In essence, this means that the further it lags behind the frontier, the bigger the productivity improvement it will receive from technology when it innovates leading to faster growth (Montias, 1963). This is similar to the convergence aspect of the neoclassical models in that it predicts that less developed countries will find capital more
productive than in developed countries. However, it is dissimilar in that it does not suggest convergence due to diminishing marginal returns but rather that the rate of growth may remain heterogeneous amongst countries as it is determined by the rate of technological advancement in each.

The series of trade models reviewed thus far all identified several key components that constitute the production function. A common feature among them was the presence of capital, labour and technology although the specifications differ. A major criticism of these models or the use of the models taken by many economists is the one–size–fits–all approach or more formally stated ontological universalism approach in which many of them have been applied (Kenny and Williams, 2001). This flaw is more clearly seen during the 1970s period when the World Bank based its lending criteria on the belief that development aid should be distributed in line with Harrod–Domar model predictions. The main idea being that investment was the key criteria for growth (Kenny and Williams, 2001) and that an investment shortfall should be supplemented by foreign aid leading to a corresponding increase in growth. The results showed that of the 138 countries that received the cumulative one trillion dollars of foreign aid between 1960 and 1990 only five showed a positive and significant association between investment and growth. Zambia in particular was predicted to have had a per capita income of US$20,000 by 1994 using this model. In reality, after decades of aid Zambia’s GDP per capita in 1994 was closer to US$600.

The 1990s brought about the abandonment of many of the earlier models to be replaced by different variants of the endogenous growth model. The Grossman & Helpman, (1991)
endogenous model brought about the recognition that policy variables could influence growth. Much attention has subsequently been given to trade policy with the World Bank and IMF embodying liberalised policy in initiatives such as the Washington Consensus (Williamson, 1993) and many structural adjustment reform programmes (Kenny and Williams, 2001). The next section reviews the literature and empirical evidence on the impact trade liberalisation has had on economic growth.

3.3 TRADE LIBERALISATION

At first glance, trade liberalisation appears to be a relatively uncomplicated concept referring to the absence of government intervention in trade policy. However, due to the many academic, economic and political stakeholders that stand to gain or lose from its application, the concept remains vague. Having considered a vast majority of the literature available to date (Atkinson, 1998; Baldwin, 2004; Bhagwati, J. and Srinivasan, TN, 2002; Bhattacharyya, 2012; Collier, 1993; Dean et al., 1994; Dollar, 1992; Dornbusch, 1992; Edwards, 1998; Feenstra, 2003; Greenaway et al., 2002; Harrison, 1996; Hoekman and Nicita, 2011; Kneller et al., 2008) it would appear that the definition of liberalisation is bound to fall somewhere within the realms of the following concepts:

- The removal of tariffs and non-tariff barriers;
- The use of a market determined exchange rate system;
- The move towards neutrality of incentives for exports and imports;
The establishment of transparent institutions and supporting policies;

The absence of government intervention; and

The move towards a free trade system.

There is still considerable debate around the effects of international trade policy among politicians and academics (Santos-Paulino, 2005). Historically, there have been various proponents of inward oriented trade policies (e.g., the Mercantilists). Latin American and Sub-Saharan African countries supported the view that import substitution industrialisation (ISI) could pay the greatest dividends amongst developing countries and hence restrictive trade dominated their development policy (Hur and Park, 2012). Over the last thirty years, this line of thought deviated from restrictive to liberalised strategies in part due to structural and financial crises, and also due to the imposition of conditions of liberalisation by lending agencies such as the International Monetary Fund (IMF) and World Bank (Rose, 2004). The impact of the proposed policies has not been uniform across nations. On the one hand, the Newly Industrialised Countries (NICs) at the time comprised of Hong Kong, Singapore, Taiwan and South Korea achieved remarkable growth resulting in a reclassification from developing to developed economies. Chile has also been able to surpass the middle-income trap and China is showing strong signs of moving towards developed nation status. The majority of developing countries have followed an uneven course of liberalisation dictated by the ruling paradigm of the day resulting in limited long-term growth (Krueger, 1998).
Developed nations such as the United Kingdom, United States, France, Sweden, Canada and Germany have historically veered towards liberalised trade regimes, evidenced through the Cobden–Chevalier Treaty (1860) and the ensuing Most Favoured Nation (MFN) clause, which led to the formation of a dense network of informal free trade agreements (Nenci, 2011). However, during the two World Wars, and the subsequent economic depression that ensued there was a gradual shift towards restrictive trade policy among developed nations. This was eventually reversed following the formation of the General Agreement on Tariffs and Trade (GATT) in 1947 and subsequent World Trade Organisation (WTO) in 1994 (Nenci, 2011).

The academic literature shares incongruent views on whether trade liberalisation leads to improved economic growth and is thus beneficial to participating nations or whether it stifles industrial development, investment and ultimately hinders economic growth (Anderson & Neary, 1996; Bhagwati & Srinivasan, 2002; Bhattacharyya, 2012; Ghatak, Milner, & Utkulu, 1995; Greenaway, 1998; Rodríguez & Rodrik, 2000). This discourse is further complicated by the lack of a uniformly accepted measurement tool for liberalisation. Greenaway et al. (2002) note that this may be a reason why the discipline has produced the vast array of differing results and inferences to the benefits of trade liberalisation.

There is general acknowledgment that as a starting point, trade liberalisation indicators can be classified in terms of incidence or outcomes based indicators (Baldwin, 1989; Pritchett, 1996; Rose, 2004). Outcomes–based indicators measure trade policy based on the difference between current flows of trade and predicted flows of trade that would have occurred in the absence of
trade barriers. Commonly used outcomes–based indicators are trade ratios (exports and imports/GDP), adjusted trade ratios and price based measures such as the real effective exchange rate (David, 2007). Incidence–based indicators measure trade liberalisation based on direct observation of the policy instruments. This occurs through observation of the level of tariffs and non–tariff barriers (NTBs) imposed on imports and through the use of composite indexes that take into account tariffs, NTBs, price effects and other policies that may affect trade (David, 2007).

Pritchett (1996) notes that measurement issues arise in incidence–based measures due to the vast coverage of and difficulty in collecting data on tariff lines, the difficulty in converting NTBs into tariff equivalents and the non–convertibility of certain currencies making cross–country comparisons difficult. On the subject of outcomes–based measures, Pritchett (1996) notes that data availability rather than theoretical foundations is a major motivation for their use. However, Pritchett (1996) warns that this can lead to misleading interpretations of results as while outcomes–based indicators do capture trade policy they also capture a host of other factors not related to trade such as oil shocks and terms of trade crises. Wacziarg (1998) concurs with this view and further argues that due to their wide coverage, outcomes–based measures are more reflective of the level of integration into the world economy and thus caution should be exercised when interpreting results.

**Trade Liberalisation Proxies**

This section reviews some of the more frequently utilised trade liberalisation indicators arising from the earlier taxonomy of incidence–based and outcomes–based indicators. Five different
indicators common to the literature were selected for analysis: (i) tariff measures, (ii) trade ratios, (iii) adjusted trade ratios, (iv) the real effective exchange rate, and (v) a trade restrictiveness index. The first four trade liberalisation indicators are selected due to data availability in the five SACU countries and subsequently form the trade liberalisation variables in the study. A brief discussion on the fifth variable is presented as an example of a composite index, which has the advantage of presenting a multi-dimensional view that includes both incidence and outcomes-based measures. However, due to limited data availability over the study period it is not applied in this research.

3.3.1 Tariffs and Non-Tariff Barriers

The first trade liberalisation variable used in this study is the tariff. The World Trade Organisation (WTO) defines tariffs as customs duties levied on merchandise imports that provide an advantage to domestic producers and also raise government revenue (WTO, 2015). Tariffs are popular measures of trade restrictiveness because they are the most direct of all measures and generally tend to have data available. Tariffs have multiple classifications, which can lead to significantly different levels of protection. Simple average tariffs calculate the unweighted average of effectively applied rates for all imported goods. The main problem with this classification method is that it treats all goods identically and not according to their importance.

In the instance where the majority of a country’s trade occurs in goods with low tariffs, a few goods with high rates will overstate the degree of protection offered (Anderson and Neary, 2003). The trade weighted average tariff has been suggested as an alternative measure whereby only the average rate is calculated based on the share of imports in the trading basket (Harrison, 1996).
However, this measure tends to underestimate the actual tariff rate as depending on the elasticity, goods with extremely high tariffs tend not to be traded (Yanikkaya, 2003). Pritchett and Sethi (1994) using data from Jamaica, Kenya and Pakistan find a weak relationship between collected and official tariff rates and conclude that the interpretation of protection offered by tariffs is inconclusive.

Wacziarg (2001) suggests that the percentage of import duty revenues from total import revenues is a better measure of the impact of tariffs. He argues that whilst most published direct measures of tariffs tend to be unweighted averages of commodity specific tariff rates, import duty measures are weighted by the composition of imports. He further notes that import duties are based on collected tariff revenues and not on officially declared or effectively implemented rates. Finally he alludes that significantly more trade tax revenue data is available for a wider number of countries than is tariff rate data (Wacziarg, 2001). David (2007) supports this viewpoint acknowledging that a further issue with the use of tariffs as a measure of trade restrictiveness is the unavailability of data due to erratic publication of tariff data by many countries. This study uses taxes on international trade as the first measure of trade restriction. The availability of published data for the five SACU countries is either limited or entirely unavailable for other tariff measures. Non–tariff barriers (NTB) such as quotas, standards and technical regulations, sanitary and phytosanitary measures, and public procurement controls referred to in the trade liberalisation literature (Wacziarg, 2001; Sachs and Warner, 1995; Robert, 2003), were excluded from the study due to the unavailability of quantitative data in the five SACU countries.
3.3.2 Real Effective Exchange Rate

The real effective exchange rate (REER) is the weighted average real exchange rate that measures the value of a country’s currency in terms of its main trading partners (Darvas, 2012). It is weighted according to the relative importance of a country’s trading partners to its GDP and expressed as an index with 100 being the equilibrium number. Auboin and Ruta (2011) define the real exchange rate as the ratio of tradable to non-tradable products that have been adjusted to reflect the purchasing power parity between trading countries. Thus the real effective exchange rate is an alternative method of measuring the real competitiveness of one nation against its trading partners, as it captures the relative prices of imports and exports as well as the relative prices of non-tradable goods (Edwards, 1989). In selecting the exchange rate variable, there was a choice of the “real effective exchange rate” and the “real exchange rate”. In reality the difference between the two is that the former measures the difference in competitiveness between a country and its main trading partners while the latter contrasts between only two countries (Wood, 2010). The former term was thus selected as trade is being analysed with respect to the world as opposed to with one trading partner.

Analysing competitiveness, the REER is in equilibrium when it creates conditions that are appropriate for internal and external equilibria in a country (i.e. investment is occurring at the appropriate rate and supply is generally equal to demand). Cline and Williamson (2010) determine the equilibrium exchange rate to be one that is indefinitely sustainable based on existing policies. Debunking this statement leads to the expectation that a country’s equilibrium
exchange rate is one which leads to a situation where the surplus or deficit on the current account is matched by equivalent capital movements that reflect a country’s pursuit of stable economic fundamentals without applying restrictive trade practices (Cline and Williamson, 2010). When analysing movements away from the equilibrium rate, an appreciation of the REER implies that there has been an increase in domestic production costs whilst global production costs have remained unchanged. Alternatively, a REER depreciation implies an increase in domestic productivity (Edwards, 1989).

The REER literature draws distinction between exogenous and endogenous determinants. Externally, international prices, transfers and interest rates are all transmitted through the exchange rate. While internally, fundamentals such as tariffs, quotas, export subsidies, capital controls, government spending and total factor productivity seen through technological progress all contribute to the REER determination (Chinn, 2006; Cottani & Cavallo, 1990; Edwards, 1989; Neary, 1988).

With the exception of technology whose origin is more difficult to determine, the majority of the internal fundamentals of the REER appear to be policy related, as these are, the ones that governments have direct control over and have tended to manipulate to suit their short–term objectives. Goldfajn and Valdés (1999) confirm this notion through earlier research, which articulates how policy makers have manipulated exchange rate fundamentals such as interest rates to suit policy objectives. Rebelo and Vegh (1995) discuss exchange rate related stabilisations in Latin America, Mexico and Israel through the use of other policy tools.
Meanwhile, Edwards (1989) cautions that although many policy makers manipulate exchange rate fundamentals in the hope of effecting the exchange rate, often the movement of the REER ends up affecting the variables put in place. Thus, empirical studies often report a bi-causal relationship between the REER and its fundamentals.

This research looks at the effect of trade liberalisation on economic growth with the misalignment of the REER used as an indicator of distortion. This approach is not unique and has been employed by a plethora of authors (Aghion et al., 2009; Auboin and Ruta, 2011; Bahmani-Oskooee, 2001). Dollar (1992) investigated the effect of price distortion on economic growth by constructing indexes of real exchange rate distortion and variability, which he finds to be highly correlated with GDP per capita growth in developing countries. In an earlier paper, Clark (1973) depicts a similar scenario using the impact of exchange rate misalignment on a firm’s growth. In this scenario, he elucidates how changes in exchange rates may affect the firm’s profit levels. Sustained exchange rate uncertainty may lead the risk averse firm to reduce its output and exposure to potential losses due to exchange rate fluctuations. Studies by Chinn (2006), Edwards (1989), and Hau (2002) show that many trade policy tools form the fundamentals of the real effective exchange rate. Baldwin (2004) notes that an association exists between restrictive trade policies and misaligned exchange rates. Wacziarg (2001) identifies price distortions as an additional channel through which trade policy affects economic growth.

Sachs and Warner (1995) construct a liberalisation index consisting of cross-country indicators among which is an exchange rate variable and use this index to determine the impact of trade
liberalisation on economic growth while holding other factors constant. Sachs and Warner employ the black market exchange rate as a means of identifying exchange controls. The rationale being that a large black market exchange premium indicates rationing of foreign exchange, which in turn suggests the presence of import controls that ultimately act to reduce the amount of foreign products entering the domestic market. Wacziarg and Welch (2003) undertake a similar approach to that of Sachs and Warner and update the liberalisation indicators and datasets used to include data available up to 1999 as opposed to 1989.

Edwards (1989) summarises the path through which the imposition of trade barriers can lead to exchange rate misalignments and emphasises the reciprocal nature of the relationship in that the transmission can occur in both directions. He draws the reader to a hypothetical situation where the imposition of a tariff on imports leads to an increase in the price of imported goods. Following economic theory, this increase in price results in a reduced demand for the imported good and an increase in demand for the locally produced good (import substitution item). He further explains that this shift in demand towards the local import substitute will result in an increase in price of locally produced non–tradable goods. Ultimately the impact of the higher import tariff will make exportable goods cheaper in comparison to non–tradable goods and will make imports more expensive than exports (Edwards, 1989). Recalling that the REER is a measure of the ratio of tradable and non–tradable products adjusted to reflect the purchasing power parity between trading countries, the overall effect of a tariff will be to shift the REER from its equilibrium level depending on the weights of tradable goods in the index.
Although economic theory acknowledges that REER misalignment may influence economic growth, the empirical literature is unable to reach a consensus regarding the short and long–term effects of such misalignment. Recent studies have shown that the devaluation of a country’s currency can have a positive impact on growth (Hausmann et al., 2005; Rodrik, 2008; Eichengreen, 2007). Alternatively a multitude of authors have failed to find a significant effect, indeed some studies (Clark, Tamirisa, Wei, Sadikov, & Zeng, 2004; Doğanlar, 2002; Feenstra & Kendall, 1991) have found devaluation to have a negative effect on growth. The SACU countries under investigation in this study are all relatively open countries.11 By virtue of trade already having a huge impact on GDP, it is expected that an exchange rate misalignment in the form of undervaluation of the currency will have a positive impact on economic growth as per the Rodrik (2008) and Eichengreen (2007) findings.

3.3.3 Trade Ratios

The most widely used openness indicator in the trade literature is the trade ratio. It is defined as the ratio of total exports and imports of goods and services to a country’s gross domestic product (World Bank, 2014b). It has been used as a proxy for trade liberalisation due to the availability of data, the view that it encompasses underlying trade policies and that it is a good indicator of a country’s exposure to international markets (Kneller et al., 2008). Economic growth is supposed to benefit from greater trade through increased competition, product variety, economies of scale and technology transfer. Thus countries that engage in more international trade are expected to exhibit higher economic growth rates (Dowrick and Golley, 2004). This measure has been used

11 See background chapter for detailed presentation of the different levels of openness of the 5 countries.
by numerous authors in different studies with positive results on its impact on economic growth (Harrison, 1996; Yanikkaya, 2003; Dollar and Kraay, 2004).

The use of trade ratios is, however, not without its critics. Pritchett (1996), for example, is critical of the use of trade ratios as a measure of trade liberalisation. In particular, he argues that trade ratios are a poor indicator of a country’s trade policy because they tend to vary across countries for reasons unrelated to trade policy. He gives the example of the US having a lower trade ratio than the Philippines which while it could be an indicator of restrictive trade policy is more likely to be an indicator of the size of the internal market. Trade ratios are also likely to capture the distance to markets especially with regard to small nations, transport costs and global demand (Aitken, 1973). For example, Singapore’s higher trade ratio compared to New Zealand’s (World Bank, 2014b) is likely to be more of a reflection of its close proximity to the Asian market than a reflection of a significantly more liberal trade policy.

3.3.4 Adjusted Trade Ratios

In an effort to control for these additional factors that are inherent in and shape trade ratios, several authors have attempted to create adjusted trade ratios. More specifically, adjusted trade ratios to control for policy factors (e.g. exchange rates and interest rates), geographic factors (e.g., population and size of the country) and natural endowments as predicted by the Heckscher–Ohlin model. Frankel and Romer (1999) and Irwin and Terviö (2002) use similar approaches assuming that a country’s geographical attributes are uncorrelated with other determinants of income while having an impact on trade with other countries. They use geographical attributes as instrumental variables to estimate the impact of trade ratios on income per capita, finding positive
and significant effects. Pritchett (1996) developed structure adjusted trade intensity measures by estimating (exports and imports)/GDP as a function of country population, size, transport costs and GDP per capita. He then took the residuals from the corresponding regressions to be reflective of the level of distortion of recorded trade ratios. Spilimbergo et al. (1999) employed a similar approach using the gravity model of trade to estimate trade ratios as a function of population, income, distance from main markets, and factor endowments.

Using a theoretical underpinning similar to that employed by Pritchett (1996) and Spilimbergo et al. (1999) this study develops an adjusted trade ratio measure. The viewpoint used in developing this variable is that trade is determined by the geographical characteristics of a country, i.e. the area and population size of the country. Cost, Insurance Freight (CIF) is included as a proxy of transport costs which are believed to impede trade (Spilimbergo et al., 1999). In addition, according to the Heckscher Ohlin Model predictions, trade should also occur due to differences in country factor endowments which are proxied by GDP (Hiscox and Kastner, 2002). The proposed model is augmented further to include domestic policy actions such as the inflation and exchange rates, which may inhibit or promote trade activity. The central tenet of the model being that the level of trade of a country is determined by internal and external resource endowments, internal and external economic policies, demographic factors and the distance to markets. In a frictionless world, these factors should accurately predict the level of trade that would occur. However due to trade policy and other unobservable effects such as non–tariff barriers, trade ratios tend to underestimate or overestimate the level of trade that should ideally have taken place. Therefore the augmentation of the standard trade ratios is aimed at addressing the earlier criticisms in the literature see (Aitken, 1973) and (Pritchett, 1996).
The adjusted trade ratio is developed using a simple two-part process. Initially, the model is estimated in EViews. Thereafter following a similar framework to the one employed by Pritchett (1996), the residuals from this estimation are then taken to reveal the percentage of over or underestimation of trade ratios. Thus in the second part of the estimation, the actual trade ratios are multiplied by the residuals as predicted by the model to provide an adjusted trade ratio used as an indicator of trade liberalisation. It is expected that both the trade ratios and adjusted trade ratios variables will have a positive impact on economic growth due to the open nature of the SACU countries.

### 3.3.5 Price Based Measures – Trade Restrictiveness Index

The development of the trade restrictiveness index (TRI) is widely attributed to Anderson and Neary (1994) in light of their theoretical research which found existing measures of trade policy mainly tariffs and non-tariff barrier measures to be restricted in their coverage as well as lacking in theoretical foundation. They argued that most trade policy analytical tools in use were simple indicators that did not sufficiently define the level of restriction of the trade regime they were describing. This lack of theoretical foundation could lead to the misinterpretation of results and poor recommendations due to an inaccurate economic analysis of the trade policy in question. The index they developed aimed to improve on simple measures of tariff and non–tariff barriers by combining data from different trade policies as well as combining data from goods with varying economic significance (Looi Kee et al., 2009).

12 Summary of adjusted trade ratios regressions are presented in the appendix for enthusiastic readers.
The trade restrictiveness model is empirically implemented by Looi Kee et al. (2009) who generate classification data of countries according to their level of trade restriction. In their model, the overall level of protection on goods imposed by a country is taken to be the summation of total tariffs imposed plus the ad–valorem equivalent (AVE) of non–tariff barriers (NTBs) (Looi Kee et al., 2009). This information on the overall level of protection on goods is used in combination with the import demand elasticities of the goods in question and the aggregate level of imports to calculate the TRI. Import demand elasticities are included in the trade restrictiveness index, unlike in weighted and un–weighted average tariff calculations, because they provide a theoretical basis for calculation that takes into consideration the importance of each good as well as the responsiveness of the goods in question to a change in price ceteris paribus.

The main criticism the TRI has received is that it does not account for subsidies. This is likely to play a distorting role when attempting to compare the level of restrictiveness in a developing country with a developed country as subsidies similar to tariffs have the ultimate effect of increasing domestic production and thus distorting trade from what it would be under free trade conditions. Thus with the US, EU and Japan providing subsidies to their agriculture industries while their major exports tend to be manufactured goods and with developing countries specialising in agricultural production with less subsidy incentives available, one might argue that this index is not reflective of the true state of protection across the different sets of countries (Krishna, 2009). Furthermore, non–tariff barrier measures are not reliable across countries due to the existence of price differentials across goods that are not solely as a result of trade policy,
which could distort the index. Non-tariff barriers are also not calculated on a yearly basis. Further criticisms of the TRI is that it is calculated under the assumptions of perfect competition which are unrealistic and that it is also calculated under partial equilibrium thus ignoring the effects of other sectors of the economy that may have a significant impact on the results.

While the TRI is not a perfect indicator of trade restrictiveness, in comparison to previous indexes, it is an index that theoretically incorporates the most notable indicators of trade policy. It is a fairly recent measure of distortion that has been scrutinized and applied by notable multilateral trade organisations such as the World Trade Organisation, United Nations Conference on Trade and Development (UNCTAD), and the World Bank (Krishna, 2009). The TRI also provides basis for a common, conceptually based, and implementable means of comparing trade policy, albeit one would need to acknowledge the limitations of the index when using it in applied research. Although the TRI is presented as an alternative measure to capture trade restrictiveness, it is not applied in this research as the quantitative data for the TRI only stretch back to 2009 and is therefore insufficient for the time-series analysis being used in this study.

The next section reviews empirical cases undertaken on the impact of trade liberalisation on economic growth. The subsection does not attempt to list all studies undertaken in the field, as the material is extensive and not the main purpose of the study. Instead, the empirical evidence is used to show the different outcomes that have been obtained and give the reader some insight
into the level of discrepancy that still exists with regard to the impact of trade liberalisation on economic growth.

3.4 **TRADE LIBERALISATION – THE EMPIRICAL STUDIES**

The review of empirical studies is divided into two sections. The first section portrays research that produced positive trade liberalisation outcomes and the second section portrays studies with negative or inconclusive impacts of trade liberalisation. The review takes into account the methods used by the authors and thus in addition to presenting the different views on the benefits of trade liberalisation also provides a snapshot of the alternate models used in the literature by the authors reviewed.

3.4.1 **The Positive Evidence on the Impact on Economic Growth**

Throughout the 1960s, academic scholars began undertaking empirical comparative research aimed at the structure of economies and their levels of growth (Hagen, 1958; Bhagwati, 1958; Chenery and Bruno, 1962; Chenery and Strout, 1966; Corden, 1966; Balassa, 1965). The research looked at how effective current policy was in achieving growth objectives, critically investigated current theory, and began to look at open oriented scenarios. Notable outcomes of the various studies undertaken were the ‘theory of effective protection’ which provided an analytical tool capable of investigating the different levels of protection given to import substitution industries, the analysis of rent–seeking behaviour, market failure, the effects of trade instruments and cross country cost–benefit analyses. Following these studies there was a developing consensus amongst

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13 See articles by Krueger (1997) and Prebischb (1959) for a more detailed discussion on import substitution industrialization policies.
academics that import substitution policy might not be as effective as earlier perceived and trade liberalisation might play a larger role in economic growth. The East Asian experience helped cast further doubt on import substitution with many East Asian economies opting for outward oriented strategies that focussed on industrialisation through the growth of exports in the manufacturing industries (Krueger, 1997).

Michaely et al. (1991) using a World Bank cross–country study examined liberalisation episodes across 19 countries. Their study investigated the speed and intensity of liberalisation episodes, the replacement of less efficient by more efficient instruments, the circumstances for liberalisation, exogenous developments and the importance of other policy instruments in liberalisation. The study made use of an index of liberalisation ranging from one to 20 where countries closer to one were deemed to have restrictive trade policy whilst those nearer to 20 were said to have open trade policy. Among the study conclusions were the small impact of liberalisation on unemployment; liberalisation leading to rapid and sustained export growth; exchange rate policy being crucial to liberalisation; and trade liberalisation affecting positively on the balance of payments, production and economic growth.

Early work undertaken by Salvatore and Hatcher (1991) investigated the effect of international trade on growth in a group of developing countries based on their classification by a World Bank study (World Bank, 1987). The World Bank study used four categories to classify economies from outward oriented to inward oriented accordingly to their trade policy. Salvatore and Hatcher (1991), using OLS examined and compared the differences in growth between outward oriented
and inward oriented countries. Their results showed that international trade led to increased
growth more evident in countries with outward oriented policies. They did caution that their
results appeared to be sensitive to the measurement instruments employed; used inappropriate
assumptions regarding production functions across countries; causation was difficult to
determine; and the timeframe in question was not sufficient to record the long run dynamic effect
of trade on growth (Salvatore and Hatcher, 1991).

Among the early studies that found a positive correlation between trade liberalisation and
economic growth was Dollar’s work between 1976 and 1985. In this study Dollar (1992) argued
that low protection levels for inputs in the production process would stimulate growth through the
accumulation of capital inflows targeted towards development, without encountering the
associated debt payment issues an inward oriented economy would incur. He tested this
proposition by constructing a price–based openness index similar to indexes used by Summers
and Heston (1988) and Wacziarg (2001) using a real exchange rate distortion measure, which
calculated the effects of price level and country characteristics and a real exchange rate variation
tool. The reasoning behind his liberalisation index was that high price levels were associated with
heavy protection and domestic market production, whilst low price levels reflected a liberalised
scenario (Dollar, 1992). He empirically tested the impact of investment, real exchange rate
variation and real exchange rate distortion as a function of GDP per capita growth using. His
datasets were obtained from Summers and Heston (1988) material over the period 1976–1985
and used to test the effects of outward orientation on growth across 95 developing countries. His
results showed that the investment rate had a positive and statistically significant impact on
growth, whilst exchange rate distortion and variability both had negative impacts on economic
growth. Dollar (1992) further models the levels of openness in Asian countries as ideal and suggests that growth in African and Latin American countries could have been significantly increased had these continents followed the Asian liberalisation model.

