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The effect of BRICS trade relations on South Africa's Economic Growth

BY

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ABSTRACT

South Africa's joining of the BRICS was supposed to transform the economy into high levels of growth but this has not been realised to date. Critics have labelled the failure on BRICS policies vague towards import substitution, unfair labour practices and the collapse of the local industry through cheap imports and dumping incidences. The study addressed the central issue on whether joining BRICS has led to a sustainable growth as was envisaged.

An econometric assessment was done using two different estimation techniques, the Autoregressive Redistributive modelling on quarterly data from 1990quarter1 to 2014quarter 4 and the Dynamic Panel Data Analysis using the General Method of Moments on annual data from 1990 to 2014. Results from the Autoregressive Redistributive model were insignificant to explain the long-run relationship between trade, direct foreign investment and growth. Save for foreign direct investments, the short-run cointegration form for all regressors carried positive signs. The contribution of trade was little to instil significant effect on SA growth.

The Generalized Method of Moments results were insignificant to explain the growth effect of real exchange rate on the BRICS economies. The long-run effects of foreign direct investment and trade were positive and statistically significant. This reinforces the Autoregressive Distributive Modelling results which showed little trade impact and negative foreign investment impact in the short run and insignificant long run relationship.

Results from the Granger Causality test cement the argument. The tests results showed that Average trade balances with the BRIC, Average foreign direct investments and real effective exchange rates Granger Cause growth uni-directionally in both South Africa and the BRICS economies. On the other hand the null hypothesis that economic growth Granger Cause Average trade balances, Average foreign direct investments and real effective exchange rate bi-directionally was rejected.

The results were similar to the Autoregressive modelling and the General Method of Moments results which showed absence of any significant long run relationship with growth and little growth effects respectively.

These findings are an indication that little has been done to foster cordial relations in foreign capital investments and trade between South Africa and the BRICS, and hereby support claims that the BRICS grouping is meant to enrich the BRICS member countries at the expense of South Africa.

Unbalanced trading trends and foreign investment relations between South Africa and the BRIC reinforce the claims.

South Africa's exports and foreign direct investments in BRICS are concentrated in the primary sector with more than 65 percent of total output in iron and steel, ores, slag and ash and mineral fuels and oils. This has slowed growth as most of the BRICS have similar economic structures of less manufacturing and insignificant value addition. More so, the negative trade balance between South Africa and the BRIC has employment implications as the influx of cheap imports deters local production.

Proper governance of the BRICS institutions, especially the New Development Bank, tariff reviews, adoption of a single currency and value addition will serve as ways to improve BRICS trade with South Africa. On the other hand, increase in bilateral investment treaties, better regulation and review of competition policy will help in boosting South Africa's foreign investments with the BRICS.

Key Words: BRICS, Trade, Foreign Direct Investment; Economic growth, South Africa

DECLARATION

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Finally, immeasurable thanks rest with my family for their unequivocal support through my PhD studies.

DEDICATION

This thesis is dedicated to my daughter, Rutendo Salma with love

The name of the Lord is a fortified tower, the righteous run to it and are safe

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LIST OF ACRONYMS

AGE	Applied General Equilibrium
APEC	Asia Pacific Economic Co-operation
APTA	Asia Pacific Trade Agreement
ARDL	Autoregressive Distributive Lag
ASGISA	Accelerated Shared Growth Initiative for South Africa
BCB	Brazil Central Bank
BRIC	Brazil-Russia-India-China
BRICS	Brazil-Russia-India-China-South Africa
BBC	BRICS Business Council
BTTC	BRICS Think Tanks Council
CBR	Central Bank of Russia
CARICOM	Caribbean Community
CCCWS	China Centre for Contemporary World Studies
CIS	Commonwealth of Independent States
CMI	Chiang Mai Initiative
COSATU	Confederation of South African Industries
CRA	Contingent Reserve Arrangement
DBSA	Development Bank of Southern Africa
DIPP	Department of Industrial Policy and Promotion
EU-CA	European Union- Central Asia
EU-SA	European Union - South Africa
FDI	Foreign Direct Investment
FMCG	Fast-Moving Consumer Goods
GATS	General Trade in Services

GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
GMM	Generalised Method of Moments
GM	Gravity Model
GDFC	Gross Domestic Fixed Capital Formation
GVCs	Global Value Chains
HDI	Human Development Index
H-O	Heckscher-Ohlin
HSRC	Human Sciences Research Council
IPEA	Institute for Applied Economic Research
IPI I	Industrial Production Index
IPR	Intellectual Property Rights
IDC	International Development Cooperation
JSE	Johannesburg Stock Exchange
MERCOSOR	South American Common Market
MOFCOM	Ministry of Commerce China
NDB	BRICS New Development Bank
NEPAD	New Economic Partnership for Africa's Development
NGP	New Growth Path
NRC	BRICS National Committee for BRICS Research
OLS	Ordinary Least Squares
PIDA	Programme for Infrastructure Development in Africa
PLC	Product Life Cycle
PPC	Plant Protection Convention
PPF	Production Possibility Frontiers
PPP	Purchasing Power Parity

RBI	Reserve Bank of India
RDP	Rural Development Programme
RF	Russian Federation
SACU	Southern African Customs Union
SADC	Southern African Development Committee
SARB	South Africa Reserve Bank
SARS	South Africa Revenue Service
SITC	Standard International Trade Classification
SMME	Small, Medium Micro Enterprise
SPS	Sanitary and Phytosanitary Measures
Stats	SA Statistics South Africa
SSA	Sub-Saharan Africa
SBSA	Standard Bank of South Africa
TBT	Technical Barriers
UECM	Unrestricted Error Correction Model
UNCTAD	United Nations Conference on Trade and Development
UNComTrade	United Nations Commercial Trade
UNServiceTrade	United Nations Service Trade
UNDP	United Nations Development Program
UNIDO	United Nations International Development Organization
US	United States
VAR	Vector Auto Regressive
WITS	World Integrated Trade Solution

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

The rapid growth of the Brazil-Russia-India-China-South Africa (BRICS) initiative over the past decade has spearheaded a new engine for global economic growth (Bell, 2011). BRICS economies share several common characteristics, most important of which are their countries' size, human capital potential, macro-economic stability, institutions and openness to trade (Da Silva, Drumond, and De Almeida, 2013).

The acronym (BRIC) was originally coined by Jim O'Neill (2001) to highlight the exceptional role of important emerging economies, initially Brazil, Russia, India and China (BRIC) in economic growth and development (Morazán, Knoke, Knoblauch, and Schafer, 2012). Goldman-Sachs (2011) identified high growth rates, economic potential and demographic development as the impetus for global economic power for BRICS ahead of the Group of 7 (G7) economies. The leaders of BRIC economies held their first meeting in Yekaterinburg-Russia (June 2009), and established an equitable, democratic and multipolar political organisation (Morazán, et al. 2012). It is through these fundamentals, coupled with geographic and demographic dimensions, that South Africa was invited to join BRICS in 2010 (Goldman-Sachs, 2011).

BRICS accounts for over 30 percent of the planet's land and 45 percent of its population (Bell, 2011). In 2010, BRICS economies recorded spectacular growth rates with a contribution of 50 percent to global economic growth (SAGI, 2013). This was due to low labour costs, which attracted a significant portion of export-oriented foreign direct investment in their economies (Da Silva et al. 2013). More so the BRIC account for over 16 percent of world trade and combined foreign reserves of an estimated US\$4 trillion, raising projections of surpassing the G8 economies in trade prospects by 2025 (SAGI, 2013).

In 2011, BRICS' share of Gross Domestic Product (GDP), based on Purchasing Power Parity (PPP) amounted to about 25 percent (US\$13.7 trillion) and 12 percent (US\$465 billion) of global annual foreign direct investment (FDI) flows (SAGI, 2013).

South Africa's membership in BRICS was attributed to the achievement of inclusive growth and sustainable development as envisaged in the New Growth Path (NGP) (Oxford, 2012). The NGP was introduced in 2010 to address unemployment problems as well as economic growth (Van Aart, Van Tonder & Ligthelm, 2011). This complements a number of the macroeconomic policies

established since the advent of democracy in 1994, namely Rural Development Programme (RDP), Growth Employment and Redistribution (GEAR) and Accelerated and Shared Growth Initiative for South Africa (ASGISA) (Van Aart et al. 2011). Those macroeconomic policies had a common thread in the theme of employment creation and growth. Nevertheless the growth prospects as envisaged in these policies have not been realised to the full in South Africa, with 24 percent of the economically active in South Africa being unemployed by June 2010 (Stats SA, 2010).

According to Oxford (2012), South Africa joined BRICS in 2010 with three main objectives, namely: advancement of economic growth, increasing competitiveness and creation of jobs. South Africa's membership into BRICS facilitates growth through trade. In this regard international trade through export-led growth strategies is one of the fundamental reasons for South Africa joining BRICS (Oxford, 2012). Economic growth theories by Romer (1986) and Lucas (1988) amongst others support this stance taken by South Africa in becoming a member of BRICS (Polodoo, Seetanah, Sannasee & Padachi, 2012).

South Africa's export trade with the BRICS partners grew from 6.2 percent in 2005 to 16.8 percent in 2011, whereas its import trade with the BRIC countries increased from 13.6 percent in 2005 to 20 percent in 2011. The trade balance changed from a negative value of US\$57 billion in 2005 to a positive value of US\$8 billion in 2011(SAGI, 2013).

A comparative advantage of South Africa being a member of BRICS is its energy in the situ mineral wealth, worth an estimated US\$2.5 trillion (SAGI, 2013). South Africa is the world's largest producer of platinum, chrome, manganese, vanadium and gold. In addition, it offers mining professional services which are a major contribution to the BRICS resource pool (SAGI, 2013).

A further reason for South Africa becoming a member of BRICS is that BRICS countries are rapidly becoming a major source as well as recipients of Foreign Direct Investments (FDIs). According to UNCTAD (2013), BRICS outward FDIs rose from \$7 billion in 2000 to \$145 billion in 2012. Forty-two (42) percent of the FDIs are in developed countries, 49 percent in neighbouring economies of BRICS - in Latin America, the Caribbean, transitional economies, South Asia, South East Asia and Africa - and 9 percent intra-BRICS investment (UNCTAD, 2013). These FDIs have positive implications on South Africa's economic growth prospects. In this regard, opportunities for domestic companies to invest in BRICS countries increase the global competitiveness of South African companies and the commodities market is enhanced. On the whole FDIs through BRICS

membership has a potential to stimulate economic growth, thereby enabling South Africa to address some of its persistent problems of high unemployment and poverty (Da Silva et al .2013).

South Africa's growth opportunities lie at national as well as sectorial level. Increased international trade through the BRICS would allow the country to gain access to the latest technology, improved efficiencies, economies of scale in production and foreign markets. More so South Africa's profile as a global player will be enhanced. This has capabilities of raising the level of exports, investment in infrastructure through increased investment, employment creation as well as poverty reduction at a social level (SAGI, 2013).

1.2 Statement of the Problem

The invitation to South Africa to join the BRIC carries symbolic significance as an acknowledgement of the country's role in Africa and on the global stage (SAGI, 2013). Major treaties and agreements were signed since the inception of BRICS in 2010. These treaties amongst others are the Moscow declaration (2010) themed joint efforts for food security; Nagoya protocol (2010) on access to genetic resources and the fair and equitable sharing of benefits; memorandum of understanding for cooperatives (Durban, 2011); Sanya (2011) urbanisation and urban infrastructure forum; Rio declaration on environment and development with the main themes of green economy in the context of sustainable development and poverty eradication (GESDPE) as well as an institutional framework for sustainable development (2012); S&T senior officials in Dalian-China on research and development; BRICS inter-bank cooperation master agreement on extending credit facility in local currency (Durban, 2013) and the endorsement of the BRICS development bank (Durban, 2013) amongst others (SAGI,2013). These agreements translated into courses of action, with mergers, acquisitions and investment in almost all sectors of the economy.

Despite all these opportunities, South Africa's economic growth have been sluggish, posting an overall growth rate of about 3.9 percent in 2010, 3 percent in 2011, and 2.3 percent in 2012 (StatsSA, 2013). The first quarter of 2013 reflected an increase of 0.9 percent year-on year from 2.5 percent recorded in the fourth quarter of 2012, the slowest expansion since 2009 (StatsSA, 2013).

The problem is that South Africa finds itself at a crossroads in that the inclusion of South Africa to the bloc has been met with mixed reactions. Some critics feel that other emerging economies with faster economic growth than South Africa could have been included, since "fast economic growth" is a common denominator within the group. According to Gauteng Province Treasury Report

(2013), the inclusion of South Africa in the group is erroneous in that South Africa was too small to be compared to the BRIC economies. In this regard, the membership of South Africa in BRICS has somewhat weakened the group's power and can be contended that the BRICS bloc represents a grouping of convenience (Fabricius & Gumede, 2013).

On the other hand trade unions under Confederation of South African Industries (COSATU) expressed the opinion that BRICS is nothing but another wave of colonisers seeking resources from Africa (Business Day, March, 2013). Resource extraction policies and a colonialist outlook on African development were at the centre of tension in South Africa's membership in BRICS. Further, BRICS policies are vague with respect to import substitution, along with ensuring sustainability and commodity beneficiation for developing countries, particularly South Africa (Business Day, March, 2013). A very critical problem which relates to South Africa becoming a member of BRICS countries is that the economy will continue to be service-orientated; meaning that consumers will buy processed goods produced by other countries which will in turn deteriorate South Africa's trade balance leading to a further increase in unemployment. Since South Africa's economic growth is lower than the other member countries there is a great possibility that the bigger countries will dominate the BRICS agenda so that the bigger countries benefit more from smaller countries such as South Africa (Business Day, March, 2013). In this regard bigger countries are likely to exploit smaller countries' mineral and other resources to their own benefit. There is already a tension between South Africa and China where there are accusations that China is dumping cheap clothes and chickens and destroying jobs.

Several prior studies also explain the significance of FDI and trade in the process of economic development and even affirm positive linkages in intra-industry trade, for example; Lederman & Maloney, 2003; Arora & Vamvakidis, 2004 and Lo & Hiscock, 2015.

However, there also exist contradicting theory and literature that predict FDI in the presence of pre-existing trade, price, financial and other distortions will hurt resource allocation and slow growth, for example; Jenish, 2013 (intra-regional trade has extra-regional trade has negative effect on growth); He, Hao & Zhang, 2015 (Wider income inequality for BRICS after joining the World Trade Organisation); Kahya, 2011 (Negative relationship between exports and growth) and Kowalski et al, 2009 (Constant position of SA in global trade compared to BRIC and inconclusive trade effect of SADC preferential trade agreement on South Africa).

A plethora of studies including those mentioned above had inconclusive evidence and did not address the implications that trade balances and foreign direct investment balances could pose on South Africa's growth.

This study examines the existing pattern in the areas of BRICS trade and investment with a view to locate in the development context of South Africa. It establishes whether South Africa's membership of BRICS has yielded any economic benefits for the country in terms of economic growth and job creation.

1.3 Research Objectives

The main objective of the study is to analyze how BRICS trade relations impacts on South Africa's economic growth.

Specific objectives are as follows:

- i. To analyse the trends of economic growth, foreign direct investment and trade amongst the BRICS countries.
- ii. To econometrically assess the impact of South Africa's membership of BRICS on economic growth in South Africa.
- iii. To ascertain the impact of trade with South Africa on the growth of BRICS economies.
- iv. To forecast the future trading patterns of South Africa in BRICS and analyse the implications on economic growth.

1.4 Hypothesis

H_0 : South Africa's membership of BRICS does not impact negatively on South Africa's economic growth.

H_A : South Africa's membership of BRICS impacts negatively on South Africa's economic growth.

1.5 Significance of the Study

Although South Africa has been an official member of BRIC countries since 2010, these countries have been trading with each other long before BRICS was formally instituted. Numerous studies have investigated the impact of trade on economic growth in BRICS economies (Sridharan, Vijayakumar & Chandra, 2009; Cakir & Kabundi, 2011; Kuboniwa, 2011; Hosein & Khadan. 2012;

and De Castro (2012). However, none have tested the impact of trade balances and FDIs of BRIC countries on South Africa's economic growth. This study attempts to fill this gap by testing the trade balances of BRIC member countries specifically resulting from trade with South Africa as well as FDIs of BRIC member countries specifically originating from BRIC member countries into South Africa as well as from South Africa into BRIC member countries. In this instance, this study makes a contribution towards the body of knowledge by establishing an economic rationale for South Africa's membership into the BRICS alliance. The results of this study will provide policy makers at all government levels as well as commercial and private organizations and trade unions with scientifically tested evidence on a rationale for South Africa's membership of BRICS alliance.

1.6 Scope of the Study

The study is guided by the quantitative research methodology. Specifically the study uses econometric modelling, namely, Autoregressive Distributive Lag (ARDL) and the Dynamic Panel Data Analysis using the General Method of Moments (GMM) to analyse the data. The ARDL and the GMM are state of the art models that take care of issues such as multi-collinearity, endogeneity and non-stationarity among variables, problems that fail to be addressed by traditional econometric methods. In order to provide a conceptual framework, a literature review is provided in chapter two, wherein various theories relating to economic growth and trade are outlined. A detailed outline on research methodology is provided in chapter five.

South Africa is provided as the study sample mainly due to the differences it has with other BRICS partners in terms of growth, trade and economic fundamentals which trade unions and various organisations have cited as unjust and demeaning to South Africa's growth and welfare, and a way to siphon South Africa of her resources. The period from 1990 to 2014 is preferred due to data availability. Russia came into existence in 1994, but had trading relations with South Africa as the Soviet Union. The same applies to the other BRIC member countries and in foreign investments. Regardless of investment illegalities prior to 2003, China was an investment partner of South Africa. The BRICS originated in 2011, making 2011-2014 the test period, as structural changes in trade and investment between South Africa and the BRICS were expected. A dummy variable will take care for such changes to eliminate issuances of spurious regressions.

1.7 Delimitations of the Study

This study focuses mainly on the effect of trade and foreign direct investments of BRIC countries in the South African economy.

1.8 Ethical Considerations

This study uses secondary data and as such is not subjected to ethics approval. However, data will be used with integrity and where I used the work of others, due acknowledgement has been given to the sources.

1.9 Organization of Study

Chapter one provides an introduction and background to the study. A problem statement, research methodology, and significance of the study are also provided in the chapter. Chapter two provides a discussion on the theoretical and empirical literature review of the theories on trade and economic growth. Chapter three reviews the economic and trade cooperation in BRICS. The first section overview the trade, economic and country profiles of the BRICS economies. Following is a bilateral trade analysis between South Africa and the BRIC. The third section unearths the FDI linkages between South Africa and the BRIC. FDI analysis by sector and industry forms the major part of the chapter. Chapter four explores BRICS institutions, with particular reference to the New BRICS Development Bank (NDB) and the Contingency Reserve Arrangement (CRA). In chapter five, an in-depth discussion of the econometric methods used for analysis in the study is provided. The chapter also describes and explains data and variable selection used in the model. Chapter six provides a report and interpretation of empirical findings. The chapter is complemented by policy implications of the findings in chapter seven. The chapter also presents a summary of the main findings, conclusions and recommendations.

The next chapter provides a theoretical as well as an empirical literature review.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Theories on trade and growth have existed for many years and provide the guidelines necessary for industrial development of world economies. This chapter reviews theoretical and empirical literature on the impact of trade in BRICS on South Africa's growth. The chapter is divided into two sections. The first section discusses trade, foreign investment and economic growth theories. The second section provides empirical evidence on developed and developing countries. Studies done on BRICS economies and in South Africa reinforce the evidence.

2.2 Theoretical Literature

A plethora of theoretical literature has existed in explaining the behaviour and patterns of trade and growth over varying economies. This section is aimed at investigating only theories that are applicable to the Study. Theories on trade are developed from their traditional static nature to the modern dynamism of free trade. Similarly, growth theories are transitioned toward modern day endogeneity of growth.

2.2.1 Theories on Trade

Trade theory can be classified into two categories, namely traditional theory and new trade theory. Neoclassical foundations are envisaged in the traditional theory. These incorporate the principles of perfect competition, constant returns to scale and homogenous goods. For discussion in this section the following are included: the Heckscher-Ohlin theory, Leontief paradox, the factor-price equalisation theorem, Linder theory and the Export Led Growth theorem. New trade theories encompass the modern day dynamism of free trade. These theories focus on imperfect competition, increasing returns to scale, product differentials and technological innovations. Imitation Lag Hypothesis, Product Life Cycle Theory, Krugman New Trade Theory, the Reciprocal Dumping Model, the Gravity model and the monopolistic trade models of Dix-Stiglitz, Dix-Stiglitz-Krugman and the Rodriguez-Rodrik trade reviews will be discussed.

2.2.1.1 Traditional Theories on Trade

2.2.1.1.1 Heckscher-Ohlin theory

David Ricardo explained trade patterns among countries on the basis of comparative advantage, which he believed was as a result of different labour productivities among countries. However, he failed to explain the causes of the differences in labour productivities. The Heckscher-Ohlin theory (H-O) was postulated in an attempt to address the failure of the Ricardian theory in explaining the causes of different labour productivities among trading nations (Appleyard et al. 2010). The theory asserts that it is not only relative abundance of a resource that will determine comparative advantage of a country, but also the intensity of the use of resources in producing the commodities across different countries that will determine the pattern of trade. In drawing up the theory, Eli Heckscher (1919) and Bertil Ohlin (1933) made a number of simplifying assumptions, such as the presence of two countries, and two homogenous goods and homogenous factors of production whose initial levels are fixed and assumed to be relatively different for each country. The two commodities have varying factor intensities which are, however, similar for all factor price ratios.

In addition, the H-O model assumes fixed technology and constant returns to scale in production of both commodities in the two countries. Perfect competition and different factor endowments are also existent in both countries. Different factor endowments refer to the fact that nations differ in the amount of productive resources they possess. For instance, nations with relative abundance of capital will have relatively inexpensive capital goods. Relative abundance may be defined in a physical sense and a price sense. The physical definition explains factor abundance in terms of physical units of two factors, labour and capital, available in each of the two countries. This definition asserts that one country would be capital abundant if its capital to labour ratio exceeds that of the other country. The price definition relies on the relative price of capital and labour to determine the type of factor abundance characterising the two countries. One country would be capital abundant as long as the rental rate or price of labour is less than that in another country (Salvatore, 2007:132).

The theory postulates that with identical technology in both countries, constant returns to scale, and given a factor intensity relationship between final products, the relative differences in factor possession between countries forms the basis of trade. The relative abundance of a resource determines factor costs, which imply varying prices for the products. The main assertion of the theory is that a country should export the commodity that uses the relatively intensive, the relative

scarce resource. This means a country with abundant capital must produce relatively more of the capital goods, whilst a country with labour abundance should produce relatively more of the labour intensive goods.

In other words, the H-O theory argues that a country can gain from international trade only if it specialises in the production and exportation of the product based on its comparative advantage. After countries engage in international trade, both countries are able to consume and produce beyond the initial levels of their Production Possibility Curves (PPC) and indifference maps (IM) mainly due to specialisation. It can therefore be deduced that export diversification comes naturally to countries endowed with a lot of production resources in relation to other countries.

The H-O theory is not always applicable in the real world as sources of comparative advantage may also come from continuous research and innovation, not only from different relative factor endowments. Furthermore, the oversimplifying assumptions are a subject of further criticisms (Salvatore, 2007). Further studies such as the factor-price equalisation theorem and the Leontief paradox were conducted to extent on the H-O model.

2.2.1.1.2 Leontief Paradox

Leontief (1951) conducted the first empirical works to test the validity of the Heckscher–Ohlin theory using trade data for various countries. An input-output table of the United States (US) for the year 1947 was used for analysis. During that time, the U.S was regarded as the most capital abundant country in the world, meaning, in view of the Heckscher-Ohlin model, the U.S was supposed to export relatively more capital intensive products and import relatively more labour intensive products as compared to its trade partners.

Results from Leontief's research were more stunning and totally the opposite of the Heckscher-Ohlin model. He found out that US import substitutes were about 30 percent more capital intensive than U.S exports (Choi, 2001). In other words, the U.S seemed to export relatively more labour intensive products and import relatively more capital intensive products.

Leontief's results were questioned because of his use of data on import substitutes instead of imports. Choi (2001) argued that the bias could have been due to tariff policy of the U.S. The tariff policy was a levy charged on imports, so as to promote import substitutes. Further study by Kravis (1956) suggested that the most protected industries during that period were the labour intensive industries. This therefore distorted the natural flow of products between the U.S and its trade

patterns. In other words high tariff increases on imported goods forced the U.S to produce more local labour intensive products. The reason for using data on import substitutes in place of imports was the unavailability of foreign production data on actual U.S imports (Salvatore, 2007:148).

The year 1947 that Leontief used for testing the Heckscher-Ohlin model was very close to the World War II. This led to Leontief repeating the test in 1956 using U.S trade data for 1951. The results were not consistent with the Heckscher-Ohlin model, but showed that U.S exports were only 6percent more labour intensive than U.S import substitutes.

More so, Leontief's tests were biased because they used a two factor model and only considered physical capital as a measure of capital, completely ignoring human capital such as job training and education (Salvatore, 2007:148). Moreover, human and knowledge capital were not taken into consideration whereas they are also important factors that affect the pattern of exports and imports.

2.2.1.1.3 Factor-price Equalisation

Paul Samuelson's (1970) factor-price equalisation theorem states that factor prices in partner countries tend to converge towards equilibrium due to specialisation and trade (Samuelson, 1949). In autarky, factor price differences are high. This is due to differences in supply conditions as well as similar demand conditions for factors of production. Furthermore, the relatively abundant factor is comparatively cheaper in the country in which it is abundant and more expensive in the country in which it is scarce. The same applies to the prices of products produced in these different countries. For instance a labour intensive product is relatively cheaper in the labour abundant country but much expensive in the capital abundant country (Samuelson, 1948).

Samuelson's argument was that, as countries specialise, the demand for their respective abundant factors tend to increase in each country. For example, a capital abundant country will demand more capital to produce more of the capital intensive product, hence driving up the price of capital in that specific country. On the other hand, the price of the relatively scarce factor, labour in this case, will fall due to the decline in its demand.

In the theory, there is a relationship between the demand of commodities and the prices of factors of production which seem to be true in reality. For instance, a change in demand of one commodity is assumed to have a direct impact on factor prices and prices of final products. As the price of labour increases in the labour abundant country, so do the prices of labour intensive products in the other country. On the opposite side, due to the decline of wages in the capital intensive country, it

consequently leads to a decrease in prices of labour intensive products. According to the factor-price equalisation theorem, trade between countries continues to expand up to a point where factor prices are equal in different countries.

Even though price distortions may prevail in the markets, the factor-price equalisation theorem seems to be realistic in the real world. This is true only when the concept of profit maximisation by producers is completely ignored. However, in reality, the theory cannot hold because profit seeking is the main motive behind production and supply of products especially for private producers. More so, markets are always imperfect such that equalisation of prices in different countries may not be achievable. Finally, factor-price distortions and differentials may be prevalent beyond sufficient international trade due to differences in trade union power in different countries (Choi & Harrigan, 2003).

2.2.1.1.4 Linder Theory

Staffan Linder (1961) deviated from the supply side pattern of trade literature by focussing on the overlapping demand side of the economy (Sen, 2010). According to Linder (1961) representative demand in the trading nations for a range of goods demanded at the respective per capita income, determines the feasibility of trade across countries. The theory departs from supply based explanations of trade in terms of factor endowments or comparative costs.

Linder's main assumption is that consumers living in similar countries will have similar tastes and desire to buy the same goods and services. Linder observed that manufacturers producing goods for the domestic market seek out countries with similar economies and preferences when they decide to expand to the export market. This is true especially in developed countries, where a new product or variation on an existing product introduced in one country is likely to be found useful and desirable in similar countries. As a result, these countries trade variations of the same goods among themselves. The other assumption is of intra-trade industry trade. This assumption suggests that similar countries import and export each other's goods, and also similar countries import and export products from the same industry.

Empirical studies have confirmed the validity of the Linder's theory assumptions with expansion to other areas of development such as saving habits, industrialization and transportation systems found in recent literature (Sen, 2010).

The major advantage of Linder's theory lies in the theory's ability to explain intra-industry trade, product differentiation and south to south trade. Major criticism has been labelled in failing to clarify that the theory holds even in emerging economies nowadays. Empirical evidence from Bangladesh, India and Pakistan prove as such (Bukhari et al. 2005).

2.2.1.1.5 Export Led Growth

Federer (1982) led efforts to initiate the idea that foreign trade in particular exports has growth implications. In development literature, trade liberalization has been commended for externalities, technological improvement, economies of scale and increases in the exchange of goods and services in world markets. Federer formalised some of these ideas to come up with the export-led growth model (Ahumada & Sanguinetti, 1995).

The assumptions of the model includes, first, that the exportable sector generates positive externalities on other economic sectors through technological spill-overs and new management techniques. Secondly, factor productivity is higher in the exportable compared to the non-exportable. This means any trade policy that focuses on reallocation of factors of production into exports out from the other sectors of the economy will have a positive effect on aggregate output (Federer, 1982).

The neo-classical properties of production functions are utilized in the model. The model assumes that the economy is divided into two sectors, exportables (X) and non-tradables (N) and is formally presented as follows;

$$N=F(K_N,L_N,X) \quad (2.1)$$

$$X=G(K_X,L_X) \quad (2.2)$$

K_i, L_i (with $i=X, N$) denote the quantity of capital and labour used in each sector. The inclusion of the exportable output into the non-tradable production function (equation 2.1), where $F_X > 0$ captures the externality effect.

The assumption of factor productivity differential is shown by the following scenario;

$$G_K/F_K = G_L/F_L = 1 + \gamma \quad (2.3)$$

Where G_K, F_K and G_L, F_L represent the marginal productivity of capital and labour in each sector respectively. γ which is a positive constant, denotes the extent to which factor productiveness in the exportable sector exceeds that in non-tradable sector. This is a reflection of a disequilibrium

condition were static gains are obtained by allocating resources from one activity to the other, and/or the existence of taxes with a negative effect on exportable goods. Total output is the sum of production in both activities, and is presented as follows:

$$Y = X + N \quad (2.4)$$

Differentiating equation (2.4) and utilising (2.1)-(2.3), we obtain the following aggregate GDP growth expression:

$$\dot{Y}/Y = \alpha I/Y + \beta \bar{L}/L + [F_X + Y/(1+\gamma)] X/Y \dot{X}/X \quad (2.5)$$

I/Y is the investment-output ratio, \bar{L}/L is the growth rate of employment and X/Y is the export-output ratio. In equation (2.5) intersectoral spill-overs and productivity differentials have an effect on exports, which cause an increase in output growth rate beyond what is determined by the accumulation of capital and labour (Federer, 1982).

The export-led growth theory is criticised for failing to justify the long-run relationship between exports and GDP growth. For example, if investment and population growth are allowed, exports will increase to signal reallocation of resources towards the exportable sector. This allocation will reduce the marginal productivity of capital, making the productivity differential smaller (Ahumada & Sanguinetti, 1995).

Second, if the situation is one of equilibrium, and where the productivity differential is as a result of other inter-sectoral distortions, there will be no reallocation of production factors. Exports as production of non-tradable goods will rise at the rate that factor accumulation commands, and have no role in economic growth (Ahumada & Sanguinetti, 1995).

The same conclusion is drawn in respect to cross-sector externality. If the elasticity of non-tradable output with respect to exports declines ($F_{XX}/(Y-X)$), subject to X , the positive effect of exports on growth declines.

The solution to the criticisms of ELGM calls for a need to treat export growth as exogenous in terms of an explicit growth theory (endogenous growth model) (Ahumada & Sanguinetti, 1995).

2.2.1.2 New Trade Theories

2.2.1.2.1 The Imitation Lag Hypothesis

The Imitation Lag theory was developed by Posner in 1961. It is mainly based on the relaxation of the traditional theories' assumption of similar or identical technology in all nations. The theory postulates that there is a delay in the transmission of technology from one country to another such that achieving similar technology in different countries is a rare or impossible phenomenon (Appleyard et al. 2010).

Suppose there are two countries (Country A and Country B). If a new product emerges in Country A as a result of extensive research and innovation, the theory suggests that it will take some time for firms in Country B to produce the same product. The time it takes for Country B to start producing the new product from the time of its introduction in Country A is known as the Imitation Lag. The Imitation Lag period includes the learning period in which firms in Country B acquire necessary inputs and technical know-how for producing the product, installation of required equipment, processing of inputs and distribution of the product to the market (Swan, 1973).

The theory further makes another adjustment of time known as the 'demand lag'. The demand lag is the time taken by consumers in Country B to fully accept the new product as a good substitute for existing products from the time of its introduction. The demand lag is directly determined by the level of loyalty of customers to the existing products and the availability of information on the new product. The central point in the imitation lag hypothesis is that trade focuses on new products. Any nation can therefore diversify its exports by engaging in continual research, innovation and production of new products.

The Imitation Lag Hypothesis has considerable relevance for present day concerns about the role of technology in global competitiveness of firms. Furthermore, it seems capable of handling comparative advantage than in the traditional trade theories of David Ricardo and Heckscher-Ohlin.

2.2.1.2.2 The Product Life Cycle (PLC) Theory

This theory owes its existence to Vernon (1966). The Product Life Cycle Theory builds on the imitation lag hypothesis in its treatment of delay in diffusion of technology. The theory is more complete in addressing trade issues, as it relaxes on several assumptions of traditional trade theory. The reason behind the development of the PLC theory was the failure of the Heckscher-Ohlin theory to predict international trade patterns especially for the USA. The theory places emphasis on

manufactured goods and is concerned with the life cycle of a new product and its effects on international trade. The new product is expected to cater for the demands of the U.S. economy. Secondly, its production process is supposed to be labour saving and capital intensive in nature.

The PLC theory analysed the new product in three stages, namely: the new product stage, the maturity stage and the standardised product stage (Appleyard et al. 2010).

During the new product stage a new product is only produced and consumed within the borders of the country which introduced it. The theory suggests that there will be no international trade involved at this stage because the product is not yet accepted as a substitute by consumers from other countries. The new product stage is followed by the maturing stage in which some general features of the product start to show up. With more standardisation in the production process economies of scale start to be realised. This is in contrast to the assumptions of traditional theories of constant returns to scale. During the same stage, foreign demand for the product starts to grow especially from other developed countries. The rise in foreign demand aided by economies of scale leads to export trade from the host to other developed countries. Once the host economies' firms start selling to other high income countries, they will assess the potential of producing abroad as compared to local production. If the cost is favourable, foreign investment occurs resulting in export displacement of the host output produced abroad. The aspect of re-location of production from the host economy to other developed countries proves that labour and capital are immobile internationally as opposed to the Heckscher-Ohlin trade theory (Appleyard et al. 2010).

When the new product reaches the standardised product stage, its features and production processes become well-known. Production of the product may totally be transferable to developing countries.

Conclusively the PLC theory is more applicable in reality since it suggests a dynamic comparative advantage with the source of exports changing throughout the life cycle of the product. More so, high diversification of exports can be achieved through innovation and staying part of other countries. High export diversification is directly linked to growth.

2.2.1.2.3 Gravity Model

The gravity model is a recent method of modelling trade flows in international economics (Stark, 2012). The model draws its work from the law of universal gravitation in physics developed by Isaac Newton (Stark, 2012). The law of universal gravitation is described as the gravitational force between two masses in relation to the distance that lies between them (Newton, 1967). The gravitational force equation is presented as:

$$F_{ij} = G M_i M_j / d_{ij}^2 \quad (2.6)$$

The gravitational force F_{ij} is regarded as being proportional to the product of the two masses M_i and M_j , and inversely proportional to the square of the distance that keeps the two masses apart from each other. G is the gravitational constant, and is empirically determined.

The relationship postulated in the gravity model, is applicable to any situation where the modelling of flows is demanded. In international economics, the gravitational model is formally presented as,

$$X_{ij} = A Y_i Y_j / D_{ij} \quad (2.7)$$

Where X_{ij} is the export volume from country i to j , $Y_i Y_j$ are economic masses represented by each country's GDP. Distance A is the geographical distance between two countries' capital cities (Head, 2003).

A standard specification of the gravity model in international trade flows using equation formulations in equation (2.19) was developed by Tinbergen (1962). The following relationship was assumed:

$$X_{ij} = A Y_i^\alpha Y_j^\beta / D_{ij}^\gamma \quad (2.8)$$

There is no direct proportionality between the independent and dependent variable according to Tinbergen. The exponents α , β and γ take values different from 1, and they refer to the elasticity of the exporting country's GDP, elasticity of the importing country's GDP and the elasticity of distance. A scenario of $\alpha = \beta = 1$ and $\gamma = 2$, corresponds to the universal gravitation equation of Isaac Newton.

Justification of both countries' economical masses is made by specifying that the amount of exports country i is capable to supply depends on its economic size Y_i and its purchasing power/income Y_j

(Starck, 2012). This enables conclusions on each country's production capacity and market potential for sales of goods to each country.

Economic variables if combined together characterize the supply and demand forces affecting each country's market. These forces are necessary for determination of trade flows. Effects are comparable with the tax function and are dependent on trade barriers and transportation costs, resulting in the decline of equilibrium trade flows. Distance is regarded as a proxy for varying factors with an influence on trade, such as transport costs, synchronization costs, communication costs and transaction costs. Distance is defined as the index of information about export markets, which is the geographical distance between economic hubs of trading partners or distance between major cities measured in land miles (Tinbergen, 1962).

Gravity models have been useful in discussions on whether countries using the same currency, facing the same borders or being members of a common body such as WTO have advantages in trading (Starck, 2012).