Savvides (1995) uses a panel data approach to investigate the growth factors in a sample of 28 African countries. Using an endogenous growth framework the study finds physical capital has a statistically significant impact on economic growth, while human capital has an insignificant impact. The study also suggests that higher inflation, higher government spending, and limited financial development adversely affect economic growth. Savvides (1995) concludes that his study finds limited but positive evidence that more outward oriented African countries have tended to grow faster than inward oriented African countries.

Harrison (1996) has acknowledged that many of the discrepancies in the trade liberalisation literature have occurred due to the different number of liberalisation measures, methods and countries used in the studies to date. She tests the impact of trade liberalisation on output using a general production function where output is a function of capital stock, primary and secondary education, population, labour force, arable land, and technological change. She uses seven different indicators of openness for a cross-section of developing countries and tests whether these different measures yield similar results over time. The liberalisation measures include but are not limited to a black market premium, a movement toward international prices, Dollar index, Trade Ratios and measures that calculate industrial sector protection and exchange rate valuation. The results showed that half of her liberalisation indicators exhibited a positive relationship with
GDP growth with three being significant at the 5% level and a fourth at the 10% level. All liberalisation variables apart from trade shares displayed the predicted signs indicating movement towards liberalisation positively affected growth while movement away negatively influenced growth. Harrison (1996) attributed the varying results to the different periods under testing suggesting that the period used was critical in determining the level of significance of openness measures.

Edwards (1998) contributed to the on–going debate on trade liberalisation and growth through the suggestion that possible causes for this have been the use of poor liberalisation indices coupled with lack of comparable data across countries, resulting in non–robust results depending on which index of liberalisation was used. He attempted to address these deficiencies with a comparative data set from 93 countries, to measure the relationship between trade liberalisation and productivity growth. In his study, Edwards (1998) used nine different liberalisation indicators that included: (i) the Sachs & Warner Index, (ii) World Development Report Outward Orientation Index, (iii) Leamer’s Openness Index, (iv) Average Black Market Premium Index, (v) Average Import Tariff on Manufacturing, (vi) Average Coverage of Non–Tariff Barriers, (vii) the Heritage Foundation Index of Distortions in International Trade, (viii) Collected Trade Taxes Ratio, and (ix) Wolf’s Index of Import Distortions.

Using instrumental weighted least squares his regression results showed that the trade liberalisation coefficients were negative 94% of the time and statistically significant 76% of the time. Therefore, the results seemed to postulate that there was a robust relationship between trade
liberalisation indicators and TFP growth. Edwards (1998) did note that upon analysis of standardised coefficients human capital and initial GDP were more important in explaining TFP growth than the liberalisation indicators. He performed further regressions using a composite trade distortion index and found the index to have the expected negative sign and level of significance thus confirming his earlier hypothesis that countries with more protection will tend to experience slower growth of TFP. Edwards (1998) does caution that whilst the results confirmed the association between the two variables, they did not address causality issues and further time–series regression tests would be needed to isolate these.

In their investigation of the impact of trade liberalisation on growth, Frankel and Romer (1999) took on a different approach using geographical characteristics. Their study paid attention to the endogenous part of trade that was solely affected by geographical factors. The rationale being that whilst geographical factors did not capture the effects of policy, technology and any other factors that may affect trade; they did have an effect on international trade. In particular, they found that countries in close proximity of each other would tend to trade more and hence geographical factors could be used in isolation to capture the effect of trade on income. Their results found a positive and significant relationship between international trade and income. They further suggested that there could be an additional link through which policy related variables could have an impact on income, albeit through a different transmission to the geographical mechanism (Frankel and Romer, 1999).
Greenaway et al. (2002) undertook a study investigating the impact of openness on growth in the short–term noting that the three most common estimation methodologies used in the literature were cross–country, time–series and computable general equilibrium models. Using a dataset of 73 countries the authors investigated the relationship between liberalisation and growth using a panel framework that incorporated inter–country and inter–temporal differences. They used three different liberalisation indicators that were:

- A World Bank Structural Adjustment Loan (SAL) indicator signalling the intent to liberalise;
- A Dean et al. index where timing of liberalisation was assessed according to tariffs, quotas, export impediments and promoters, and exchange rate distortion (Dean et al., 1994); and
- A Sachs & Warner index which using (Summers & Heston, 1991) dataset determined the level of liberalisation using non–tariff barriers, average tariffs, black market exchange rate premiums, socialism, and state monopoly over major exports (Sachs and Warner, 1995).

Greenaway et al. (2002) specified a growth model adopted from (Levine and Renelt, 1992) and include terms of trade and liberalisation indicators. Their results showed that liberalisation exhibited a J–curve effect in the short–term indicating that initially growth declines after a liberalisation episode before it eventually improved.
Vamvakidis (2002) examined the correlation between trade orientation and growth, noting that the majority of the literature on openness and growth only dated back to the 1970s, which limited its ability to measure the long–term relationship between the two variables. He corrected for this by measuring the long–term impact of openness on growth using data from 1870 – 1970 with the benefits of a historical analysis allowing for a more robust measurement of the link between trade liberalisation indicators and the other independent variables in the growth models. He acknowledged that a major hindrance to the investigation of the long–term openness–trade relationship was the lack of data for periods prior to 1970. Vamvakidis (2002) put forth the argument that prior to 1970 the world was less open than it currently is and hence theoretically protection might have worked more effectively than openness in stimulating growth. He reviewed studies by (Brecher, 1974; Dornbusch, Fischer, & Samuelson, 1977; Rodriguez, 1974) that demonstrated an optimal level of protection could lead to short–term growth. He acknowledges that whilst theoretically sound protected industries as listed in the above studies would have had to be correctly selected by governments over a given period, which was a rare feat in practice.

In order to get a wider coverage of the trade liberalisation to growth relationship Vamvakidis (2002) uses six different liberalisation measures listed as follows:

- Sachs & Warner variable;
- Average tariff rate;
- Average non–tariff barrier coverage from Barro and Lee data (1996);
- Average ratio of import duty revenues to total imports;
- Average trade share; and
His results generally showed that trade liberalisation had a positive impact on growth for the tested period; however, statistical significance was dependent on the liberalisation indicators used.

In the period 1950–1970, his results showed that none of the indicators was statistically significant apart from the import licence requirements variable, which was positive and significant in the absence of the investment share. In the period 1920–1940, higher protection levels appeared to foster faster growth. The results suggested a negative correlation between liberalisation and growth during the 1870–1910 period; however, this might have arisen due to limited data. Vamvakidis’ overall results appear to suggest that the link between liberalisation and growth may have only been positive when the predominant trading environment was open as shown through the negative results prior to 1970 (Vamvakidis, 2002).

Dollar and Kraay (2004) contribution to the debate was centred around the effect that the liberalisation of trade had on developing countries and income distribution. They compared growth rates in a select group of developing countries that underwent liberalisation against their non–liberalising counterparts and used developed countries as a control group. Economies were deemed to be liberalising according to their real levels of growth in trade to GDP as well as their reduction in average tariff levels. Trade volumes were bound to reflect trade policy related variables (e.g. non–tariff barriers) and include a wide range of other non–policy related variables
such as geography, rule of law, and colonial history. In response, Dollar and Kraay (2004) suggested proportional changes in trade volumes over decades as a way of measuring the effects of openness on trade. This was because the proportion of the other variables was unlikely to change significantly across decades, meaning any change could be attributed to a change in trade policy.

Using a data set for 73 developing countries, Dollar and Kraay (2004) employed cross-country regressions using Ordinary Least Squares (OLS) and Instrumental Variables (IV) to look at the relationships between trade openness, a range of other variables and average annual growth rates. Their results showed that for the periods in concern, the countries that adopted more open trade policies experienced higher increases (5%) in growth rates than both developed countries (2.2%) and non-liberalising developing countries (1.4%). Their results also suggested that changes in trade volumes displayed a strong positive correlation with changes in growth rates supporting the view that liberalised countries tended to grow more rapidly than non-liberalised countries. However, there was no relationship shown between changes in trade volumes and changes in inequality.

More recently Winters (2004) reviewed the existing literature on trade liberalisation and economic performance concluding that based on the available literature the evidence suggests that liberalisation promotes growth. He noted that the literature was plagued with inconsistent methodology and problems in definition and measurement. Firstly, the definition of liberalisation

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14 See works by Caselli et al. (1996) for a detailed explanation of their regression functional form.
varied depending on whether it was being used in a policy context or for purely academic reasons. Secondly, measurement across countries was difficult and inconsistent. Causation was a further issue that was difficult to establish across countries. In this regard Winters (2004) observes that it is often very difficult to establish whether liberalisation causes economic growth or whether as a result of a country growing faster it develops better infrastructure, technology and thus adopts more open policies. The final issue was that successful trade policies were often implemented in combination with other policies that encouraged the sound development of investment, human capital and state institutions. Winters also identified the lack of a strong theoretical backbone to be a major hindrance to much of the empirical work. Brock and Durlauf (2001) concurred insisting that there were too many unknown variables in growth theory for inferences to be made using openness in the standard growth models. Baldwin (2004), Greenaway (1998) and Collier (1993) inferred that any attempts to isolate and investigate the effects of trade liberalisation on growth would ultimately prove to be futile, as the policy was never designed to be implemented in isolation of other policies.

Winters (2004) building on the conclusions drawn by other authors (Baldwin, 2004; Brock and Durlauf, 2001; Taylor, 1998; Wacziarg, 2001), turned his attention to the manner in which trade liberalisation and growth were linked through the use of other policies. Corruption is thought to have a link to openness in that countries that trade more with external markets are likely to face more scrutiny on their institutions and subsequently will encourage more transparent operations to meet the demands of foreign investors (Wei, 2000). Another closely linked policy to growth and liberalisation was inflation as high levels tended to erode real growth. Investment policy was a key link identified by numerous authors as a key requirement for growth (Sala-i-Martin, 1997;
Levine and Renelt, 1992; Wacziarg, 2001; Srinivasan and Bhagwati, 1999). Institutions and education were also found to play a significant role in fostering growth with the latter occurring through innovation and the ability to acquire and imitate foreign know–how, whilst the former provides stable conditions, which brought about convergence in countries systems providing investors with further confidence in the new markets Winters (2004).

Sakyi (2011) undertakes a study that looks at Ghana’s economic performance pre-liberalisation and finds that economic performance before 1983 was poor culminating in a minimum negative growth rate of -14.5% in 1975. The author attributes these poor results to import substitution industrialisation policies, political instability, trade control instruments, disinvestment and an economic crisis during the mid 1970s. The author notes that the economic fortunes of Ghana improved after the implementation of World Bank structural adjustment programmes which focused on the removal of foreign exchange distortions, trade restrictions and corrected macroeconomic imbalances. Sakyi (2011) using the ARDL bounds test regresses trade openness, foreign aid, labour force growth, gross domestic investment, government expenditure, the political system and labour force participation rate on real GDP growth. Whilst the author does not find a statistically significant relationship between the other variables and economic growth, Sakyi (2011) does find that both openness and foreign aid since 1983 have had a positive and statistically significant impact on economic growth in Ghana.

3.4.2 The Negative or Inconclusive Evidence on the Impact on Economic Growth

This section reviews research from selected authors where the general conclusions drawn about the effectiveness and appropriateness of trade liberalisation in stimulating economic growth are
inconclusive or negative. This section aims to show that whilst there have been liberal results, which call for less government interference in trade policy there have also been numerous studies which have shown that trade liberalisation has not had a significant impact on economic growth. This suggests that trade liberalisation should be analysed and applied in a case–by–case setting that captures conditions unique to the study in question.

Levine and Renelt (1992) searched for empirical linkages between growth rates and a variety of theoretical factors. In their analysis of international trade and price distortions, they examined the relationship between growth and a variety of trade indicators such as estimates of trade policy, import indicators and price distortion between domestic and international markets. Their trade distortion indices included a Leamer (1988) openness index to measure levels of liberalisation in terms of openness and intervention, Black Market Exchange–rate premium (BMP) (Leamer, 1988), and Dollar’s (1992) index measuring distortions between domestic and international prices. They found that the Dollar index was positively correlated with the BMP and suggested that it might be more appropriate to use this index as a general measure of price distortion rather than an indicator of trade policy.

Using extreme bounds analysis (EBA) Levine and Renelt (1992) found that when using the Leamer Index there was only a significant and positive relationship between trade liberalisation and growth when investment was included. Using the BMP no robust correlation was found between growth and investment, whilst the Dollar index was found to be negatively correlated with growth.
Greenaway (1993) takes a sceptical view of the impact of trade liberalisation on growth. He argued that much of the work previously undertaken used flawed methodologies. Amongst his observations was the apparent lack of an analytical framework within the different components of the study. This he argued contributed to the inconsistent ways to evaluate the manner in which different economies responded to liberalisation. He observed the use of subjective scoring in the classification of liberalisation episodes, which led to the development of unreliable liberalisation indexes based on authors’ judgements. This in turn complicated comparisons across countries. In his opinion, trade liberalisation was further plagued by inconsistent definitions of liberalisation across the different aspects of the study, which had the follow on effect of making it impossible to construct reliable aggregate measures of trade distortion. He recommended improving and standardising the measurement tools used to evaluate the liberalisation episodes as this would greatly improve comparability and reduce inconsistency in measurement techniques and restore confidence to the interpretation of results (Greenaway, 1993).

Perhaps the most cited article on the inconclusive relationship between trade liberalisation and economic growth is that of Rodríguez and Rodrik (2000) which was sceptical of the empirical research undertaken and offered a critique of the literature. In their analysis of work undertaken by Dollar (1992), the authors suggested that the Distortion measure was inappropriate due to conceptual flaws in the construction of the distortion index; whilst the variability index tended to measure instability in countries as opposed to trade orientation.
Their critique of Sachs and Warner (1995) argued that while the index had high and robust coefficients when placed in regressions, upon individual testing of its components, the black market premium and state monopoly of exports variables accounted for the majority of the significance in the index. They also drew special criticism to the insignificance of tariffs and non–tariff barriers when measured independently as these constituted the most direct measure of trade policy. The authors suggested that the black market premium and state monopoly of exports only measured growth through their high correlation with other macroeconomic determinants of growth. They confirmed that the Sachs and Warner index measured a wide range of policy and institutional differences that were highly correlated with the components of the index and therefore tended to bias results upwards. Harrison and Hanson (1999) upon decomposition of the Sachs & Warner openness composite measure also found tariffs and quotas to be statistically insignificant. Similarly, their tests revealed that only the socialist economic system coefficient was significant which suggested that the economic market structure rather than trade policy was responsible for statistical significance in the Sachs & Warner index. The authors also noted that Sala-i-Martin (1997) experienced a similar issue failing to find a significant relationship between measures of trade policy and long run growth. Harrison and Hanson (1999) concluded that the Sachs & Warner openness variable may not capture liberalisation adequately due to differing time periods from when data was collected to actual test periods. A significant relationship between tariffs and growth was only established upon modification of their tariff instrument to capture average effective tariffs instead of end–of–period tariff rates.

In their review of Edwards (1998) paper, which incidentally looks at the openness and growth relationship using nine alternative liberalisation indicators, Rodríguez and Rodrik (2000)
concluded that there was an absence of a robust relationship between openness and growth. Furthermore, the results presented were highly reliant on inconsistent weighting methods\textsuperscript{15} and questionable data.\textsuperscript{16} They noted the subjective construction of the indicators, which did show statistical significance therefore biasing any judgement and lacking robustness when tested with data from alternate credible sources.

Rodríguez and Rodrik (2000) discredited a host of other articles (Ben–David, 1993; Frankel & Romer, 1999; Harrison, 1996; Lee, 1993b; Wacziarg, 2001), due to an array of reasons ranging from the poor construction of indexes as stated above to inaccurate data, inadequate measurement timeframes, subjectivity of analysis, and correlation with other non–trade factors such as geography and size. They concluded that based on their research findings there was little evidence to support the view that liberalisation of trade policy leads to automatic economic growth. They iterate that if such a relationship were to exist it would do so in unison with a host of other complementary factors and hence caution should be taken when considering trade liberalisation as a sole development programme without significant knowledge of unidentified underlying factors.

Yanikkaya (2003) examined the impact of trade volumes and trade restrictions on growth. His results showed that an increase in trade volumes appears to coincide with an increase in economic

\textsuperscript{15} GDP per capita is found to be a less than ideal instrumental-variable (IV) in cross sectional analysis for countries that have unreliable data collection methods. The other IV are found to be sensitive to the specification of the instrument lists which Rodríguez and Rodrik (2000) assert biases estimates of the trade liberalization coefficients. The authors find that the only variables that are subject to all specifications are the subjective indexes which have an element of bias about their determination.

\textsuperscript{16} Data used by Edwards (1998) is highly questionable because the import tax ratio data for India states figures as low as 2.4% import tax whilst India is known to have a high tariff rate (Rodríguez and Rodrik, 2000).
growth visible through technology transfer, the development of economies of scale, and the exploitation of comparative advantage. His trade restrictions results pointed towards a significant and positive correlation with growth. This he interpreted to mean that under certain conditions, trade restrictions could cause a reallocation of resources from an industry with no advantage to one with comparative advantage and thus promote growth. Yanikkaya (2003) did caution that while the results were supported by strategic trade theory and the infant industry argument, there were many other untested variables that were also likely to be contributing to the relationship including country specific characteristics. Hence, caution should be exercised when interpreting how trade liberalisation would affect growth.

According to Krueger (1978) many countries in the 1950s switched from inward oriented policies to outward oriented policies as this gradually became the accepted doctrine. This led academic study to investigate further the relationship between exports and growth and subsequently more attention was drawn to the measurement of liberalisation variables and estimation techniques used. Kneller et al. (2008) empirically investigated the link between trade liberalisation and economic growth. The authors acknowledged that both the empirical and theoretical discourse on the matter has yielded different conclusions and remained unresolved. This heterogeneity in outcomes could be due to a large set of variables omitted from the regression analysis. They listed variables put forward by Winters (2004) such as education, levels of development, institutional capacity, macroeconomic stability and anti-corruption measures. Recognising the multidimensional facets of liberalisation the authors employed a regression analysis that combined information on the timing of liberalisation, the use of additional trade variables, volume measures of openness as well as the use of conditionality factors such as human capital,
natural barriers and institutional quality. They noted that while there were several estimation approaches available (between country analysis, and time–series analysis) they chose cross–country analysis. They disregarded time–series analysis because of the requirement of large datasets, which due to the recent nature of liberalisation were unavailable.

Kneller et al. (2008) results proved inconclusive leading to the conclusion that simple liberalisation indicators used in the majority of the literature were not able to explain adequately the variation in the extent of trade liberalisation across countries. The results also showed correlation amongst factors synonymous with poor growth pre–liberalisation, suggesting that countries with poor economic growth pre–liberalisation were likely to have poor growth post liberalisation. They conclude that their results could only be interpreted subjectively and on a case–by–case basis with caution being exercised when making general inferences about trade liberalisation and its effects on growth rates.

In a more recent study, Read and Parton (2009) analysed the liberalisation efforts that had been undertaken in Kenya, Tanzania and Uganda. They noted that whilst changes in international trade policy took place in the late 1980s to early 1990s, the evidence showed that the balance of trade of all three countries had deteriorated over the last 25–year period. More worryingly for the three countries, Read and Parton (2009) acknowledged the absence of a level playing field in global agriculture. Reports from Oxfam (2002) have alluded to unfair trade practices by the USA and EU countries through subsidisation of their agricultural industries. The effect being an artificial tax on developing countries exports resulting in a decline in potential agricultural revenue. Read
and Parton (2009) concluded that trade liberalisation might not be the best initiative for Sub-Saharan African countries due to the lack of infrastructure, under-developed institutions, weak policy framework and the non-reciprocal market access conditions imposed by developed countries.

3.5 CHAPTER CONCLUSION

The theory of international trade has progressed from static to dynamic modelling of the impact of trade on economic growth. Benefits of trade have been hypothesised to be improved economic growth, the creation of economies of scale which lower production costs and increase efficiency, enhanced competition further improving production efficiency and innovation, and the transfer of knowledge through technology (Anderson, 2008). Trade liberalisation has been proposed as a measure to magnify these externalities and increase economic growth. Despite the arguments presented in international trade theory, the empirical literature has not been able to present unequivocally positive outcomes when considering the impact of trade liberalisation on economic growth. This lack of agreement has been attributed to the use of multiple measurement instruments, heterogeneity of production functions across countries, inadequate timeframes and samples, and the use of different time-series, cross section, panel data, partial equilibrium and computable general equilibrium (CGE) models. While partial equilibrium and CGE modelling are not uncommon in the literature they have mostly been used in hypothetical scenario modelling making them static in nature and unsuitable for this study (Greenaway, 1998). Furthermore they have been found unsuitable in determining events that have actually occurred which is one of the aims of this study.
The focus of trade liberalisation modelling has been twofold with the within–country strand focussing on time–series modelling and the cross–country studies using panel data modelling (Kneller et al., 2008). Whilst fixed and random–effects panel data models do take into account country specific heterogeneity and create larger sample sizes, they do still assume common economic and technological structures, which in the case of the five SACU countries is unlikely to be true.\(^{17}\) Panel data models unrealistically group countries together and according to (Kenny and Williams, 2001, p.3) predetermine that “the ‘components’ of all economies are in some way the same, and hence that economies and economic processes are comparable.”

Time–series models have not been without criticism either with earlier models using statistical techniques that struggled to determine causality and cointegration properties.\(^{18}\) There was also a tendency similar to panel data modeling of generalizing country specific results. Earlier time–series studies also suffered from stationarity issues where spurious results were produced due to the nonstationarity of model variables (Pesaran and Shin, 1999; Atkins and Coe, 2002). First differencing of variables has been suggested as a solution to these earlier problems, as this would eliminate stationarity issues.\(^{19}\) However the interpretation of differenced data becomes more difficult due to the loss of long run information making it harder to use results as a policy prescription. The ARDL bounds testing approach (Pesaran and Shin, 1999; Pesaran et al., 2001) has been proposed as a technique that allows for the control of country specific variables, time

\(^{17}\) Refer to background chapter for a deeper review of the economic SACU backgrounds.

\(^{18}\) See Section (4.2.6) on cointegration in the methods chapter for a deeper discussion.

\(^{19}\) See Gujarati (2004) for a detailed analysis of stationary processes and derivations of equations.
invariant variables, and the analysis of the long run relationship between trade liberalisation, and economic growth.

The economic growth and international trade literature using the general production function retain the endogenous growth model as the preferred modelling framework. However, this framework is by no means conclusive and model selection has tended to occur based on researcher objectives and availability of data. The literature presents mixed evidence as to the impact of trade liberalisation on economic growth. The vast majority of studies use cross–country frameworks either comparing liberalisation results across a selected group of developing countries or between developed and developing countries (Collier, 1993; Dowrick and Golley, 2004; Easterly, 2001; Francois et al., 2005; Greenaway, 1998). For as many studies that find positive impacts (Michaely et al., 1991; Salvatore and Hatcher, 1991; Dollar, 1992; Harrison, 1996; Frankel and Romer, 1999; Hoekman and Nicita, 2011; Kneller et al., 2008) there are alternate studies that produce negative or inconclusive results (Clemens & Williamson, 2004; Greenaway, 1993; Irwin & Terviö, 2002; Levine & Renelt, 1992; Rodríguez & Rodrik, 2000; Yanikkaya, 2003).

The literature provides miniscule clues on the impact of trade liberalisation in any of the five SACU countries. There are a few attempts using combinations of panel data and mostly CGE models that investigate the potential impact of liberalisation on the agricultural sectors (Black, 1998; Edwards, 2005; Fedderke & Vaze, 2001; Jonsson & Subramanian, 2001; Parr, 1994; Roberts & Thoburn, 2003; Thomy et al., 2013; Thurlow, 2007; Tsheko, 2005). However,
rigorous discussions on liberalisation and its impact on economic growth, exchange rate policy, investment, human capital and labour productivity in the 5 SACU countries are virtually absent. This makes it difficult for SACU policy makers to develop legislation based on academic research because of the lack of consensus on the impacts of trade liberalisation and the lack of comparable empirical data for the region. These issues also complicate the evaluation of existing trade agreements in the five SACU countries as policy makers are forced to make subjective decisions on trade policy that may or may not be in the best interests of their populations.

This study therefore considers the lack of literature on Botswana, Lesotho, Namibia, South Africa and Swaziland on the topic. It also considers the weaknesses in previous cross–country approaches, which have grouped South Africa and Botswana with other developing nations, which might not share similar characteristics with them. The study acknowledges the virtual absence of any published literature on trade liberalisation in Lesotho, Namibia and Swaziland and recognises the out–dated techniques that have been used in time–series analysis on developing countries. Through the recognition of these gaps in the literature and the inconsistencies in estimation, this study was able to develop its research question: **What is the Impact of Trade Liberalisation on Economic Growth in SACU Countries?**

The study aims to address this research question and by so doing fill these voids in previous research by estimating the impact of trade liberalisation on economic growth in the five SACU countries applying a more rigorous endogenous growth framework, modelled through an ARDL bounds testing approach. In employing the ARDL bounds test it aims to solve previous
methodological weaknesses in studies of the trade liberalisation–growth relationship amongst developing countries. This study will also test the robustness of the model through alternative fixed–effects panel data specification. The literature makes use of several different liberalisation indicators. This study attempts to use the most commonly cited liberalisation proxies in the form of taxes on international trade for tariffs under the incidence–based category: the real effective exchange rate to proxy the price–based categories; and the trade ratios and adjusted trade ratios for outcomes–based measures.

The next chapter sets out the methodology used in this study and gives a deeper insight into how the impact of trade liberalisation on economic growth is analysed using the ARDL bounds test and fixed–effects panel data approaches.
CHAPTER FOUR: METHODOLOGY

4.1 INTRODUCTION

Building from the literature introduced in the previous chapter, this study will use econometric time–series and panel data techniques. The time–series approach is selected as the main estimation technique due to the study analysing the movement of the variables of interest over a 32–year time period. In the past data on all key variables of interest has not been available for prolonged periods leading to more common panel data cross–country estimations over shorter periods and the use of dummy variables to capture the incidence of trade liberalisation. However, the recent availability of a 32–year dataset intuitively makes time–series an appealing estimation option for the individual country analyses. Panel data on the other hand is chosen because each year relative to each study country provides a unique cross sectional viewpoint of the way trade liberalisation affects economic output. Panel data thus allows for these cross sectional values to be jointly analysed over time providing richer results, which can be used as robustness checks to the time–series results before drawing conclusions. However, a foreseeable drawback to the panel–data approach is the assumption of homogeneity across test samples. In the case of this study, as already seen in chapter 2 there are some inherent differences among the SACU countries both structurally and economically. For example, while all five countries are classified as developing economies, Lesotho and Swaziland have different levels of economic development compared to Botswana, Namibia and South Africa. However, being SACU members they do share many common policies (e.g. the Common External Tariff and Common Monetary Area). Therefore, caution will need to be exercised when interpreting the panel–data results due to the heterogeneous nature of the countries in the sample.
The next section of the chapter presents a brief overview of time–series data. This is followed by a deeper review of the main time–series analytical tool – autoregressive distributed lag (ARDL) bounds test to cointegration (henceforth the bounds test). The test equation has endogenous growth foundations and is developed using a general production function. The subsequent section introduces panel data methods and describes the three main branches in panel data testing. The next section gives a general exposition on pooled OLS methods followed by a review of the fixed–effects and random–effects models. The chapter differentiates between the two and provides guidance as to why the fixed–effects model is more appropriate to use in the study. The chapter provides a description of the data and the sources used in the study and concludes with a summary of the main concepts.