Estimation of the model is usually done using the ordinary least squares (OLS). An error term ϵ_{ij} is added to the natural logarithm of equation (2.8) so as to infer a linear relationship which allows interpretation of coefficients as elasticity. The linear relationship is shown as follows:

$$\text{Log}(X_{ij}) = \log A + \alpha \log(Y_i) + \beta \log(Y_j) - \gamma \log(D_{ij}) + \epsilon_{ij} \quad (2.9)$$

The coefficients are interpreted as follows: A percentage increase in the exporting country's GDP (Y_i) result in α per cent increase in export volume *ceteris paribus*. Likewise, a percentage increase in distance between countries i and j will cause γ per cent decrease in trade flows everything else held constant. Error term ϵ_{ij} is independent and log-normally distributed (Starck, 2012)

2.2.1.2.4 Krugman New Trade Theory

Traditional theories of trade advocate the notion that trade could only arise and lead to mutual gains if countries differ in their technologies, resources and product categories (inter-industry trade) (Leao & Leao, 2009).

Paul Krugman departed from this notion and led efforts to show that trade can also arise in mutual beneficial ways even if the countries are similar in capacities. This trade he termed 'intra-industry trade', and portrays a two-way exchange of goods within a standard industrial classification (Leao & Leao, 2009).

In presenting his model, Krugman initially characterizes the autarkic equilibrium in a monopolistic competitive industry. He went on to analyse the effect of trade on that equilibrium (Leao & Leao, 2009).

In the autarkic equilibrium of the monopolistic competitive industry, all firms are assumed to be symmetric, which implies that the demand function and cost function are identical for all firms. This is regardless of them selling differentiated products. A typical firm is illustrated by the following cost function:

$$C=F+ c.Q \quad (2.10)$$

Where F represents the fixed cost, Q is the level of output and c is the firm's marginal cost, which is constant. This scenario implies economies of scale, because the larger the firm's output, the less is the fixed costs per unit (Leao & Leao, 2009). Similarly, average cost AC is expected to decrease as Q increases.

$$AC= C/Q= F/Q+ c \quad (2.11)$$

The implication of the AC equation above is that, given the size of the industry market (S), if the number of firms increase (n), each firm will produce less Q (S/n), which results in a higher average cost (AC) (Leao & Leao, 2009).

In a monopolistic competitive industry, the demand directed to the product of a typical firm decreases with its own price and the number of firms in the industry. It is increased by the size of the total demand for the industry's product and the average price charged by the firm's rivals (Krugman & Obstfeld, 2006). The total industry sales are unaffected by the average price charged by the firms in the industry. This gives an impression that firms gain customers at each other's expense (Leao & Leao, 2009).

In the presence of free entry and exit, the industry equilibrium is given by $P= AC$. This is the zero profit condition and is defined by the number of firms and the average price they charge. If the profit maximizing price of established firms is higher than their average cost, the firms will be making above-normal profits. This consequence results in new firms entering the market in a self-aggravating manner until the price is equal to average cost. Thus the equilibrium of each individual firm corresponds to the aggregate industry equilibrium (Leao & Leao, 2009).

To show the effect of trade equilibrium in the industry, Krugman created a combined larger market. The market allowed more varieties of goods to be produced at lower average costs than in any national market alone. Figure 2.1 shows a demonstration of Krugman's explanation

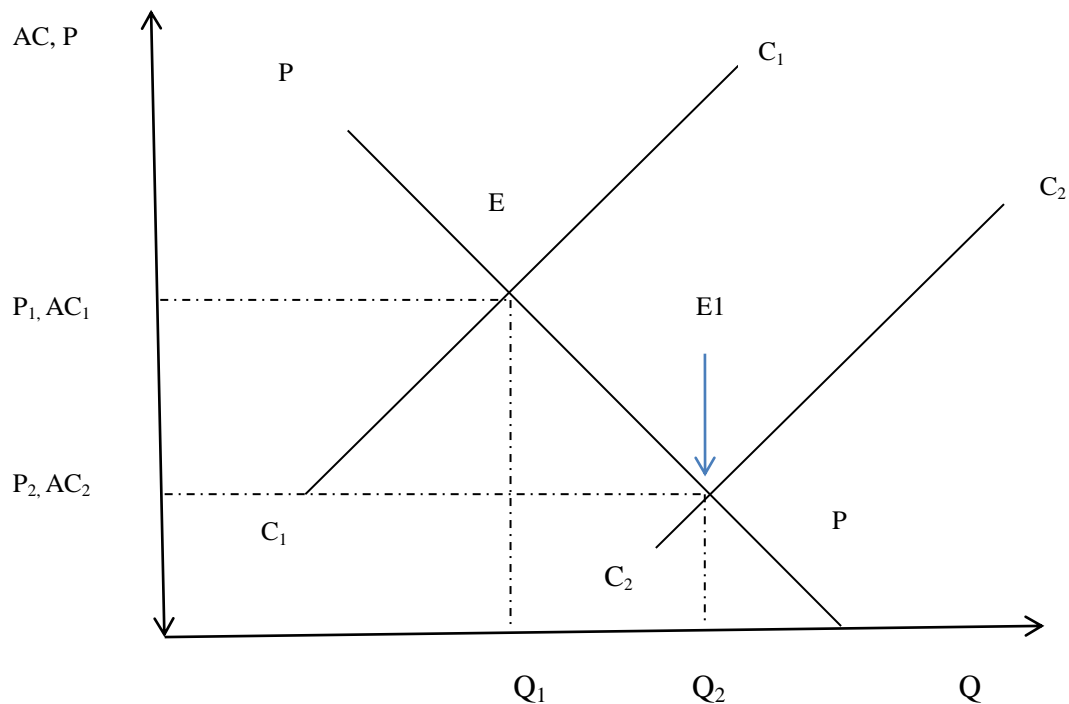


Figure 2.1 Krugman New Trade Theory Illustration

Source: Krugman & Obstfeld, 2006

According to Krugman (1979), in autarky the industry equilibrium for each country is at point E, price is P_1 and the number of firms is Q_1 . With the introduction of trade, the market size of the industry increases (S) and given the number of firms (Q), the sales accrued from each firm rise (S/Q). This results in the Average Cost (AC) of each firm falling such that the Cost Curve (CC) curve shifts from C_1C_1 to C_2C_2 . In other words, with the introduction of trade, the industry equilibrium shifts from point E to point E1. This will cause prices to fall from P_1 to P_2 . This scenario will lure more firms into the industry, such that the number of firms increases from Q_1 to Q_2 . The implication to consumers is that at point E1, a variety of products are available at a lower price than at point E (Krugman & Obstfeld, 2006).

Regardless of making a positive contribution to trade theory, Krugman 1979 failed to make explicit several aspects present in his demonstration. The effect of trade upon the demand curve faced by the

typical firm in each nation was not addressed, followed by how firms react to the change in demand curves they face and the short-term outcome of their behaviour. Finally, the reason for failure of firms and the role of this failure in adjustment towards final free trade equilibrium was also not explicitly spelt out (Leao & Leao, 2009).

Krugman (1984) extended on his base model by introducing trade protection in order to support exports and production but still fail to explain the criticisms.

2.2.1.2.5 Reciprocal Dumping Model

From a monopolistic price discrimination view, dumping in international trade is explained in terms of a profit maximising firm faced with a higher elasticity of demand abroad than at home. If this firm is able to discriminate between domestic and foreign markets, it will charge a lower price abroad than at home. Such accidental differences in country demands will result in dumping (Brander & Krugman, 1982).

Brander (1981) departed from the accidental differences phenomenon and developed a model in which the rivalry of oligopolistic firms acts as the major catalyst for trade, resulting in a two-way trade in identical products. The model is built to argue that the oligopolistic rivalry between firms naturally gives rise to ‘reciprocal dumping’, a situation whereby each firm dumps in another firm’s home markets.

The model is founded on the following assumptions:

- (i) The presence of two identical countries, one regarded as the domestic country and the other foreign.
- (ii) Each country has a firm producing commodity Z, and this firm is responsible for exporting goods from one country to the other.
- (iii) Each firm incurs transport costs in exporting to the other country.
- (iv) Each firm views the other country as a separate market, therefore it chooses the profit maximising output for each country separately.
- (v) Cournot perception is prevalent in each firm, as it assumes the other firm will hold output fixed in each country.

According to Brander & Krugman (1982), the domestic firm produces output x for domestic consumption and output x^* for foreign consumption. Marginal cost is a constant c , and transport costs is the marginal cost of export c/g , where $0 \leq g \leq 1$. On the other hand, the foreign firm produces output y for export to the domestic firm and output y^* for its own market. The foreign firm faces a symmetric cost structure. Using p and p^* to represent domestic and foreign prices, the profits accruing to both firms can be written respectively as:

$$\pi = xp(Z) + x^*p^*(Z^*) - c(x + x^*/g) - F \quad (2.12)$$

$$\pi^* = yp(Z) + y^*p^*(Z^*) - c(y/g + y^*) - F^* \quad (2.13)$$

F represent fixed costs, and asterisks show variables associated with a foreign country. The profit maximising choice of x is independent of x , and also for y and y^* respectively.

The domestic country only will be considered for the sake of symmetry. Each firm maximises profit subject to its own output, resulting in the following first order conditions:

$$\pi_x = xp' + p - c = 0 \quad (2.14)$$

$$\pi_y^* = yp' + p - c/g = 0 \quad (2.15)$$

Subscripts are used to show derivatives in equation (2.14) and (2.15) respectively. The first order conditions are implicit in form and their solution is the trade equilibrium. The solutions are presented as:

$$p = c\epsilon / (\epsilon + \delta - 1) \quad (2.16)$$

$$\delta = c\epsilon / g(\epsilon - \theta) \quad (2.17)$$

The variable δ stands for y/Z , which is the foreign share of the firm in the domestic market. ϵ signifies the elasticity of domestic demand $-p/Zp'$

Equation (2.14) and (2.15) are solved for p and δ , resulting in the following solutions:

$$p = c(\epsilon + g) / g(2 - \epsilon) \quad (2.18)$$

$$\delta = (\epsilon(g - 1) + 1(1 + g)) \quad (2.19)$$

The solutions are in equilibrium only if second order conditions are satisfied.

$$\pi_{xx} = xp'' + 2p' < 0; \quad \pi^*_{yy} = yp'' + 2p' < 0 \quad (2.20)$$

The following conditions are also imposed:

$$\pi_{xy} = xp' + p' < 0; \quad \pi^*_{yx} = yp'' + p' < 0 \quad (2.21)$$

Condition (2.21) means that marginal revenue declines when the other firm increases its output. This implies stability in equilibrium and less likelihood of being affected by demand structures.

Positive solution to equations v and vi implies the presence of two-way trade. A positive solution arises if $\epsilon < I / (I - g)$ at the equilibrium. This means price exceeds the marginal cost of exports ($p > c/g$) and that $\delta > 0$.

At equilibrium, each firm has a smaller market share of its export market than of its domestic market, therefore marginal revenue is expected to be high in the export market. Transport costs cause the marginal cost of delivering an exported unit to be higher than for a unit of domestic sales. This is, however, consistent with the higher marginal revenue realised. Perceived marginal revenue can equal marginal cost in both markets at positive output levels. This holds for firms in both countries, giving rise to two-way trade. Each firm has a smaller profit than cost in its export market than at home, resulting in reciprocal dumping (Brander & Krugman, 1982).

The reciprocal dumping model has been criticised as being pareto-inefficient. Some monopoly distortions persist after trade and high transport costs are incurred in cross-hauling (Brander & Krugman, 1982). With free entry and opening of trade, reciprocal dumping is welfare improving for the Cournot case. The competitive effect of having more firms and a larger overall market dominates the loss caused by increased transport costs.

2.2.1.2.6 The Dixit-Stiglitz Model

Trade theory has often pointed to perfectly competitive markets characterized by well- defined utility functions and homogeneous production functions with constant and decreasing marginal productivities and constant returns to scale.

Increasing returns are a prominent feature in many real world production processes and are the basis for the Dixit-Stiglitz model (1977). Often such production technologies are said to generate natural monopolies since an implication of increasing returns is that large production entities are more productive than smaller ones. The natural monopolies give rise to monopolistic competition. Such

markets are characterised by many producers who can enjoy some market power and free entry so that profit opportunities are limited (Emer Universitet, 2016).

Markets with monopolistic competition aspects can be modelled with increasing returns to scale production technologies. This is useful for application to international trade. Real world trade flows can hardly be explained by comparative advantage. The monopolistic market approaches supplement trade theory as they address how trade can be generated between similar countries and in the same industries (Intra-industry trade).

The Dixit-Stiglitz (1977) model is discussed from the demand, production, welfare and many industries point of view and has wide applications in many other economics topics such as growth theory, environmental economics, macroeconomics and microeconomics.

2.2.1.2.6.1 The demand side

The Dixit-Stiglitz (1977) model is characterised by a demand side that captures many product varieties. One specific approach for modelling this is to introduce a representative consumer who always demands the existing varieties. This is interpreted literally so that one assumes that every consumer prefers variety in the consumption basket. Another interpretation is that the demand system is for a representative consumer who is an aggregate of many consumers with distinct individual preferences for each variety. The constant elasticity of substitution (CES utility function) is used to represent consumers' preferences.

$$U(q_1, q_2 \dots q_N) = \sum_{i=1}^N q_i^{(\delta-1)/\delta} \quad (2.22)$$

Where q_i denotes quantity of consumption good i and δ is the elasticity of substitution among varieties. The general assumption is that δ is greater than 1 ($\delta > 1$). If δ is equal to infinity ($\delta = \infty$), the utility function is just the sum of consumed quantities of each variety. In other words consumers do not care if one good is substituted for an equal quantity of another (Emer Universitet, 2016).

A variety of the CES utility function where one imposes equal weights on all varieties converges to a Cobb-Douglas utility function.

$$\lim_{\delta \rightarrow \infty} \ln V = \sum_{i=1}^N (1/N) \ln q_i \quad (2.23)$$

$$V = e^{\sum_{i=1}^N (1/N) \ln q_i} \quad (2.24)$$

The expression is a Cobb-Douglas function for consumption of N goods where each has an expenditure share equal to $1/N$ and implies that a CES function of the type V approaches a Cobb-Douglas function where δ goes to zero (Emer Universitet, 2016).

2.2.1.2.6.2 The Production side

The model is also underpinned by increasing returns and the simplest means of introducing increasing returns is to assume that the production of a good involves a fixed cost in addition to a constant marginal cost, so that the average cost is decreasing in quantity. A labour demand function drawing from the production function is used;

$$l(g) = f + cq \quad (2.25)$$

Where l is labour demanded, f is the fixed cost of production and c is the constant marginal cost.

It is assumed that there are no economies of scale, so there is no reason for a firm to produce multiple varieties. Since consumers have an unbounded taste for variety, every firm will produce a distinct variety rather than producing another firm's type and losing profits to competition. The result is one variety per firm and one firm per variety.

2.2.1.2.6.3 Welfare

The Dix-Slignitz model can also be interpreted as a general equilibrium model for a closed economy. Consumers demand consumption goods according to their demand functions. The demand functions are derived from the CES utility function. Consumers earn their income from being part of the labour force. Firms employ workers for production of their individual varieties, produced under increasing returns to scale. The firms price monopolistically but free entry ensures that profits are squeezed away. Since firms are symmetrical, their price and produced quantities are similar. The number of firms is determined by the available labour force (Dix-Slignitz, 1976).

With reference to the utility function shown in equation (2.22), if $\delta > 1$, U increases with the available labour force. The higher is δ , the less does utility depend on the labour force. Increased population implies that a larger number of product varieties are on the market. Each firm produces the same amount (Dix-Slignitz, 1976).

Krugman 1979 produced a similar welfare model as of Dix-Slignitz (1976), but with a more general utility function. In that case, the elasticity of substitution depends on the consumption of each good. Therefore also the demand elasticity depends on substitution. When demand elasticity increases with

consumed quantity, increased population results both in more varieties and increased production of each variety and therefore lower costs (because of increasing returns) and lower prices (Krugman 1979).

2.2.1.2.6.4 Trade

Dix-Stiglitz (1976) model is expanded from autarky to free trade with more than one firm. From the welfare considerations, it is clear that this increases welfare. More product varieties become available.

The CES utility function has limited effects on trade. In the expressions for firms' output, produced quantity does not depend on market size. Firms' production is the same with and without trade, and trade merely involves more products being available hence the product varieties are imperfect substitutes but are of the same types. Consumers consume some of all varieties available.

The expansion of one sector model to two countries gives rise to intra-industry trade. In this scenario, technologies and preferences are assumed to be identical with the exception for size which is allowed to differ. Trade will therefore allow increased production per firm so that average costs decrease and reduces prices.

Drawing from the one sector model, consumers use some of all varieties available, also of varieties abroad. Exports from country a to country b are the following;

$$X_{ab} = N_a p_{ab} q_{ab} = N_a p_a \frac{P_{ab} - \delta w L_b}{P_b - 1 - \delta} \quad (2.26)$$

$$Q_{ab} = \frac{P_{ab} - \delta w L_b}{P_b - 1 - \delta} \quad (2.27)$$

Equation 2.26 gives exports as the value of sales per firm from country a to country b ($p_{ab} q_{ab}$), times the number of firms in country a . The second equation provides demand functions for countries' a and b , which are solved via a price index for country b to obtain total exports from country a to country b . Exports from country a to country b depends on the two countries sizes, and with trade, welfare as reported from the utility function increases for the small country at the same time there is increase in product variety (Dix-Stiglitz, 1976).

2.2.1.2.6.5 More than one Industry

Extension to the trade phenomenon identifies the Dixit Stiglitz (1976) demand system use in combination with demand for other goods. This is particularly convenient in models of more than one industry. One might, for instance, assume that there is one standard industry producing a homogenous good under constant returns to scale and one sector producing varieties of a differentiated good under increasing returns to scale. A common example where this approach is used is for models with an agriculture sector producing a homogenous good under constant returns to scale and a manufacturing sector producing differentiated goods under increasing returns to scale. The results are similar to earlier discussion in a one sector model demand set-up. Recommendations drawn with free trade are also necessary in this instance (Emer Universitet, 2016).

2.2.1.2.7 The Dix-Stiglitz-Krugman Model

The Dix-Stiglitz-Krugman (1980) model introduces trade costs in the Dixit-Stiglitz framework. It turns out that this has a new impact on trade: Due to imperfect competition and scale economies, market size or market access now matters in an independent way for the determination of specialisation and trade. Large countries will have a competitive advantage in the monopolistic sector. This is analysed in a model with a simpler supply side, with only one factor of production. This was called the “*Krugman model*”, due to its introduction in Krugman (1980) (Melchior, 2004).

2.2.1.2.7.1 Introducing trading costs: Krugman Extension

A home market effect can show up in two different forms: As a comparative advantage for X goods for a large country, or in the form of a higher factor rewards in the large country (Melchior, 2004).