4.2 TIME–SERIES ANALYSIS

Time–series data are orderly sequenced data relating to a specific variable over time. Time–series models can be univariate or multivariate in nature. Univariate time–series models use the history of a single variable to model the behaviour of the same series (Studenmund, 2011). For example, a variable $Y$ at time $t$ is displayed as a function of past values of that variable plus current and past random error terms. Multivariate time–series models on the other hand use past and present values of the dependent variable along with past and present values of several factors to determine the influence on the variable $Y_t$ in question. This study uses multivariate time–series data and incorporates them into dynamic models. Dynamic time–series models typically consider the impact of present and past values of endogenous ($y$) variables and exogenous ($x$) variables when explaining the impact on the endogenous ($y$) variable (Gujarati, 2004).
The analysis of time–series data poses challenges to researchers because it typically involves the estimation of dynamic models with lagged variables. The assessment of lagged variables using ordinary least squares (OLS) regressions is problematic due to: (i) multi–collinearity in exogenous variables; (ii) the (x) value coefficients not following a progressively declining value pattern; and (iii) the degrees of freedom tending to decrease (Gujarati, 2004). Further problems that dynamic time–series models face are that small sample sizes tend to bias their predictions, and serial correlation causes further bias in standard error predictions of estimators using OLS regardless of sample size. An additional issue with the estimation of time–series data is that often independent variables appear to be more significant than they actually are when they display the same trend as the dependent variable. This leads to spurious correlation which is a sturdy association between two or more variables without any real underlying association (Studenmund, 2011). Spurious correlation tends to overstate the t–scores and overall fit (R^2) of the regressions making results unreliable.

A major cause of spurious correlation is nonstationary time–series. A nonstationary time–series is one where the mean and variance continually change over time and has a simple correlation coefficient between the X variable and its lagged variable which is influenced by factors other than solely the length of the lag between the two (Studenmund, 2011). Nonstationarity is typical of real GDP and other economic data as economies tend to change over time due to global shocks, business cycles, commodity booms and other conditions (Hendry and Juselius, 2000).^{20}

^{20} See section 2.2 for more on stationarity.
4.2.1 Overview of the Bounds Test

In classical economic theory Granger and Newbold (1974) demonstrated the potential for spurious regressions due to time-series data sharing common trends and the nonstationarity of data. These findings led to the adoption of an estimation technique called cointegration analysis, which allowed for the estimation of nonstationary variables as long as one combination of the variables in question was stationary. In the presence of stationarity, variables were found not to drift apart but move together in the long run. Two main strands of cointegration have been developed. The first technique was the two-step residual-based procedure proposed by Granger (1986); and Engle and Granger (1987), which was used to test the null hypothesis of no cointegration. The second was the Johansen and Juselius (1990) system-based reduced rank approach. The main shortcoming of these approaches was that all variables had to be integrated of order one requiring extensive pre-testing of all variables to meet this criterion.

In contrast, the technique adopted within the methodology of this study is the autoregressive distributed lag (ARDL) bounds test to cointegration first proposed by Pesaran and Shin (1999) and advocated by Pesaran et al. (2001). It allows for the estimation of cointegration using ordinary least squares (OLS) once the appropriate lag length has been selected. This method is employed due to the study requiring the long run and short run analysis of the dynamic interactions between multiple variables of interest. An advantage of this technique over earlier approaches such as Johansen and Juselius (1990) system-based reduced rank regression or the two-step residual based approach of Engle & Granger (1987), is the lack of requirement for all...
the variables to be tested to be integrated of the same order. The bounds test gives the flexibility of being able to test the relationships of variables that are \( I(0), I(1) \) or mutually cointegrated (De Vita and Abbott, 2002). However the test has been found to be unstable in the presence of \( I(2) \) variables (Fosu and Magnus, 2006) and thus for the purpose of this study unit root testing on all variables prior to estimation was necessary. A further advantage of the testing procedure is that it has also been found to be robust when testing small and large sample sizes unlike earlier cointegration tests which were sensitive to small samples (Odhiambo, 2009).

The foundations of the bounds test are built using the concepts of stationarity, unit roots, vector autoregressive models (VAR), cointegration and vector error correction models (VECM). Hence, these concepts are defined in the following sections to provide the reader with a working understanding of their meaning.

### 4.2.2 Unit Roots and Stationarity

A time–series is said to be stationary if its mean and variance are constant over time (Gujarati, 2004). Thus, the series will tend to drift around its mean due to the limited variance. The series can be of a stochastic nature (randomly determined) or a deterministic nature (displaying a trend). In contrast a nonstationary time–series or a random walk model is one where the mean and variance continually change over time and has a simple correlation coefficient between the \( X \) variable and its lagged variable which is influenced by factors other than solely the length of the lag between the two (Studenmund, 2011).
Consider the following model:

\[ Y_t = \beta_0 + \beta_1 t + \beta_2 Y_{t-1} + \mu_t, \quad \mu_t \sim i.i.d(0, \sigma^2) \]  \hspace{1cm} (4.1)

Where \( Y_t \) shows the \( Y \) variable or GDP in economic data, \( \beta_0 \) is a constant, \( \beta_1 \) is the coefficient on the time trend, \( t \) is a time trend, \( \beta_2 \) is the coefficient on the lagged value of \( Y_t \), \( Y_{t-1} \) is the lagged value of the \( Y \) variable or GDP in economic data and \( \mu_t \) is an error term also considered to be the random shock to the system.

In a simple random walk model as described below \( \beta_0 = 0, \beta_1 = 0 \) and \( \beta_2 = 1 \) resulting in:

\[ Y_t = Y_{t-1} + \mu_t, \quad \mu_t \sim i.i.d(0, \sigma^2) \]  \hspace{1cm} (4.2)

Equation 4.2 shows a simple random walk model (RWM) without a drift whereby \( Y_t \) shows the \( Y \) variable or GDP in economic data, and \( \mu_t \) is an error term also considered to be the random shock to the system. This term is assumed to be independently and identically distributed with a mean of zero and a variance of \( \sigma^2 \) (Gujarati, 2004). When considering the conditional mean of \( Y_t \) and its variance at date \( t \) conditional on an initial value of \( Y_0 \) at time \( 0 \) one obtains:

\[ E[Y_t] = E[Y_0 + \sum \mu_t] = Y_0 \]  \hspace{1cm} (4.3)

\[ Var[Y_t] = \sigma^2 t \]  \hspace{1cm} (4.4)

Equations 4.3 and 4.4 suggest that the RWM stated in (Equation 4.2) is nonstationary. This is because while the mean of \( Y_t \) is equal to its starting value and is thus constant, its variance is time linear and therefore increases infinitely over time violating the assumptions of stationarity.
Normally the mean of $Y_t$ is set at 0, thus making $E[Y_t] = 0$. Gujarati (2004) notes that if the terms in equation 4.2 are re–arranged as in equation 4.5 the first difference of $Y_t$ becomes stationary:

$$Y_t - Y_{t-1} = \Delta Y_t = \mu_t \quad (4.5)$$

Now consider a random walk with drift model as described below where $\beta_0 \neq 0$, $\beta_1 = 0$ and $\beta_2 = 1$ resulting in:

$$Y_t = \beta_0 + Y_{t-1} + \mu_t, \quad \mu_t \sim i. i. d.(0, \sigma^2) \quad (4.6)$$

Again, this model is nonstationary as the random walk model predicts that the value at time $t$ will be equal to the previous period’s value plus a constant term (drift) and a randomly occurring error term. Similar to the pure random walk model this model can be made stationary by differencing.\(^{21}\)

Equation 4.7 describes a deterministic trend (not to be confused with a random walk with drift) where $\beta_0 \neq 0$, $\beta_1 \neq 0$ and $\beta_2 = 0$ resulting in:

$$Y_t = \beta_0 + \beta_1 t + \mu_t, \quad \mu_t \sim i. i. d.(0, \sigma^2) \quad (4.7)$$

\(^{21}\) See Gujarati (2004) for a detailed analysis of stationary processes and derivations of equations.
While both possess a constant and an error term, in the random walk with drift model the value of $Y_t$ is regressed on the previous period’s value of $Y_{t-1}$ as opposed to the deterministic trend where $Y_t$ is regressed on the time trend $\beta_1 t$. The variance in this model is stationary, however the mean is time–variant and hence the overall series is nonstationary. This model is made stationary through the calculation of $\beta_0$ and $\beta_1$ and the subsequent calculation of the mean of the series. Once the mean is known this is subtracted from the series and the series becomes stationary or de–trended as seen in equation 4.8:

$$Y_t - \beta_1 t = \beta_0 + \mu_t, \quad \mu_t \sim i.i.d(0, \sigma^2) \quad (4.8)$$

Next consider equation 4.9, which describes a random walk with drift and deterministic trend where $\beta_0 \neq 0; \beta_1 \neq 0$ and $\beta_2 = 1$:

$$Y_t = \beta_0 + \beta_1 t + \beta_2 Y_{t-1} + \mu_t, \quad \mu_t \sim i.i.d(0, \sigma^2) \quad (4.9)$$

Similar to a deterministic trend, the differenced series for a random walk with drift and deterministic trend is time–variant and thus nonstationary:

$$\Delta Y_t = \beta_0 + \beta_1 t + \mu_t, \quad \mu_t \sim i.i.d(0, \sigma^2) \quad (4.10)$$
Thus after differencing, this model has to be de-trended before it can be made stationary. As the abovementioned models are nonstationary they are said to possess unit roots\(^{22}\) (Gujarati, 2004). As suggested in equation 4.5, nonstationary time-series can be made stationary by differencing them of first order or more if necessary and in certain cases through de-trending. Once time-series are differenced and made stationary in this manner they are known to range from first order integrated time-series indicated by \(I(1)\) notation to \(d\)-order integrated time-series indicated by notation \(I(d)\) (Granger, 1986).

A major flaw with nonstationary time-series is that they are mostly useful for analysis in the current timeframe and generalisations cannot be drawn from past periods nor the results accurately used to make meaningful predictions. In addition, Ordinary Least Squares (OLS) regressions produce unreliable results in the presence of unit roots. It is therefore essential to test time-series data for unit roots before running them in OLS regression models. A multitude of nonstationarity tests exist with their main purposes being to test the hypothesis that the variable under investigation has a unit root and is likely to benefit from being stated in its first or second differential form should the first differential be found to contain unit roots. This study uses Augmented Dickey Fuller, Phillips–Perron and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) unit root tests to determine whether time-series are stationary or nonstationary.

\(^{22}\) A unit root refers to the root of the polynomial in the lag operator. If you set \((1 - L) = 0\), one obtains \(L = 1\), hence the name unit root.
4.2.3 Augmented Dickey Fuller Test

The Augmented Dickey Fuller (ADF) test investigates whether a time–series has a unit root. The ADF test takes into consideration situations where the error terms may be correlated with previous terms by adding lagged difference values of the dependent variable to the regression. Note that the test as specified in Equation 4.11 below is used to test a random walk model with a drift and a stochastic trend. It may also be used to test a random walk model with or without a drift. Using equation 4.11 as the basis for the test one obtains:

\[ \Delta Y_t = \beta_1 t + \beta_2 Y_{t-1} + \sum_{i=1}^{p} c_i \Delta Y_{t-1} + \varepsilon_t \]  \hspace{1cm} (4.11)

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

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

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

The main difference between the PP test and the ADF test is that the ADF test accounts for any serial correlation in the error terms by introducing a lagged difference term of the dependent variable. The PP test approximates and adjusts the t–ratio of the $\beta_2$ coefficient in order to prevent serial correlation from affecting the asymptotic distribution of the test statistic. In essence, the PP test corrects for serial correlation through the modification of the test statistics by using nonparametric statistical methods. The two tests are very similar in that the asymptotic distribution of the two tests is identical though it may differ in small samples due to the different methods used to correct for serial correlation (Gujarati, 2004). Thus, interpretation of the t–statistic follows the same procedure as per the ADF test.

The PP and ADF tests have received criticism over their failure to determine whether a process is stationary when the root lies close to 1 (i.e. has very persistent alternative roots), especially in small data samples (DeJong, Nankervis, Savin, & Whiteman, 1992; Nelson & Plosser, 1982). For example in equation 4.11 if $\beta_2$ was found to be 0.95 as opposed to 1, the PP and ADF tests may incorrectly fail to reject the null hypothesis and find the time–series in question to be nonstationary. Further criticism has been received for their low power and size problems, which
is typical in economic data (Schwert, 1989). The power of the test is reduced upon the addition of
trend and constant variables to the regression equations. Although, the size distortions result from
the test rejecting the null hypothesis of nonstationarity in the presence of a large moving average
root that is negative.

4.2.5 Kwiatkowski–Phillips–Schmidt–Shin Test

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

\[ Y_t = \delta t + r_t + \varepsilon_t \]  \hspace{1cm} where \( r_t = r_{t-1} + \mu_t \)  \hspace{1cm} (4.13)

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

Unit root tests were conducted on all key variables of Botswana, Lesotho, Namibia, South Africa and Swaziland using all three ADF, PP and KPSS tests. Variables of GDP/Capita, Current GDP, Real GDP, Imports, and Investment were converted to log values to express the large GDP figures in smaller numbers. The time–series variables were analysed graphically to determine whether there were visual trends and then tested empirically using intercept and trend, and intercept only specifications depending on the visual analysis. E–views automatically determined the lag lengths. Initial analysis of the ADF and PP tests produced inconsistent results. This was thought to be occurring due to the economic time–series data that was being analysed having: (i) persistent alternatives, which were close to unity but less than 1; (ii) the relatively small sample size of 32 years resulting in size problems; and (iii) the majority of the data having deterministic trends. KPSS tests produced more consistent results with unit roots eliminated after first differencing of the variables in question. Thus, the results of the KPSS tests were used.

4.2.6 Cointegration

Re–examining the concept of stationarity, a series is said to be stationary if its means and variances tend to fluctuate around a constant value over time (Hendry and Juselius, 2000). The examination of nonstationary time–series in dynamic models can lead to spurious results, a concept which was ill–understood until the work of Granger and Newbold (1974) showed that two nonstationary time–series variables when tested together could produce results that were
statistically significant even though there was no significant underlying relationship between the two. Initially, this problem was resolved by simply converting the data to first difference form.

However, the majority of economic theory has been developed for the interpretation of the relationships between variables in levels and not differences, which would speak to their growth rates. Research has shown that the majority of economic time–series data is nonstationary at levels testing and hence new approaches to estimation have had to be developed for greater accuracy in the interpretation of results (Nobel Prize Committee, 2003). Granger (1981) is credited with the breakthrough method that did not require time–series data to be stationary before application to macroeconomic statistical models. His work involved the introduction of a concept called cointegration. Consider (Equation 4.14) below:

\[ y_t = \alpha + \beta x_t + \varepsilon_t \] (4.14)

re–written as:

\[ \varepsilon_t = y_t - \alpha - \beta x_t \] (4.15)

with \( y_t \) being the dependent variable, \( x_t \) the independent variable and \( \varepsilon_t \) being a random stochastic independent and identically distributed (IID) error term. According to Granger (1981) the simulation of the independent variable should produce the major properties of the dependent variable. For example if \( x_t \) is integrated of order \( (d) \) (i.e. can be made stationary by differencing \( (d) \) times), then \( y_t \) should also be integrated of order \( (d) \) or \( I(d) \). He also proposed that weakly stationary variables are \( I(0) \), and that should a variable \( x_t \) be \( I(1) \) then \( \Delta x_t \) is \( I(0) \). He observed that
variation of higher orders dominates that of lower orders, i.e. in a linear combination, variables of $I(1)$ will dominate those of $I(0)$. Granger (1981) further noted that if upon examination of equation 4.14, $y_t \sim I(1)$ and $x_t \sim I(1)$, then the linear combination of $y_t-x_t \sim I(1)$. However, Granger observed that in the instance where $\varepsilon_t \sim I(0)$ then:

$$y_t - \alpha - \beta x_t \sim I(0) \tag{4.16}$$

That is equation 4.14 will have the same statistical properties as a $I(0)$ or stationary variable and the linear variables will be cointegrated (Granger, 1981). Thus two variables sharing a long–term or equilibrium relationship amongst themselves are said to be cointegrated (Gujarati, 2004). Upon further examination of equation 4.15, $(y_t-\alpha-\beta x_t)$ is said to be the cointegrating regression (error correction term), which measures the extent to which the system $(x_t, y_t)$ is out of equilibrium, with $\varepsilon_t$ being the equilibrium error and the slope parameter $\beta$ being the cointegrating parameter.

Basic cointegration tests apply the augmented Engle–Granger test (Engle & Granger, 1987), which is a test, based on the residuals of the cointegrating regression, where one nonstationary variable is tested against another nonstationary variable for the presence of unit roots in the residuals. This two–step procedure initially involves the estimation of a regression of the same form as equation 4.14 using OLS. Once the residuals have been obtained these are tested for stationarity using the Augmented Engle–Granger Test. Gujarati (2004) cautions that due to the residuals $\varepsilon_t$ being based on the cointegrating parameter $\beta$ the ADF critical significance values are
substituted with values calculated by Engle and Granger hence the name Augmented Engle–Granger Test. Should the residuals be found to be I(0) then equation 4.14 is confirmed as a cointegration regression regardless of $x_t, y_t$ being nonstationary.

4.2.7 The ARDL Bounds Test

The bounds test is used to examine the long run relationship between growth determinants, trade liberalisation, and economic growth as specified in the aggregate production function. The bounds test is centred on the Wald or joint F–statistic in a generalised Dickey–Fuller regression used to examine the significance of the lagged levels of the test variables in a conditional unrestricted vector error correction model (VECM). Pesaran et al. (2001) acknowledge that the asymptotic distribution of the upper and lower statistics are non–standard under the null hypothesis of the absence of a levels relationship between the test variables, regardless of whether the regressors are integrated of order zero, integrated of order one or mutually cointegrated (Pesaran et al., 2001).

Pesaran et al. (2001) provide two sets of asymptotic critical values for the lower and upper bounds which assume that all the regressors are either purely $I(0), I(1)$ or mutually integrated. The first set of critical values (upper bound) is based on the assumption that variables are integrated of order one, while the second set (lower bound) is based on the assumption that the variables in the bounds test are integrated of order zero. Upon examination of the test results if the F–test statistic falls outside of the upper bounds or below the lower bounds critical values, then a conclusive inference can be made without the requirement of the knowledge on the order
of integration/cointegration of the underlying regressors. However, should the test statistic fall between the upper and lower bounds the cointegration test is inconclusive and the order of integration is required prior to any inferences being drawn.

The bounds test procedure is used to examine the effect of trade liberalisation on economic growth in Botswana, Lesotho, Namibia, South Africa and Swaziland. This application of the bounds test is particularly useful as empirical studies show incongruity on the effects of trade liberalisation on economic growth. Furthermore, to the best of the author’s knowledge, no studies have examined the within country effects of trade liberalisation in least developed countries (LDCs) such as Lesotho and Swaziland or the other SACU countries of Botswana, Namibia and South Africa using newer empirical approaches. In an effort to partially remedy this neglect, the dynamic causal relationship between economic growth and trade liberalisation is empirically estimated, whilst controlling for growth factors. The study draws its theoretical basis from the endogenous growth literature\(^\text{23}\) and uses an augmented aggregate production function in the form of:

\[
Y = f(A, L, K, HC, LIB) \tag{4.17}
\]

Where \(Y\) is output measured by GDP per capita, \(A\) is technology measured by total factor productivity, \(L\) is labour proxied by the number of persons engaged, \(K\) is physical capital measured by investment stock, \(HC\) is human capital proxied by the human capital index

\(^{23}\) See theoretical framework under literature review chapter for complete exposition.
developed in the Penn World Tables (PWT) database along with secondary enrolment figures from the World Bank Development Indicators (WDI) databases and LIB is a measure of trade liberalisation which is proxied through the use of four different measures of the average tariff rate (T), trade ratios (TR), real effective exchange rate (RER) and adjusted trade ratios (ATR).

The data for this study was derived from the World Bank, Bruegel, and Penn World Tables national accounts data. Employing the bounds test, the relationship between trade liberalisation and economic growth in the SACU countries is quantified. The test sample is measured over a time frame ranging from 1980 to 2011.

The augmented production function is converted to equation form and specified in log format forming the trade model as follows:

$$\ln Y = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 \ln HC + \beta_4 \ln LIB + \epsilon_t \tag{4.18}$$

Adopting the framework of Pesaran et al. (2001)\textsuperscript{24} equation 4.18 is re–stated as an ARDL model yielding:

\textsuperscript{24} See Pesaran et al. (2001) for full exposition.
\[ \Delta \ln Y_t = \alpha_0 + \sum_{j=1}^{p_1} \alpha_{1,j} \Delta \ln Y_{t-j} + \sum_{j=1}^{p_2} \alpha_{2,j} \Delta \ln L_{t-j} + \sum_{j=1}^{p_3} \alpha_{3,j} \Delta \ln K_{t-j} + \sum_{j=1}^{p_4} \alpha_{4,j} \Delta \ln HC_{t-j} + \sum_{j=1}^{p_5} \alpha_{5,j} \Delta LIB_{t-j} + \alpha_6 \ln Y_{t-1} + \alpha_7 \ln L_{t-1} + \alpha_8 \ln K_{t-1} + \alpha_9 \ln HC_{t-1} + \alpha_{10} \ln LIB_{t-1} + \mu_t (4.19) \]

Where \( Y \) is GDP per capita, \( L \) is labour, \( K \) is physical capital, \( HC \) is human capital, and \( LIB \) is a vector of trade liberalisation variables (i.e., \( T, TR, ATR \) and \( RER \)). Trend terms have been left out as these characteristics are removed through differencing. The difference operator is \( \Delta \), while \((p_1–p_5)\) are the number of lagged difference terms in the system selected based on the lag numbers most commonly selected by the lag selection (HQ, AIC, SC, FPE and LR) criteria, and \((\mu_t)\) represents an uncorrelated disturbance/innovation term that has zero mean and finite variance.

The bounds test is used to investigate the presence of a level relationship between \((Y_t, L_t, K_t, HC_t, \text{ and } LIB_t)\). Empirically this is achieved through an F–test using OLS. Thus in equation 4.19 the coefficients to be tested are: \( H_0: \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0 \); against the coefficients: \( H_1: \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq 0 \). Pesaran et al. (2001) develop asymptotic critical value bounds whereby if the F–statistic is found to lie below the lower bounds then the null hypothesis of no cointegration cannot be rejected. If the computed F–statistic is found to lie above the upper bounds of the critical values this would confirm the presence of cointegration amongst the variables in the
model. In instances where the F–statistic falls between these bounds, inference is inconclusive and prior knowledge of the cointegration rank \((r)\) of the forcing variable is required.

Following the estimation of a long–run relationship between the variables in (equation 4.19), the short and long run elasticities (Granger causality) between variables are estimated. Granger causality occurs when past values of a time–series \(x_t\) significantly contribute to the prediction of a time–series \(y_t\). The alternative can also occur when past values of \(y_t\) significantly contribute to the forecasting of a time–series \(x_t\), in this instance the time–series \(y_t\) is said to Granger cause \(x_t\).

In the absence of cointegration the procedure terminates after the initial bounds test. However, in the presence of cointegration, long run elasticities can be calculated using OLS according to equation 4.20 below:

\[
\ln Y_t = \alpha_0 + \sum_{j=1}^{p_1} \alpha_{1,j} \ln Y_{t-j} + \sum_{j=1}^{p_2} \alpha_{2,j} \ln L_{t-j} + \sum_{j=1}^{p_3} \alpha_{3,j} \ln K_{t-j} + \sum_{j=1}^{p_4} \alpha_{4,j} \ln H_{t-j} \\
+ \sum_{j=1}^{p_5} \alpha_{5,j} \ln H_{t-j} + \mu_t
\]  

(4.20)

The final step is the calculation of short run elasticities, which are calculated following the determination of a long–run (cointegration) relationship between the variables in question. In this
instance, causality is determined using an error correction model associated with the long run estimates as described below:

\[
\Delta \ln Y_t = \alpha_0 + \sum_{j=1}^{p^1} \alpha_{1,j} \Delta \ln Y_{t-j} + \sum_{j=1}^{p^2} \alpha_{2,j} \Delta \ln L_{t-j} + \sum_{j=1}^{p^3} \alpha_{3,j} \Delta \ln K_{t-j} + \sum_{j=1}^{p^4} \alpha_{4,j} \Delta \ln HC_{t-j} + \sum_{j=1}^{p^5} \alpha_{5,j} \Delta \ln LIB_{t-j} + \vartheta \text{ecm}_{t-1} + \mu_t
\]  

(4.21)

Where the variables are as defined earlier apart from the addition of \( \text{ecm}_{t-1} \) that is the cointegration regression or error correcting term. The error correcting term \( \text{ecm}_{t-1} \) measures the extent to which the system is out of equilibrium (i.e. it measures the portion of \( Y_t \) that is not attributable to \( L_t, K_t, HC_t, \) and \( LIB_t \)). The error correcting term will also measure any shocks to the system as well as ensure the correction of deviations from long-run equilibrium through a series of short–term adjustments. The magnitude of the coefficient (\( \vartheta \)) determines the rate of adjustment back to long–term equilibrium once shocks are introduced into the system in the short–term. The introduction of an error correction mechanism allows for the analysis of short–term behaviour in a cointegrated model whose short–term movements might differ from their long–term ones. The study of short–term changes in variables’ movements thus enables a better understanding of how the series re–adjusts itself in the long run.

Causality is determined through the significance of the coefficient of the lagged error correction term and joint significance of the coefficients of the lagged differences of the right hand side.
variables using the F–test. The coefficients of the lagged difference variables represent the short run dynamics of the model’s convergence to equilibrium while ($\vartheta$) represents the speed of adjustment in the model (Dritsaki and Dritsaki, 2013).

4.3 PANEL DATA

The five SACU countries share many common attributes including common borders, economic policies, and membership to the same customs union. These cross–country homogeneities in theory provide an opportunity for the collective testing of the impact of trade liberalisation on economic growth in the region justifying the use of panel data methods as an alternative to the time–series estimation. For example in the current study, each country’s growth and trade policy variables can be viewed as separate cross–sectional units with (N) dimensions. The analysis of each cross sectional unit over (T) time periods ensures that the data also exhibits time–series characteristics. Hence, the panel data approach becomes a useful additional technique to analyse the study data.

Gujarati (2004) identifies two ways of classifying panel data. In the first panel, if each cross sectional unit (country) has the same number of time–series observations it is referred to as a balanced panel. Alternatively should the length of time–series observations vary amongst cross sectional units it is referred to as an unbalanced panel. This research deals with balanced panels as 32 time–series observations are recorded for all five countries.
Panel data can also be classified as micro or macro panels. Micro panels have a greater amount of cross sectional units (N) than time–series observations (T) (i.e. N>T). In macro panels there are more time–series observations (T) than cross sectional units (N) i.e. N<T. This research uses macro panels as the time dimension of 32 years exceeds the space dimension of five countries.

The main advantages of panel data pertaining to this study as listed by (Baltagi, 1995) and (Gujarati, 2004) are:

- The ability to take the specific heterogeneity of the five SACU countries into account. This is particularly useful as Botswana and Namibia have similar sized economies with similar exports, whereas Lesotho and Swaziland are at the lower end of the development scale with small economies in comparison. South Africa on the other hand has a significantly diversified and larger economy, which would share few characteristics with the BLNS (Botswana, Lesotho, Namibia, and Swaziland) countries.25

- The creation of larger datasets through the combination of time–series and cross sectional data, which in turn allows for more degrees of freedom, reduces collinearity, and provides data that are more informative. The use of panel data methods in this research greatly increases the number of observations. Trade data has in the past and still remains notoriously difficult to obtain with many governments choosing not to publish tariff data.

25 This could also work against the method as South Africa due to its extremely large size in comparison to the other countries could be seen as an outlier making interpretation of general results arguable to the South African case.
and other institutional data, whilst human capital and labour statistics often do not extend prior to the formation of the WTO in 1995.

- The ability to better analyse the dynamics of change, which is particularly relevant when analysing trade policy, which has undergone several changes over the last 30 years.
- The measurement of unobservable effects such as government policy decisions, which are harder to detect under time–series and cross sectional models.

The academic literature on panel data portrays three popular estimation methods of pooled OLS, fixed–effects model (FEM), and random–effects model (REM) that are briefly explained below (Hansen, 2013; Gujarati, 2004; Wooldridge, 2002; Baltagi, 1995).

### 4.3.1 Pooled OLS Model

The pooled OLS model is the simplest panel data approach and basically stacks all the observations for each country on top of each other and estimates a standard OLS regression as seen in the example below:

\[
Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it}
\]  
(4.22)

A pooled OLS regression in the present study would suggest that all countries in the current study display the same characteristics implying that there are no unobserved differences present. This follows the same logic as standard OLS and assumes that errors are independent and identically
distributed, $u_{it} \sim iid (0, \sigma_u^2)$. The main issue with pooled OLS is that its assumptions are unrealistic. For example assuming that the intercept values for South Africa and the BLNS countries are the same would be unrealistic. Additionally, assuming that slope coefficients of the $X$ variables are identical is further unrealistic as it assumes that trade policy and any growth occurs in the same manner across all five countries. Furthermore, should unobserved heterogeneity exist within the model, OLS estimators will be biased due to correlation of the error term with the $X$ variables. Therefore, due to the high likelihood of heterogeneity pooled OLS would not be suitable in this study, as it would likely distort the true nature of the relationship between the $Y$ and $X$ variables across all five SACU countries.

4.3.2 Fixed–Effects Model

The fixed–effects model (FEM) assumes that there are disparities in the intercepts across countries:

\[
Y_{it} = \beta_{1i} + \beta_{2}X_{2it} + \beta_{3}X_{3it} + u_{it}
\]  

(4.23)

This effect is captured by the intercept term having an (i) subscript indicating that there may be heterogeneity across all five countries. Gujarati (2004) explains that the term “fixed–effects” arises because although the intercepts may vary across countries they remain constant or fixed over time. Intuitively an obvious question that arises is how is heterogeneity across countries accounted for using the FEM? This concept is explained through the use of dummy variable
intercepts or more precisely through the “least squares dummy variable” (LSDV) method (Baltagi, 1995). Empirically this is estimated as follows:

\[ Y_{it} = \alpha_1 + \alpha_2 D_{2t} + \alpha_3 D_{3t} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it} \]  

(4.24)

where \( D_{2t} = 1 \) for country 2 and 0 otherwise and \( D_{3t} = 1 \) for country 3 and 0 otherwise. In the case of this study there would be four dummy variables plus an intercept to avoid perfect collinearity or 5 dummy variables and no common intercept. While relatively simple to estimate, the LSDV model does suffer from the degrees of freedom problem and is thus recommended for use where ‘N’ is small. Additionally when many variables are introduced to the model the likelihood of multicollinearity increases making accurate parameter estimation difficult. The model estimators can be made more efficient using first difference or within-group estimators. First difference estimators improve efficiency by differencing out individual effects. The alternative within-group method allows for dependent and independent variable data to be expressed as deviations from their means in a process called demeaning.26

4.3.3 Random–Effects Model

An alternative model to the FEM is the Random–Effects Model (REM), which expresses the lack of knowledge on the true model through the disturbance term as opposed to through the intercept (Gujarati, 2004). Therefore, the REM investigates differences in the variance of error terms in the hope that an inference can be made on the general population based on these differences.

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26 See Brüderl (2005) for an explanation on the use of first-difference and within group estimators.
Revisiting (Equation 4.23) from the FEM, the intercept term $\beta_{1i}$ is not treated as a fixed term but rather thought of as a random variable with a mean of $\beta_1$. Therefore, the intercept value is written as follows:

$$\beta_{1i} = \beta_1 + \epsilon_i \quad i = 1, 2, ..., N \quad (4.25)$$

Where $\epsilon_i$ is a random error term that is independent and identically distributed, $\epsilon_i \sim iid \left(0, \sigma^2_i\right)$. This model assumes that the five countries in the present studies are drawn from a larger universe of similar countries with a common intercept value whilst the individual heterogeneity of each country’s intercept is displayed in the error term, $\epsilon_1$. Substituting (Equation 4.25) into (Equation 4.23) we now derive (Equation 4.26) as follows:

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \omega_{it} \quad (4.26)$$

$$\omega_{it} = u_{it} + \epsilon_i \quad (4.27)$$

Equation 4.26 now has a composite error term, which is made up of two components that include $\epsilon_1$ or the country specific error component and $u_{it}$, which is the combined time–series and cross section error component (Gujarati, 2004). The country specific error component $\epsilon_1$ is not readily observable and is thus known as the unobserved heterogeneity within the model. The REM employs the usual assumptions of no correlation amongst country error components and the lack of autocorrelation amongst time–series and cross sectional units.
\( \varepsilon_i \sim N(0, \sigma^2_\varepsilon) \quad u_{it} \sim N(0, \sigma^2_u) \) \hspace{1cm} (4.28)

\[ E(\varepsilon_i u_{it}) = 0 \quad E(\varepsilon_i \varepsilon_j) = 0 \quad (i \neq j) \] \hspace{1cm} (4.29)

\[ E(u_{it} u_{is}) = E(u_{it} u_{jt}) = E(u_{it} u_{js}) = 0 \quad (i \neq j; t \neq s) \] \hspace{1cm} (4.30)

Gujarati (2004) cautions that the autocorrelation assumption is violated when the error terms of a given cross sectional unit are combined across two periods. The correlation coefficient \( \text{corr}(\omega_{it}, \omega_{is}) \) is stated as follows:

\[ \text{corr}(\omega_{it}, \omega_{is}) = \frac{\sigma^2_u}{\sigma^2_\varepsilon + \sigma^2_u} \] \hspace{1cm} (4.31)

The violation arises because the value of the correlation between error terms at two different intervals remains constant across all time periods without any resulting decay and the formation given in (Equation 4.31) is identical for all countries. Thus, the resulting OLS regressions would produce inefficient estimators and generalised least squares (GLS) is recommended as an alternative.

The question therefore arises as to which model is more appropriate between the FEM and REM? Gujarati (2004) and Studenmund (2011) propose that in selecting the most appropriate model one should consider the likelihood of correlation between error terms \( \varepsilon_1 \) and \( X \) variables. In the event
that there is no correlation between the two then the random--effects model would be the most suitable. However, should there be correlation between $\varepsilon_1$ and the $X$ variables then the fixed--effects model would be more appropriate. In the case of the present study, one would intuitively expect there to be correlation between the error term and $x$ variables. The reason for this occurrence is that often the $x$ variables are imperfect proxies, which do not account for all the expected impact as per growth theory. Therefore, the error term is likely to encompass other hidden effects such as total factor productivity and other policy measures (e.g. affirmative action) which would be heavily correlated with labour, capital, human capital and trade policy.

In further differentiating which model to use Gujarati (2004) sets out four rules of thumb to aid in the decision:

- If the time--series data ($T$) is larger than the cross sectional data ($N$) then there is likely to be a minute difference in estimators and model selection is dependent on the researcher’s choice.

- If the cross sectional data ($N$) is larger than the time--series data ($T$) then the decision should be made based on whether the researcher believes the cross sectional units to be drawn from a larger population sample. If this is the case then FEM would be more appropriate and REM would be used where the cross sectional units are regarded as randomly drawn.

- Correlation between $\varepsilon_1$ and the $X$ variables would lead to biased estimators when using REM and in such cases FEM would be preferred.
Where the cross sectional data (N) is large and the time-series data (T) is small with all assumptions of the REM intact then REM would produce estimators that are more efficient.

The Hausman test can also be used to decide between the choice of FEM and REM as it tests whether individual effects are uncorrelated with other variables in the regression. The null hypothesis of the Hausman test is that the FEM and REM estimators are essentially the same. The test statistic has an asymptotic $\chi^2$ distribution. Hence, it follows that rejection of the null hypothesis indicates that the REM is not suitable and the FEM is more appropriate.

4.4 DESCRIPTION OF DATA

Having defined the main empirical techniques, this section re-visits and summarises the study variables presented in chapter 3. The study uses 32 annual observations over the period 1980–2011 to examine the impact of trade liberalisation on economic growth. Data was obtained from the Penn World Tables, World Bank Development Indicators, and Bruegel datasets with all monetary values stated in constant 2005 US$ prices.

Using the augmented general production function developed in the theoretical section and re-stated in equation 4.32 below, there are five key categories of variables used in this study as follows:

$$Y = f(A(L, K, HC, LIB))$$  \hspace{1cm} (4.32)
Where $Y$ is GDP per capita, $K$ is capital stock, $L$ is labour, $HC$ is human capital, and $LIB$ is trade liberalisation. The effect of technology ($A$) is not readily observable but in line with endogenous growth theory is transmitted through human capital and capital and is thus not included in the estimation.

The endogenous variable used in this study is GDP per capita. It is used as the proxy to measure economic growth. GDP is defined as the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (WorldBank, 2014b). Data are in constant 2005 U.S. dollars. GDP per capita is derived from the division of the GDP figure by the population size for the years in question. Actual data is taken from the Penn World Tables (PWT) databases and hence is purchasing power parity adjusted and therefore comparable across countries.

Capital stock was obtained from the PWT database. It is comprised of assets such as plants, machinery, equipment, and infrastructure construction. It takes into account net depreciation of past assets but ignores assets such as land, subsoil and intangible assets. Similar to GDP per capita, this proxy for physical capital is preferred to the WDI database gross fixed capital formation variable due to it being purchasing power parity adjusted and therefore comparable across countries (Feenstra et al., 2013). According to neoclassical and endogenous growth theory
capital is expected to have a positive impact on growth therefore the capital coefficient is expected to have a positive sign.

Data for the second exogenous variable, labour was also obtained from the PWT database. The exact proxy used to represent the labour force was the number of persons engaged. This proxy is constructed using estimates of people that have contributed to domestic production within the identified economies over the specified period (Feenstra et al., 2013). It is constructed using a combination of a variety of sources that include the Total Economy Database’s employment data, International Labour Organisation (ILO) employment data, and World Bank employment and labour data. The employment data from these sources arises out of rigorous analyses of population census and labour force surveys providing a consistent coverage of persons engaged in economic activity within a country. Due to data limitations across all five countries for the study period, this is the only labour proxy that is readily available for the entire study period and selected for labour. It is consistent with definitions in the academic literature (Harrison, 1996; Hanushek and Kimko, 2000; Harrison and Hanson, 1999) and also consistent with definitions provided by the OECD where preferred representations of labour input are given by the total number of hours worked by people employed or by the total number of people employed (Freeman, 2008). In line with growth theory the labour component is also expected to have a positive influence on growth and thus a positive coefficient.

Endogenous growth theory suggests that growth rates are influenced by ideas and inventions that lead to an improvement in technology (Hanushek and Kimko, 2000). These technological
innovations arise out of increased human capital and hence the inclusion of a measure of human capital in this study in addition to the labour component. Previous studies have used an aggregate measure of primary or secondary school enrolment to measure human capital (Barro, 1991; Barro & Lee, 1996; Mankiw et al., 1992). The use of school enrolment rates has been criticised as an effective measure of human capital composition as it does not accurately measure the relevant stock of human capital present within the labour force and also fails to take into account the changing composition of the workforce in terms of demographics and population (Hanushek and Kimko, 2000).

Barro and Lee (2013) develop an index of human capital per person, based on years of schooling and returns to education. The general idea being that workers productivity will depend on their different stocks of formal schooling, their inherent ability to perform tasks and their stock of work experience. This study uses the Human Capital Index developed by Barro and Lee (2013) as the measure of human capital (third exogenous variable) and also includes average secondary school enrolment rates from the WDI database in some secondary tests. The average secondary school enrolment rates are included due to persistent unit roots being identified in some country’s HC index data making them unsuitable for bounds testing. This variable is thought to have a positive impact on growth and thus the expected sign of the human capital coefficient is positive.

The literature identifies four major categories of liberalisation measures consisting of outcome–based; incidence–based; price–based measures and composite indexes (Rose, 2004; Yanikkaya, 2003; Leamer, 1988; Harrison, 1996). This study uses two outcome–based liberalisation
indicators of trade ratios and adjusted trade ratios. Trade ratios are composed of the sum of imports and exports divided by total GDP and are readily available from a variety of sources. This data is derived from the WDI database. Adjusted trade ratio data is not published and this liberalisation measure is developed by regressing trade ratios against country size, distance to major markets, internal market size, domestic interest rate, the real effective exchange rate, and the consumer price index, with the residuals serving as a proxy for trade distortion. The coefficient of trade ratios is expected to be positive due to an increase in trade activity being associated with an increase in economic activity. Adjusted trade ratios are theoretically supposed to be a better reflection of trade ratios, which are criticised for taking into account non-policy measures. Thus adjusted trade ratios show the percentage by which trade ratios overstate or understate economic activity due to trade. Therefore, it follows that this exogenous variable is also expected to have a positive sign.

The study also uses an incidence-based liberalisation measure, which indicates the level of tariff barriers. This information is not readily available for the study sample and is thus constructed by dividing total taxes on international trade over total imports and using the result as a proxy for tariff barriers. Data is taken from the WDI database. This is a direct impediment to trade and is expected to have a negative sign.

The final trade liberalisation measure falls under the price-based category and the study uses the real effective exchange rate (REER) as a proxy for price distortion. The REER measures the true

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27 See the section on Adjusted Trade Ratios in Literature review for a complete exposition on proxy development.

28 The reader is referred back to the literature review for an explanation of tariffs.
value of a country’s currency against a basket of its main trading partners.\(^{29}\) According to Darvas (2012) it is a frequently used variable in both theoretical and applied economic research, and policy analysis. It is used to evaluate the equilibrium value of a currency, changes in price competitiveness, international trade flows, and distortion of production between the tradable and the non–tradable sectors. The REER is calculated from the nominal effective exchange rate (NEER) and a measure of the relative price (i.e. the consumer price index or CPI) or cost between the country under study and its trading partners (Darvas, 2012). Data for this measure is taken from the Bruegel database. A negative coefficient of the REER would indicate that the currency has devalued, whereas a positive sign would indicate an appreciation of the currency. By virtue of trade already having a huge impact on GDP, it is expected that an exchange rate misalignment in the form of undervaluation of the currency will have a positive impact on economic growth as per the Rodrik (2008) and Eichengreen (2007) findings.

4.5 SUMMARY OF MAIN CONCEPTS

This chapter has elucidated how the research objectives of the study would be met through empirical testing. Primarily the chapter discussed how a quantitative time–series based approach would be used to examine the impact of trade liberalisation on economic growth. The literature highlighted three main statistical methods of time–series, panel data and computable general equilibrium methods that have been used to model the relationships between trade and growth. Time–series, specifically the ARDL bounds test was chosen as the primary estimation method. This technique, centred on the Wald or joint F–statistic in a generalised Dickey–Fuller regression,

\(^{29}\) The reader is referred to the literature review for a detailed discussion on the REER.
was used to examine the significance of the lagged levels of the test variables in a conditional unrestricted vector error correction model (VECM). This approach unlike earlier approaches such as the system based reduced rank regression Johansen and Juselius (1990) or the two–step residual based approach of Engle and Granger (1987), had the advantage of not requiring that the variables to be tested all be integrated of order 1 (De Vita and Abbott, 2002).

Time–series estimation was selected over other techniques due to its ability to observe actual outcomes as opposed to hypothetical scenarios which was typical of computable general equilibrium (CGE) modelling (Greenaway et al., 2002). Time–series would also provide within country analysis and thus not suffer from the assumption of homogeneity across production functions as might be observed from panel data. CGE models were discarded due to their use in static scenario predictions, which were not suitable for this study. Fixed–effects panel data methods were used as an alternative approach to test the robustness of the time–series results although the vast differences in the SACU countries, noted in chapter 2, might pose difficulty in interpretation of the results. The penultimate section of this chapter revisited the data variables and sources.

The first part of chapter 5 presents the outcomes of the empirical methods described in this chapter. The latter part presents a detailed discussion based on the statistical analysis and macroeconomic conditions of the five countries. The chapter concludes with policy recommendations and implications for the SACU countries.
CHAPTER FIVE: RESULTS

5.1 INTRODUCTION

The previous chapter introduced the statistical methods employed to test the impact of trade liberalisation on economic growth. This chapter presents the results of the empirical analysis of the trade model as developed in the previous chapter. The analysis of the five countries economic performance in chapter two showed that the South African economy was far more diversified in production terms in comparison to the economies of Botswana, Lesotho, Namibia, and Swaziland (BLNS).30

Time–series methods were employed to statistically test the within–country dynamic effects of trade liberalisation on economic growth. The robustness of the model to other statistical estimations was also tested using alternative panel data specifications. The research question: “What is the Impact of Trade Liberalisation on Economic Growth in SACU Countries?” was tested by including four different trade liberalisation indicators to the trade model developed in the previous chapter. The benefit of using four alternate estimations would be to provide a robust empirical analysis of the impact of trade liberalisation on economic growth through different lenses.

The first section of this chapter re–examines the key variables, trends and data sources used in the trade model. The next section looks at the preparatory tests that were undertaken before model simulation. This is followed by a presentation of the time–series outcomes from the

30 See background chapter for an exposition on the economic performance of the five countries.
autoregressive distributive lag (ARDL) bounds test followed by the panel data empirical results. The chapter then concludes with a discussion on the implication of the results for SACU countries.

5.2 ANALYSIS OF EXPLANATORY VARIABLES

The study’s trade model was developed based on the production function approach to empirical modelling. This approach identifies income, capital, labour and human capital as the primary endogenous and exogenous variables. These next sections will provide preliminary statistical analysis of the data used and identified trends.

5.2.1 GDP per Capita

The endogenous variable used in this study was income, which was proxied by GDP per capita. As previously noted, GDP is defined as the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products (WorldBank, 2014b). GDP per capita is GDP divided by the population in a given year. The data is in constant 2005 US dollars sourced from the Penn World Tables (PWT) databases and hence is purchasing power parity adjusted and comparable across countries.
Figure 5.1 suggests a general but modest upward trend for GDP per capita in all countries with Botswana showing the greatest annual average growth over the study period averaging around 4.85% while South Africa had the lowest annual average growth at 0.49% (Table 5.1).

However, much of the slow growth in South Africa was due to the apartheid era, and when growth was analysed from 2000 onwards Botswana still experienced the highest annual average growth rate albeit at a lower rate of 2.93% while Swaziland exhibited the lowest annual average growth rates at 0.98%. The dips in Namibian and South African growth from 1980 to the early 1990s are in line with the effects of apartheid. The lifting of sanctions post 1990 and 1994 in Namibia and South Africa respectively resulted in heightened economic growth in both countries. Due to this \textit{a priori} break in the data, an apartheid dummy variable is included throughout the
empirical estimations. The reasoning behind an apartheid dummy in all five country estimations is that while the policy was only implemented in South Africa, its economic effects would have been transmitted throughout the region due to the high dependence on South African imports and economic activity by the BLNS states.

Table 5.1. GDP per Capita Growth Rates in SACU Countries 1980–2011

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Botswana</th>
<th>Lesotho</th>
<th>Namibia</th>
<th>South Africa</th>
<th>Swaziland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.85%</td>
<td>2.19%</td>
<td>0.55%</td>
<td>0.49%</td>
<td>1.50%</td>
</tr>
<tr>
<td>Median</td>
<td>4.60%</td>
<td>2.04%</td>
<td>0.72%</td>
<td>0.97%</td>
<td>1.03%</td>
</tr>
<tr>
<td>Maximum</td>
<td>25.66%</td>
<td>6.76%</td>
<td>9.84%</td>
<td>4.34%</td>
<td>12.49%</td>
</tr>
<tr>
<td>Minimum</td>
<td>-6.30%</td>
<td>-1.71%</td>
<td>-4.88%</td>
<td>-4.65%</td>
<td>-3.50%</td>
</tr>
</tbody>
</table>

GDP per Capita Growth Rates in SACU Countries 2000–2011

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Botswana</th>
<th>Lesotho</th>
<th>Namibia</th>
<th>South Africa</th>
<th>Swaziland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.93%</td>
<td>2.75%</td>
<td>2.51%</td>
<td>2.35%</td>
<td>0.98%</td>
</tr>
<tr>
<td>Median</td>
<td>3.84%</td>
<td>3.17%</td>
<td>2.33%</td>
<td>2.50%</td>
<td>0.92%</td>
</tr>
<tr>
<td>Maximum</td>
<td>7.27%</td>
<td>4.43%</td>
<td>9.84%</td>
<td>4.34%</td>
<td>2.24%</td>
</tr>
<tr>
<td>Minimum</td>
<td>-6.30%</td>
<td>-0.53%</td>
<td>-2.59%</td>
<td>-2.42%</td>
<td>-0.35%</td>
</tr>
</tbody>
</table>

Source: Penn World Tables National Account Data (2013)

5.2.2 Capital Stock

The first exogenous variable is capital proxied in this study by the capital stock taken from the PWT database. It is comprised of assets such as plants, machinery, equipment, and infrastructure construction. It takes into account net depreciation of past assets but ignores assets such as land, subsoil and intangible assets.
Figure 5.2. 32–year Capital Stock trends across BLNS Countries

Source: Penn World Tables National Account Data (2013)

Figure 5.3. 32–year Capital Stock trend in South Africa

Source: Penn World Tables National Account Data (2013)
Figures 5.2 and 5.3 show positive capital stock growth rates across the study period. Botswana exhibited the highest growth rate at 7.41% while South Africa had the largest absolute stock and was plotted separately due to the substantial difference in capital stock sizes. Swaziland displayed the lowest growth in capital at 1.57% over the study period. Against this background, one might question why there is a difference between the growth in capital and the growth in income. For example in the case of Botswana, capital has grown at 7.41% while income has only grown at 4.85%. This might suggest that based on the data much of the economic activity that has been happening has been occurring in the capital-intensive sectors. With the high unemployment rates identified in chapter 2 and the high incidence of poverty in all five countries, the data would suggest the need to stimulate labour intensive industries as well as introduce better redistributive policies to improve social welfare.

<table>
<thead>
<tr>
<th>Table 5.2. Capital Growth Rates in SACU Countries 1980–2011</th>
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<tr>
<td>Statistic</td>
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<tr>
<td>Mean</td>
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<td>Median</td>
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<td>Maximum</td>
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<td>Minimum</td>
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<th>Capital Growth Rates in SACU Countries 2000–2011</th>
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<td>Statistic</td>
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<td>Mean</td>
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<tr>
<td>Median</td>
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<tr>
<td>Maximum</td>
</tr>
<tr>
<td>Minimum</td>
</tr>
</tbody>
</table>

Source Penn World Tables National Account Data (2013)

Worryingly the data show that the GDP per capita and capital growth rates appeared to fall short of World Bank growth estimates of 7.1% for Sub-Saharan Africa required to half global poverty by 2015 (Hanmer et al., 1999). Reasons for this poor performance ranged from restrictive policies
such as the effects of apartheid in Namibia,\textsuperscript{31} South Africa and the region, military coups in Lesotho and poor economic policy in Swaziland. Accordingly, to the theory of international trade, trade liberalisation has been suggested as a means to improve economic conditions (Anderson, 2008) and provides further justification for the undertaking of the current study.

5.2.3 Labour Stock

The second exogenous variable labour is proxied by the number of persons engaged. This proxy is constructed using estimates of people that have contributed to domestic production within the identified economies over the specified period (Feenstra et al., 2013). Due to data limitations across all five countries for the study period, this is the only labour proxy that is readily available for the entire study period and selected for labour.

Figure 5.4. 32–year Total Labour trends across BLNS Countries

![BLNS Total Persons Engaged 1980-2011](source)

Source Penn World Tables National Account Data (2013)

\textsuperscript{31} Prior to 1990 Namibia was under South African administration and therefore classified as a part of South Africa. The reader is referred back to Chapter two for this background information.
Figures 5.4 and 5.5 revealed positive growth trends for the labour component across the study period showing that as the populations have increased so has the number of people engaged in productive activity. Botswana, Lesotho and Namibia grew at a similar rate with the countries having similar population figures. South Africa with a significantly greater population was expected to have a larger workforce and is thus represented separately due to the significant difference in labour force sizes. Swaziland exhibited the lowest labour figures during the study period. Not readily apparent from these figures is the low participation rate of the population. Recall from chapter two that the official unemployment rates as of 2010 in the SACU countries ranged from 20% to 28% suggesting that a significant proportion of the population was not engaged in productive activity. The labour figures therefore show that there is a real requirement for economic stimulus that will lead to job creation.
5.2.4 Human Capital Stock

Previous studies have used an aggregate measure of primary or secondary school enrolment to measure human capital (Barro, 1991; Barro & Lee, 1996; Mankiw et al., 1992). These proxies have been criticised due to their inability to accurately measure the relevant stock of human capital present within the labour force and also fails to take into account the changing composition of the workforce in terms of demographics and population (Hanushek and Kimko, 2000). This study measures human capital using an index of human capital per person, based on years of schooling and returns to education Barro and Lee (2013).

Figure 5.6. 32–year Human Capital trends across SACU Countries

Source: Penn World Tables National Account Data (2013)
Botswana, displayed the highest accumulation of Human Capital stock with Lesotho and Namibia displaying the lowest figures. World Bank figures indicated that South Africa had the largest percentages of persons enrolled in secondary school with Lesotho displaying the lowest figures during the study period. The figures for human capital showed positive trends with Botswana recording the highest value of 2.84 at the end of 2011. However, when these results are compared against developed country averages such as Australia (human capital – 3.38) and New Zealand (human capital – 3.51) they are still significantly low. However, in comparison to other developing economies SACU human capital scored relatively well with India and Brazil both having recorded lower scores of 1.92 and 2.44, respectively (Feenstra et al., 2013).