In order to show this as simply as possible, we assume that there is only one factor of production (labour), of which countries have endowments L_h and L_f . Still we use i, j as country subscripts for common expressions. Trade in the X sector is allowed at some trading cost t , which we assume identical in both directions ($t=t_{hf}=t_{fh}$). Then overall utility is defined by the CES index

$$X_i = \left[n_i x_{ii}^{\frac{\sigma-1}{\sigma}} + n_j x_{ji}^* \frac{\sigma-1}{\sigma} \right]^{\frac{\sigma}{\sigma-1}} \quad (2.28)$$

$$\sigma > 1, i,j=h,f$$

Since firms within each country will be similar (except from making different varieties). Here x_{ji}^* is imports from the other country, and the reason for using an asterisk will become clear below.

Firms use c units of labour as marginal costs for every additional unit of x produced, and f units as a fixed production cost. Hence we have economies of scale in the production of each variety. The wage is w_i in country i .

The “iceberg trading costs” approach in Melchior (2014) is used to introduce transport costs. The approach assumes that some of the exports x_{ij} “melt away” during transportation. So if x_{ij} units are shipped, only x_{ij}/t arrive, $t > 1$. We will end up with $x_{ji}^* = x_{ij}/t$. This is so because we are dealing with consumed quantity.

With iceberg trading costs, transport cost does not enter the cost function, which may be written as;

$$C_i = w_i (f + c (x_{ii} + x_{ij})) \quad (2.29)$$

With iceberg trade costs, the firm will set the same price in the two markets, but consumers will receive less in the foreign market than the quantity shipped. A main thing to observe here is that t is a real cost and not a tariff (Melchior, 2004). It maybe transport cost or other resource cost related to exports. Since it is not a tariff, tariff revenue is therefore not considered when evaluating welfare.

Total profits of a firm in country i (excluding the distinction between x_{ii} and x_{ij} since the same price will be charged in both cases) is;

$$\pi_i = p_i x_i - w_i (f + c x_i) \quad (2.30)$$

Profit maximisation then gives;

$$p_i = \sigma c w_i / (\sigma - 1) \quad (2.31)$$

Equation 2.30 is equal to zero (the free-entry condition) hence it gives

$$x_i = f (\sigma - 1) / c \quad (2.32)$$

Since f and c are constants, we see also here that firm size is fixed by (2.32). The value of output will in this case be $x_i p_i = \sigma f w_i$ (Melchior, 2004).

2.2.1.2.7.2 Welfare in monopolistic competition with trading costs: Krugman model

If we substitute the demand functions $C_{Bi} = (1-a) L_i w_i$ and $X_i = a P_{xi}^{-1} L_i w_i$ into the utility function $U_i = X_i^a C_{Bi}^{1-a}$, we obtain the indirect utility function (2.33); Which represent the welfare of the whole nation (Melchior, 2004).

$$V_i = a^a (1-a)^{1-a} w_i L_i P_{xi}^{-a} \quad (2.33)$$

Dividing by L_i , we obtain welfare per labour unit,

$$v_i = V_i / L_i = a^a (1-a)^{1-a} w_i P_{xi}^{-a} \quad (2.34)$$

Welfare increases with the (nominal) wage level, and is inversely related to the price index for X goods. So the lower price for X, the higher welfare. p_B is set at 1, and does not affect the discussion. The price index is presented as;

$$P_{xi} = \left[n_i p_i^{1-\sigma} + n_j (p_j t)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (2.35)$$

The pricing condition tells that $p_i = \sigma c w_i / (\sigma - 1)$ so we may write

$$P_{xi} = \frac{\sigma c}{\sigma - 1} \left[n_i w_i^{1-\sigma} + n_j (w_j t)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (2.36)$$

Since welfare is *inversely* related to P_{xi} , it must be *positively* related to the bracketed expression. In order to compare the welfare impact of X prices in the two countries, we may therefore analyse how the bracketed expression is influenced by country size or a change in t . In the two-sector model with market size effects, this is particularly $w_i = w_j = 1$. Hence we obtain;

$$P_{xi} = \frac{\sigma c}{\sigma - 1} \left[n_i + n_j t^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \quad (2.37)$$

$$\text{if } w_i = w_j = 1$$

Then the solutions for n_i and n_j may be substituted in the bracketed expression, and one may analyse how it responds to changes in country size. From the expression, you see that Welfare is higher if a country has a large share of X production (n_i is large).

For a given allocation of production, welfare is lower if trading costs are high (since $t^{1-\sigma}$ is then smaller, $t > 1$, $\sigma > 1$). This means thereof that the larger country has a higher welfare level.

The welfare in each country, as well as the welfare gap, responds to a change in t . In fact you will find that the small country gains from trade liberalisation in welfare terms, even if its share of X production declines (Melchior, 2004).

2.2.1.2.7.3 Empirical relevance of trade models with monopolistic competition

The introduction of scale economies and imperfect competition in trade models implies that *market size* becomes more important as a determinant of trade (Melchior, 2004).

The Dixit-Stiglitz model as well as the “Krugman model” may explain intra-industry trade.

According to the Dixit-Stiglitz model, the volume of intra-industry trade will be higher with the more equal countries are in size. The model therefore provided a theoretical foundation for the empirical result that the proportion of intra-industry trade in total bilateral trade is higher between countries of equal size (Melchior, 2004).

Helpman and Krugman (1985, 173) also noted that high per capita income may reflect capital-abundance, and if the SDS sector is capital-intensive, we should also expect a higher proportion of intra-industry trade in trade between countries with high per capita income, and between countries with similar per capita income. This is also confirmed by empirical research (Balassa & Bauwens (1988 in Melchior, 2004).

There is, however, no firm evidence suggesting that intra-industry is highest in capital-intensive sectors, so the link between theory and data is weak on this point, however, there is strong evidence, however, that intra-industry is higher in sectors which uses skilled labour intensively (Melchior 1994).

The relationship between intra-industry and per capita income is not as suggested by Helpman and Krugman (1985) although the authors explicitly stated that the suggested relationship between capital intensity and was not confirmed empirically. The results are consistent with their model to the extent that high per capita income is explained by skill endowments (Melchior, 2004). .

The existence of market size effects represents another explanation why intra-industry trade is larger between countries of *similar* size. This is so if we control for relative size. Empirical findings from Melchior, 2004 support the findings.

2.2.1.2.8 Rodriguez- Rodrik Trade Discussions

Policies toward foreign trade are among the more important factors promoting economic growth and convergence in developing countries. Krueger, 1998 in Rodriguez & Rodrik, 2001 judges that it is straightforward to demonstrate empirically the superior growth performance of countries with outward-oriented trade strategies. Stiglitz, 1998 specifications of empirical growth regressions in Rodriguez & Rodrik, 2001 find that some indicators of external openness-whether trade ratios or indices or price distortions or average tariff level is strongly associated with per-capita income growth. Fischer 2000 in in Rodriguez & Rodrik, 2001 reiterated that, integration into the world economy is the best way for countries to grow. Such statements notwithstanding, if there is an inverse relationship between trade barriers and economic growth (Rodriguez & Rodrik, 2001).

According to in Rodriguez & Rodrik, 2001, simple measures of trade barriers tend not to enter significantly in well-specified growth regressions, regardless of time periods, subsamples, or the conditioning variables employed. Simple tariff averages underweight high tariff rates because the corresponding import levels tend to be low. Such averages are also poor proxies for overall trade restrictions when tariff and nontariff barriers are substitutes. As for the nontariff coverage ratios, they do not do discriminate between barriers that are highly restrictive and barriers with little effect. More so, there are conceptual flaws as such both indicators are clearly measured with some errors due to smuggling, coding problems and weaknesses in the underlying data amongst other problems (Rodriguez & Rodrik, 2001).

As a result of concerns related to data quality, recent literature on trade openness and growth has resorted to more creative empirical strategies. These strategies include; constructing alternative indicators of openness (Dollar, 1992; Sachs and Warner, 1995); testing robustness by using a wide

range of measures of openness, including subjective indicators (Edwards, 1992, 1998); and comparing convergence experience among groups of liberalizing and non-liberalizing countries (Ben-David, 1993); (Rodriguez & Rodrik, 2001).

2.2.1.2.8.1 Conceptual Underpinnings

According to Rodriguez & Rodrik, (2001), in a small economy that takes world prices of goods as given the relationship between trade restrictions and economic growth can be presented in three classifications; Firstly, in static models with no market imperfections and other pre-existing distortions, the effect of a trade restriction is to reduce the level of real GDP at world prices. In the presence of market failures such as externalities, trade restrictions may increase real GDP.

Secondly; in standard models with exogenous technological change and diminishing returns to reproducible factors of production, for example the neo-classical model of growth, a trade restriction has no effect on the long-run (steady-state) rate of growth of output. This is true regardless of the existence of market imperfections. However, there may be growth effects during the transition to the steady state. These transitional effects may be positive or negative, depending on how the long-run level of output is affected by the trade restriction.

Thirdly, in models of endogenous growth generated by non-diminishing returns to reproducible factors of production or by learning-by-doing and other forms of endogenous technological change, the presumption is that lower trade restrictions boost output growth in the world economy as a whole. But a subset of countries may experience diminished growth, depending on their initial factor endowments and levels of technological development.

Combined together, these points imply that there should be no theoretical presumption in favour of finding an unbiased, negative relationship between trade barriers and growth rates in cross-national data. The main complications are twofold. First, in the presence of certain market failures, such as positive production externalities in import-competing sectors, the long-run levels of GDP at market prices can be higher with trade restrictions than without (Rodriguez & Rodrik, 2001).

Second, under conditions of endogenous growth, trade restrictions may also be associated with higher growth rates of output whenever the restrictions promote technologically more dynamic sectors over others. Moreover in dynamic models, an increase in the growth rate of output is neither a necessary sufficient condition for an improvement in welfare (Rodriguez & Rodrik, 2001).

Since endogenous-growth models are often thought to have provided the missing theoretical link between trade openness and long-run growth, it is useful to reflect on why such models in fact provide an ambiguous answer.

Grossman and Helpman (1991), Feenstra (1990), Matsuyama (1992), worked out examples where a country that is behind in technological development can be driven by trade to specialize in traditional goods and experience a reduction in its long-run rate of growth.

Rodriguez & Rodrik, (2001) regarded such models as formalizations of some very old arguments about infant industries and about the need for temporary protection to catch up with more advanced countries. The issues were clarified with the help of a simple model of a small open economy with learning-by-doing. The model is a simplified version of that in Matsuyama (1992), except that Rodriguez & Rodrik, (2001) analysed the growth implications of varying the import tariff, rather than simply comparing free trade with autarky.

The tendency to greatly overstate the systematic evidence in favour of trade openness has a substantial influence on policy around the world. The major concern is that the priority afforded to trade policy has generated expectations that are unlikely to be met, and it may have crowded out other institutional reforms with potentially greater payoffs. In the real world, where administrative capacity and political capital are scarce, having a clear sense of policy priorities is of utmost importance. The effects of trade liberalization may be on balance beneficial on standard comparative-advantage grounds; the evidence provides no strong reason to dispute, however Rodriguez & Rodrik, 2001 disputed on the view increasingly common, that integration into the world economy is such a potent force for economic growth that it can effectively substitute for a development strategy.

2.2.1.3 Summary on Trade Theories

The main traditional trade theories of Hecksher Ohlin (1933), Paul Samuelson (1970) and Federer (1982) explain the occurrence of international trade through comparative advantages necessitating the exchange of goods. This they termed inter-industry trade.

The Hecksher-Ohlin theory was postulated in an attempt to address the failure of Ricardian theory in explaining the causes of different labour productivities among trading nations. In the Hecksher-Ohlin model, the country exports the good which makes more abundant use of its factor intensity.

Trade allows a shift in resources towards the sector that draws upon the abundant factor, and the value of aggregate output increases. The H-O theory is not always applicable in the real world as sources of comparative advantage may also come from continuous research and innovation, not only from different relative factor endowments.

Paul Samuelson's (1970) factor-price equalisation theorem states that factor prices in partner countries tend to converge towards equilibrium due to specialisation and trade. In autarky, factor price differences are high. As countries specialise, the demand for their respective abundant factors tend to increase in each country. Even though price distortions may prevail in the markets, the factor-price equalisation theorem seems to be realistic in the real world.

Finally, Federer (1982) led efforts to initiate that foreign trade in particular exports has growth implications. This he termed the 'export led growth model'. The assumptions of the model includes, first, that the exportable sector generates positive externalities on the other economic sectors through technological spill-overs and new management techniques. Second, any trade policy that focuses on reallocation of factors of production into exports from other economic sectors will have a positive effect on growth (Federer, 1982). The export-led growth hypothesis has been criticised for failing to justify on long run relationships between exports and GDP growth.

Most developing countries practice the traditional trade theory perspectives as they specialise in production of primary commodities ready to be exported to developed countries willing to trade in finished and semi-finished commodities. Most BRICS countries are still developing as such they follow the behavioural patterns as specified in the traditional theories of trade.

With the advent of globalization and international trading blocs, a new wave of theorist proposed a new set of theories that mostly opposed the founding principles of traditional trade theorists. These theorists reviewed beyond the two sector country model to a perfect market and monopolistic market systems. The new monopolistic trade theorists of Krugman (1979), Brander Krugman (1982), Dix-Stiglitz (1977), Dix-Stiglitz-Krugman (1980) and Rodrik-Rodriguez (2001) provides a distinct pattern of gains in trade even with similar country characteristics and resource endowments. Krugman shows that trade can also arise in mutually beneficial ways even if countries are similar. This trade he termed 'intra- industry trade', and shows a two way exchange of goods with standard industrial classifications. The model focused on the effect of trade on autarkic equilibrium of the monopolistic competitive industry. The model, though applicable to modern day theory, fails to address how firms react to the change in demand curves they face in the short term, the reason for

failure of the firm and the role of this failure towards final free trade equilibrium adjustment. Brander & Krugman (1982) developed the reciprocal dumping model to show incidences of the negative consequences of trade. The model is built to argue that the oligopolistic rivalry between firms naturally gives rise to ‘reciprocal dumping’, a situation whereby each firm dumps in another firm’s home markets. The reciprocal dumping model has been criticised as being pareto-inefficient.

Increasing returns are a prominent feature in many real world production processes and are the basis for the Dixit-Stiglitz model (1977) and Dixit-Stiglitz-Krugman (1980). Production technologies are said to generate natural monopolies which give rise to monopolistic competition. Such markets are characterised by many producers who can enjoy some market power and free entry so that profit opportunities are limited. The Dixit-Stiglitz (1977) model is discussed from the demand, production, welfare and many industries point of view, while the Dixit-Stiglitz-Krugman (1980) is an extension to the Dixit-Stiglitz (1977) model. Both models have wide applications in many other economics topics such as growth theory, environmental economics, macroeconomics and microeconomics

With the advent of the BRICS, trade shifted from the inter-industry basis of traditional trade theorists towards the intra-industry basis of the new trade theorists. Trade trends show South Africa importing the same products and components they export to partner countries. The same happens to most developing countries which have decided to trade in various regional blocs. Re-exports and value addition are a prerequisite for driving growth under the intra-industry trading basis.

2.2.2 Theories on Foreign Direct Investment

Numerous theories have been developed in FDI literature. These theories have been classified as microeconomic theories and macroeconomic theories of FDI.

Microeconomic theories focus on the characteristics of a firm that influence its decision making processes. These include market imperfections, market power and investment location theories.

Macroeconomic theories of FDI seek to investigate on a country’s characteristics that explain FDI inflows within and across countries. Examples include internalization and product cycle theories.

FDI literature has also reviewed theories that focus on FDI motives. This was so because there were anomalies in classifying them under the microeconomic or macroeconomic theories. These include natural resource seeking, market seeking and efficiency seeking theories.

This section discusses the FDI theories from each classification. Dunning's eclectic theory (1973), Hymer Industrial Organisation Theory (1963) and Blonigen (2005) motivational theories will be discussed.

2.2.2.1 The Eclectic Theory

The theory is postulated by Dunning (1973) and seeks to offer a general framework for determining patterns of both foreign owned production undertaken by a country's own enterprises and also that of domestic production owned by foreign enterprises. According to Dunning (1973), there are two types of investment that a firm can choose to undertake. That is, Foreign Portfolio Investment (FPI) and Foreign Direct Investment (FDI). FPI is defined as the passive holdings of securities and other financial assets, which do not entail active management or control of securities issuer. FPI is positively influenced by high rates of return and reduction of risk through geographical diversification. The return of FPI is normally in the form of interest payments or non-voting dividends. FDI is defined as the acquisition of foreign assets for the purpose of control (Dunning, 1973).

The eclectic theory is launched in three pillars of Ownership, Location and Internalisation (O+L+I). The three pillars are different questions that foreign investors seek to answer. The O pillar comprises of the ownership advantages that addresses the question why the foreign firms need to go abroad. According to Dunning (1985), this question hypothesizes that foreign firms have one or more firm specific advantages which allows them to overcome operating costs in a foreign country. The ownership advantages include core competency, brand name and economies of scale amongst others.

The L pillar addresses the question of location. According to Dunning (1985), the decision of the firm to move offshore is based upon the firm specific advantage in conjunction with factors in a foreign country. Factors such as land and labour are important in determining the location of a Multinational Enterprise (MNE) in order for it to make profits. Dunning (1985) further asserts that the choice of investment location depends on several complex calculations that include economic, social and political factors to determine whether investing in that country is profitable or not.

The I pillar represents the internalisation advantages on how to go abroad. The MNE have several options to choose from in their entry mode in a foreign country. Choices range from the arm's

length transactions (market) to the hierarchy (wholly owned subsidiary). The MNE can choose internalisation if the market does exist or functions poorly, that is transaction costs of the external route are high. Under the firm specific advantage, an MNE operating a plant in a foreign country can be faced with a number of additional costs in relation to their local counterparts (local competitor). These costs according to Dunning (1985) comprises of;

- i. Cultural, legal, institutional and language differences
- ii. Lack of knowledge about local market conditions
- iii. The increased expense of communicating and operating at a distance

The eclectic theory therefore points out that for a foreign firm to be competitive in a foreign country, it must have some kind of unique advantages that can help them overcome the cost associated with operating in the new country. These advantages are called ownership or firm specific advantages (FSAs) or core competencies and they help the foreign firm in generating high revenues for the same cost, or lower costs for the same revenues compared to domestic firms. Dunning (1997a) identified three main types of ownership advantages for multinational enterprises. These include;

- i. *Knowledge/technology* defined to include all forms of innovative ideas.
- ii. *Economies of large size* include economies of scale, scope, learning and broader access to financial capital and diversification of assets and risks.
- iii. *Monopolistic advantages* occur in the form of privileged access to input and output markets through patent rights and ownership of scarce natural resources.