Figure 5.7. 32–year Secondary School Enrolment trends across SACU Countries

![SACU Secondary School Enrolment 1980-2011](source: World Bank Development Indicators (2014))
5.3 ANALYSIS OF TRADE LIBERALISATION VARIABLES

This study adopted four different liberalisation measures. The use of multiple variables would examine whether trade liberalisation was sensitive to alternative measurement and inadvertently determine under which conditions growth had been most favourable. The study selected variables based on incidence of distortion, outcomes of distortion and price–based measures.\textsuperscript{32} The next section briefly looks at the trends in these four variables.

5.3.1 Tariffs

The ratio of taxes on international trade to total imports (henceforth tariffs) in South Africa appear to have been moving down over the study period with a peak of 21% in the mid–1980s to an average rate below 10% post–apartheid (Figure 5.8). The BLNS (Botswana, Lesotho, Namibia, and Swaziland) countries on the other hand recorded higher average tariff rates with their averages hovering around 17%.

\textsuperscript{32} See literature review for a deeper discussion on the trade liberalisation variables.
Another noticeable trend is that BLNS tariff rates appeared to have been relatively stable around the 15–20% range up to early 2000 (see table 5.3). However, from 2002 to 2008, tariff rates appear to have soared in line with an increase in GDP per capita and capital formation rates in the BLNS indicating that increased economic activity in the region led to increased taxation on international trade and not necessarily a change in trade policy. This is even more evident post–global financial crisis period (2009) where tariff rates are seen to decline dramatically in line with the decline in economic activity.
Table 5.3. Average Simple Tariff Rates in SACU Countries 1980 – 2011

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Botswana</th>
<th>Lesotho</th>
<th>Namibia</th>
<th>South Africa</th>
<th>Swaziland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>17.56%</td>
<td>16.89%</td>
<td>19.44%</td>
<td>7.60%</td>
<td>17.08%</td>
</tr>
<tr>
<td>Median</td>
<td>16.27%</td>
<td>15.74%</td>
<td>17.96%</td>
<td>6.93%</td>
<td>15.13%</td>
</tr>
<tr>
<td>Maximum</td>
<td>32.81%</td>
<td>34.23%</td>
<td>39.52%</td>
<td>21.33%</td>
<td>35.07%</td>
</tr>
<tr>
<td>Minimum</td>
<td>11.48%</td>
<td>1.26%</td>
<td>5.97%</td>
<td>4.37%</td>
<td>11.37%</td>
</tr>
</tbody>
</table>

Source World Bank Development Indicators (2014)

This evidence supports the WTO (2009a) notion that the BLNS were heavily reliant on revenue from trade taxes. However, this paints a dual canvas where, on the one hand, tariffs appear to be positively correlated with economic activity in the BLNS but negatively correlated in the South African case with a less than 1% dependence on trade tax revenue. Intuitively, with up to 70% of some BLNS countries revenue arising from the SACU revenue pool\(^{33}\), one would foresee a contraction in the BLNS economies were a reduction in trade tax revenue to occur. As such whilst the BLNS states do not completely subscribe to a Prebisch style import substitution industrialisation model (Prebischb, 1959), they maintain snippets of it. Infant industry protection is still afforded in Botswana and Namibia while agriculture and selected manufacturing industries are also highly protected throughout the region.

\(^{33}\) The reader is referred to chapter 2 for a background discussion on SACU and its trade policies that determine how revenue is allocated.
5.3.2 Trade Ratios and Adjusted Ratios

The most widely used openness indicator in the trade literature is the trade ratio\textsuperscript{34} defined as the ratio of total exports and imports of goods and services to a country’s gross domestic product (World Bank, 2014b). It has been used as a proxy for trade liberalisation due to the availability of data, the view that it encompasses underlying trade policies and that it is a good indicator of a country’s exposure to international markets (Kneller et al., 2008). Economic growth is supposed to benefit from greater trade through increased competition, product variety, economies of scale and technology transfer. Thus countries that engage in more international trade are expected to exhibit higher economic growth rates (Dowrick and Golley, 2004).

Figure 5.9 shows relatively open trade ratios of about 50% in South Africa. This is significantly lower than the BLNS ratios indicating that whilst South Africa is still largely reliant on trade there are other industries propping up the economy. Interestingly Botswana and Namibia have shown a declining ratio indicating that the two economies were becoming relatively more closed in character and possibly expanding internally. However, caution should be exercised in this interpretation because both countries are primary commodity producers. Therefore, an increase in demand for diamond exports, which would have an effect on the diamond price, would be reflected in the trade ratios of both countries without any change in domestic activity or trade policy having occurred. Lesotho and Swaziland have the highest trade ratios, which is in line with

\textsuperscript{34} For a deeper exposition on trade ratios the reader is referred to chapter \ref{chap:chapter3}.
their being least developed countries (LDCs) and hence big recipients of donor aid, which tends to distort their level of openness due to trade reasons.

Figure 5.9. 32–year Trade Ratio movements across SACU Countries

Adjusted trade ratios\textsuperscript{35} displayed in Figure 5.10 appeared to follow a similar route to trade ratios indicating that other non–trade related characteristics such as exchange rates, interest rates, geographic factors and natural endowments were not found to distort trade significantly in SACU countries.

\textsuperscript{35} See the literature review subsection in chapter two for a discussion on the development and benefit of adjusted trade ratios.
5.3.3 Real Effective Exchange Rate

The final trade liberalisation variable used in the study was the real effective exchange rate (REER) defined by (Darvas, 2012) as the weighted average real exchange rate that measured the value of a country’s currency in terms of its main trading partners.\footnote{The reader is referred back to the literature review for a complete discussion on the real effective exchange rate.}

SACU countries REER movements have shown a gradual move from over-valued currencies in the early 1980s to currencies that have been fluctuating around their equilibrium value between 2005 and 2010. This early volatility appears to have been in line with restrictive trade policies within South Africa at that time with the rest of the region adopting this policy by virtue of their
dependence on South African imports and use of the South African currency. Post 1994 the REER has tended to fluctuate within 20 points of 100 showing periodic volatility with crashes in 1998 and in 2001 (Bhundia and Ricci, 2008). The BLNS countries are all seen to follow the same pattern as South Africa because of the effect of the common monetary union and in Botswana’s case the Pula being pegged to the Rand. No further conclusions can be drawn from the data at this point apart from the fact that South Africa appears to have continuously had an overvalued currency throughout the majority of the study period.

Figure 5.11. 32–year Real Effective Exchange Rate movements across SACU Countries

Source: Darvas (2012) Bruegel dataset
5.4 TIME–SERIES RESULTS

The methodology chapter established time–series methods as the main estimation procedure for this study. The ARDL bounds test was identified as the most appropriate time–series modelling technique. This method was employed due to the study requiring the long run and short run analysis of the dynamic interactions between multiple variables of interest. Whilst this newer modelling technique had the flexibility of testing relationships that were I(0), I(1) or mutually cointegrated it was found to be unstable in the presence of I(2) variables (Fosu and Magnus, 2006). Unit root tests were employed on all variables prior to bounds test estimation and are presented after the descriptive statistics of the individual time-series model variables.

5.4.1 Descriptive Statistics

Descriptive statistics for the dependent, core and test variables are presented in Table 5.4. The mean value of income ranged from a low of US$1093 in Lesotho to US$6520 in South Africa. The average capital component was lowest in Lesotho at US$8717million and highest in South Africa at US$608107 million, which reflects the difference in the South African market size in comparison to its SACU counterparts. Average number of persons engaged were particularly low in Swaziland with only 279621 persons engaged compared to roughly 700000 people engaged in Botswana and Lesotho, 500000 in Namibia and 12,962,091 in South Africa. Human capital estimates were more closely aligned with a low variance across all five countries, reflective of the region’s colonial education system (Herman et al., 2011). The average real effective exchange rate value appears to be close to unity implying little distortion in exchange rate values of most SACU countries. However, the South African Rand with a mean of 118 does appear to be overvalued.
The average tariff rate was seen to be around the 17% mark across the BLNS countries. In contrast the average South African tariff rate was 7.6% indicating that the South African economy was more liberalised than its SACU counterparts. There was a huge variance in openness across all 5 SACU countries. The band range of 52% for South Africa to 163% for Lesotho gave an indication of the significant role of trade in the five SACU countries.

Table 5.4: SACU Countries Time–Series Data Descriptive Statistics

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Core Variables</th>
<th>Test Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>ATR 97,77249</td>
<td>0,175637</td>
</tr>
<tr>
<td>Median</td>
<td>2,41358</td>
<td>96,69429</td>
</tr>
<tr>
<td>Maximum</td>
<td>93,87641</td>
<td>6019,267</td>
</tr>
<tr>
<td>Minimum</td>
<td>28956,87</td>
<td>700491,2</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>70176,7</td>
<td>99,70128</td>
</tr>
<tr>
<td>Skewness</td>
<td>100,4118</td>
<td>0,162766</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0,175637</td>
<td>124,6491</td>
</tr>
<tr>
<td>Jarque–Bera Probability</td>
<td>0,49635</td>
<td>91,91765</td>
</tr>
<tr>
<td>Sum</td>
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<td>163,8225</td>
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<tr>
<td>Sum Sq. Dev.</td>
<td>3,927134</td>
<td>16,10757</td>
</tr>
<tr>
<td>Observations</td>
<td>32</td>
<td>3,134683</td>
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<tr>
<td>Lesotho</td>
<td>2,419634</td>
<td>192616,5</td>
</tr>
<tr>
<td>Mean</td>
<td>0,042315</td>
<td>2,334921</td>
</tr>
<tr>
<td>Median</td>
<td>163,8225</td>
<td>3,134683</td>
</tr>
<tr>
<td>Maximum</td>
<td>0,49635</td>
<td>192616,5</td>
</tr>
<tr>
<td>Minimum</td>
<td>2,419634</td>
<td>192616,5</td>
</tr>
<tr>
<td>Std. Dev.</td>
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<td>192616,5</td>
</tr>
<tr>
<td>Skewness</td>
<td>5,62039</td>
<td>192616,5</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>163,8225</td>
<td>192616,5</td>
</tr>
<tr>
<td>Jarque–Bera Probability</td>
<td>17,48039</td>
<td>789,0426</td>
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<td>Sum</td>
<td>17,48039</td>
<td>131,0919</td>
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<tr>
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<td>789,0426</td>
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<td>Observations</td>
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<td>789,0426</td>
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</table>

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<table>
<thead>
<tr>
<th>Kurtosis</th>
<th>2.494403</th>
<th>1.966965</th>
<th>1.502781</th>
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<th>2.737495</th>
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<tr>
<td>Jarque–Bera</td>
<td>0.728741</td>
<td>2.710511</td>
<td>2.998437</td>
<td>2.822299</td>
<td>0.846203</td>
<td>0.385054</td>
<td>1.56125</td>
<td>1.778232</td>
</tr>
<tr>
<td>Probability</td>
<td>0.694634</td>
<td>0.257881</td>
<td>0.223305</td>
<td>0.243863</td>
<td>0.655012</td>
<td>0.824872</td>
<td>0.45812</td>
<td>0.411019</td>
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<td>278968.3</td>
<td>240705.2</td>
<td>3147.847</td>
<td>5.407458</td>
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<td>34976.94</td>
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<td>3.78E+11</td>
<td>8673.891</td>
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### Namibia

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<td>K</td>
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<tr>
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<td>67,64449</td>
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<td>12434.07</td>
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<td>Std. Dev.</td>
<td>27,8757</td>
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<tr>
<td>Skewness</td>
<td>0.562311</td>
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<td>Kurtosis</td>
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<td>Jarque–Bera</td>
<td>1,904284</td>
<td>8,247989</td>
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<td>Probability</td>
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<td>Sum</td>
<td>3558,001</td>
<td>65,94035</td>
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<td>Sum Sq. Dev.</td>
<td>24088,7</td>
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### South Africa

<table>
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<th>Test Variables</th>
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<tr>
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<td>HC</td>
<td>K</td>
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<tr>
<td></td>
<td>53,25294</td>
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<td>96,2909</td>
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<tr>
<td>Skewness</td>
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</tr>
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<tr>
<td>Probability</td>
<td>0.257775</td>
<td>0.106006</td>
<td>0.079783</td>
</tr>
</tbody>
</table>

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Unit root tests were conducted on the trade model variables for Botswana, Lesotho, Namibia, South Africa and Swaziland using Augmented Dickey Fuller (ADF), Phillips–Perron (PP) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests. The model variables [Y–Income, L–Labour, K–Capital, HC–Human Capital, (LIB = T–Tariffs, RER–Real Effective Exchange Rate, TR–Trade Ratios, ATR–Adjusted Trade Ratios)] as stated and defined in the literature review and methodology chapter were converted to log format. The time–series variables were analysed graphically to determine whether there were visual trends and then tested empirically using...
intercept and trend, and intercept only specifications depending on the visual analysis. The statistical program EViews automatically determined lag lengths using Schwarz information criteria. Initial analysis of some of the ADF and PP tests produced varying results. This was thought to be occurring due to the economic time-series data that was being analysed having: persistent alternatives, which were close to unity but less than 1; the relatively small sample size of 32 years resulting in size problems; and the majority of the data having deterministic trends. KPSS tests produced results that are more consistent with unit roots eliminated after first differencing of the variables in question. Thus, whenever there were inconclusive tests, the results of the KPSS tests were used in determining the order of integration of variables. The results of the unit root tests for all variables are presented in Tables 5.5 – 5.9 for trend and intercept estimations.

Table 5.5. Results of GDP per Capita (Y) KPSS, ADF and PP Unit Root Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>KPSS (P–values)</th>
<th>ADF (P–values)</th>
<th>PP (P–values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
</tr>
<tr>
<td>Botswana – LnY</td>
<td>0.1685</td>
<td>0.1376*</td>
<td>0.8780</td>
</tr>
<tr>
<td>Lesotho – LnY</td>
<td>0.0712*</td>
<td></td>
<td>0.0823**</td>
</tr>
<tr>
<td>Namibia – LnY</td>
<td>0.1940</td>
<td>0.0990*</td>
<td>0.7268</td>
</tr>
<tr>
<td>South Africa – LnY</td>
<td>0.1941</td>
<td>0.0735*</td>
<td>0.8414</td>
</tr>
<tr>
<td>Swaziland – LnY</td>
<td>0.1400*</td>
<td>0.0000*</td>
<td>0.7861</td>
</tr>
</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.
Table 5.6. Results of Capital Stock (K) KPSS, ADF and PP Unit Root Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>KPSS (P–values)</th>
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<th>ADF (P–values)</th>
<th></th>
<th>PP (P–values)</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
</tr>
<tr>
<td>Botswana – LnK</td>
<td>0.1584</td>
<td>0.0682*</td>
<td>0.2654</td>
<td>0.0246*</td>
<td>0.7783</td>
<td>0.2799</td>
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<tr>
<td>Lesotho – LnK</td>
<td>0.1857</td>
<td>0.0895*</td>
<td>0.9044</td>
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<td>0.3976</td>
</tr>
<tr>
<td>Namibia – LnK</td>
<td>0.1989</td>
<td>0.1057*</td>
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<td>0.0022*</td>
<td>0.9998</td>
<td>0.0013*</td>
</tr>
<tr>
<td>South Africa – LnK</td>
<td>0.1603</td>
<td>0.1713</td>
<td>0.9756</td>
<td>0.1092**</td>
<td>0.9940</td>
<td>0.3103</td>
</tr>
<tr>
<td>South Africa – LnK without trend</td>
<td>0.7393</td>
<td>0.2842*</td>
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<td>0.9980</td>
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<tr>
<td>Swaziland – LnK</td>
<td>0.1923</td>
<td>0.0934*</td>
<td>0.9818</td>
<td>0.0095*</td>
<td>0.9999</td>
<td>0.0992**</td>
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</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.

Table 5.7. Results of Total Labour (L) KPSS, ADF and PP Unit Root Tests

<table>
<thead>
<tr>
<th>Variable</th>
<th>KPSS (P–values)</th>
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<th>ADF (P–values)</th>
<th></th>
<th>PP (P–values)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
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<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
</tr>
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<td>Botswana – LnL</td>
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<tr>
<td>Botswana – L</td>
<td>0.1347*</td>
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<td>0.1544</td>
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<td>0.1106</td>
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<tr>
<td>Lesotho – LnL</td>
<td>0.1736</td>
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<tr>
<td>Namibia – LnL</td>
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<td>0.0065*</td>
<td></td>
<td>0.6340</td>
<td>0.3427</td>
</tr>
<tr>
<td>South Africa – LnL</td>
<td>0.1358*</td>
<td></td>
<td>1.0000</td>
<td>0.3859</td>
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<tr>
<td>Swaziland – LnL</td>
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<td>0.1360</td>
<td>0.5785</td>
<td>0.9221</td>
<td>0.4769</td>
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</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.

Table 5.8. Results of Human Capita (HC) Secondary Enrolment (Sec) KPSS, ADF and PP Unit Root Tests. NB Primary enrolment data stated for Botswana due to persistent unit roots.

<table>
<thead>
<tr>
<th>Variable</th>
<th>KPSS (P–values)</th>
<th></th>
<th>ADF (P–values)</th>
<th></th>
<th>PP (P–values)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
<td>Difference</td>
</tr>
<tr>
<td>Botswana – LnHC</td>
<td>0.2005</td>
<td>0.1821</td>
<td>0.1391</td>
<td>0.3640</td>
<td>0.0000*</td>
<td></td>
</tr>
<tr>
<td>Botswana – LnSec</td>
<td>0.1926</td>
<td>0.5000</td>
<td>0.9495</td>
<td>0.2102</td>
<td>0.9979</td>
<td>0.0000*</td>
</tr>
<tr>
<td>Botswana – LnPri</td>
<td>0.1549</td>
<td>0.1712</td>
<td>0.0246*</td>
<td></td>
<td>0.0270*</td>
<td></td>
</tr>
<tr>
<td>Botswana – LnPri without trend</td>
<td>0.5810</td>
<td>0.4133*</td>
<td>0.0001*</td>
<td>0.0001*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesotho – LnHC</td>
<td>0.1978</td>
<td>0.1361*</td>
<td>0.5727</td>
<td>0.9976</td>
<td>0.5959</td>
<td>0.9976</td>
</tr>
<tr>
<td>Lesotho – LnSec</td>
<td>0.0973*</td>
<td></td>
<td>0.4136</td>
<td>0.0031*</td>
<td>0.3420</td>
<td>0.0032*</td>
</tr>
</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.
Table 5.9: Results of Tariff Rate (T), Trade Ratios (TR), Real Effective Exchange Rate (RER) and Adjusted Trade Ratios (ATR) KPSS, ADF and PP Unit Root Tests.

<table>
<thead>
<tr>
<th>Variable</th>
<th>KPSS (P-values)</th>
<th>ADF (P-values)</th>
<th>PP (P-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Difference</td>
<td>Level</td>
</tr>
<tr>
<td>Botswana – LnHC</td>
<td>0.2696*</td>
<td>0.1378</td>
<td>0.0006*</td>
</tr>
<tr>
<td>Botswana – LnTR</td>
<td>0.6838</td>
<td>0.0916*</td>
<td>0.6149</td>
</tr>
<tr>
<td>Botswana – LnRER</td>
<td>0.1845*</td>
<td>0.3517</td>
<td>0.0042*</td>
</tr>
<tr>
<td>Botswana – LnATR</td>
<td>0.0809*</td>
<td>0.2689</td>
<td>0.0024*</td>
</tr>
<tr>
<td>Lesotho – LnT</td>
<td>0.5237</td>
<td>0.5243</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Lesotho – LnTR</td>
<td>0.1653</td>
<td>0.1127*</td>
<td>0.0140*</td>
</tr>
<tr>
<td>Lesotho – LnRER</td>
<td>0.3678*</td>
<td>0.0447*</td>
<td>0.0463*</td>
</tr>
<tr>
<td>Lesotho – LnATR</td>
<td>0.2446*</td>
<td>0.0374*</td>
<td>0.0900**</td>
</tr>
<tr>
<td>Namibia – LnT</td>
<td>0.2529*</td>
<td>0.6726</td>
<td>0.0352*</td>
</tr>
<tr>
<td>Namibia – LnTR</td>
<td>0.6403</td>
<td>0.5000</td>
<td>0.2509</td>
</tr>
<tr>
<td>Namibia – LnRER</td>
<td>0.1336*</td>
<td>0.4025</td>
<td>0.0002*</td>
</tr>
<tr>
<td>Namibia – LnATR</td>
<td>0.4898</td>
<td>0.2605*</td>
<td>0.3361</td>
</tr>
<tr>
<td>South Africa – LnT</td>
<td>0.2861*</td>
<td>0.3186</td>
<td>0.0003*</td>
</tr>
<tr>
<td>South Africa – LnTR</td>
<td>0.5822</td>
<td>0.2645*</td>
<td>0.2725</td>
</tr>
<tr>
<td>South Africa – LnRER</td>
<td>0.3031*</td>
<td>0.3557</td>
<td>0.0015*</td>
</tr>
<tr>
<td>South Africa – LnATR</td>
<td>0.2324*</td>
<td>0.2520</td>
<td>0.0003*</td>
</tr>
<tr>
<td>Swaziland – LnT</td>
<td>0.1010*</td>
<td>0.0834**</td>
<td>0.0878*</td>
</tr>
<tr>
<td>Swaziland – LnTR</td>
<td>0.3680*</td>
<td>0.3002</td>
<td>0.0003*</td>
</tr>
<tr>
<td>Swaziland – LnRER</td>
<td>0.0927*</td>
<td>0.3653</td>
<td>0.0000*</td>
</tr>
</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.
Based on the findings of the unit root tests, the model variables are confirmed to all be integrated of order zero I(0) or integrated of order one I(1). In instances where variables were integrated of order two I(2)\(^{37}\) different proxies were used and tested for unit roots. This applied to the human capital proxy, which was found to be consistently I(2) across Botswana and Swaziland. This issue was resolved with World Bank secondary enrolment data for Swaziland and World Bank primary enrolment data for Botswana where persistent unit roots were found in secondary enrolment data. These new proxies were found to be integrated of an order lower than two. The Botswana lnL variable was also found to be integrated of order two I(2) and thus (L) was used in place of (lnL) due to its lower order of integration. Following the results presented in Tables 5.5–5.9, an analysis of the long and short run relationships between the model variables using the autoregressive distributive lag (ARDL) bounds test to cointegration was found to be possible.

5.4.3 ARDL Cointegration Test Results

Once the unit root tests had been completed, the diagnostics suggested that the use of the bounds test was appropriate for the study and an ARDL bounds test analysis was undertaken. Prior to running the ARDL models, the appropriate lag length was determined through estimation of the underlying VAR model using d(lnY) as the endogenous variable and d(lnL) d(lnHC) d(lnK) d(lnLIB) as exogenous variables where d(lnLIB) = d(lnT); d(lnTr); d(lnRER); and d(lnATR). Initially the study tested the lag structure using lag length criteria and including 2 lags as suggested by Pesaran et al. (2001) for annual time–series data. Lag lengths were selected based on the lag numbers most commonly selected by the lag selection (HQ, AIC, SC, FPE and LR) criteria.

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\(^{37}\) The bounds test has been found to be unstable in the presence of I(2) variables (Fosu and Magnus, 2006) hence special care was taken to include only I(0) or I(1) variables in all estimations.
criteria. For example, in determining the lag length for the ARDL model for South African tariff rates, 3 out of the 5 criteria (HQ, AIC, FPE) suggested that the optimal lag length was 1 lag hence this was chosen as the optimal length for the ARDL model. Lag length determination tests were run on all models prior to ARDL bounds testing.

An AR Root Stability Test was also undertaken to determine model stability. The main premise of the test being that the underlying VAR and thus subsequent model is stable if all roots have a modulus less than one and lie within the root circle (Lutkepohl, 1991). The AR Root Graphs (not presented), showed that all roots from the VAR models used in the study were found to lie within the unit root circle indicating stability of the models. As this section of the research involved time–series estimation, special attention was given towards the elimination of serial correlation, as this is known to plague economic time–series data. This was achieved through a further diagnostic test – the Breusch Godfrey test, and in instances where serial correlation was found to be present, models were estimated using Newey–West estimators to produce heteroscedasticity and autocorrelation consistent (HAC) standard errors. Multicollinearity tests were not conducted due to limited evidence obtained using Gujarati’s (1995, p.335) “classic” approach alongside an empirical technique that automatically reduces the influence of multicollinearity.

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38 See the works of Newey and West (1987) for a complete discussion on HAC standard errors.
39 The study found little evidence of multicollinearity using Gujarati’s (1995, p.335) “classic” approach. In this instance, the existence of a high $R^2$ value will, in most cases, “reject the hypothesis that the partial slope coefficients are simultaneously equal to zero. However, the individual $t$ test will show that none or very few of the partial slope coefficients are statistically different from zero”. Moreover, the empirical approach adopted in this study required that all variables were transformed into first differences, which has the added advantage of mitigating any potential problems associated with multicollinearity and endogeneity (see, the seminal paper by Pesaran & Shin 1999).
Following lag selection and model stability determination, the ARDL framework developed by Pesaran et al. (2001), was used to estimate the dynamic relationship between trade liberalisation and economic growth. Four models were developed with the main difference in each model being the measure of trade liberalisation used (Log Tariff Rates (InT); Log Trade Ratios (InTR); Log Real Effective Exchange Rate (InRER); and Log Adjusted Trade Ratios (InATR). These trade models were used to estimate long run relationships between trade liberalisation and economic growth. This general specification was modified according to the trade liberalisation variable being tested, for example, when testing trade ratios impact on economic growth the (lnLIB) variable would represent trade ratios. The generic model is re–stated below in equation 5.1 where all variables are as previously defined in the methodology chapter:

\[
\Delta \ln Y_t = \alpha_0 + \sum_{j=1}^{p_1} \alpha_{1,j} \Delta \ln Y_{t-j} + \sum_{j=1}^{p_2} \alpha_{2,j} \Delta \ln L_{t-j} + \sum_{j=1}^{p_3} \alpha_{3,j} \Delta \ln K_{t-j} + \sum_{j=1}^{p_4} \alpha_{4,j} \Delta \ln H_{t-j} + \\
\sum_{j=1}^{p_5} \alpha_{5,j} \Delta \ln LIB_{t-j} + \alpha_6 \ln Y_{t-1} + \alpha_7 \ln L_{t-1} + \alpha_8 \ln K_{t-1} + \alpha_9 \ln H_{t-1} + \alpha_{10} \ln LIB_{t-1} + \mu_t \quad (5.1)
\]

In the first step, using a lag specification as determined by the lag length criteria, the ARDL model was estimated using Ordinary Least Squares (OLS). A Wald test was performed on the lagged coefficients to test the null hypothesis of no cointegration:

\[
H_0 : \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = 0.
\]
The computed F–statistic was compared against the Pesaran et al. (2001) upper and lower critical values at 5% significance level after 1 lag using an unrestricted intercept and no trend. If the computed F–statistic was found to lie above the upper bounds of the critical values this would confirm the presence of cointegration amongst the variables in the model. If the F–statistic was found to lie below the lower bounds then the null hypothesis of no cointegration could not be rejected. Finally, if the computed F–statistic lay between both the upper and lower bounds then a conclusive decision could not be reached based on the test. Tables 5.10–5.14 present the results of the long run bounds tests.