Dunning (1997) reiterated that ownership advantages can change over time and varies with age and experience of the multinational enterprise. The firm must use some foreign factors in connection with its domestic Firm Specific Advantages in order to earn full rent on the FSAs. The locational advantages of various countries are keys in determining which country will play host to the MNE. Dunning (1997a) distinguished between three categories of country specific advantages (CSAs) as follows; Economic, Social and Political. The economic advantages include the quantities and qualities of the factors of production, size and scope of the market, transport, as well as telecommunications costs. Social advantages include psychological distance between the home and the host country, general attitude towards foreigners, language and cultural differences and the overall stance towards free enterprise. Finally the political advantages include the general and specific government policies that affect inward FDI inflows, international production and intra- firm

trade. Thus, an attractive (CSAs) package for a multinational enterprise would include a large and growing high income market, low production costs, a large endowment of factors scarce in the home country, politically stable economy and a country that is culturally and geographically close to the home country.

The eclectic theory points out that the existence of a special knowhow or core skill is an asset that can generate economic profits to a foreign firm. These profits can be earned by licencing the Firms Specific Advantage (FSA) to another firm, exporting products using the FSA as an input or setting up subsidiaries abroad. Furthermore the theory provides that a hierarchy (vertically or horizontally integrated) is a better method of organising transactions than the market (trade between unrelated firms) whenever external markets are nonexistence or imperfect. Thus internalisation advantages lead to preferentially wholly owned subsidiaries by MNEs over arm's length transactions. However in setting MNEs abroad, Dunning (1997) identified the following difficulties;

- i. Natural Market failure (natural imperfections).
- ii. Lack or insufficient information on pricing, costs and benefits.
- iii. Transaction costs under conditions of risk, uncertainty, moral hazard and adverse selection.
- iv. Structural market failure due to imperfections created by MNEs.
- v. Monopoly power exertion using oligopolistic methods, predatory pricing, cross subsidization, market cartelization and market segmentation.
- vi. Arbitraging government regulations and exploiting regulations in terms of tariffs, taxes, price controls and non- tariff barriers.

Furthermore, Dunning (1995) highlighted that FDI in developing countries is shifting from market seeking and resource seeking FDI to more efficiency seeking FDI. This is due to socio-economic pressures induced on prices, thus MNEs are expected to relocate some of their production facilities to low cost developing countries. Despite of these developments, FDI in developing countries is still directed at assessing natural resources and national or regional markets.

Like any other model, the eclectic theory has its weaknesses. It has been suggested in the theory that the OLI variables are independent of each other. This notion has received much criticism by international trade scholars. The understanding is that it is very difficult to separate these variables as they work hand in hand. For example a firm's response to its exogenous locational variables

might itself influence its ownership advantages and its ability and willingness to internalise markets. Therefore over time, the separate identity of variables becomes difficult to justify.

Kojima (1982) claimed that the explanatory variables identified by the eclectic theory under each pillar are so numerous that its predictive value is almost zero. Furthermore he, Kojima (1982) argued that the eclectic theory insufficiently allows for differences in the strategic response of firms to any given configuration of OLI variables.

The theory has been viewed in static or comparatively static terms. In this regard, it offers less guidance to the dynamics of the international process of firms and countries.

The eclectic theory is relevant to the study as it identifies the determinants of MNEs to invest abroad as portrayed in the OLI variables. For instance, in the case of the location advantage, foreign investors have the advantage of choosing the location where the plants will be built. In most cases these locations are close to the ports and harbours for the ease of transportation. Furthermore foreign investors have the ownership advantage which includes brand names, benefits of economies of scale and technology.

2.2.2.2 Industrial Organisation Theory

The theory is also known as micro- level theory of FDI and is attributed to the work of Hymer (1960). In the theory Hymer (1960) suggests that the decision to set up value-adding operations abroad depends on the industry and certain aspects of individual companies, rather than the country and national capital availability as suggested by Dunning (1973).

The theory makes emphasis on two main points. Firstly, the firms become MNEs due to their possession of competitive advantage and their ability to maximise their productivity by using this competitive advantage in another country. This however leads to the concept of ownership advantages as discussed by Dunning (1994). Secondly, the competitive structures of some industries would encourage firms to internationalise more than those in other countries.

Hymer's industrial organisation theory of FDI hypothesises that the rate of profit has a tendency to drop in industrialised countries. This is due to domestic competition, thus creating the propensity for firms in underdeveloped countries to engage in FDI. The theory considered tradable ownership

advantages and the removal of competition as key requirements for an individual firm in a given industry to invest overseas and thus become an MNE.

Hymer made four assumptions under the micro-level theory of FDI namely;

- i. In the post-war years, FDI was two-way between developed and developed countries. Other theories suggested that the flow of capital was one way from developed to underdeveloped countries.
- ii. A country was supposed to either engage in outward FDI or receive inward FDI only. Hymer observed that MNEs moved in both directions across national boundaries in industrialised countries. This implies that countries simultaneously receive inward FDI and engage in outward FDI.
- iii. The level of FDI was found to vary between industries. This means that, if capital availability was the driver of FDI, then there should be no variation since all industries would be equally able and motivated to invest abroad.
- iv. Due to local financing of foreign subsidiaries, it was not practically plausible that capital moved from one country to another.

Hymer (1976) strongly argued that MNEs can only exist in an imperfect market, when firms have non- financial ownership advantages compared to other firms in the same industry. This means that the determinants for MNEs lie with the individual firms, rather than country's capital availability as suggested by the eclectic theory of FDI. Hymer (1976) further discusses the nature of the market power approach of firms and their oligopolistic interdependence in collusive agreements, as they focus on domination of the market, the raising of entry barriers and the removal of conflict. Hymer (1960) asserts that firms invest abroad in order to dominate more markets, raise profits and create more conflict- removing oligopolies. This means only the largest firms, such as those in an oligopoly environment could sufficiently offset the costs of being foreign with their strong ownership advantages.

Congruent with Dunning (1973), Hymer believed that MNEs investing in foreign markets are, compared to local firms, faced with certain additional costs and risks in terms of knowledge of local market conditions, cultural, institutional and linguistic barriers and communication and transport costs. Thus firms that wish to invest through FDIs in these foreign markets must have specific advantages to gain a competitive on local firms in a foreign country. These advantages include advanced technology, Research and Development capabilities, superior managerial, administrative and marketing skills, access to low- cost funding and interest rate and exchange rate differentials.

Hymer was of the opinion that, in the world of segmented national markets which are dominated by home grown monopolists, a merger of two such firms or the acquisition of one by the other would result in externalities or internalisation of MNEs from the latter (creation of a firm spanning the two countries). Hymer therefore believed that MNEs were internalising externalities due to competition on markets for final products. In simple terms this means that as competition intensifies between two firms on markets for final products, prices charged on consumers are lowered such that they end up losing their monopoly profits. Hymer identified a positive relationship between oligopolistic market structures and FDI by United States firms. This leads to the conclusion that competitive conditions and firm specific advantages influence FDI positively. This is in agreement to arguments suggested by Dunning (1973).

Hymer's theory has been criticised openly by other scholars. Yamin (2000) stated that Hymer discusses the theory behind how and why firms invest in international markets, but ignores how firms operate efficiently in other countries, including their use of advantages. Yamin observed that Hymer assumed firms were merely reacting to structural market failures, whereas in reality firms are in fact proactive in their use of advantages.

Hymer (1976) believed that a firm's main objective was profit maximisation and expansion. However, Yamin (2000) argued that firms actively employ and develop assets with the aim of improving internal efficiency. Thus it is believed that oligopolies succeed through their size rather than possessing an ownership advantage, as the purpose of oligopolies is to remove conflict, whereas assets increase competition and encourages innovation.

Hymer (1976) proposed that only oligopolies can invest abroad, however this is not the case nowadays. This denotes the decrease in importance of market power as a final strategy in the location of MNEs.

Another weakness of the industrial organisation theory it is largely based on the market power approach, completely ignoring the costs associated with making transactions to invest abroad. Dunning and Rugman (1985) believed that cognitive market failures require transaction- specific assets to minimise these costs, but Hymer only included tradable advantages, such as scale economies and technologies when making decisions to invest abroad.

The industrial organisation theory is relevant to this study as it points out the reason why foreign investors decide to set up value adding operations abroad depending on industry and certain aspects of individual companies. Firms that want to invest through FDI must therefore have competitive edge on local firms in destined countries through technology, Research and Development, access to low funding, favourable interest rates and exchange rate differentials.

2.2.2.3 Blonigen FDI Decisions as Influenced by Motivators

Blonigen (2005) considers on a set of factors on a set of factors investigated by empirical literature on the extent and direction of FDI. In particular, he emphasised on the effects of exchange rates, taxes, trade flows and trade barriers.

2.2.2.3.1 Exchange Rates

Exchange rates are used to determine on the choice between expected returns of different decisions of investment. Exchange rate volatility, which is the main determinant of FDI, has both positive (Goldberg & Kolstad, 1995) and negative effects (Urata & Kawai, 2000). Notwithstanding, it is possible to make precise decisions on the grounds of different motivations underpinning FDI decision. When FDI is resource driven, a positive relationship between *exchange rate volatility* and FDI arises. In these instances, outsourcing becomes the relevant alternative to resource seeking FDI, and also the FDI option is preferable because the price of buying intermediate goods will be higher when acquired through outsourcing than through the parent company (Blonigen, 2005).

The same scenario happens to market seeking FDI, the effect is positive given that the alternative available is of exporting goods surrounded by increasing uncertainty due to exchange rate fluctuation. FDI will be preferred since they consist of transfers internal to the firm and are more protected against the volatility of the currency (Blonigen, 2005).

In the case of non-market asset seeking FDI, the choice of investing through FDI will be postponed because of optimistic higher profits in future, yielding a negative relationship between volatility and FDI (Campa, 1993 in Franco, Rentocchini & Marzetti 2008).

On the *level of exchange rate*, literature identifies a positive relationship between depreciation of the local currency and FDI (Barrel and Pain, 1998). In this scenario we need to differentiate between localization and internalization determinants. In the case of resource seeking FDI, the effect is positive as imports become expensive if the exchange rate depreciates. With regard to market

seeking FDI, the effect of the internalization determinant will be positive due to the fact that an increase in the exchange rate decreases the cost of acquiring an asset abroad, at the same time decreases the nominal profit gained by the FDI activity (Franco et al, 2008). The localisation determinant component can be distinguished between perfect and imperfect capital market. The effect is negative for perfect market as there are no possibilities of taking advantage of internal prices. In the latter case, the firm may act through prices in order to raise nominal profits. In the case of non-market asset seeking FDI, the effect is positive because in the short run the price of the assets will decrease such that it is not convenient to delay acquisition.

Mostly from a theoretical point, an increase in the *expected exchange rate* may lead to a current reduction of the amount of FDI. This effect will be negative when the choice is between trade and market seeking FDI. When the choice is between outsourcing and resource seeking FDI, the effect is less negative due to the existence of long-term contracts. Once FDI is chosen as a local strategy for local determinant, expected exchange rates do not impact on the level of the FDI because all the transfers are made internally to the firm. The case is similar for resource seeking, market seeking FDI and for non-market seeking FDI.

2.2.2.3.2 Trade Effects

With reference to trade effects from different measures of trade protection (Blonigen, 2002) reached positive results blurred to confirm what he termed tariff jumping hypothesis. Blonigen (2005) considered the same results and suggested that the literature had not considered trade effects of FDI that are closely linked with FDI motivators. It is affirmed in this case that the choice of serving the foreign market through FDI would have been taken already, a reason why the effect is only with reference to the localization choice. Franco et al, 2008 classification revealed a null effect in non-market asset seeking FDI, explained by the reason that the goods are insensitive to trade protection as they do not pass through the market. The effect is positive in market seeking FDI as trade and FDI are substitutes. In resource seeking FDI, the effect is positive because goods are exchanged between two countries sensitive to higher trade costs.

2.2.2.3.3 Taxes

Similarly to exchange rate movement, a number of taxes affect FDI. Blonigen (2005) emphasised on the role of corporate income tax rates in host economies. A higher host country tax rate discourages FDI with a median elasticity tax -rate on FDI of -3.3 percent (De Mooij & Ederveen 2003 in Blonigen, 2005). Taxes effect of FDI also varies on the type of taxes, the form of FDI and the influence of government policy (Blonigen, 2005).

Another empirical issue is on how parent companies should deal with double taxation in both the host and parent company). Two standards methods to deal with double taxation are for the host country to offer credit or a reduction of foreign tax payment made by the multinational company (Blonigen, 2005). Mixed evidence was found on U.S 1986 tax reform which identified mixed results for differences in FDI behaviour under different parent country tax regimes (Swenson, 1994 in Blonigen, 2005). Affirming results came from Hines (1996) which finds that the U.S taxation decreases FDI more for non-credit-system foreign investors than credit-system foreign investors (Blonigen, 2005). Another significant contribution is on tax competition between countries competing for FDI (Janeba, 1995) and the impact of bilateral tax treaties between countries (Chisik & Davies, 2004).

2.2.2.3.4 Trade Protection

Tariff and non-tariff trade barriers also form the basis for FDI. In the case of resource seeking FDI, the effect is positive. This is so because multinational companies acting on internal prices can build a more favourable setting which offsets the negative sign from tariffs imposed on goods' re-import (Blonigen, 2005 in Franco et al, 2008).

In the case of market seeking FDI, a tariff-jumping hypothesis ensures, which means that the multinational companies will invest through a foreign affiliate in order to avoid the higher costs of serving the foreign market through exports (Blonigen, 2005 in Franco et al, 2008).

For non-market asset seeking FDI, the effect is insignificant because higher tariff barriers do not have influences on the price of the resource the firm is looking for.

2.2.2.3.5 Other factors

Wei, (2000) in Blonigen (2005) discussed on other factors with an effect on FDI. These include trade policies, agglomeration and information externalities.

Institutions are also responsible for FDI inflows are divided into two segments; those relative to the social and political issues (corruption, infrastructure and bureaucracy) and those relative to the technological environment (patents and intellectual property rights). This was reinforced by recent literature which supports that good institutions are the driving force for increasing FDI inflows (Franco et al, 2008).

The other contribution is on how FDI impacts on parent and host country's wages, technological spill-overs and economic growth. The wage inequality effect of FDI argues that if multinational

companies have different technologies which demand different types of labour than local firms, increased FDI can lessen or increase existing wage inequality. Results from the U.S using industry – level data finds little to no impact of outbound and inbound FDI on U.S wage inequality (Slaughter, 2001 in Blonigen 2005).

Literature on productivity spill-overs from FDI is vast compared to the one on wage spill-overs. The evidence is mixed due to ambiguity in theory and difficulty in identifying spill-overs in data, a situation discussed by Harrison (1999) in Blonigen (2005).

Literature on the effect of FDI on the host economy growth is often gauged by endogeneity bias, and often relies on cross-country data which is poor. The sensitivity of these studies was pointed out by Carkovic and Levine (2005).

A detailed empirical analysis of how FDI has affected BRICS economies is presented in the third section.

2.2.3 Theories on Economic Growth

Theories on economic growth have existed for many years and provide a basis for understanding the role that savings and investments play in the industrial development of economies. Among these is the Keynesian growth theory as portrayed by the Harrod-Domar growth model which will be discussed in the next section. This is followed by the Neo-classical growth theory and the New (Endogenous) growth theory

2.2.3.1 Harrod-Domar Growth Model

The Harrod-Domar growth model represents the Keynesian economics school of thought. It models growth as an outcome of the equilibrium between saving and investment.

According to Nafziger (1997:123), Harrod designed the model in an attempt to establish the rate of growth in income that would induce equilibrium between saving and investment. The fundamental variables in the model include capital accumulation and the ratio of increase in output to increase in investment. This can be represented as ΔK and $\Delta K/\Delta Y$ respectively. The change in output is a result of change in capital stock ($\Delta Y = \Delta K$). The change in capital stock is due to investment, thus $\Delta K = I$.

In order to determine whether or not the actual growth rate will create a situation where desired investment equals desired saving, Harrod (1939:79) distinguished between three different growth rates, actual growth rate (g), warranted growth rate (g_w) and natural growth rate (g_n).

The actual growth rate is shown as a ratio of saving out of income s to the ratio of change in capital to the change in output ($\Delta K/\Delta Y$). This is shown as:

$$g = s/c \quad (2.38)$$

Substituting the expressions for s and c into equation (i) gives $s/c = S/Y / (I/\Delta Y)$, which show output growth, when savings(S) = investment (I) and $\Delta Y/Y$ indicates the growth of output.

According to Harrod (1939:80), the warranted growth rate is the growth rate that encourages investment, such that investment and saving are in equilibrium and the capital stock is fully utilised. Thus desired expenditure equals output, that is $g = g_w$. This provides the basis for economic agents and entrepreneurs to continue investing, at the same time encouraging economic growth.

In a situation where the desired level of saving is not equal to the desired level of investment ($g \neq g_w$), the output growth rate will translate into a recessionary or an inflationary gap.

Harrod (1939:81) made an analysis of two scenarios, that is when the actual growth rate is greater than the warranted growth rate, $g > g_w (\Delta K/\Delta Y > I/\Delta Y)$, and when the actual growth rate is less than the warranted growth rate. $g < g_w (\Delta K/\Delta Y < I/\Delta Y)$. In the first scenario ($g > g_w$), investment is not enough to maintain a constant capital stock growth. As a result, an inflationary gap opens. With increased investment, the inflationary gap widens due to an increase in actual output, emanating from an increased demand for factor inputs.

In the latter case, when $g < g_w$, desired investment exceeds the current capital stock growth rate. Resources become idle and investment is discouraged. This will result in a recessionary gap. The significance of this disequilibrium is that it will be self-aggravating. This is because when $g > g_w$, an incentive to invest is initiated, while when $g < g_w$, there will be a disincentive to invest.

Domar (1947:81), working independently of Harrod, agreed with Harrod's conclusion that a departure of the economy from the equilibrium was self-aggravating. He pointed out that investment, while contributing to aggregate demand via the multiplier, also increases supply through its effect on expanding productive capacity. He established the rate of investment that provides a basis for supply to equal demand at the potential income level. This equilibrium requires that,

$$Y_d = \Delta Y_s \quad (2.39)$$

Where $\Delta Y_d = \Delta I/s$, which implies that a change in the level of investment $\Delta I/s$ causes a change in the level of demand ΔY_d and also causes a change in the level of supply ΔY_s by

$$Y_s = I\delta \quad (2.40)$$

δ resemble capital stock productivity. Thus the investment growth rate $\Delta I/I$ must equal investment and capital stock productivity for full equilibrium to exist.

The Domar analysis of growth did not guarantee full employment of labour, even in the presence of full utilisation of capital stock, hence giving an allowance for Harrod's natural growth rate. This follows Thirwall's (2003:140) proposition that the actual growth rate cannot exceed the natural growth rate.

This is in instances when all the active labour force is employed. Thus it is of paramount importance to establish the economy's long run relationship between capital growth and labour force growth which aggravates to full employment.

The Harrod-Domar growth model gives a clear outline of the development problems facing less developed nations. This is especially with regard to production techniques. According to Thirwall (2003:141), developing countries can alter the capital-labour ratio when they shift towards the use of more labour-intensive production techniques without compromising on output levels.