**Table 5.10. Critical Value Bounds of the F–Statistic (Botswana).**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I(0)</td>
<td>I(1)</td>
</tr>
<tr>
<td>Model 1 – (lnT)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 2 – (lnTR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 3 – (lnATR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 4 – (lnRER)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
</tbody>
</table>

*Indicates a cointegration relationship. Due to the presence of serial correlation all models were estimated using Newey–West estimators.

**Table 5.11. Critical Value Bounds of the F–Statistic (Lesotho).**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I(0)</td>
<td>I(1)</td>
</tr>
<tr>
<td>Model 1 – (lnT)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 2 – (lnTR)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 3 – (lnATR)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 4 – (lnRER)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
</tbody>
</table>

*Indicates a cointegration relationship. Due to the presence of serial correlation all models were estimated using Newey–West estimators.
Table 5.12: Critical Value Bounds of the F–Statistic (Namibia).

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Model 1 – (lnT)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 2 – (lnTR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 3 – (lnATR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 4 – (lnRER)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
</tbody>
</table>

*Indicates a cointegration relationship. Due to the presence of serial correlation all models were estimated using Newey–West estimators. Unrestricted Intercept and no Trend Critical Value Bounds taken from Pesaran et al 2001

Table 5.13: Critical Value Bounds of the F–Statistic (Swaziland).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Model 1 – (lnT)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 2 – (lnTR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 3 – (lnATR)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
<tr>
<td>Model 4 – (lnRER)</td>
<td>0</td>
<td>6.58</td>
<td>6.58</td>
</tr>
</tbody>
</table>

*Indicates a cointegration relationship. Due to the presence of serial correlation all models were estimated using Newey–West estimators. Unrestricted Intercept and no Trend Critical Value Bounds taken from Pesaran et al 2001

Table 5.14: Critical Value Bounds of the F–Statistic (South Africa).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Model 1 – (lnT)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 2 – (lnTR)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 3 – (lnATR)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
<tr>
<td>Model 4 – (lnRER)</td>
<td>1</td>
<td>4.04</td>
<td>4.78</td>
</tr>
</tbody>
</table>

*Indicates a cointegration relationship. Due to the presence of serial correlation all models were estimated using Newey–West estimators. Unrestricted Intercept and no Trend Critical Value Bounds taken from Pesaran et al 2001

After undertaking the initial bounds test, the next step was the estimation of long run elasticities.

The results from Tables 5.10–5.14 show that a cointegration relationship only existed within the
South African models and Lesotho Tariff model. Therefore, only the South African models and Lesotho Tariff model could be tested for long run and short run elasticities without producing spurious results. Tables 5.15–5.17 present the long run results.

5.4.4 Long Run Empirical Results

The base equations for Models 1–4 as stated in Tables 5.15–5.17 were estimated using OLS. The results showed that all models had very good explanatory power in terms of the Adjusted $R^2$ values, with all models accounting for at least 81% of the variation in South Africa’s and Lesotho’s economic growth. The F–Statistics were all highly significant indicating that all variables jointly contribute to the determination of economic growth. Breusch–Godfrey and Durbin Watson statistical tests revealed the high likelihood of serial correlation within the models. Although this would not bias the OLS estimators it would make them inefficient with understated or overstated standard errors. Therefore, all models were estimated using Newey–West estimators to produce heteroscedasticity and autocorrelation consistent (HAC) standard errors. The estimated coefficients presented in models 1–4 are elasticity coefficients of GDP per capita in response to a one percent change in the explanatory variables of Labour, Capital, Human Capital, Tariffs, Trade Ratios, Adjusted Trade Ratios, and the Real Effective Exchange Rate. All models were initially tested with the inclusion of an apartheid dummy variable that was open from 1980–1994, the years when South Africa was under sanctions, and closed in other years. In all long run models, the apartheid dummy was insignificant ($p > 0.05$) and hence it was left out of the ARDL results and not discussed.

40 For a complete discussion on serial correlation see Gujarati (2004) chapter 12.
Model 1 – Tariffs have an impact on income

Looking at the results of Model 1 in Table 5.15, the long run results show that the impact of tariffs are significant at the 1% level but only have a very marginal effect on GDP per capita with them being responsible for a 0.09% decrease in growth ($\text{LnT} = -0.0917; p < 0.01$). Thus, Model 1 confirms that the level of tariffs in South Africa has had a negative impact on income albeit a marginal one which is in line with international trade theory. Although labour has the expected sign in the regression ($\text{LnL} = 0.0682; p = 0.4069$), it is statistically insignificant meaning no plausible conclusions can be drawn from the result. Human capital surprisingly has an unexpected sign ($\text{LnHC} = -1.0164; p < 0.01$) and is highly significant at the 1% level. This would lead one to believe that a 1% increase in the skilled labour force leads to a 1% drop in GDP per capita, which would be counterfactual and contradict earlier discussed growth and trade theories. A more plausible interpretation of this result would be that as GDP per capita has increased the engagement of human capital has decreased by 1%. This is in line with the earlier identified capital-intensive nature of the South African economy suggesting that the majority of the country’s growth was arising out of mining or capital-intensive manufacturing activity. In addition the negative coefficient of human capital could also be attributed to the high level of emigration of skilled labour that occurred in South Africa during the apartheid era and post-apartheid due to the social factors such as the high crime rates and high prevalence of extreme poverty that have continued to plague the country. Narayan and Smyth (2005) draw similar conclusions upon obtaining a negative sign on the labour component from their investigation of trade liberalisation in Fiji. Specifically they note that the coups of 1987 and 2000 may have been the root cause of the emigration of skilled labour from Fiji (Narayan and Smyth, 2005). This is
further supported by World Economic Forum (WEF) data, which ranks South Africa 50th in its ability to retain skilled labour (Schwab and Sala-i-Martin, 2014). Finally the capital stock’s impact on growth is of the expected sign and highly significant at the 1% level (LnK = 0.5193; p<0.01). This result implies that a 1% increase in capital, which is transmitted through an increase in investment, leads to a 0.5% increase in economic growth.

Table 5.15: Impact of Trade Liberalisation on Economic Growth for South Africa and Lesotho

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp. Sign</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
<td>1.3871</td>
<td>0.5676</td>
<td>2.4440</td>
<td>0.0213</td>
<td>14.1600</td>
<td>5.1294</td>
<td>2.7606</td>
<td>0.010*</td>
</tr>
<tr>
<td>LNL</td>
<td>(+)</td>
<td>0.0682</td>
<td>0.0809</td>
<td>0.8424</td>
<td>0.4069</td>
<td>-0.8993</td>
<td>0.4774</td>
<td>-1.8839</td>
<td>0.070**</td>
</tr>
<tr>
<td>LNHC</td>
<td>(+)</td>
<td>-1.016</td>
<td>0.1429</td>
<td>-7.1129</td>
<td>0.000*</td>
<td>1.6669</td>
<td>0.2170</td>
<td>7.6811</td>
<td>0.000*</td>
</tr>
<tr>
<td>LNK</td>
<td>(+)</td>
<td>0.5193</td>
<td>0.0830</td>
<td>6.2595</td>
<td>0.000*</td>
<td>0.4299</td>
<td>0.1615</td>
<td>2.6618</td>
<td>0.013*</td>
</tr>
<tr>
<td>LN(T)</td>
<td>(-)</td>
<td>-0.0916</td>
<td>0.0293</td>
<td>-3.1319</td>
<td>0.004*</td>
<td>-0.0122</td>
<td>0.0132</td>
<td>-0.9308</td>
<td>0.3602</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Observations</th>
<th>32</th>
<th>Observations</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>$R^2$</td>
<td>0.8756</td>
<td>$R^2$</td>
<td>0.9888</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.8572</td>
<td>Adjusted $R^2$</td>
<td>0.9872</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.0362</td>
<td>S.E. of regression</td>
<td>0.0246</td>
</tr>
<tr>
<td>Akaike IC</td>
<td>-3.6553</td>
<td>Akaike IC</td>
<td>-4.4323</td>
</tr>
<tr>
<td>F–Stat</td>
<td>47.5395*</td>
<td>F–Stat</td>
<td>597.8682*</td>
</tr>
<tr>
<td>Durbin Watson</td>
<td>0.7972</td>
<td>Durbin Watson</td>
<td>0.6182</td>
</tr>
</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.

**Impact of Tariffs on Income in Lesotho**

Following the detection of a cointegration relationship between tariffs and GDP per capita in the Lesotho model long run tests were also conducted. These revealed that the tariff rate in the Lesotho model as seen in Table 5.15 was insignificant although it did have the correct sign. This
might be due to the high level of dependence on South Africa for imports, exports and monetary policy, meaning that most tariff measures in Lesotho were likely to be masked by South African trade policy measures. This finding is further supported by Lesotho’s membership to the Southern African Customs Union (SACU) whereby a common external tariff (CET) is set within the union, which allows duty free movements of goods within the union and one tax rate to be applied to external goods upon entry to the union.

With South Africa contributing to over 90% of SACU’s GDP and with over 90% of Lesotho’s imports originating in South Africa it is clear to see that tariffs on product lines outside of the CET would be masked by those within and hence the insignificant impact. Human capital and capital have both had a positive impact on growth with a 1 percentage point increase in human capital being associated with a 1.66% increase in GDP per capita and a 1% increase in capital having a 0.42% effect on GDP per capita. This is in line with standard trade and endogenous growth theory, which postulates that positive externalities of trade such as learning by doing and learning from exposure to new technology occur during trade. Similar to the South African scenario economic growth has had a reduced impact on labour suggesting that growth is also occurring in capital-intensive industries. This is also supported by the high unemployment rate in Lesotho recorded at over 20%. Therefore, model 1 results suggest that tariffs similar to the other BNS countries are not found to have any meaningful impact on the level of economic growth in Lesotho.
Model 2—Trade Ratios have an impact on Income

The results from Model 2 in Table 5.16 show that the openness variable under investigation in model two (LnTR = 0.3350; \( p < 0.01 \)) is found to be both significant and have the expected sign confirming that South Africa would benefit from an increase in international trade through 0.3% of enhanced economic growth. Both labour (\( \text{lnL} = -0.3231; p < 0.01 \)) and human capital (\( \text{lnHC} = -0.1734; p = 0.3349 \)) have unexpected negative signs however only labour is significant. This would imply that in this instance as the labour force increased by 1% GDP per capita decreased by 0.3% suggesting that labour has not been productive over the study period. South Africa has been prone to frequent civil unrest, which would also explain the negative sign of the labour variable (\( \text{lnL} = -0.3231 \)) and the lack of productivity. Interestingly Auty (2004) and De Soysa (2000) find high correlations between civil strife and abundant natural resources in developing countries with conflict more likely to arise when the majority of the resource wealth is limited to capital intensive sectors such as mining (De Soysa, 2000). These conditions are typical across Africa. South Africa is a known exporter of commodities, which are capital intensive, implying that as investment into this sector has increased there has been a corresponding increase in national output. However, due to the capital-intensive nature of commodities, in particular the mining sector, this growth has not led to additional employment as the labour component was substituted by machinery, which is a common phenomenon in the mining sector (Auty, 2001).
Table 5.16. Impact of Trade Liberalisation on Economic Growth for South Africa

Dependant Variable: Income – $lnY$ – GDP per capita

$$lnY = \beta_0 + \beta_1lnL + \beta_2lnK + \beta_3lnHC + \beta_4lnTR + \epsilon_i$$

$$lnY = \beta_0 + \beta_1lnL + \beta_2lnK + \beta_3lnHC + \beta_4lnATR + \epsilon_i$$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp.</th>
<th>Sign</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>4.3051</td>
<td>0.9667</td>
<td>4.4536</td>
<td>0.000*</td>
<td>5.4130</td>
<td>1.1091</td>
<td>4.8804</td>
<td>0.000*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNL</td>
<td>-0.3231</td>
<td>(+)</td>
<td>0.1148</td>
<td>-2.8136</td>
<td>0.009*</td>
<td>-0.3547</td>
<td>0.1072</td>
<td>-3.3100</td>
<td>0.0027*</td>
<td></td>
</tr>
<tr>
<td>LNHC</td>
<td>-0.1734</td>
<td>(+)</td>
<td>0.1766</td>
<td>-0.9819</td>
<td>0.3349</td>
<td>-0.1068</td>
<td>0.1937</td>
<td>-0.5515</td>
<td>0.5858</td>
<td></td>
</tr>
<tr>
<td>LNK</td>
<td>0.6452</td>
<td>(+)</td>
<td>0.0762</td>
<td>8.4620</td>
<td>0.000*</td>
<td>0.6372</td>
<td>0.0698</td>
<td>9.1229</td>
<td>0.0000*</td>
<td></td>
</tr>
<tr>
<td>LN(ATTR)</td>
<td>0.3350</td>
<td>(+)</td>
<td>0.0706</td>
<td>4.7484</td>
<td>0.000*</td>
<td>0.1980</td>
<td>0.0415</td>
<td>4.7694</td>
<td>0.0001*</td>
<td></td>
</tr>
</tbody>
</table>

Observations 32 32
R² 0.8981 0.9141
Adjusted R² 0.8830 0.9013
S.E. of regression 0.0328 0.0301
Akaike IC -3.8538 -4.0252
F–Stat 59.4615* 71.8401*
Durbin Watson 0.6774 0.6894

*Indicates significance at 5% level; **Indicates significance at 10% level

The capital component in Model 2 (LnK = 0.6452; \( p < 0.01 \)) is again positive and statistically significant with a coefficient of 0.6%, which is similar to that of the tariff model.

Model 3 – Adjusted Trade Ratios have an impact on Income

The main variable of interest in Model 3, the adjusted trade ratio, showed that trade has had a conservative but positive impact of 0.19% on income compared to the higher estimate of 0.3% obtained from the trade ratios model (LnATR = 0.198; \( p < 0.01 \)). Overall, the adjusted trade
ratios model displayed similar characteristics to the trade ratios model. However, both human capital ($\ln HC = -0.1068; p > 0.05$) and labour variables had negative coefficients ($\ln L = -0.354; p < 0.05$) which contradicted trade and growth theory implying that there were deep-seeded structural issues embedded within the South African economy that were preventing effective utilisation of both general labour and skilled labour. This finding could be of particular use to policy makers as they pursue goals of balanced economic growth.

Model 4 – The real effective exchange rate has an impact on income

The coefficient of the REER ($\ln RER = 0.1765; p < 0.05$) is positive and significant suggesting that a 1% appreciation of the currency has led to a 0.17% increase in GDP per capita. This is in line with South African Rand exchange rate movements which have seen a steady decline of the Rand since the implementation of a free floating mechanism from a level of USD:Rand 1:0.77 in 1980 to a 1:7.26 rate in 2011. This is seen in Figure 5.12, which shows nominal exchange rate movements of the Rand against the US Dollar over the study period.
The REER results suggest that the Rand has largely been overvalued during the study period apart from the currency dips in 2001 and 2008. South Africa has experienced positive GDP growth over the same period indicating that contrary to popular economic belief (Berg and Miao, 2010; Eichengreen, 2007; Rodrik, 2008) the appreciation of the Rand has helped economic growth. This would suggest that the nature of the South African economy presents unique scenarios, which require further investigation. Possible reasons for this peculiarity are presented in the discussion session.

Further investigation of the impact of the REER on economic growth in table 5.17 shows that all other variables are significant at the 10% level with labour (LnL = 0.2529; p = 0.09) becoming insignificant at the 5% level. Human capital similar to the earlier models has an unexpected sign (LnHC = –1.0532; p < 0.01), which is consistent with earlier findings that South Africa has either
been losing skilled labour as its economy has been growing or has been unable to make productive use of its skilled labour as a result of growth occurring in capital intensive sectors. The contribution of capital to economic development at 0.47% is consistent with the earlier findings of Models 1 – 3 (LnK = 0.4735; \( p < 0.01 \)).

Table 5.17: Impact of Trade Liberalisation on Economic Growth for South Africa

<table>
<thead>
<tr>
<th>Dependant Variable: Income – ( \ln{Y} ) – GDP per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \ln{Y} = \beta_0 + \beta_1 \ln{L} + \beta_2 \ln{K} + \beta_3 \ln{HC} + \beta_4 \ln{RER} + \epsilon_t )</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp. Sign</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
<td>-1.5865</td>
<td>1.2077</td>
<td>-1.3136</td>
<td>0.2000</td>
</tr>
<tr>
<td>LNL</td>
<td>(+)</td>
<td>0.2529</td>
<td>0.1454</td>
<td>1.7397</td>
<td>0.09**</td>
</tr>
<tr>
<td>LNHC</td>
<td>(+)</td>
<td>-1.0532</td>
<td>0.1931</td>
<td>-5.4541</td>
<td>0.000*</td>
</tr>
<tr>
<td>LNK</td>
<td>(+)</td>
<td>0.4735</td>
<td>0.1211</td>
<td>3.9105</td>
<td>0.000*</td>
</tr>
<tr>
<td>LN(RER)</td>
<td></td>
<td>0.1765</td>
<td>0.0720</td>
<td>2.4512</td>
<td>0.021*</td>
</tr>
</tbody>
</table>

Observations 32
R\(^2\) 0.8349
Adjusted R\(^2\) 0.8105
S.E. of regression 0.0417
Akaike IC -3.3720
F–Stat 34.1456*
Durbin Watson 0.6572

*Indicates significance at 5% level; **Indicates significance at 10% level

5.4.5 Error Correction Model Results

The next stage in the ARDL Bounds Test was the development and estimation using OLS of an Error Correction Model (ECM). This was used as a diagnostic test to further confirm the existence of a long run relationship between the model variables. The ECM was developed using
the underlying ARDL model (Equation 5.1) developed earlier and replacing the lagged log terms in the initial ARDL model with an error correction term (ECT) that is comprised of the residuals from the long run model estimation. The results of the ECM are presented in Table 5.18 below.

Table 5.18: Error Correction Model for South African Trade Liberalisation Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>ECM 1 – (lnT)</th>
<th></th>
<th>Coef</th>
<th>t–Stat</th>
<th>Coef</th>
<th>t–Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.0019</td>
<td></td>
<td>0.0651</td>
<td>-0.0097</td>
<td>-0.3556</td>
<td></td>
</tr>
<tr>
<td>d(lnY(-1))</td>
<td>0.5919</td>
<td></td>
<td>3.0671*</td>
<td>0.6784</td>
<td>3.8790*</td>
<td></td>
</tr>
<tr>
<td>d(lnL(-1))</td>
<td>-0.2325</td>
<td></td>
<td>-0.4996</td>
<td>-0.0834</td>
<td>-0.2013</td>
<td></td>
</tr>
<tr>
<td>d(lnHC(-1))</td>
<td>0.0851</td>
<td></td>
<td>0.2162</td>
<td>0.2354</td>
<td>0.6075</td>
<td></td>
</tr>
<tr>
<td>d(lnK(-1))</td>
<td>0.1903</td>
<td></td>
<td>0.3543</td>
<td>0.3648</td>
<td>0.7320</td>
<td></td>
</tr>
<tr>
<td>d(lnLib(-1))</td>
<td>0.0113</td>
<td></td>
<td>0.5283</td>
<td>0.0496</td>
<td>1.2162</td>
<td></td>
</tr>
<tr>
<td>ECT(-1)</td>
<td>-0.4069</td>
<td></td>
<td>-2.0004*</td>
<td>-0.4484</td>
<td>-2.7047*</td>
<td></td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.2320</td>
<td></td>
<td></td>
<td></td>
<td>0.3780</td>
<td></td>
</tr>
<tr>
<td>F–Stat</td>
<td>2.4604*</td>
<td></td>
<td></td>
<td></td>
<td>3.9374*</td>
<td></td>
</tr>
<tr>
<td>D–W</td>
<td>1.6536</td>
<td></td>
<td></td>
<td></td>
<td>2.0577</td>
<td></td>
</tr>
</tbody>
</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.

The coefficient of the lagged error correction term ECT(-1) in Model 1 (ECT(-1) = –0.4069; \( p < 0.05 \)) and Model 4 (ECT(-1) = –0.4484; \( p < 0.05 \)) were found to be negative and significant confirming the previously obtained long–run relationship. Other models were not reported due to

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41 See methods chapter for a full exposition.
the lack of significant \( ECT_{t-1} \) which implied that the previous cointegration results obtained for these models could not be robustly confirmed. Diagnostically, a Breusch-Godfrey test (\( P = 0.1626 \)) revealed the absence of serial correlation, a White Heteroskedasticity test further confirmed the absence of heteroskedasticity (\( P = 0.5232 \)) whilst a Jarque-Bera test confirmed a normal distribution (\( P = 0.5876 \)). A Cusum test (graph not included) confirmed the functional form and showed the ECM to be stable.

In Model 1 the coefficient of the \( ECT_{t-1} \) was \(-0.406\) and also significant at the conventional 5% level. Its value suggested that after a shock to long–term economic growth, approximately 40.68% of the deviation from normal patterns would be corrected within the first year. In model 3 the coefficient of the \( ECT_{t-1} \) was \(-0.4484\) and also significant at the conventional 5% level. This value suggested that after a shock to long–term economic growth the system would adjust itself at an annual rate of 44.84%.

The short run relationships are also reported in Table 5.18. In the short run all variables were found to be insignificant at the 5% level (\( p > 0.05 \)), which presents possible evidence of a J–Curve impact of trade liberalisation on economic growth. The J–Curve not discussed in detail in this study describes the tendency of a policy/variable of interest to have an insignificant or negative effect in the short term but have significant positive outcomes in the long–term. Interested readers on J Curve dynamics are directed to literature reviews on the J–Curve phenomenon by Bahmani-Oskooee and Ratha (2004). Upon inclusion of the apartheid dummy (results not presented) in the regression models, short–run growth variables were still
insignificant as reported earlier. However the apartheid coefficient was consistently negative (−0.03) and statistically significant at the 5% level suggesting that in the short run apartheid had had a negative impact on economic growth in South Africa. These short run results on the impact of apartheid are consistent with results produced by (Thaver and Ekanayake, 2010; Truett and Truett, 2003) who all find sanctions to have had a negative impact on the South African economy.

5.5 PANEL DATA RESULTS

Time-series estimation was used as the primary econometric estimation method. In this section the results of alternate specifications of the trade model developed in the methodology chapter are discussed. A panel data empirical specification was used to test the robustness of the model. Panel data estimation was specifically chosen due to its ability to:

- Create larger datasets through the combination of time-series and cross sectional data, which in turn allowed for more degrees of freedom, reduced collinearity, and more informative data;
- Take the specific heterogeneity of the 5 SACU countries into account;
- Measure unobservable effects such as government policy decisions; and
- Analyse the dynamics of change.

Using fixed-effects panel data methods, Model 1 tested whether the levels of tariffs in the SACU countries had an impact on economic growth over the period 1980–2011. The specification of the model was as per prior production function specification developed in the methodology chapter.
built on the endogenous growth framework (Aghion & Howitt, 1998; Baldwin, 2004; Barro, 1991). Using the same framework, Models 2–4 were used to test the impact of openness on economic growth, and the real effective exchange rate on economic growth. Descriptive statistics of the model variables were presented prior to estimation.

5.5.1 Descriptive Statistics

Descriptive statistics for the dependent, core and test variables were presented in Table 5.19. The mean value of income in SACU over the study period was US$ 4175, which is significantly below Botswana and South African income levels but more in line with Namibian incomes. However, this value looks to overstate average income levels for Lesotho and Swaziland whose respective GDP per capita was consistently below US$ 4000 over the study period. The labour and capital components averages appeared to be dominated by South African figures due to the large size of its labour market in comparison to the BLNS countries. Human capital estimates were more reflective of the regional average with a low standard deviation across all five countries. This can also be explained by the integrated colonial history, which to a large extent shaped the culture and educational norms in existence within the region (Herman et al., 2011). The average real effective exchange rate value appears to be close to unity implying little distortion in exchange rate values. However, on closer examination one can see that there has been a gradual move from an overvalued exchange rate from a maximum level of 172 to a mean of 104. Intuitively one might expect this gradual weakening of the currency to have had an impact on economic growth by making exports more competitive, however the average level of 104 indicates that the currency was still over–valued during the study period.
The average tariff rate was seen to be 15.7% across all five countries. This would appear to overstate the value of tariffs as the South African average tariff rate was 7.6% and with South African exports, accounting for at least 60% of BLNS imports you would intuitively expect the real tariff rate to be closer to 7% than 15%. The average level of openness measured using trade ratios and adjusted trade ratios was 115% indicating that on average trade played a significant role in the five countries. Similar to earlier variables this value tends to overstate the level of openness of the larger South African economy due to the high trade ratios particularly in Lesotho and Swaziland. This is seen through the high standard deviation values of 44 and 50 units for trade ratios and adjusted trade ratios respectively.

Table 5.19: Panel Data Descriptive Statistics

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Core Variables</th>
<th>Test Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>L</td>
</tr>
<tr>
<td>Mean</td>
<td>4175.510</td>
<td>305381.1</td>
</tr>
<tr>
<td>Median</td>
<td>3668.056</td>
<td>684661.8</td>
</tr>
<tr>
<td>Maximum</td>
<td>9941.495</td>
<td>18904980</td>
</tr>
<tr>
<td>Minimum</td>
<td>789.0426</td>
<td>176875.2</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>2293.930</td>
<td>5273300.</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.425034</td>
<td>1.885894</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>2.514496</td>
<td>5.082726</td>
</tr>
<tr>
<td>Sum</td>
<td>0.040990</td>
<td>0.000000</td>
</tr>
<tr>
<td>Sum Sq. Dev.</td>
<td>668081.6</td>
<td>4.89E+08</td>
</tr>
<tr>
<td>Observations</td>
<td>8.37E+08</td>
<td>4.42E+15</td>
</tr>
</tbody>
</table>

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5.5.2 Fixed–Effects Estimation Model

Prior to estimation, it was necessary to determine which among the three discussed methods of Pooled, Fixed–Effects and Random–Effects would be the most appropriate under the panel data framework. Pooled logistic regressions were not selected due to the expectation of unobserved heterogeneity arising from country specific or time specific effects. This was verified with a Wald test to see whether the variance component of the country specific error component (ρ) was equal to zero. The results (not reported here) rejected the null hypothesis of country specific error components being equal to zero confirming that panel data regressions were preferable to pooled data estimations.

As discussed in the methodology chapter aside from pooled regressions, there are two different methods available for estimation within the panel data framework. These are the fixed–effects models and random–effects model. Based on the Hausman test (results reported in Tables 5.20–5.23), fixed–effects estimators were more efficient and selected as the appropriate estimation model.

Models 1–4 were tested using OLS with the base equations as previously stated in the methodology chapter and restated in Tables 5.20–5.23. A set of predictors which included three structural control growth variables and a further four trade liberalisation variables were used to test the impact on income. The analysis was performed on complete cases only. Model

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42 The reader is referred back to the methodology chapter for a detailed discussion on the three different panel data frameworks.
specifications looked at both levels and differenced formats of GDP per capita with the rationale being that levels specification would test the impact on economic development and differenced specification would test the impact on economic growth. The levels models had very good explanatory power in terms of the Adjusted $R^2$ values with all models accounting for at least 98% of the variation. As expected, the differenced models had lower adjusted $R^2$ values as much of the long term explanatory power was expected to be lost due to the introduction of differenced terms to the regression. Further analysis of the diagnostics showed that the differenced models had higher Durbin–Watson statistics, which were closer to 2 reducing the likelihood of serial correlation. The main issue being that although serial correlation does not bias the OLS estimators it makes them inefficient with understated or overstated standard errors. To account for the suspected serial correlation, the levels models were estimated using coefficient covariance weights to produce robust standard errors. Panel corrected standard errors & covariance (PCSE) estimators were selected as opposed to White period estimators, which operated most efficiently under the assumption of a large number of cross–sections.