Failure of the Harrod-Domar growth model in achieving steady growth at its potential level gave rise to the introduction of other growth models that allowed the substitution of economic variables, such as the neoclassical growth model and the new endogenous growth model.

2.2.2.2 Neoclassical Growth Model

The Neoclassical Growth model was developed by Robert Solow and Trevor Swan in the 1950s. The model entails that the rate of growth of GDP is increased by a higher share of GDP devoted to investment, decreased by a higher rate at which the physical capital stock depreciates, and increased by faster growth in technology or total factor productivity (Solow, 1962).

The neoclassical growth model assumes that technological progress is exogenously determined and its level is the same across countries. It is renowned for its use of the Cobb-Douglas production function and assumes that, first, the labour force growth is constant; second, all saving is invested,

that is, saving (S), investment (I) and the propensity to save (sY) are all equal; and, third, output Y , is determined by the interaction of capital and labour, that is,

$$Y = F(K, L) \quad (2.41)$$

The production function $Y = F(K, L)$ shows constant returns to scale and diminishing returns to scale of the variable factor, in the event of other factors being held constant (Mankiw, 2003:83). These assumptions will then be used in explaining why the economy reaches a steady-state level of growth when capital per worker and the investment requirement are in equilibrium.

The model asserts that the increase in the labour supply and/or investment in equipment and machinery increases productivity. Technological change is regarded as a major contributor to productivity through invention and innovation (Burda & Wyplosz, 2001:44). Increase in capital stock, which takes the form of physical or human capital, is also capable of increasing labour productivity. Physical capital emanates from investment in real capital. Human capital involves human investment in education and training (Becker & Barro, 1988:66).

The criticism against the neoclassical growth model gave rise to the endogenous growth theory. The assumption of perfect competition assumes that equilibrium will be achieved, ensuring maximum allocation of resources by markets themselves. When markets fail to clear, uncertainty emerges and information becomes imperfect. This causes instability in expectations and accrues in the market as investment plants are scaled down. The effect of change in investment plans impacts negatively on economic growth.

Solow brings in technological change when the growth process reaches a steady state. This type of technical process is assumed to be neutral. It is not responsive to any forces in the model. Thus it becomes difficult to discuss the extent of technological change in the model.

Another assumption of the neoclassical model, that technology is exogenously determined, and its level of availability is the same throughout the world, has been criticised by Stonier & Hague (1975:621), who argue that technology in the model is tradable in a perfectly competitive market where it is freely available and is endogenously determined for long-run economic growth.

The new endogenous growth theory will be discussed in the subsequent section, in an attempt to overcome the problems of the neoclassical theorists.

2.2.2.3 New (Endogenous) Growth Theory

The New Endogenous Growth theory covers the loopholes of the neoclassical growth theory, which assumes that technological change is exogenously determined in explaining long-run economic growth. This has resulted in failure to explain differences in technologies across countries. These technological differences help to explain why some countries are rich and others are poor.

The new growth theory provides a model where technology is endogenously determined. Technology is envisaged in the model by introducing a sector of research and development that produces new ideas. The ideas are used to manufacture capital goods in monopolistic competition which allows researchers to earn profit from their efforts. The sector that produces final goods uses them as factor inputs (Romer, 1993:76).

According to Jones (1998:72) new ideas or knowledge changes technologies in production. These technological changes make production inputs more productive. The theory faces three major propositions: first, technological change is central to the generation of long-run growth; second, technological improvement is mainly influenced by intentional actions of agents who respond to market incentives and, third, the economics of ideas is different in that the cost of production is incurred only once, and the ideas can be used over and over again without attracting further costs.

In the new endogenous growth theory, price-taking behaviour cannot be entertained due to the insurgence of monopolistic competition. This is incorporated in the principle of non-rivalry and non-excludability of technological change. When a good such as knowledge is non-rivalry, it means that its consumption by one person does not preclude another from consuming it (Romer, 1990:72).

According to Pack (1994:65) non-rivalry holds significant implications for the growth theory. Non-rivalry goods such as public goods can be accumulated to an unlimited extent, and can be used in the same place at the same time. Rival goods such as human capital have a limited life span, and with the death of a person, his knowledge disappears from the economic scene. Non-rival goods need not be replicated. This implies that inputs in the production process should combine rival and non-rival goods so as to experience increasing returns to scale.

In order to increase long-run economic growth in the model, the number of researchers must increase. The same applies to the rate of population growth and to the rate of population growth. This implies that the growing population is one with technical skills that can be used for innovation processes. In this regard, the model is fitting only to the developed countries; however, developing countries can learn a lesson from this outcome in their quest for poverty eradication.

2.2.2.4 Easterly –Sachs Aid Effectiveness Debate

Foreign aid is defined from the Organization for Economic Cooperation and Development (OECD) in Radelet (2006: 4) as financial flows, technical assistance, and commodities that are designed to promote economic development and welfare as their main objective and are provided as either grants or subsidized loans. When “effectiveness” is referred to in the aid definition “foreign aid effectiveness” it should be assumed that economic growth is the objective (Miller, 2011:74). However, Kenney (2008:331) points out there are a wide range of other possible objectives of aid, including: income growth for a specific segment of the population, for example, the extreme poor development of non-income areas such as education, health or democracy; or even political support or trade benefits for donor countries (Radelet, Michael & Rikhil, 2008: 331).

2.2.2.4.1 Arguments that Aid is Effective: Sachs

Arguments of Sachs are presented in his book, the end of poverty (Sachs, 2005). The arguments presented are in various dimensions, but three components are identifiable; First, Sachs establishes the moral case for aid by detailing the reach and severity of extreme global poverty. He does so with both macro level statistics and stories from real people he has met who are living within the constraints of extreme poverty (Miller, 2011).

The second part of his case is the theory behind aid effectiveness, which includes arguments for the poverty trap and the financing gap. Sachs claims that the extreme poor are in a poverty trap whereby they are “too poor to save and thereby accumulate the capital per person required to withdraw themselves out of poverty (Sachs, 2005: 56).

The argument goes that growth requires investment in the form of capital, and investment requires saving. Saving, in turn, can only happen when an individual or country has income beyond that required for survival (Sachs, 2005: 246-249). As many individuals or countries have to dedicate all their income to survival, such growth often never occurs. Therefore, aid is effective because it helps ensure capital accumulation and subsequent growth (Sachs, 2005: 250). The need for investment in

infrastructure and human capital to propel growth is therefore central to Sachs' theory behind the effectiveness of aid. At the country level, he argues that growth will not happen without government investments in schools, clinics and roads amongst priority projects (Sachs, 2005: 252). In theory if poor country governments are often unable to meet those investments, a so called "financing gap" between the capital investment a country needs and what they are actually able to provide opens (Sachs, 2005: 274-275). Aid, in theory, can therefore fill the financing gap.

The third part of the argument for aid effectiveness is anecdotal (Miller, 2008). Sachs gives many examples of aid successes, including the following; the Rockefeller Foundation's financial assistance to the Asian Green revolution; the United Nations Population Fund's spread of family planning since the 1950s; and the eradication of Polio as supported by organizations such as UNICEF, the World Health Organization and U.S. Centres for Disease Control and Innovation (Sachs, 2005: 259-263). Sachs uses these examples to support his case for aid by arguing that they are all examples of bringing development.

Sachs arguments are reinforced with literature from Radelet et al, (2006) who summarises this literature by identifying three economic arguments for aid. The first is the classical view dominant before the '90s and very similar to Sachs' theoretical foundation. The argument entail that aid will increase growth by augmenting saving, financing investment and adding to the capital stock. Second, it has been argued that aid that supports health and education may increase growth by increasing worker productivity. Thirdly, aid could "provide a conduit for transfer of technology or knowledge from rich countries to poor countries by paying for capital goods imports or through technical assistance (Radelet et al, 2006).

Further, arguments by (Kenny, 2008: 332) entails that aid influences policy and improved policy leads to better growth Such a mechanism would work through donor influence of local policymakers by providing financial resources, influencing policy debate and formulation, and technical assistance (Miller, 2011).

2.2.2.4.2 Arguments that aid is ineffective: Easterly

One of the most critical opponents of Sachs' stance on aid effectiveness is William Easterly. His book 'White Man's Burden: Why the West's Efforts to Aid Have done so Much and So Little Good' was released a year after 'The End of Poverty' and in many ways was an assault on Sachs' core

logic and arguments (Miller, 2011). Central to Easterly's thesis is the idea that top down planning for development (the sort that is required to implement massive aid programs) simply does not work. This is well summarized by Duncan Greene who identifies two core components of Easterly's arguments: Firstly; aid fails because its implementation is not accountable or responsive to the people served, Secondly; aid creates perverse incentives for bureaucrats (promotion based on how much money you manage to disburse) that have little to do with development (Greene, 2008 in Miller, 2011:75). These two arguments form most of the constructive part of Easterly's case. The rest is predominantly an attack on Sachs and other big aid supporters. As such, understanding Easterly's is best done through an understanding of his main criticisms of Sachs (Miller, 2011).

Easterly levels three major arguments against Sachs and other supporters who advocate a major increase in aid in order to propel impoverished nations out of the poverty trap. The first is a rejection of the poverty trap itself. According to Easterly, there is simply no empirical evidence that the poverty trap exists. The poverty trap is based on the premise that extremely poor countries will have little to no growth by virtue of their being poor. Easterly shows that from 1950-2001, the poorest fifth of countries increased their per capita income growth by a factor 2.25, while the richest four-fifths increased by a factor of 2.47 (Easterly, 2006). He also argues that when the same analysis is done by breaking all countries into halves based on how much aid they received "countries with below-average aid had the same growth rate as countries with above average foreign aid". He cited a number of other statistical tests that he claims shows that economic growth is not trapped by poverty (Easterly, 2006: 41).

Easterly's second argument is related to his first: he rejects the premise of Sachs and others that poor countries have poor growth because of a poverty trap rather than bad government. (Easter, 2006: 42). Using index ratings of democracy and corruption, Easterly tests the causes of slow growth among 24 countries that had the worst democracy and corruption ratings in 1984. His tests reveals that from 1985-2006, when control is made for both initial poverty and bad government, it is bad government that explains slower growth (Easterly, 2006:43). In general, Easterly rejects the poverty trap because there is "no evidence that initially poor countries are at a growth disadvantage once you control for good government (Miller, 2011). Aid therefore is to be judged ineffective because it is bound to be confounded by corruption and poor governance.

The third and final attack that Easterly levels at Sachs' insistence on the effectiveness of aid is simply a reference to the academic research that shows that aid does not lead to growth. He begins

by citing a 1996 paper by Peter Boone of the London School of Economics that found that aid finances consumption and not investment (Easterly, 2006: 45). Next he attacks a seminal paper (Burnside & Dollar, 2000) that found that aid contributes to growth in good policy environments. To substantiate his attack he references a study that he co-authored that discounted the Burnside and Dollar study (Easterly et. al, 2004).

Easterly further supports his case by citing other studies that demonstrate there is a lack of evidence that aid leads to growth (Rajan & Subramanian, 2005). The studies demonstrated on three major constraints on the possibility of aid being effective are, which are; the fungibility of aid, the so-called Dutch Disease, and limited absorptive capacity (Miller, 2011).

The fungibility of aid refers to the fact that recipient governments are not obliged to spend aid in certain ways: An aid-recipient country could render ear-marked aid fungible by reducing its own resources in the sector that receives aid and transferring them to other sectors of the budget (Miller, 2011:78).

Dutch disease is a possible negative unintended effect of aid that causes upward pressures on the exchange rate of aid recipient currency and therefore causing a decline in relative economic competitiveness (Riddell, 2007). This happens because of “a shift of production from tradable goods and services, such as food or textiles towards non-tradable goods and services such as teaching or health care (Barder, 2006: 12).

A third reason to expect aid’s impact to be negative is limited absorptive capacity of recipient countries. This refers to the fact that recipient governments find it difficult to use aid efficiently and effectively. Countries may not be able to properly “absorb” aid because of the macro-economic management challenges it presents, undermining of institutions, for example by drawing talented staff away from institutions into the aid industry or by transferring political accountability from governments to donors or their lack of resources such as personnel or infrastructure needed to implement the desired aid projects (Miller, 2011:74).

2.2.2.4.3 Summary and Analysis: Sachs vs. Easterly

In their stripped down forms, Sachs will appeal to fans of Keynesian economics and Easterly will undoubtedly be supported by the classical economists. Sachs makes a strong case that aid is needed and that governments have a role to play in provision and implementation, while Easterly makes a

strong case that Sachs' theory behind why aid works is completely unjustified. The case-by-case evidence showing that the majority of aid projects reach their objectives supports Sachs' case. At the same time, there is something intuitively attractive about Easterly's overall claim that aid planning is not accountable or responsive to people and needs on the ground.

In analysing these two cases, it can be said that both authors treat their arguments with passion however, Sachs framework seem to have lost credibility with growth and aid effectiveness scholars in the mid-1990s (Radelet, 2006: 8).

Easterly deserves an equal amount of criticism for the simple nature in which he treats Sachs' poverty trap. He provides scant details on his statistical analysis, focuses on a definition of the trap based around zero or negative growth as opposed to insignificant or insufficient growth, and spends too much time trying to prove that countries are not trapped. The argument becomes vague as the opposition claims ensued. For example, Easterly claims that US\$2.3 trillion in aid has been wasted, Sachs' that an extra US\$195 billion will cut poverty by half and continue to do so despite the other presenting counter arguments seems to suggest that they at times forgo science in the interest of advancing their causes and ideologies (Miller, 2011:72). "Perhaps their biggest mistake is their stubborn focus on their core messages and differences with their opponents. Sachs does not deny that the aid system has problems at the same time Easterly does not deny that aid can and has worked in at least some cases. Both could be more productive if they focused on areas of value to the aid system where they are close enough to agreement to engage in honest dialogue. For example, they could devote more attention to analysis of what successful aid projects have in common and what poorly planned projects look like" (Miller, 2011:77).

2.2.3 Assessment of Theoretical Literature

In traditional models of international trade, trade generates static improvement in output without necessary inducement of growth. Openness to trade from an autarkic point of view improves the allocative efficiency of the economy. In the Ricardian model, a country specializes in the production and export of the good in which it has a comparative advantage.

The Heckscher-Ohlin theory was postulated in an attempt to address the failure of Ricardian theory in explaining the causes of different labour productivities among trading nations (Appleyard et al, 2010). In the Heckscher-Ohlin model, the country exports the good which makes more abundant use

of its factor intensity. Trade allows a shift in resources towards the sector that draws upon the abundant factor, and the value of aggregate output increases. The H-O theory is not always applicable in the real world as sources of comparative advantage may also come from continuous research and innovation, not only from different relative factor endowments. Furthermore, the oversimplifying assumptions are a subject of further criticisms.

Leontief (1951) conducted the first empirical works to test the validity of Heckscher-Ohlin theory using trade data for various countries. An input-output table of the United States (U.S) for the year 1947 was used for analysis. Results from Leontief's research were more stunning and totally the opposite of the Heckscher-Ohlin model. He found that U.S import substitutes were about 30 percent more capital intensive than U.S exports (Choi, 2001).

Leontief's results were questioned because of his use of data on import substitutes instead of imports. Further study by Kravis (1956) suggested that the most protected industries during that period were the labour intensive industries. This therefore distorted the natural flow of products between the U.S and its trade patterns. More so, Leontief's tests were biased because they used a two factor model, and only considered physical capital as a measure of capital, completely ignoring human capital such as job training and education (Salvatore, 2007:148).

Linder theory (1961) focuses on the demand side of the economy. Linder considers consumers living in similar countries to have similar tastes and desire to buy the same goods and services. Similarly, manufacturers producing goods for the domestic market seek countries with similar product preference when they decide to export. Representative demand in the trading nations for a range of goods demanded at the respective per capita income, determines the feasibility of trade across countries. The validity of Linder theory lies in the theory's ability to explain intra-industry trade, product differentiation and south to south trade. The only criticism was failure to notice the applicability of the theory even in developing countries. Expansion to other areas of development, saving habits and industrialization were contacted in recent literature.

Paul Samuelson's (1970) factor-price equalisation theorem states that factor prices in partner countries tend to converge towards equilibrium due to specialisation and trade. In autarky, factor price differences are high. As countries specialise, the demand for their respective abundant factors tend to increase in each country. Even though price distortions may prevail in the markets, the

factor-price equalisation theorem seems to be realistic in the real world. This is true only when the concept of profit maximisation by producers is completely ignored.

Using neoclassical properties of production functions, Federer (1982) led efforts to initiate that foreign trade in particular exports has growth implications. This he termed the 'export led growth model'. The assumptions of the model includes, first, that the exportable sector generates positive externalities on the other economic sectors through technological spill-overs and new management techniques. Second, any trade policy that focuses on reallocation of factors of production into exports from other economic sectors will have a positive effect on growth (Federer, 1982). The export-led growth hypothesis has been criticised for failing to justify on long run relationships between exports and GDP growth. Second, if the situation is one of equilibrium, and where the productivity differential is as a result of other inter-sectoral distortions, there will be no reallocation of production factors. Lastly, if the elasticity of non-tradable output with respect to exports declines, the positive effect of exports on growth declines. To apply the model in reality and subdue the criticisms, exports need to be treated as exogenous in terms of the explicit endogenous growth theory (Ahumada & Sanguinetti, 1995).

The new trade theories focus on the dynamic nature of trade in transition from autarky to free trade. Imperfect competition, increasing returns to scale, product differentials, technological innovations and research and development characterise the theoretical prepositions.

The Imitation Lag Hypothesis by Posner (1961) relaxes on the traditional assumption of identical technology among countries. The role of technology and comparative advantage in global competitiveness of firms is reinforced. The central point in the imitation lag hypothesis is that trade focuses on new products, which appeals to the export market through the demand lag principle of time. This therefore means any nation can diversify its exports by engaging in continual research, innovation and production of new products. Imitation lag hypothesis is closer to reality to a greater extent because technology is rarely identical among countries.

Product Life Cycle theory, by Vernon (1966) builds on the Imitation lag hypothesis on the assumption of delay in technological diffusion. The theory places emphasis on trade patterns for new manufactured product in the U.S. The new product is expected to pass through three stages until it can be transferred to the developing country for production. The U.S will then import from the developing country while specialising in new products. The PLC is applicable to reality due to

its dynamic comparative advantage component. More so, high export diversification is possible through innovation.

The Gravity Model (GM) draws from Isaac Newton's law of universal gravitation. In this law, universal gravitation is described as the gravitation force between two masses in relation to the distance that lies between them. This relationship is applied to international trade flows to represent export volume from respective countries in a sample, their economic masses represented by each country's GDP and the geographical distance between their major capital cities. The gravity model is useful in assessing the effect of trade agreements on trade. It determines whether a trade agreement leads to significantly more trade among its partners than one would otherwise predict given their GDPs and distances from one another.