Further diagnostics revealed that the differenced models also had lower Akaike Information Criteria and smaller standard errors. The F–Statistics were all highly significant indicating that all variables jointly contributed to the determination of income. Thus based on the diagnostics results the differenced models (dlnY) appeared to be better specified and were used for all subsequent panel data analysis. The OLS coefficients, robust standard errors, $t$–statistics, probability values and other diagnostics were presented in Tables 5.20–5.23.

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43 For a complete discussion on serial correlation see Gujarati (2004) chapter 12.
Model 1: The levels of tariffs have an impact on economic growth in SACU countries

Looking at the main variables of interest in Table 5.20, the impact of tariffs on economic growth was seen to be negative (Int = –0.003) but insignificant at conventional levels with a \( p \) value of 0.688. Therefore, under the panel data framework tariffs were found not to have had any meaningful impact on economic growth. This is in contrast to the time–series analysis, which identified a significant and negative impact in the South African case. The contradicting results and their implications are discussed further in section 4 of this chapter.

The impact of labour was seen to be positive and significant across all five countries (LnL = 0.05; \( p < 0.01 \)). The major difference between the time–series and the panel specifications being that labour was insignificant in the former but is significant in the latter though the impact in both is very small indicating a need for labour enhancing policies in the region. The impact of capital surprisingly was negative and insignificant under the panel framework (LnK = –0.009; \( p = 0.5228 \)). This may be due to the dominating effect of the disinvestment that has been occurring in Swaziland and in Lesotho to a lesser extent. The impact of human capital appears to be consistent across both time–series and panel data estimations (LnHC = –0.1194; \( p = 0.0096 \)) with a negative and significant coefficient. This is likely due to the exodus of professionals to South Africa from the BLNS countries and the subsequent loss of skilled labour to the rest of the world thereafter. This is also likely exacerbated by the lack of job creation with the majority of growth occurring in the mining sectors. The apartheid dummy has the correct sign (D Ap = –0.025; \( p = 0.07 \)) however it is not significant at conventional levels which is in line with the time–series results suggesting apartheid did not have an impact on long–run economic growth.
Table 5.20. Impact of Tariffs on Economic Growth for SACU Countries

Dependant Variable: $\ln{Y}_{it} - Model\ 1a: lnY = \beta_0 + \beta_1 lnL + \beta_2 lnK + \beta_3 lnHC + \beta_4 lnT + \epsilon_t$

Dependant Variable: $dln{Y}_{it} - Model\ 1b: dlnY = \beta_0 + \beta_1 lnL + \beta_2 lnK + \beta_3 lnHC + \beta_4 lnT + \epsilon_t$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp. Sign</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
<th>Coef</th>
<th>S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
<td>-1.7626</td>
<td>0.6130</td>
<td>-2.8755</td>
<td>0.005*</td>
<td>-0.4277</td>
<td>0.2494</td>
<td>-1.7152</td>
<td>0.088**</td>
</tr>
<tr>
<td>LNL</td>
<td>(+)</td>
<td>-0.2314</td>
<td>0.0561</td>
<td>-4.1274</td>
<td>0.000*</td>
<td>0.0553</td>
<td>0.0203</td>
<td>2.7175</td>
<td>0.0074*</td>
</tr>
<tr>
<td>LNK</td>
<td>(+)</td>
<td>0.5117</td>
<td>0.0377</td>
<td>13.575</td>
<td>0.000*</td>
<td>-0.0094</td>
<td>0.0146</td>
<td>-0.6405</td>
<td>0.5228</td>
</tr>
<tr>
<td>LNHC</td>
<td>(+)</td>
<td>0.7683</td>
<td>0.1314</td>
<td>5.8458</td>
<td>0.000*</td>
<td>-0.1194</td>
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<td>-2.6231</td>
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Model 1a – Fixed–Effects – (lnT) – Period weights (PCSE) standard errors & covariance (d.f. corrected)

**Income levels**

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**Economic Growth**

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</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.

**Model 2 and 3: The level of openness (trade ratios and adjusted trade ratios) has an impact on economic growth in SACU countries**

Two openness measures were used to test the impact of trade liberalisation on income in this study. Adjusted trade ratios (ATR) were developed to compensate for some of the deficiencies of trade ratios (TR) that have attracted criticism in the literature see (Rodríguez and Rodrik, 2000; Irwin and Terviö, 2002; Yanikkaya, 2003; Wacziarg, 2001; Frankel and Romer, 1999). The ATR
index\textsuperscript{44} was developed controlling for the impact of exchange rate policy, interest rate policy, population of the country and natural endowments using similar guidelines to indexes formulated by Pritchett (1996) and Spilimbergo et al. (1999). This would lead to trade ratios that more accurately predicted trade levels once endogeneity issues had been addressed. Upon examination of the ATR index, whilst it did differ from the TR index obtained from World Bank data, the unobserved policy factors did not appear to understate or overstate the flow of trade significantly from its long–run path. Bearing in mind these similarities, both TR and ATR models are analysed and discussed simultaneously in the results and the discussion sections.

Models 2a, 2b, 3a and 3b were used to investigate the impact of openness on economic growth. Looking at the results presented in tables 5.21 and 5.22, trade ratios were not found to have a significant impact on economic growth (LnTR = 0.0356; \( p = 0.1077 \)). Similarly adjusted trade ratios followed a similar route to trade ratios with (LnATR = 0.0186; \( p = 0.1221 \)). Possible explanations for this result could be the dominating effect of high foreign aid dependence by some of the BLNS countries leading to extremely high trade ratio levels not reflective of international trade. For example, Lesotho and Swaziland could be acting as outliers due to their collectively high trade ratios at over 140%. However, their growth of GDP per capita is relatively poor during the study period thus nullifying the impact of trade ratios from the other three countries. Temple (1999), Edwards (1998) and Yanikkaya (2003) highlight the impact that outliers can have in changing the expected signs of openness regressions. The study in a separate exercise (results not presented) tested models 2 and 3 without the inclusion of South Africa.

\textsuperscript{44} See literature review for a deeper exposition on ATR development.
taking it to be an outlier due to its economic size in comparison to the BLNS, and obtained a negative and significant impact on income ($\ln TR = -0.1708; p < 0.05$) and ($\ln ATR = -0.09; p < 0.05$). In contrast, when the South African model is run independently as in the ARDL framework the results suggest openness has a positive and significant impact on income. It is difficult to draw meaningful conclusions from the BLNS results again due to the high dependence of both Lesotho and Swaziland on foreign aid. This is further confirmed by the time–series results not producing statistically significant results. Labour, capital and human capital follow the same trajectory as in the tariff model indicating some consistency in the growth variable predictions. The apartheid dummy whilst negative was insignificant in both cases ($LnTR – D_{Ap} = -0.0134, p = 0.415; LnATR – D_{Ap} = -0.0147, p = 0.362$) indicating that apartheid had no impact on long–term growth in the region further confirming time–series estimations.
# Table 5.21. Impact of Trade Ratios on Economic Growth for SACU Countries

**Dependant Variable:** $\ln Y_t - \text{Model 2a}: \ln Y = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 \ln HC + \beta_4 \ln TR + \varepsilon_t$

**Dependant Variable:** $\ln Y_t - \text{Model 2b}: \ln Y = \beta_0 + \beta_1 \ln L + \beta_2 \ln K + \beta_3 \ln HC + \beta_4 \ln TR + \varepsilon_t$

## Model 2a – Fixed–Effects – (lnTR) – Period weights (PCSE) standard errors & covariance (d.f. corrected)

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<th>Exp. Sign</th>
<th>Income levels</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
<th>Coef</th>
<th>S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
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**Observations**: 160

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<th>F–Stat</th>
<th>Durbin Watson</th>
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*Indicates significance at 5% level; **Indicates significance at 10% level.
Table 5.22: Impact of Adjusted Trade Ratios on Economic Growth for SACU Countries

Dependant Variable: $lnY_{it} – Model 3a: lnY = \beta_0 + \beta_1 lnL + \beta_2 lnK + \beta_3 lnHC + \beta_4 lnATR + \varepsilon_t$

Dependant Variable: $dlnY_{it} – Model 3b: dlnY = \beta_0 + \beta_1 lnL + \beta_2 lnK + \beta_3 lnHC + \beta_4 lnATR + \varepsilon_t$

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Model 3b – Fixed–Effects – (lnATR) – Economic Growth

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</table>

*Indicates significance at 5% level; **Indicates significance at 10% level.
Model 4: The REER has an impact on economic growth in SACU countries

The real effective exchange rate is seen to have a negative and insignificant coefficient (lnRER = –0.0274; \( p = 0.232 \)) indicating that misalignment of the exchange rate has not had an impact on GDP per capita growth in the long run. These results neither contradict nor support previous studies that have shown that the undervaluation of the exchange rate can have a positive impact on developing countries economic performance (Hausmann et al., 2005; Rodrik, 2008; Eichengreen, 2007). This insignificant impact is likely explained through the fact that the BLNS largely have little control over their exchange rate or monetary policy with this being determined in the CMA.\(^{45}\) Botswana is a slight exception to this rule with it being outside of the CMA, however the Pula is pegged to the Rand as one of Botswana’s major trading partners and thus performance of the Rand also influences the Pula’s performance.

The coefficient of the REER is positive and significant in the South African time-series specification but insignificant under the panel data specification. The time-series results appear to present a better representation of the REER. Using economic logic and the fact that South Africa’s major exports are commodity based, one might expect them to benefit from a stronger currency through the Balassa Samuelson effect.\(^{46}\) In essence, with the majority of traded activity occurring in the mining sector, productivity growth will occur in this sector but not in the rest of the economy leading to wage increases initially in the tradable sector followed by the non–

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\(^{45}\) The reader is referred to the background chapter for an overview on the Common Monetary Area (CMA).

\(^{46}\) See articles by Lothian and Taylor (2008) and Fischer (2004)
tradedable sector. This will place upward pressure on the REER and thus see an appreciation of the real effective exchange rate.

Table 5.23. Impact of RER on Economic Growth for SACU Countries

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<td>Prob</td>
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<td>Hausman Test</td>
<td></td>
<td>41.2733</td>
<td>Prob</td>
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*Indicates significance at 5% level; **Indicates significance at 10% level.
5.6 DISCUSSION OF RESULTS

5.6.1 The impact of tariffs on economic growth in SACU countries

The results presented in sections 2 and 3 under the impact of tariffs on economic growth render mixed messages. In section 3 under the panel data framework the results show no significant relationship between tariffs and economic growth, and are in line with the results and conclusions reached in some previously undertaken studies (Rodriguez and Rodrik, 2000; Irwin and Terviö, 2002). Clemens and Williamson (2004) using a panel data estimation find similar discrepancies in their 35 country sample with tariffs showing a positive correlation to GDP growth prior to World War II followed by an insignificant impact between 1950–1996. Vamvakidis (2002) also fails to find a positive correlation between tariff rates and economic growth. Amongst his conclusions, is the inference that a possible reason for this inconsistency is the inability of the selected liberalisation measures to perfectly capture the extent of protectionism occurring within a country.

In the time–series outcomes, tariffs are not seen to have an impact on growth in the short–term or long–term in the BLNS countries regardless of the existence of high levels of heterogeneity in taxation, industrial and agricultural policy. A plausible explanation of this as identified earlier is the masking effect of the relatively high level of integration arising from SACU membership and the common monetary area (CMA). The high economic dependence on South Africa arising from SACU revenue and an extremely high South African import bill is likely to be the main reason why tariffs have not had an impact on the level of economic development in the BLNS. Put simply with SACU receipts accounting for between 20–70% of state revenue in BLNS states and
with South African trade activity generating over 90% of the composition of SACU receipts, one would expect South African trade policy to have the dominant effect within the region. Subsequently with all BLNS countries being members of the customs union, these imports from South Africa circulate free of trade taxes and therefore are not captured in the tariff estimates. This effect is transmitted through the disassociation between tariffs and income seen in the time-series results.

South African ARDL results are in line with standard trade theory or the neoclassical perspective of international trade in that they confirm that tariffs have had a negative impact on income. This is in line with earlier approximations in the trade liberalisation literature. Lee (1993a) using cross-country regressions between 21 developed and 60 developing countries finds that import-weighted average tariffs have had a negative effect on economic growth. Knight et al. (1993) using a panel data approach find that higher tariffs have a negative and significant impact on real GDP per capita transmitted through a reduction in capital goods imports and technology transfer. Harrison (1994) finds a positive association between tariffs and productivity growth. In her study of firm level productivity in Cote D’Ivoire between 1979 and 1987, Harrison finds that productivity growth is four times higher in unprotected sectors than protected ones lending weight to the hypothesis that protectionism not only slows growth but breeds inefficiency. A plethora of studies finds similar results using different methodologies and datasets (Dollar, 1992; Frankel & Romer, 1999; Harrison, 1996; Hoekman & Nicita, 2011; Kneller et al., 2008; Wacziarg, 2001).

47 See works by (Grossman and Helpman, 1990; Helpman, 2004; Turnovsky, 2003)
South Africa presents an interesting case study in that while it is affected by many issues common to developing countries it also has many attributes of developed nations. For instance, South Africa has well developed financial markets ranked better than financial markets in countries such as Canada, Switzerland and Germany (Schwab and Sala-i-Martin, 2014). The country’s legal framework, exchange rate policy and other macroeconomic policies, and the infrastructure in the key business hubs are well developed and maintained. These conditions therefore provide a platform for beneficial engagement in international trade, which is seen through the negative coefficient on average tariffs. However, at 0.09% the effect is modest (LnT = −0.0917; p < 0.01) and can be interpreted to mean that South Africa has already undergone much liberalisation in a tariff sense with little impact likely to occur from further tariff reductions. However, there may be room for further reduction of non-tariff barriers. This finding is supported by a study on tariffs in South Africa, where Fedderke and Vaze (2001) find that while tariff liberalisation has occurred, the effective rate of protection appears to have increased implying that non–tariff barriers are likely creating a greater distortionary impact on the South African economy. Rangasamy and Harmse (2003) also find that liberalisation has taken place in South Africa following the end of apartheid. However, they assert that the speed of liberalisation has been too fast and may have been detrimental to the local economy. Edwards (2005) concludes that the direction of liberalisation in South Africa has been progressively downwards from the early 1990s to present, but that there is still room for further reduction of barriers and simplification of tariff bands, especially within the clothing, textiles and tobacco industries (Edwards, 2005).
The available literature appears to support the hypothesis that tariff liberalisation has had an impact on economic development. There also seems to be consensus that tariffs are not the only trade policy inhibiting growth in the region. The existence of non-tariff barriers along with relatively low levels of tariffs in the South African market provides support for the modest impact on income that tariffs have had in this research. Non-tariff barriers whilst readily acknowledged to be in existence are extremely difficult to accurately measure and were thus excluded from this study. The Department of Trade and Industry (DTI) who acknowledge protection of strategic sectors also support this hypothesis. Their justification for added protection arises from the rationalisation that the past speed of liberalisation may have hurt smaller industries in the country by increased competition from more established counterparts (ITED, 2010).
Policy Research Area 1

Future activity in this sector could look to develop non–tariff barrier indexes for the region and replicate this study using a combination of tariff and non–tariff barriers. The first recommended research area to policy makers is that they should be looking for alternative ways to liberalise the economy. South Africa and arguably the BLNS by virtue of their high South African import bills have benefitted from tariff liberalisation. Future research could investigate the potential gains that could be achieved from liberalising the protected sectors and encouraging investment, productivity growth and human capital retention, which would likely reverse the signs in the labour and human capital components of the study. The liberalisation of protected sectors would also ensure common policies throughout all SACU countries and thus strengthen SACU regional integration as intended in the 2002 SACU Agreement.

5.6.2 The impact of openness on economic growth in SACU countries

The panel data results find no link between openness (TR and ATR) and economic growth in SACU countries. Levine and Renelt (1992) using extreme bounds analysis obtain similar results finding no robust relationship between any trade openness indicator and growth. Their analysis whilst completed using exports makes special mention that the substitution of imports or total trade in place of exports as used in this study yields the same coefficient estimates and standard errors hence the three variables can be used interchangeably. Levine and Renelt (1992) explain that their results discredit the new growth theory of (Grossman & Helpman, 1990; Romer, 1986). The main principle in these theories is based on Adam Smith’s notion that openness to trade
would increase productivity by encouraging specialisation, which would only be profitable in a larger market. However, their results show that the relationship between openness and growth is based on increased accumulation of resources and not on product specialisation as the impact of openness on growth is found to only be robust to the inclusion of investment.

Based on the low levels of infrastructure investment in the BLNS as identified by the Global Competitiveness Report 2014 (Schwab and Sala-i-Martin, 2014), one would expect the level of infrastructure to increase as trade intensified. This would in turn spur positive growth in the region. However, this notion is led by an export led growth hypothesis whereby exports grow at a faster or at least a similar rate to imports. Imports are also assumed to be inputs into the export sector. However, the results may turn out to be different in the case of a least developing country (LDC). Using Lesotho as a hypothetical example, it is plain to see that the country is highly dependent on foreign aid with this averaging 6% of imports over the study period. Alternatively, foreign aid has also comprised 40% of gross capital formation and 31% of government expenditure over the study period (WorldBank, 2014b). As Lesotho opens its economy to trade the levels of its imports will increase. However, the import bill is geared towards government and socially oriented activity and less towards export–oriented activity. In the event that this government activity leads to unproductive activity, this would leave the country unable to service its international obligations. This would ultimately lead to a trade imbalance, an unsustainable debt, pressure on the exchange rate, reduced productivity and a decline in growth similar to the Latin American debt crisis of the 1970s and 1980s.48

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It should be reiterated that the Lesotho scenario stated above is purely hypothetical and unlikely to occur given that SACU receipts and membership of the CMA provide further macroeconomic protection to the country, although it does illustrate a scenario where openness through an increase in imports could have a negative impact on economic development. However, it is still important to note the extremely high import bills of the BLNS states. For example, Table 5.24 highlights that apart from South Africa and Botswana, the other SACU members import bills all constitute over 50% of GDP with Lesotho and Swaziland averaging 130% and 85% respectively. Their export bills however are significantly less with Lesotho only exporting goods worth 33% of GDP, Namibia 47% of GDP and Swaziland 70% of GDP.

Table 5.24. SACU Import and Export Averages 1980 – 2011 (World Bank databank). (Source World Bank Development Indicators, 2014)

<table>
<thead>
<tr>
<th></th>
<th>Exports of goods and services (% of GDP)</th>
<th>Imports of goods and services (% of GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botswana</td>
<td>53.54</td>
<td>47.43</td>
</tr>
<tr>
<td>Lesotho</td>
<td>32.80</td>
<td>130.73</td>
</tr>
<tr>
<td>Namibia</td>
<td>47.03</td>
<td>51.37</td>
</tr>
<tr>
<td>South Africa</td>
<td>27.16</td>
<td>24.40</td>
</tr>
<tr>
<td>Swaziland</td>
<td>69.61</td>
<td>84.55</td>
</tr>
</tbody>
</table>

The challenge of a high import demand function as noted by Thaver and Ekanayake (2010) is that this tends to lead to current account deficits, which if persistently maintained can lead to high net foreign liabilities and increase the cost of borrowing which could adversely affect long–term growth rates. Gumede (2000), in research undertaken on South African import demand functions,
found that the high growth rate of imports without the counterbalancing growth of exports led to foreign exchange shortages and exacerbated other macroeconomic conditions such as unemployment.

**Policy Research Area 2**

The second policy research area arising out of these results is the need for a reduction of the high import bill in SACU member states and a move towards labour-intensive export-oriented activities. Future research in this sphere could be directed towards examining the relationship of the import demand function and GDP growth in the BLNS countries.

The effects of import demand functions on growth are not the main study consideration in this research and are thus not discussed further. The interested reader is referred to works by Bahmani-Oskooee and Niroomand (1998); Carone (1996) and Chang et al. (2005) for a more detailed examination of import demand functions.

Openness from a South African perspective appears to support the conclusions reached by (Yanikkaya, 2003; Harrison, 1996) and would thus support the export-led growth hypothesis that typified the 1970s–1990s (Michaely et al., 1991; Jung and Marshall, 1985; Heller and Porter, 1978; Greenaway and Sapsford, 1994). In this study, openness appears to foster economic growth through its positive impact on capital. Revisiting the time-series ARDL results in section 5.4.3 it is clear that the coefficient on capital is larger (\( \ln K = 0.645; p < 0.01 \)) and (\( \ln K = 0.637; p < 0.01 \)) when trade ratios and adjusted trade ratios are included. Whereas estimation results using tariffs
and the REER have a smaller impact on capital accumulation respectively ($\ln K = 0.519; p < 0.01$) and ($\ln K = 0.473; p < 0.01$). Expressed differently, under openness a 10% increase in the capital stock would increase income by around 6.5% whilst a 10% decline in tariffs would raise the capital stock by 5% with a 10% appreciation of the currency resulting in a 4.7% increase in capital. These results are in line with the findings of Lee (1995) and Wacziarg (2001) who argue that an open economy is likely to benefit from economies of scale and attract foreign investment into areas where they have comparative advantage. Wacziarg (2001) further explains that the move towards openness in a country may also induce domestic producers to import capital that was not previously available to them and thus increase the local stock of capital as well as the technological expertise gained from operating this new capital. The former theory accounts for the South African scenario very well with an increase in openness not only increasing the level of income but also accounting for 6% of capital growth. The former theory is discredited, as the results show no link between trade openness, human capital and income growth, which is indicative of investment occurring in the capital–intensive mining sector.

**Policy Research Area 3**

Based on the time–series results one can conclude that trade openness does have an impact on economic growth with capital accumulation being an additional source through which its effects are transmitted. Policy research arising out of these results would be the investigation of the opening up of protected sectors as productive sectors are likely to attract investment and thus further stimulate growth. Future research in this area could look to decompose the transmission routes of openness by industry sector and also look at the effect of openness in such sectors’ productivity. This would provide guidance to policies
aimed at boosting sector productivity and might shed further light into the effectiveness of infant industry protection policies that have been readily applied across strategic sectors.

5.6.3 The impact of the REER on economic growth in SACU countries

Like most trade policy measures, consensus on the use of the REER as a tool for economic development remains at best unresolved. The empirical results when juxtaposed against each other present a divergent scenario open to multiple interpretations (Gala, 2008; Johnson, Ostry, & Subramanian, 2007). A popular view is that overvaluation of the currency can be harmful to economic performance (Rodrik, 2008). This is typified by the poor performance during the import substitution industrialisation (ISI) era and subsequent debt crisis of the 1970s and 1980s of countries that had overvalued currencies (Diaz-Alejandro et al., 1984; Felix, 1990). In a further study of Latin American countries, Galindo et al. (2007) show a negative relationship between currency over–valuation and employment growth.

In contrast to this paradigm, the results suggest that a 1% appreciation of the REER has contributed towards a 0.17% real income increase in South Africa but had no impact on the BLNS countries. These results contradict the works of (Berg and Miao, 2010; Eichengreen, 2007; Rodrik, 2008) who all find that undervaluation of the exchange rate had a positive impact on growth through the promotion of the export sector. They also contradict works by Fang et al. (2006) who find a weak but positive effect of exchange rate depreciation on export growth in Asian developing countries, whilst Haddad and Pancaro (2010) develop evidence that suggests
that an undervalued exchange rate has a positive impact on exports and growth in developing countries.

The Balassa–Samuelson effect offers a credible explanation for the divergent results. Using this hypothesis economic growth is supposed to be spurred by high productivity in the tradable sector. The growth in the tradable sector leads to an inflation differential between the tradable and the non–tradable sectors due to heterogeneous productivity levels. One assumption being that in developing countries the non–tradable sector is less productive due to limited access to new technology and skills acquired from the rest of the world through trade (Eichengreen, 2007). A second assumption being that relative tradable prices remain constant across all trading countries. This inflation differential between the two sectors leads to an appreciation of the real effective exchange rate. In the case of the SACU countries the tradable sector accounts for the majority of economic activity across all five countries with commodities making up over 60% of exports. The financial sector in South Africa is similarly well developed being ranked 7th globally by the World Economic Forum in terms of financial market development (Schwab and Sala-i-Martin, 2014). The SACU domestic sector has also tended to be less developed than the traded sector and mostly dominated by inefficient government parastatals and a relatively small private sector (WTO, 2009a). In addition it should be noted that the commodities boom of the 2000s (Helbling et al., 2008) would have further fuelled growth and productivity in the mining sector without the corresponding growth in the non–tradable domestic sectors.
Therefore based on the Balassa–Samuelson effect it is clear to see why results in the time–series section of this study suggest that an appreciation of the REER has led to an increase in economic development. Ito et al. (1999) apply similar logic in their analysis of 11 Asian countries finding strong correlation between economic growth and real exchange rate appreciation in Japan, Korea, Taiwan, Hong Kong and Singapore.

The study results showed a 0.17% increase (see time–series results) in income due to exchange rate misalignment. This figure does appear to prescribe modest growth through exchange rate policy possibly due to the volatile nature of the Rand.49 The literature on volatility however does not resolve the issue with one school of thought arguing that increased volatility is likely to reduce trade due to risk adverse exporters reducing their international activity (Clark, 1973). More recently, this hypothesis has been questioned under the assumption that firms are likely to hedge against exchange rate variability through financial market activity and thus volatility is likely to have an insignificant impact on trade (Broll, 1994; Clark et al., 2004; Franke, 1991). The latter is likely to be the case in South Africa due to the presence of well–functioning financial markets that would most certainly provide adequate hedging strategies for large firms involved in international trade.

Policy Research Area 4

Based on the evidence provided through this research the manipulation of the exchange rate, as a trade policy tool is not recommended. A vast number of academics (Berg and Miao, 2010; Eichengreen, 2007; Rodrik, 2008; Haddad and Pancaro, 2010) appear to favour the IMF and World Bank institutions export–led hypothesis that an undervalued exchange rate would increase economic activity. However, the study results on the contrary indicate that an appreciation of the real effective exchange rate has been accompanied by modest growth in South Africa.

Eichengreen (2007) cautions that whilst exchange rate policy can be used to jump–start growth it cannot merely replace other growth fundamentals such as the labour force, the saving rate or an environment conducive to investment. The move to a freely floating exchange rate policy along with the implementation of capital controls by the South African government appears to have somewhat reduced the volatility in the Rand. However, with poor domestic fundamentals in the region and the increased openness of the SACU economy exposing the region to global shocks, both the Rand and Botswana Pula are likely to remain volatile currencies in the short term. Therefore, the REER would be better viewed as a complementary tool to facilitate growth as opposed to a means to growth in itself.
5.7 CHAPTER SUMMARY

This chapter has presented the results of the four models estimated in this research. The chapter has produced mixed results showing the time-series estimations not to be robust to panel data estimations. The time-series and panel data estimations BLNS countries produced inconclusive results. Ironically, their dominating effect may have clouded the South African results in the panel data estimations making this appear inconclusive.

The South African ARDL results present a more accurate picture of what is occurring in the region regarding trade liberalisation due to the sheer size of the South African market with it comprising over 90% of SACU trade along with the majority of the BLNS imports originating in South Africa. Building from this logic and reverting to the study research question, indeed trade liberalisation has had an impact on economic growth. The reduction of tariffs has increased economic growth albeit by a very modest amount. This would suggest that the majority of tariffs have reached the lower end of the scale leaving not much room for further tariff reduction. However, as noted by Edwards (2005) there is still room for further policy liberalisation by way of elimination of non-tariff barriers in protected sectors.

Openness and the REER in the South African case have also had positive impacts on economic growth. This suggests that there is room for the adoption of policies that will increase the level of international trade. At the regional level, this is encouraging providing evidence that the on-going regional integration efforts between the Common Market for Eastern and Southern Africa (COMESA) and the East African Community (EAC) are likely to benefit the SACU region. It
also provides credible statistical evidence that other on–going international trade negotiations such as the Economic Partnership Agreement (EPA) with the EU are likely to have a positive impact on the region through improved growth.

However when looking at trade liberalisation as a policy tool it is crucial to remember that trade policy is rarely transmitted in a standalone sense but often in conjunction with other macroeconomic policies, adequate infrastructure and good governance structures (Vamvakidis, 2002). Many of the trade models common to the literature have been developed using the general production function, which assumes the presence and transmitting functioning of certain growth variables. For example, significant weight is attached to capital, labour, and technology as predictor variables through which the effects of trade are conveyed. However, the key challenge when analysing the impact of trade liberalisation through this lens is that very often in developing countries there is a deficit in all of these key variables. For example, when one takes a closer look at capital investment developing countries do not fare well. According to the 2014 Global Competitiveness Report published by the World Economic Forum the country with the highest level of infrastructure in Africa is Mauritius with a ranking of 43 out of 144 countries. Looking at the present study South Africa fares the best with an infrastructure ranking of 60; followed by Namibia at 66; Swaziland at 97; Botswana at 101 and Lesotho at 116 (Schwab and Sala-i-Martin, 2014). On closer examination of labour, Sub–Saharan Africa is plagued by high unemployment, high incidences of poverty and low levels of skilled labour.50 Mauritius is the highest ranked African country in the World Economic Forum quality of education index at 49, whilst Lesotho is

50 See chapter two on the Macroeconomic background for a recap of country specific conditions.
ranked 97; Swaziland is at 102; Botswana at 104; Namibia at 119; and South Africa ranked at 122. Technological capability poses similar challenges for the region with South Africa ranked 66; Botswana at 76; Namibia at 89; Swaziland at 125; and Lesotho highly technologically deficient ranked at 137 out of 144 countries (Schwab and Sala-i-Martin, 2014).

These very real issues are compounded by the fact that Southern Africa also has very high income inequality as seen through the Gini coefficient. Yet, much of it has arisen out of colonial and apartheid legacies. Trade as a development strategy has been criticised in that it does not address inequality and the literature suggests that SACU has comparative advantage in the mining sector, which is known to be a capital–intensive industry and thus not likely to directly address this pertinent issue. Norway is provided as an illustration of how well trade has worked with the benefits from trade being used to improve overall national welfare. Trade theoretically and empirically is known to increase the overall wealth of the country and thus it should continue to be viewed as a tool for such. It is therefore recommended that redistributive policies should not cloud the potential impacts of trade but rather be viewed as separate matters to be addressed by the government of the day. The key argument being that if wealth is not increasing in the region then it becomes even harder to redistribute the little income that is available without creating further disruption to the region.

51 For further discussion on redistributive policies, see article by Larsen (2006) on how Norway escaped the resource curse and used revenue gained from its oil trade to boost its economy.
6 CHAPTER SIX: CONCLUSION

6.1 INTRODUCTION

International trade continues to be a major driver of economic growth. It is undeniable that trade has played a significant role in the growth of the Chinese economy with over 200 million people having being lifted out of poverty between 1978 and 1995 (Chen and Feng, 2000; Shujie, 2000). While politicians and academics do not dispute this fact, the debate lies within the exact mechanism through which the benefits occur. Academics have attempted to construct various models of international trade through which projections on economic growth have been made. The accuracy and validity of these models has continually been questioned due to the difficulty of scientifically proving the counterfactual (i.e. what would the world be like if there were no barriers to trade). Politicians on the other hand have a mandate to improve the wellbeing of their electorates but also an incentive to be re-elected, which are often in conflict. According to Schumpeterian growth (Ertur and Koch, 2011), whole industries are likely to be wiped out in the development process, which if happening close to an election period, results in a disgruntled electorate giving politicians less incentives to make reforms to policy that might in the long-run benefit an economy. This state of events has arguably been the status quo in the world today and the issue of the benefits of trade at best remain unresolved.

A plethora of academic research has focussed on the benefits of trade in developed and developing countries alike with many useful insights that have deeply enriched the literature. However, the majority of the literature on developing economies has arisen out of Asia, Eastern Europe and South America with little attention dedicated to Africa and even less attention
towards Southern Africa. This study therefore attempted to fill this void in the literature using five Southern African countries as case studies. South Africa and to a lesser extent Botswana are mentioned in some of the trade liberalisation literature whilst Lesotho, Namibia, and Swaziland have been virtually left out of the majority of the literature. A major criticism of the extant research is that the cross-country comparisons used have often been unrealistic and have not portrayed the full extent of the trade and growth relationships within the two countries. For example, it is difficult to draw accurate conclusions about trade policy actions in South Africa from a panel consisting of China, Brazil, Indonesia, Nigeria and Mexico. A further criticism of past work has been the limited availability of data and inaccurate measurement techniques, for example spurious relationships arising due to stationarity issues (Hendry and Juselius, 2000). A small number of studies have opted for static analysis of agriculture and manufacturing sectors using general computable equilibrium models but this has still left a void into how the economies have reacted to trade policy in the long-term.

The identified lacunae in empirical literature and econometric methods along with the unresolved question of the relationship between trade liberalisation and economic growth provided the justification for this study. The thesis specifically attempted to answer the research question “What is the Impact of Trade Liberalisation on Economic Growth in SACU Countries?” Given the lack of availability of data previously on SACU countries, the thesis makes an important contribution to knowledge in the region. The remainder of this chapter is structured as follows: Section 6.2 summarises the main outcomes of the preceding 5 chapters. Section 6.3 summarises the policy implications arising out of this research. Section 6.4 discusses the
contributions of the study to the trade liberalisation literature and the final section outlines areas for future research.

6.2 SUMMARY OF THE THESIS

Chapter 1 of the study acknowledged the importance of trade to economic growth and the limited input of the African continent to global economic output. There was a further acknowledgement of the overall decline in economic performance within the SACU region based on empirical evidence even though it would appear that the number of commitments to trade agreements had increased. This practical problem called for closer examination of the region's trade policy and the development of the research question that would guide the study:

“What is the Impact of Trade Liberalisation on Economic Growth in SACU Countries?”

Chapter 2 presented an overview of the macroeconomic conditions in the five SACU countries. This included geopolitical and economic summaries of the pertinent structural issues affecting all five countries, the main contributors to GDP, common policies and trade policies. The chapter identified high inequality in the region, high unemployment, and a very heavy dependence on trade tax revenue by Botswana, Lesotho, Namibia and Swaziland. All five countries were members of the Southern African Customs Union, which, in theory, would mean that one would expect a dominating trade policy to be set across all five countries. However, this chapter showed that in addition to very real differences in the size of the economies and levels of development,
trade policy was not homogenous across all countries. In reality, the common external tariff only covered 55% of all goods leaving member states leeway to negotiate trade agreements with historical trading partners. The review also showed the existence of protection for certain industries. Overall, macroeconomic prospects in the region had not been great by most economic measures although Botswana had generally fared better than the other SACU countries. The chapter did reveal that the five SACU countries were very open to trade, although uneven protection levels and structural deficiencies were likely masking its true benefit.

The first half of chapter three provided a review of the relevant theoretical developments in international trade. This was divided into five distinct sections that oversaw the progression of trade thought from static modelling in the early, classical and imperfect competition models to the dynamic modelling in classical and endogenous growth models. This section demonstrated the flaws in earlier models and how academic thought has evolved to view the input of technology as being endogenously determined as well as growth as a dynamic process. The second half of chapter three reviewed the main trade liberalisation empirical literature. A major finding arising out of this literature review was the lack of a universally accepted definition of trade liberalisation. There was agreement that trade liberalisation tends to fall within incidence–based, outcomes–based, price–based measures and trade restrictiveness indexes which are all likely to have different effects on growth. This study used the percentage of import duty revenues from total import revenues to measure the impact of tariffs and proxy for an incidence–based measure. Under outcomes–based measures, the study chose the ratio of total exports and imports of goods and services to a country’s gross domestic product and an adjusted trade ratio measure that controlled for country specific and domestic policy actions that might affect trade. In
addition to these three measures, the study employed the real effective exchange rate as a price–based measure. Trade restrictiveness indexes and non–tariff barriers were not included as alternate measures due to the lack of data over the study period.

As is akin to much of economic thought, the in–depth review of the academic literature did not provide consensus on the impact of trade liberalisation on economic growth. This was true across all liberalisation measures used. Possible reasons for this included the different methods of analysis, the quality of data, the study period and heterogeneous test samples. The study aimed to rectify many of these issues through the use of newer statistical methods, an updated timeframe stretching over a reasonable period, access to newer data that was more reflective of internal conditions, and within country estimations that would not make earlier assumptions of homogeneity across production functions.

Chapter 4 contemplated on an appropriate empirical framework in which to model the research question. The trade model that was adopted was derived from previously undertaken literature on trade liberalisation under the endogenous growth framework. The study adopted the ARDL bounds test to measure the long–term co–movements of trade liberalisation and economic growth. By choosing this method, the study would avoid issues of stationarity that plagued earlier time–series results, and would provide country specific results that would be more meaningful to policy makers in SACU countries. The study also adopted fixed–effects panel data methods to test whether the trade model was robust to different specifications.
Four different variations of the model presented as (Equation 4.18) were used to the test the impact of trade liberalisation on economic growth. The main difference in each model being that the (lnLIB) variable in (Equation 4.18) was substituted for tariffs, trade ratios, adjusted trade ratios and real effective exchange rate variables. An apartheid dummy was included to both the time-series and panel data estimations to capture the long-term structural impact on the countries. Chapter 5 presented the empirical results of the study. The main findings were presented according to the liberalisation variables used in the econometric analysis.

**The impact of tariffs on economic growth in SACU countries**

Tariffs were not found to have a significant impact on economic growth in the BLNS countries regardless of whether time-series or panel data estimations were used. This was in contrast to South African time-series results, where the econometric evidence showed a cointegrating relationship between variables that suggested a significant and negative association between tariffs and growth. These results were explained to be occurring due to the high dependence by the BLNS countries on SACU revenue of which 90% of this revenue was attributed to South African import taxes. There was a further acknowledgement of the extremely high South African import bill by the BLNS, which would not appear in their average tariff rates due to the masking effect of the SACU common external tariff (CET). Tariffs in South Africa whilst negative and significant, had a very modest impact on economic growth suggesting that future activity in incidence-based measures could focus on the development and measurement of the impacts of non-tariff barriers.
The implication of this result is that the removal of any remaining tariffs in the South African economy is unlikely to inhibit growth in the country. The time-series evidence reveals that the presence of tariffs have hindered long run economic growth in South Africa and thus policy reform in this sphere is likely to boost investment and growth. A definitive decision for BLNS countries cannot be made due to the inconclusive results. However, their high dependence on South African imports and policy decisions suggest that they would benefit from an increase in South African economic activity.

**The impact of openness on economic growth in SACU countries**

The time-series and panel data results did not find robust relationships between any of the trade openness indicators (TR and ATR) and economic growth in the BLNS countries. In the case of the panel data estimations similar to the tariff results, the high composition of South African import tax revenue in the BLNS income coupled with the high dependence of Swaziland and Lesotho on foreign aid would have further distorted the results making them appear to engage in more trade than they actually did. The empirical results of the South African ARDL bounds test trade model showed that openness contributed significantly and positively to economic growth when analysed using both trade ratios and adjusted trade ratios. Capital also appeared to move positively with openness and economic growth, which was in line with theoretical views that an open economy was more likely to attract foreign investment and thus further stimulate growth.

The major implication of this result is that there is room for further liberalisation of protected sectors such as agricultural, transport and services. Openness has led to economic growth in the case of South Africa and this has been accompanied by an increase in investment. Therefore an
increase in openness in the economy through liberalisation of protected sectors would likely lead to increased investment in such sectors as well as the inflow of human capital and technology which would help to eliminate inefficiency in these sectors and further boost economic growth.

*The impact of the REER on economic growth in SACU countries*

The study’s results showed that an appreciation of the REER had a positive impact on economic growth in South Africa but had no impact in the BLNS countries. In the latter case, it is easy to understand why this might be the case with Lesotho, Namibia and Swaziland all interchangeably using the Rand in their economies, whilst Botswana has its currency pegged to the Rand. This implies that the BLNS have ceded much of their monetary policy to South Africa and have little control over currency manipulation. In the former, the results suggest that a stronger South African Rand has contributed to positive economic growth. The Balassa–Samuelson effect offers a credible explanation for the South African time–series results with growth in the tradable sector leading to an inflation differential between the tradable and the non–tradable sectors due to heterogeneous productivity levels and a subsequent appreciation of the real effective exchange rate. South Africa being a big commodity producer is likely to have benefitted from investment in the mining sector as well as the commodity boom without corresponding productivity in the non–tradable sector showing further support for the results.

*Short–term findings*

Short–term results under the ARDL bounds test showed that none of the trade liberalisation variables had any impact on economic growth suggesting the possibility of a J–Curve effect in
the movement between the trade liberalisation variables and economic growth. The apartheid dummy was found to be positive and significant suggesting that in the short–term apartheid did influence economic growth.

The main implication arising out of these findings is that trade policy cannot be used as a short–term stimulant of economic growth. The entry of capital, the adaptation to new technology and the development of human capital are all processes which are unlikely to occur overnight and thus trade policy should be viewed and used as a long term strategic development tool.

**Unexpected Findings**

Throughout the time–series results, the coefficients of labour and human capital were found to be negative which contradicted growth theory and study expectations. This was explained in terms of growth having occurred in a capital–intensive South African economy suggesting that the majority of the country’s growth was arising out of mining or capital–intensive manufacturing activity with limited employment opportunities. In addition, the negative coefficient of human capital was also suggestive of the high level of emigration of skilled labour that had occurred in South Africa during and post–apartheid due to the social factors such as the high crime rates and high prevalence of extreme poverty that continued to plague the country.

The implications of a declining skilled labour force and an unproductive labour force are that economic growth is unlikely to be sustained or stimulated without this concern being addressed. Endogenous growth theory predicts that the effects of technology are transmitted through the
interaction between new capital and a skilled labour force. Therefore, for trade liberalisation to have a sustained impact on the economy skills shortages and human capital retention have to be addressed.

6.3 POLICY IMPLICATIONS

Included in chapter five was the relevance of this study’s results and the policy implications. The results indicated that tariffs have had a significant and negative long-term impact on economic growth in South Africa. One might hypothesise that this is also true of the BLNS by virtue of their high South African import bill; however, the results do not suggest this as they found an insignificant relationship. Hence, the first recommendation to South African policy makers is that based on the tariff results they should be looking to reduce incidence based measures throughout the economy. Tariffs have been significantly lowered although there is reason to believe that they could be reduced further across all product lines. There is also reason to believe that non-tariff barriers could be further reduced as evidenced through the heterogeneous trade and industrial policy across the SACU region. The removal of tariffs along with other structural adjustment programs could encourage foreign direct investment in the region in labour intensive light manufacturing industries.

The macroeconomic background of the BLNS suggests that openness does not tell the full story relating to their growth due to their extremely high dependence on foreign aid and customs revenue. As such, the trade ratio and adjusted trade ratio results were all insignificant in the BLNS countries. Therefore, a definitive policy recommendation cannot be given. However,
future policy research arising out of these results could focus on the need for a reduction of the high import bill of SACU member states and a move towards labour-intensive export oriented activities in conjunction with internal infrastructure development initiatives. Future research could also look to untangle SACU revenue and foreign aid from GDP and measure the degree of openness without these two elements as this would provide a better view of the level of openness in the region. A further policy recommendation arising out of the openness results would be the opening up of strategic sectors such as agriculture and the services sector as efficiency and productivity are already low in these sectors. The econometric results show that an increase in openness in South Africa has been followed by a corresponding increase in investment, therefore it is envisaged that foreign capital and technical expertise might improve outcomes if restrictions were removed in these sectors.

While the econometric results show that a slight appreciation of the exchange rate has benefitted South Africa over the long-term, the manipulation of the exchange rate, as a trade policy tool would not be recommended to policy makers. Eichengreen (2007) cautions that whilst exchange rate policy can be used to jump-start growth it cannot merely replace other growth fundamentals such as the labour force, the saving rate or an environment conducive to investment. Therefore, the REER would be better viewed as a complementary tool to facilitate growth as opposed to a means to growth in itself.

Based on the macroeconomic review in chapter two it is evident that the SACU region has many structural deficiencies and challenges typical of developing nations such as high unemployment,
high inequality, poor public and health services, high poverty prevalence and inadequate infrastructure. The policy actions that the governments have taken are questionable in that there does not appear to have been much progress over the last three decades to alleviate many of these challenges. Two particular policy areas that have always been and remain areas of contention are agricultural policy and government procurement. As highlighted in chapter two, whilst agriculture’s contribution to GDP has been declining, its contribution to employment has been increasing and thus all of the SACU governments have identified it as a strategic sector probably because it is seen to possess low lying fruit capable of reducing the poverty levels.

The real challenge lies in the manner in which agriculture is used. Currently the sector is not productive being comprised of a majority of subsistence farmers, is in a region that is subject to frequent droughts and flooding, and is sealed off from foreign competition and investors alike due to the heavy protection of the sector. A similar story arises in government procurement and services with the energy, telecommunications, and transport sectors throughout the region requiring major investment and upgrades. Ironically whilst these sectors pose the greatest opportunities for employment and poverty reduction were investment to be injected they are the most protected. It is true that many western nations offer similar if not greater protection to their agriculture sectors, however, the difference is that the US, European Union and Japan are productive in other sectors and do not have a majority of their labour employed in agriculture. The reduction of barriers in the agricultural and service sectors along with adequate incentives could see the development and genuine expansion of value-added industries across the region such as dairy processing, fish processing industries for example.
Finally, it would be naïve to think that policy makers are unaware of the consequences of their actions or lack of actions, best illustrated through this response by Jean Claude Juncker when asked on Eurozone economic policy and democracy:

“We all know what to do, we just don't know how to get re-elected after we've done it”

Telegraph (2014).

6.4 CONTRIBUTIONS OF THE STUDY

This research has made the following contributions to various literature streams:

In the first place, the study contributes to the within country literature on trade liberalisation in small developing and least developed economies. The study demonstrated that trade liberalisation occurring through incidence and outcomes based measures has had an impact on economic growth in a small developing country such as South Africa. Price based measures suggest otherwise, although as noted by Eichengreen (2007) and Rodrik (2008) these should not be considered in isolation but rather as a complementary tool to other policies that support growth.

Secondly, the research fills a gap in macroeconomic research that has isolated Lesotho, Namibia and Swaziland by investigating the impact of trade policy on their economies from a general equilibrium perspective. This aspect of the research is a novel contribution to the LDC literature in that previous work has only tackled this debate from a cross–country perspective using older
less accurate data with countries like Lesotho, Namibia and Swaziland excluded from estimations due to the lack of empirical data.

Finally, the study also makes a methodological contribution in that it finds that the newer ARDL time-series method is a better measurement tool for the impact of trade liberalisation on economic growth than the commonly used panel data methods. Whilst panel data is a useful tool for cross-country analysis (see chapter 4) it makes the implicit assumption that the production functions across all countries under investigation are similar with no significant outliers. In the case of SACU countries, Lesotho and Swaziland appear to share similar economic characteristics, whilst Botswana and post-independence Namibia have similar levels of economic development and South Africa is seen to be on a very different growth path. Indeed, the EU has separate market access trade agreements with South Africa and the BLNS countries even though they are all members of the same customs union in recognition of the level of heterogeneity amongst SACU member states (WTO, 2009e). Thus, panel data estimations are unlikely to produce accurate measures of economic conditions in the region, which was a major finding of this research.
6.5 FUTURE RESEARCH

Whilst this study has not been able to resolve convincingly the trade and growth debate in all five countries, a number of potential research areas have arisen out of the study results:

- Future activity in this sector could look to develop non–tariff barrier indexes for the region and replicate this study using a combination of tariff and non–tariff barriers using the ARDL bounds test framework. This would present a clearer picture of the level of impact of incidence in the region.

- Future research in this sphere could be directed towards examining the relationship of the import demand function and GDP growth in the BLNS countries. This is particularly important when looking at an increase in openness and a reduction of tariffs, which would give consumers and industry greater access to foreign markets.

- Future research in this sphere could look to decompose the transmission routes of trade liberalisation by industry sector using dynamic stochastic general equilibrium (DSGE) models and also look at the effect of openness in such sectors’ productivity. This would provide guidance to policies aimed at boosting sector productivity and might shed further light into the effectiveness of infant industry protection policies that have been readily applied across strategic sectors such as agriculture and the services sectors where inefficiencies are currently present.

- A growing political concern is inequality. This study did not address welfare redistribution as the main focus was on strategies to increase the overall income to the
SACU countries. Future research could look to investigate the impact of redistributive strategies from trade income.

- The lack of data over the complete study period hindered the research to a certain extent and hence newly developed trade restrictiveness indexes by Anderson and Neary (1994) and Looi Kee et al. (2009) which are thought to provide a more accurate image of the level of distortion across a range of categories could not be used.
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1. **Adjusted Trade Ratios**

Pritchett (1996) developed structure adjusted trade intensity measures by estimating \((\text{exports and imports})/\text{GDP}\) as a function of country population, size, transport costs and GDP per capita. He then took the residuals from the corresponding regressions to be reflective of the level of distortion of recorded trade ratios. Spilimbergo et al. (1999) employed a similar approach using the gravity model of trade to estimate trade ratios as a function of population, income, distance from main markets, and factor endowments.

Using a theoretical underpinning similar to that employed by Pritchett (1996) and Spilimbergo et al. (1999) this study develops an adjusted trade ratio measure. The viewpoint used in developing this variable is that trade is determined by the geographical characteristics of a country, i.e. the area and population size of the country. Cost, Insurance Freight (CIF) is included as a proxy of transport costs which are believed to impede trade (Spilimbergo et al., 1999). In addition, according to the Heckscher Ohlin Model predictions, trade should also occur due to differences in country factor endowments which are proxied by GDP (Hiscox and Kastner, 2002). The proposed model is augmented further to include domestic policy actions such as the inflation and exchange rates, which may inhibit or promote trade activity. The central tenet of the model being that the level of trade of a country is determined by internal and external resource endowments, internal and external economic policies, demographic factors and the distance to markets. In a frictionless world these factors should accurately predict the level of trade that would occur. However due to trade policy and other unobservable effects such as non–tariff barriers, trade ratios tend to underestimate or overestimate the level of trade that should ideally have taken place. Therefore
the augmentation of the standard trade ratios is aimed at addressing the earlier criticisms in the literature see (Aitken, 1973) and (Pritchett, 1996).

The adjusted trade ratio is developed using a simple two–part process. In the first instance, the model is estimated in EViews employing panel data generalised least squares (GLS) using cross–section SUR weights. This option is preferred to ordinary least squares (OLS) as there is reason to suspect the presence of heteroskedasticity and autocorrelation due to GDP being present in both Trade Ratios and Income on both sides of equation A.1. The adjusted trade ratio model is stated in semi–log equation format as follows:

$$\log(TR) = \beta_0 + \beta_1 \log(Y) + \beta_2 \log(P) + \beta_3 \log(Lan) + \beta_4 \log(RER) + \beta_5 \log(CPI) + \beta_6 \log(CIF) + \epsilon_t$$

(A.1)

where $TR$ is (exports and imports)/GDP, $Y$ is GDP which is reflective of the size of the internal market and thus a proxy for its factor endowments, $P$ is the size of the country’s population, $Lan$ is the size of the arable land in hectares, $RER$ is the real effective exchange rate, $CPI$ is the consumer price index, $CIF$ is the proxy for transport costs, log is the natural log, $\epsilon_t$ is a random stochastic independent and identically distributed (IID) error term.

The model (Table A.1) had very good explanatory power with the Adjusted $R^2$ value accounting for 96% of all model variation. As expected due to the likely presence of serial correlation the
model had a low Durbin–Watson statistic of 0.77. However as explained earlier this was corrected for using GLS cross–section SUR weights. The F–Statistics was highly significant indicating that all variables jointly contributed to the determination of trade ratios.

Table A.1: Calculation of Adjusted Trade Ratios in SACU Countries

<table>
<thead>
<tr>
<th>Variable</th>
<th>Exp. Sign</th>
<th>Coef</th>
<th>Robust S.E.</th>
<th>t–Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
<td>14.24873</td>
<td>1.302207</td>
<td>10.94199</td>
<td>0.0000*</td>
</tr>
<tr>
<td>LNY</td>
<td>(+)</td>
<td>0.190106</td>
<td>0.064961</td>
<td>2.926475</td>
<td>0.0040*</td>
</tr>
<tr>
<td>LNP</td>
<td>(+)</td>
<td>-0.752379</td>
<td>0.082167</td>
<td>-9.156720</td>
<td>0.0000*</td>
</tr>
<tr>
<td>LNLAN</td>
<td>(+)</td>
<td>0.217169</td>
<td>0.068735</td>
<td>3.159496</td>
<td>0.0019*</td>
</tr>
<tr>
<td>LNRER</td>
<td></td>
<td>-0.604336</td>
<td>0.090476</td>
<td>-6.679546</td>
<td>0.0000*</td>
</tr>
<tr>
<td>LNCPI</td>
<td>(-)</td>
<td>0.140527</td>
<td>0.030710</td>
<td>4.575876</td>
<td>0.0000*</td>
</tr>
<tr>
<td>LNCIF</td>
<td>(-)</td>
<td>14.24873</td>
<td>1.302207</td>
<td>10.94199</td>
<td>0.0000*</td>
</tr>
</tbody>
</table>

Observations 160

R$^2$ 0.9638

Adjusted R$^2$ 0.9615

S.E. of regression 1.0247

F–Stat 443.3427*

Durbin Watson 0.7737

Hausman Test 14.566 Prob 0.0124

*Indicates significance at 5% level; **Indicates significance at 10% level
Following a similar framework to the one employed by Pritchett (1996), the residuals from this estimation are then taken to reveal the percentage of over or underestimation of trade ratios. Thus in the second part of the estimation (not presented), the actual trade ratios are multiplied by the residuals as predicted by the model to provide an adjusted trade ratio used as an indicator of trade liberalisation. It is expected that both the trade ratios and adjusted trade ratios variables will have a positive impact on economic growth due to the open nature of the SACU countries.