Krugman (1979) departed from the traditional belief that trade only arises and leads to mutual benefit if countries differ in their technologies or in their resources. Krugman shows that trade can also arise in mutually beneficial ways even if countries are similar. This trade he termed 'intra-industry trade', and shows a two way exchange of goods with standard industrial classifications. The model focused on the effect of trade on autarkic equilibrium of the monopolistic competitive industry. The model, though applicable to modern day theory, fails to address how firms react to the change in demand curves they face in the short term, the reason for failure of the firm and the role of this failure towards final free trade equilibrium adjustment.

Brander & Krugman (1982) developed the reciprocal dumping model to show incidences of the negative consequences of trade. The model is built to argue that the oligopolistic rivalry between firms naturally gives rise to 'reciprocal dumping', a situation whereby each firm dumps in another firm's home markets. The reciprocal dumping model has been criticised as being pareto-inefficient. Some monopoly distortions persist after trade and high transport costs are incurred in cross-hauling.

Increasing returns are a prominent feature in many real world production processes and are the basis for the Dixit-Stiglitz model (1977). Often such production technologies are said to generate natural monopolies since an implication of increasing returns is that large production entities are more productive than smaller ones. The natural monopolies give rise to monopolistic competition. Such markets are characterised by many producers who can enjoy some market power and free entry so that profit opportunities are limited. The Dixit-Stiglitz (1977) model is discussed from the demand, production, welfare and many industries point of view and has wide applications in many other

economics topics such as growth theory, environmental economics, macroeconomics and microeconomics.

In analysis of theories on FDI, the eclectic theory and the industrial organisation theories were discussed. The main highlight of the eclectic theory is that of the ownership advantage. The theory points out that for a country to be competitive in a foreign country, it must have some kind of a unique advantage that can help them overcome the cost associated with operating in a new country. In this regard the eclectic theory is regarded as a positive contributor to FDI discussions.

The industrial organisation theory considered tradable ownership advantages and the removal of competition as key requirements for an individual firm in a given industry to invest overseas. In the theory Hymer (1960) suggests that the decision to set up value-adding operations abroad depends on the industry and certain aspects of individual companies, rather than the country and national capital availability as suggested by Dunning (1973).

The theory makes emphasis on two main points. Firstly, the firms become MNEs due to their possession of competitive advantage and their ability to maximise their productivity by using this competitive advantage in another country. This however leads to the concept of ownership advantages as discussed by Dunning (1994). Secondly, the competitive structures of some industries would encourage firms to internationalise more than those in other countries.

The major criticism of Hymer's theory is that Hymer discusses the theory on how and why firms invest in international markets, but ignores how firms operate efficiently in other countries, including their use of advantages. Furthermore, the theory is largely based on market power approach, completely ignoring the costs associated with making transactions to invest abroad.

Despite of the limitations, the industrial organisation theory is useful to this study as it points out the reason why foreign investors decide to set up value adding operations abroad depending on industry and firm attributes.

Blonigen (2005) presented the idea that motivators are the key of FDI decisions and that FDI is one of the different relevant alternatives to grasp an opportunity from a foreign country. In view of this, he discussed on the relationship between motivations and the set of alternatives by which the

opportunity can be seized. Two general terms; internalization determinants and localization determinants were purported to have an effect on the decision for an FDI strategy and on FDI localization. Empirical evidence from a motivation-based classification distinguishing among three main motives; resource seeking, market seeking and non-marketable asset seeking reinforced Blonigen' preposition on FDI motivators, as such policy recommendations can be deduced with reference to the discussion.

In early models of economic growth, trade does not have a clear effect on growth. Harrod–Domar views capital as the sole factor of production hence trade liberalization (moving the economy to free trade from autarky) is expected to have positive growth effects. In neoclassical models of growth for closed economies, such as the Solow model, the steady state of growth of output is completely exogenous and equal to the growth rate of labour (growing exogenously at the steady state) in addition to the exogenous rate of technological progress. Extensions of Solow in Baldwin (1992) show that opening the economy to free trade from autarky has only temporal effects on the growth rate of output. The weakness of the neoclassical theory is that it fails to explain the determinants of the exogenous variable, prediction of absolute convergence where developing countries with the same access to technology as developed countries will catch up, and diminishing marginal product of capital (MPK) to zero. Due to these weaknesses, the endogenous growth theory becomes relevant in addressing the effects of economic integration through trade on growth.

The endogenous growth theory posits that positive externalities such as human capital development, and Research and Development (R&D) prevent the marginal product of capital from declining. Technological progress unlike the neoclassical theory is attributed to positive externalities. Human capital development through knowledge accumulation and skills development contributes positively to growth in output. Companies that engage in R&D cannot isolate benefits to themselves but to society at large due to spill-over effects.

The debate over the effectiveness in foreign aid has existed for decades. Recently, it has come to the fore due to the prominence of work and subsequent publicity of Jeffrey Sachs and William Easterly. The debate these two carry out in the public eye is both sensational and polarized. However, an investigation of the academic literature in which Sachs and Easterly's arguments are rooted reveals just as much polarization. Numerous studies have assessed the relationship between foreign aid and growth through econometric analysis of cross-country or "macro" data relating the two variables. These studies have consistently turned up inconclusive or contradictory results. At the same time,

there is a growing body of research that seeks to determine when and why aid is effective by looking at projects and programs on a case-by-case or “micro” level (Miller, 2008:72). Both studies should combine to find the most probable ways to channel aid for growth benefits.

The next section provides a detailed review of empirical literature on growth.

2.3 Empirical Literature

This section analyses empirical evidence from various econometric methodologies highlighting the impact of trading in BRICS on South Africa’s growth. Empirical literature from South Africa and BRICS is scant. Previous studies focused on export diversification and the trade openness effect on growth. This was far less than required to correctly evaluate how trade impacts growth. Studies on developed and developing countries will complement the BRICS and South African literature.

2.3.1 Studies on Developed Countries

Jenish (2013) examined recent economic trade and development in 11 countries of the Commonwealth of Independent States (CIS). Different trade flows were brought into the analysis in order to examine their effects on economic growth. A Generalised Method of Moments (GMM) panel data estimation methodology was employed over the period 2000-2010. Results of the study showed that trade with the Russian Federation (RF) had a positive effect, although only moderate on economic growth. Neither intra-regional trade without RF nor extra-regional trade has a significant impact on growth. Investment, oil exports and economic freedom had a positive effect on growth.

Korgun (2012) investigated the impact of trade on growth in Russia. The OLS technique was used for the period 2000-2012. Results of the study identified a significant relationship between natural resource export and economic growth. Furthermore, three inferences were made from the results. First, imports played a major role in growth due to delayed consumption and increased liberalization of Russia’s domestic market. Second, high growth was due to the convergence process in closing the gap between poor and wealthy nations. Third, natural resource exports affected growth through the introduction of new technologies and increased productivity in the resource sector.

Marelli & Signorelli (2011) analysed the economic growth of China and India in terms of their integration in the global economy. Fixed effects model by 2SLS was utilized over panel data from 1980-2009. Results of the study showed positive growth effects for the two countries of opening up and integrating in the world economy.

With the aid of a fixed effects panel estimator, Arora & Vamvakidis (2004) empirically examined the extent to which a country's economic growth is influenced by its trading partners' economies. Panel estimation results based on four decades of data of 100 countries, showed that trading partners' growth and relative income levels had a strong effect on domestic growth, even after controlling for the influence of common global and regional trends. In other words, the results imply that industrial countries benefit from trading with developing countries, which grow rapidly, while developing countries benefit from trading with industrial countries, which have high income levels.

Lederman & Maloney (2003) examined the empirical relationships between trade structure and economic growth, with particular reference to the influence of natural resource abundance, export concentration, and intra-industry trade. Panel data of five year periods from 1975-1999 was utilised. GMM systems estimator, OLS for intra-trade industry and the Herfindahl Index for export concentration were used as estimation techniques. In contrast with most recent literature, trade had a different effect on growth depending on its structure (natural resource abundance, export concentration and intra-industry trade). Natural resource abundance appears to have had a positive effect on growth, whereas export concentration hampered growth even after controlling for physical and human capital accumulation.

Connolly (1998) in Schneider (2003) considered imports within certain specific Standard International Trade Classification (SITC) classes so as to separate out the effects of imports of goods that embody technology from general openness effects. She found that high-technology imports from developed countries positively affected domestic innovation and led to increased GDP growth as higher quality capital goods are used in domestic production.

Eaton & Kortum (1996) in Schneider (2003) developed a Ricardian model to explore the role of trade in spreading the benefits of innovation among OECD countries. They found that trade serve as an important component for gains from improved technology. The magnitude of the gains differs with proximity to the source. This means foreigners benefit by only a tenth as much as the innovating country.

2.3.2 Studies on Developing Countries

Didier & Hoarau (2014) identified determining factors of bilateral trade flows between Sub-Saharan Africa (SSA) and BRIC countries. Estimations were done on gravity models for bilateral exports and imports of 47 African countries relative to BRIC, considered both as a group and individually, on

the period 2000-2010. The results confirmed negative impact of distance and geographical remoteness together with the positive effects of SSA and BRIC's GDPs. Moreover, the augmented variables (terms of trade, natural resources and democracy) highlighted the specific role of China in comparison to other BRIC economies.

Osei, Naanwaab, Saleem & Akuffo (2012) used a Cobb-Douglas production function to estimate the impact of FDI, exchange rate, capital-labour ratio and trade openness on GDP for 38 African countries from 1980-2008. Panel data analysis was carried over a two way fixed effects model. Results of the study showed a positive relationship between trade openness and growth.

Kahya (2011) analysed the relationship between foreign trade and economic growth in Turkey over the period 1980-2009. The study adopted two methodologies of Vector Auto Regressive (VAR) and Vector Error Correction (VEC) models and descriptive statistics in order to investigate the dynamic relationship between GDP, exports and imports. The study also analysed the composition change in Turkey's foreign trade. Results of the analysis suggest that imports were the main determinant of growth in Turkey for the periods 1987Q1-2007Q4 and 2001Q1-2007Q4. Exports did not have an important impact during that period. Export growth was significantly affected by GDP growth, indicating a growth-led export pattern. There was also a distinctive characteristic of foreign trade observed which, however, failed to be supported empirically over the previous decade.

Ledyava & Linden (2008) investigated the factors influencing growth in 74 Russian states for the period 1996-2005 using both panel and cross-sectional data analysis. The results of the study reported that, apart from investments, exports are highly significant in explaining growth in Russia.

Yanikkaya (2003) undertook a cross-country empirical investigation on trade openness and economic growth for a panel of over 100 developed and developing countries. Observations were carried out from 1990-1997. Oil exporting countries were excluded due to data considerations. Results of the study showed that trade barriers are positively and in most specifications significantly associated with growth, especially for developing countries. This was consistent with the findings of theoretical growth and development literature.

Schneider (2004) posits in a paper examining the role of high technology, intellectual property rights (IPR) and FDI in determining a country's rate of innovation and economic growth. Country fixed effects method and OLS were utilised as estimation techniques to test the unique panel data set for developed and developing countries from 1970-1990. The results suggested that high technology

imports are relevant in explaining domestic innovation both in developed and developing countries. Foreign technology had a stronger impact on per capita GDP growth than domestic technology. IPRs affected the innovation rate, but the impact was more significant in developed countries. FDI results were found to be inconclusive.

2.3.3 Studies on BRICS

He, Hao & Zhang (2015) investigated the effects of foreign trade and FDI on income distribution in the BRICS. Annual data from 1960-2012 was utilised over static and dynamic panel data analysis techniques. The results showed that changing imports and exports has a positive effect on growth. However, the effects of imports, exports and FDIs were different amongst the BRICS countries. Save for India, all the BRICS members' income gap widened with ascension to World Trade Organisation (WTO).

Lo & Hiscock (2014:187) studied the rise of the BRICS in the global political economy. Granger causality tests were conducted to show the relationship between growth and trade from 1990 to 2012. Causality tests results suggest a bi-directional causal relationship in economic growth between India and Brazil. Economic growth in India caused economic growth in China and South Africa, while growth in South Africa caused GDP growth in Brazil. For the growth/trade relationship, economic growth in Brazil causes trade in India and South Africa, while growth in China influences trade in Brazil and India. Growth in South Africa impacted trade in India only. Trade/growth changes in Brazil had a positive impact on economic growth in India, while South Africa has the same effect on China. In conclusion, due to varying results from the panel analysis, trade in BRICS was readily recommended; however, the setting was not considered to be a more powerful economic bloc.

Mercan, Gocer, Bulut & Dam (2013) investigated the effect Openness on Economic Growth for emerging markets: Brazil, Russia, India, China and Turkey (BRIC-T). Individual time effects Panel Data Analysis from 1989 - 2010 was used in which growth was modelled against trade openness. The rate of external trade (exports + imports) to GDP was used. Results of the study found a positive and statistically significant effect of trade openness on growth.

Jadhav (2012) explored the role of economic institutional and political factors in attracting foreign direct investment in BRICS. The study used panel unit root tests and multiple regressions on panel data spanning a ten year period from 2000-2009. Findings indicated that economic factors are more

significant in BRICS economies than institutional and political factors. Market size measured by RGDP, trade openness, natural resource availability, rule of law and voice and accountability were found to be statistically significant in FDI attraction.

Hosein & Khadan (2012) studied the impact of emerging markets (BRIC) on the Caribbean Community (CARICOM). Trade indices were utilized to review the growth effects for CARICOM from the growth of BRICs for the period 1991-2010. The trends showed a positive impact of BRICS on global merchandise trade, CARICOM-BRIC trade-relations, tourism and FDI. The tourism industry was regarded as the engine for economic growth as such a call was made for the establishment of a CARICOM-BRIC tourism strategy. Of note also to growth was the threat of Chinese workers on domestic employment and on imports in the clothing and textile industry.

De Castro (2012) examined the evolution of trade intensity among BRIC during the period 1995-2009. An empirical analysis was also used to examine the intensity of bilateral trade flows between BRIC and EU. Calculations were based on the trade intensity index, trade complementary index and RCA. The results review Sino-Brazilian and Sino-Indian trade as a trade with the highest intensity progression. Russia was found to be the most intensive partner for EU.

Polodoo et al. (2012) examined the degree to which international trade has contributed to the economic growth experience enjoyed by the BRICS economies. The study used data from 1990-2010 over econometric methodologies of panel unit root and random coefficient estimates. The empirical results reveal that international trade has contributed a lot to high economic growth rates in the BRICS economies. Of significance also was human capital, Gross Domestic Fixed Capital Formation (GDFCF) and exchange rate appreciation. A convergence effect in dynamic setting was also revealed.

Cakir & Kabundi's (2011) studied on trade linkages between South Africa and the BRIC countries using the global vector autoregressive model over the period 1995Q1-2009Q4. The results suggest that trade linkages exist between the BRIC; however, the magnitude differs from each country. Shocks from each BRIC country were shown to have considerable impact on South African's real imports and output.

Kuboniwa (2011) studied the impact of trading gains on economic growth in BRIC using OLS regression for the period 1995-2010. The studies were done at the helm of the global financial shock, termed the 'Dutch disease' in 2000. Results of the study suggest that Russia was unscathed

by the Dutch disease. All the BRIC nations were affected by trading gains. 50 percent and 20 percent were explained for Russian and Brazilian growth. Impacts on India and China were almost negligible, implying immunity to recurrent global financial crises should correlations persist.

Naude & Rossouw (2011) looked at the links between export diversification and economic performance in Brazil, China, India and South Africa. The study used time data on exports from 1962-2000, and was compelled to conclude that access to markets was the key benefit of South Africa's membership to BRICS. Applied General Equilibrium Modelling (AGE) and Granger causality tests were used as the methods of estimation. Results from the AGE model suggested a U shaped relationship between per capita income and export specialization in China and South Africa. South Africa was the only country where export diversification had an ambiguous positive impact on economic growth, while in contrast to Brazil, in China and India export specialisation was most preferred. Granger causality tests were inconclusive and not robust with regards to export diversification measures.

Sridharan, Vijayakumar & Chandra (2009) investigated the causality between Foreign Direct Investment and Growth in the BRICS economies. Quarterly data from 1996Q1-2007Q4 (Brazil), 1994Q1-2007Q4 (Russia), 1992Q1-2007Q4 (India), 1999Q1 -2007Q4 (China) and 1990Q1-2007Q4 (South Africa) was utilised. The Industrial Production Index (IPI) was used as a measure for economic growth. Johansen's cointegration model and the vector error correction model were used as estimation techniques. Results of the study found that growth leads to FDI bi-directionally for Brazil, Russia and South Africa. On the other hand, FDI leads growth uni-directionally for India and China respectively.

2.3.4 Studies on South Africa

Using quarterly time series data from 1990-2013, Mogoe & Mongale (2014) studied the impact of international trade on economic growth in South Africa. Johansen's cointegration test and the vector error correction model were used as the estimation techniques. Empirical results showed that inflation rate and the export and exchange rate have a positive relationship with growth, while imports were negatively related with growth.

Jordaan & Kanda (2011) investigated the trade effects of the European Union - South Africa (EU-SA) and Southern African Development Committee (SADC) preferential trade agreements. Panel data from 1994-2008 was used in estimation of the gravity model. Results of the study showed

significant trade expansion effect between the EU and SA preferential trade agreement. The SADC agreement was considered not fully operational hence the trade effects of SADC preferential trade agreement on South Africa were inconclusive. Recommendations were made for South Africa's trade policy to be geared toward multilateral liberalisation. In addition, South Africa was supposed to promote regional economic stability and development through supporting regional trade agreement initiatives.

Kowalski, Lattimore & Bottini (2009) examined key trade and trade related issues facing South Africa. Firstly, they described the implications of global trade performance and South Africa's exports on economic growth in the period from 1990 -2006. Secondly, they assessed South Africa's comparative trade performance based on the Gravity Model and OLS estimation technique. Finally, an econometric assessment of the impact of South Africa's trade liberalisation on labour and total factor productivity during the period from 1988-2003 was carried across all industrial sectors. The main findings of the study indicate that South Africa has succeeded in re-inserting the economy back into world trade in the mid-90s following years of political difficulties. Major economic policy changes in the early 90s were commended for their efforts. However, since 1995 South Africa's position in the global trade remained constant. This was in contrast with the performance of China, Russia and India who continued to deepen their trade integration into world trade supply chains. The econometric assessment of productivity determinants in South Africa suggested that the effective rates of protection and trade liberalisation in the manufacturing sector during the period from 1988-2003 significantly affected total factor productivity.

Thurlow (2006) used a dynamic general equilibrium and microsimulation model to assess the effect of trade liberalization on growth, employment and poverty. Drawing on the 1998 SAM, the GCE model identified 39 commodities, three geographic regions, 117 productive activities and eight types of labour. The results suggest that trade policies have not contributed to increased poverty and that trade induced technological change had accelerated growth. All population types benefited from trade-induced growth, but it was the higher income African and white households who benefited more than lower income Asian and coloured households. Trade reforms contributed to the rising capital and skill-intensity of production. Decline in poverty has been small and further liberalization was bound to benefit high income households.

2.3.5 Assessment of Empirical Literature

Several studies have been done on BRICS; however, few have addressed the impact of the BRICS alliance on South Africa's growth. Empirical literature on the impact of trade on growth from various economies and trade arrangements has been useful in unearthing the problem. Even though useful, the literature is still scarce. Various studies have focussed on the effect of trade openness, export diversification and trade liberalisation on growth. Table 2.1 provides a summary of the empirical literature and a guide for selecting variables to be tested in the empirical analysis. Studies by Lederman & Maloney (2003), Thurlow (2006), Kowalski et al. 2009, Polodoo et al. (2012), Cakir & Kabundi (2012) and Mogue & Mongale (2014) amongst others provide guidance on the theoretical and empirical framework to follow. The studies mentioned above are from different countries and use different techniques but the variables used in their respective empirical models are similar.

The variables that have been empirically found to have a positive relationship with economic growth (GDP) include exports, employment, FDI, productivity, natural resource abundance, political stability, human capital, technology, distance and geographical remoteness. Selected variables that have been found to have a negative relationship on GDP are interest rate, exchange rate, debt, imports, corporate tax rate and wage costs.

Empirical literature on the impact of trade on growth done by Mercan et al. (2013) and Polodoo et al. (2012) provides an empirical framework adopted in the study.

Table 2.1 Summary of Selected Empirical Literature

AUTHOR(S)	COUNTRY(S)	METHODOLOGY	VARIABLES	BASIC EVIDENCE
Jenish (2013)	11 Commonwealth States.	GMM from 2000-2010.	Trade, intra- regional trade, extra-regional trade, investment, oil exports and economic freedom.	Trade, investment, oil exports & economic freedom had a positive effect on RF growth. Intra-regional trade and extra-regional trade had a negative impact on RF growth.
He, Hao & Zhang (2015)	BRICS	Static and Dynamic Panel using GMM.	GNI, FDI and trade	Imports, exports and FDI have positive effect on income inequality and economic growth. Wider income inequality for BRCS after joining WTO
Lo & Hiscock (2014)	BRICS	Granger Causality tests on panel data from 1990 - 2010	GDP, exports less imports (trade)	Economic growth in Brazil causes trade in India and South Africa. Growth in China influences trade in Brazil and India. South Africa's growth impacted trade in India
Mercan et al (2013)	BRIC; Turkey	Individual time effects panel data from 1989 -2010	External trade (export + import) and GDP	Positive and statistically significant effect of trade openness on growth.
Hosein & Khadan (2012)	BRIC; Caribbean Community	Trade intensity index on panel data for the period 1991-2010	Exports, imports, FDI, tourism, employment	Positive impact of BRICS on global merchandise trade, CARICOM- BRIC trade relations, tourism and FDI. Threat of Chinese workers on domestic employment and imports in clothing industry.
Polodoo et al. (2012)	BRICS	GMM and OLS on Panel unit root and random coefficient estimates from 1990 - 2010.	(Exports + Imports), GDP, real exchange rate, net foreign direct Formation.	Statistically significant variables. Positive effect of international trade on growth.
Cakir & Kabundi (2011)	BRICS	Global VAR over the period from 1995Q1 - 2009Q4.	Real output, Real exports, real exchange rate.	Shock from BRIC affect SA real imports and output. Positive transmission effect of real exchange rate.
Kowalski et al. (2009)	South Africa	OLS and Gravity model over period the period from 1988 -2003	Exports, imports, Total Factor Productivity (GDP)	Constant position of SA in global trade compared to BRIC. Positive impact of protection and trade liberalisation on total factor productivity.

Source: Own summary from selected empirical literature

2.4 Chapter Summary

The main objective of this chapter was to review literature on trade and economic growth. It is evident from the empirical review that many factors in trade are important as catalyst for growth in the host countries but with different significance. Studies from developed countries, developing countries, the BRICS and South Africa have been useful in unearthing the real effect of trade and foreign investments on economic growth. Growth theories which include the Harrod-Domar growth model, neo-classical growth theory and the new endogenous growth theory were reviewed in the chapter. The new endogenous growth theory was found to be compatible with the present day world in terms of human capital and technological development, thus formulating the basis for the empirical evidence.

Sachs makes a strong case that aid is needed and that governments have a role to play in aid provision and implementation, while Easterly makes a strong case that Sachs' theory behind why aid works is completely unjustified. The case-by-case evidence showing that the majority of aid projects reach their objectives supports Sachs' case. At the same time, there is something intuitively attractive about Easterly's overall claim that aid planning is not accountable or responsive to people and needs on the ground. In analysing these two cases, it can be said that both authors treat their arguments with passion however Sachs framework seem to have lost credibility with growth and aid effectiveness scholars in the mid-1990s (Radelet, 2006: 8).

The chapter also reviewed FDI theories, the eclectic theory, the industrial organisation theory and the motivators for FDI investment. The main insight from these theories is that the main reason why investors invest abroad is because of the location advantages, country specific advantages (where to locate?), ownership advantages (why go abroad) and internationalisation (how to go abroad). The country specific advantages portray that investment in a foreign country goes far beyond the firm specific advantages as it looks at the political environment, availability of raw materials, language and cultural differences, government regulations as well as the performance of the economy. Thus in this regard, understanding the specific ownership, internalization and locational advantages of trans-national companies facilitates in the comprehension of the behaviour of firms as countries seek to attract the right kind of foreign investment.

Several theories on trade were reviewed. Most of the theories predicted that countries need to exploit their comparative advantage in order to maximise their welfare. Trade occurs only when at least one of the parties improve their position. How they perceive the improved position depends on

visible evidence of value created. Ricardo showed how labour could be used to create value. In contrast, Heckscher Ohlin showed how factor endowments create value. The advent of the Leontief paradox, the Factor Price equalisation and the Linder hypothesis complemented the basis for trade in the traditional trade models. The static nature of the traditional models and failure to account for inter-industry trade led to the development of new trade theories. New trade theories are dynamic in the sense that they look at intra- industry trade, various demand factors, market structures, externalities and economies of scale.

Increasing returns are a prominent feature in many real world production processes and are the basis for the Dixit-Stiglitz model (1977). Often such production technologies are said to generate natural monopolies since an implication of increasing returns is that large production entities are more productive than smaller ones. The natural monopolies give rise to monopolistic competition. Such markets are characterised by many producers who can enjoy some market power and free entry so that profit opportunities are limited (Emer Universitet, 2016).

The introduction of scale economies and imperfect competition in trade models implies that *market size* becomes more important as a determinant of trade (Melchior, 2004).

The Dixit-Stiglitz model as well as the Krugman model extension explains intra-industry trade.

According to the Dixit-Stiglitz model, the volume of intra-industry trade will be higher with the more equal countries are in size. The model therefore provided a theoretical foundation for the empirical result that the proportion of intra-industry trade in total bilateral trade is higher between countries of equal size (Melchior, 2004).

The various arguments from the traditional and new trade theories, foreign investment theories and economic growth theories provides a conceptual framework for analysing BRICS trade and economic cooperation in the succeeding chapter three.

CHAPTER 3

ECONOMIC AND TRADE COOPERATION IN BRICS: THE SOUTH AFRICAN PERSPECTIVE

3.1 Introduction

The BRICS originated from the work of Goldman Sachs (2001) who identified Brazil, Russia, India and China (BRIC) as growing economies rapidly expanding to become a global economic powerhouse ahead of the Group of 7 (G7) economies (Mathur & Dasgupta, 2013). According to Suresh & Dube (2013), by the time Goldman Sachs coined the idea of the BRIC; key structural changes were taking place within the BRIC member countries, which are catalyst in Sachs' predictions. Brazil had established a drastic economic stabilization plan to reverse hyperinflation and boost privatisation towards the end of 1980, while India had implemented major economic reforms in the early 1990s. On the other hand, Russia had proposed feasible strategies to regain its lost economic status, and China had survived the Asian economic crisis unharmed (Singh & Dube, 2013).

From 2001-2008, prominent economic changes were experienced within the BRIC economies, prompting formalisation on June 16 2009 in Yekaterinburg, Russia. Some of the changes included China exploring its modernisation capacity by joining the world trade organisation (WTO) in 2001; China overtaking Germany as third largest economy in 2007; and Brazil becoming a global creditor for the first time in 2008, as well as introducing a sovereign wealth fund with China and Persian Gulf states to invest excess capital (Singh & Dube, 2013).

In 2010, the BRIC combined more than a quarter of the world's land area, 40 percent of world population, and GDP of US\$20.39 trillion in Purchasing Power Parity (PPP) terms (WTO, 2015).

SA has been increasingly vocal about the non-representation of developing countries in the international arena, quite fitting with the desire within BRIC for a power shift away from the west. This prompted SA to be included in the BRICS in 2010, with official formalisation in 2011 (Onyekwena, Taiwo & Eberechukwu (2014).

The main objective for BRICS formation was to encourage commercial, political and cultural cooperation amongst BRICS member countries in contrast with the long standing bias of Western countries in the context of global affairs (IDC, 2013). On formation, the BRICS accounted for 19.9

percent of the world GDP in nominal terms and 26.8 percent of the world GDP in PPP terms (WTO, 2013).

The BRICS have been very successful in attracting foreign direct investment (FDIs). The manufacturing sector is responsible for high FDI inflows in China, while the bulk of inward FDIs in Brazil, Russia and South Africa are focused on the exploitation of natural resources. In India, by contrast, FDIs primarily flow to the service sector. Financial, real estate and business services tops the list (UNIDO, 2012).

Trade between BRICS is highly complementary. Brazil, Russia and South Africa are strong in the commodity and natural resources sectors with exports destined for China and India. With the use of cheap labour readily available in China and India, China dominates the manufacturing sector while India is a net exporter of generic pharmaceuticals, textiles, software engineering and business process outsourcing (Mathur & Dasgupta, 2013). Intra-BRICS trade was US\$230 billion in 2011, and the BRICS countries set themselves a target of US\$500 billion of trade by 2015. In 2012 the BRICS countries' trade growth with Africa had outpaced global trade and trade with the rest of the world (UNCTAD, 2014).

Integration in global value chains (GVCs) has beneficial effects on job creation, strengthening of business linkages and technology and skills transfer. The contribution of BRICS to global value chain increased from 3 percent in 1971 to 17 percent in 2008. The total foreign value added in gross exports for individual BRICS countries was 33 percent for China, India 24 percent, South Africa 21 percent, Brazil 11 percent and Russia 7 percent. Value addition from services was low in all BRICS; their total value-added exports were 33 percent, of which 8 percent was sourced from other countries (Banga, 2013).

As noted by UNIDO (2012), the BRICS were positioned for success by virtue of industrial policies connoted on internationalization, capability development, export promotion and FDI attraction. Countries that had previously adopted the industrial policy to enhance their imminent comparative advantage, foreign investment and technology transfer had seen substantial growth in their economies.

In presence of natural resources, finances and consumers, the BRICS need cutting edge technology in the form of innovative models in order to impart further momentum on manufacturing and

growth. In view of the introductory points highlighted, the chapter points out the major attributes of the BRICS economies, citing areas of mutual engagement in trade and foreign direct investments within the cooperation. The first section discusses on the general economic and trade attributes of the BRICS economies. The preceding section analyses the trade patterns between South Africa and the BRIC economies. Following is a discussion on foreign direct investment linkages between South Africa and the BRIC. The last section offers conclusions to the chapter.

3.2 Economic and Trade Cooperation in BRICS

During the past years, BRICS economies have recorded spectacular growth rates. This has raised eyebrows among academicians, policy makers and researchers pertaining to the secrets which have contributed to the very high growth rates enjoyed by these economies (Polodoo, 2012). It has been found that the BRICS economies have been practicing export-led growth strategies over the recent decades and have opened up their economies more than any other emerging economies. It is debatable as regards the extent to which international trade has contributed to the economic miracle of these economies.

The impact of trade on economic growth has always been at the forefront of discussions among economists, academicians and policy makers. Since the traditional theories on trade discussion by Hecksher Ohlin (1933) and Linder (1961) intra- trade industry analysis, it is found that international trade leads to efficient resource allocation enabling countries to achieve higher level of income and standard of living. An explicit elucidation of the impact of trade on economic is provided by new growth theories by Romer (1993) and Lucas (1988) and the monopolistic new trade theories of Dix-Stiglitz-Krugman (1980) and Rodrik & Rodriguez (2001). In essence, trade promotes growth via various channels: It makes available a wider range of intermediate and capital goods which helps to increase an economy's productive capacity; it enables developing nations to have benefit from advanced technology emanating from developed economies; it enables a country to fully utilize its resources, a situation that promotes production and consumption; last, but, not least, it enables local producers to produce on a large scale thus enabling them to reap economies of scale. This section unearths on the economic and trade attributes of the BRICS economies that necessitate growth in their economies through various trade mechanisms as presented in chapter 2 of the study. The first sub-section unearths the various country's economic and trade profiles of the BRICS economies. Following is a subjective view on BRICS' trade attributes pointing to policies, flows and composition within the member countries. Concluding statements are offered in the last sub-section

3.2.1 BRICS Country Profiles

To clearly evaluate the impact of the BRICS alliance on each country's growth and development, it is necessary to understand the positioning of these economies in the global context. The BRICS account for more than a quarter of the world GDP in PPP terms, and over 40 percent of the global population in 2014. In terms of landmass, Russia is the largest country in the group. China is second with nearly half of the landmass to that of Russia. The most populous nation in the world and in BRICS is China, followed by India. Together these two countries account for about 30 percent of the world's population (World Bank, 2015).

The BRICS account for over 40 percent of the world's labour force. High population growth results in an increase in the labour force. Over the years 1995-2011, Brazil, India and South Africa recorded positive annual growth in their population. China's growth decelerated, while Russia had no growth in its population. Projections for 2020 done by UNCTAD (2014) expect the working age population to rise by 240 million in India and 20 million in Brazil. Demographic projections for China suggested a peak in labour force by 2015, declining thereafter. South Africa's projections were almost insignificant. In Russia the population was projected to decline by 20 million until 2020. Population growth is meaningful when there is a matching increase in available jobs. Improvement in total factor productivity is necessary for growth.

In 2014 the unemployment rate was 24.3 percent in South Africa, 4.8 percent in Brazil, 5.2 percent in Russia, 7.3 percent in India and 4.1 percent in China. The informal sector absorbed a large proportion of the BRICS labour-force. A significant number of the working population was underemployed, due to skill mismatch and poor human resources development. Investment in education and skills training is therefore necessary to increase the availability of jobs. The literacy rate in Brazil, Russia, China and South Africa was within the range of 89 percent to 100 percent. India's literacy rate was 63 percent, 17 percent lower than that of the other BRICS countries. This is quite astonishing citing the level of advanced research and development in India. Resources should be realigned towards the development of basic education (World Bank, 2015).

The Human Development Index (HDI) of the United Nations Development Program (UNDP) portrays a clear picture on the categorization of the BRICS amongst developing nations. Of the BRICS, only Brazil, Russia and China were listed among the top 100 countries in HDI for 2013. Income inequality, as measured by the Gini-coefficient, was still a major challenge for all BRICS nations. Over 21 percent of Brazil, Russia and India's population was under the poverty datum level.

Russia had a sharp rise in poverty and inequality since 1990 auspices of the Soviet Union, such that the population below the poverty line was only 11 percent. The issuance of economic sanctions in 2014 towards her meddling in Ukraine’s economic affairs is likely to reverse the trajectory trend subverting the masses to poverty. Only China experienced a sharp decline in its absolute poverty figures. Rapid industrialisation, foreign investment and trade were the main reasons for such a positive outcome. Concerns are, however, raised on the ageing of China’s population and the incidence of poverty due to workforce retirement

Table 3.1 BRICS Country Profiles

	Surface Area (km ²)	Population (million)	Annual Population Growth Rate (%)	Unemployment Rate	Population below poverty line	Income Inequality (Gini Coefficient)	Life Expectancy	Literacy Rate	HDI Ranking 2013
Brazil	8 515 770	206 078	0.9	4.8	21.4	51.9	74	90	79
Russia	17 098 242	143 820	-0.2	5.2	11	42	69	100	57
India	3 287 2683	1 295 292	1.43	7.3	29.8	33.9	66	63	136
China	9 599 961	1 364 270	0.52	4.1	6.1	46.9	75	94	91
South Africa	1 221 037	55 000	1.15	24.3	23	57.8	52	89	118

World Bank, 2015: Available from: <http://data.worldbank.org/indicator>. [20 November 2015]

3.2.2 BRICS Economic Profiles

The BRICS phrase was coined by Goldman Sachs in 2001. Outstanding economic performance and GDP growth were the main catalysts for inception.

South Africa benefits from joining BRICS includes the fact that the country can attract increased FDI from BRICS members, as well as allow domestic companies to invest mainly in those countries. Moreover, with the abundant natural resources in South Africa and the rest of Africa, an opportunity for trade with BRICS countries is made to meet their resource appetite (SAGI, 2013). The country is well-positioned to benefit from joining BRICS as it will receive greater global exposure, more so South Africa’s membership in BRICS offers huge potential for the country to boost its

competitiveness via cooperation in investment and trade. Finally, increased FDI would stimulate economic growth, thereby enabling the country to address some of its persistent problems of high unemployment and poverty (SAGI, 2013).

There are however also risks of South Africa being in BRICS. The risks include that the country has the smallest GDP and population, which could threaten its competitiveness. South Africa's economic growth has been lagging behind that of other members. This could constrain its ability to exploit opportunities that may be made available by joining BRICS.

Economic stakeholders take care of self-interest first. South Africa must know exactly the kind of trade relations it wants and set clear policies to avoid exploitation. More so malpractice by some of the member countries in terms of labour practises causes unemployment (case of China). A threat is also adamant from competitive imports, for example China in the textile industry. Finally ownership of Africa's resources is shifted towards BRICS members through mergers and acquisitions in key sectors of mining and agriculture (SAGI, 2013).

During the first decade of the century (2000-2010), the alliance contributed 36 percent of world GDP growth in PPP terms. By 2020, the BRIC was projected to account for a third of the global economy (PPP terms) and contribute an equivalent of 50 percent in GDP growth. By 2050, the BRIC were expected to displace most of the G7 (Group of 7) countries, with the exception of the United States and Japan amongst the largest economies of the world (World Bank, 2014).

In 2011, South Africa was added to the group. BRICS as a group accounted for 20 percent of the world GDP in nominal terms and 27 percent of the world GDP in PPP terms.

Year-on-year growth in Brazil, Russia and South Africa fluctuated below 9 percent from 1990-2013 (Figure 3.1). Only India and China experienced robust growth exceeding 10 percent over the same time period. After the inception of the BRICS, positive growth was realised for all economies. China and India gained more from the alliance, posting 7.6 and 4.9 percent growth respectively, while Brazil and South Africa recorded less than 3 percent of growth in their economies. Russia experienced an erratic trajectory trend due to high energy prices over the same period. However, this would not deter a threefold year-on-year GDP growth (World Bank, 2014).

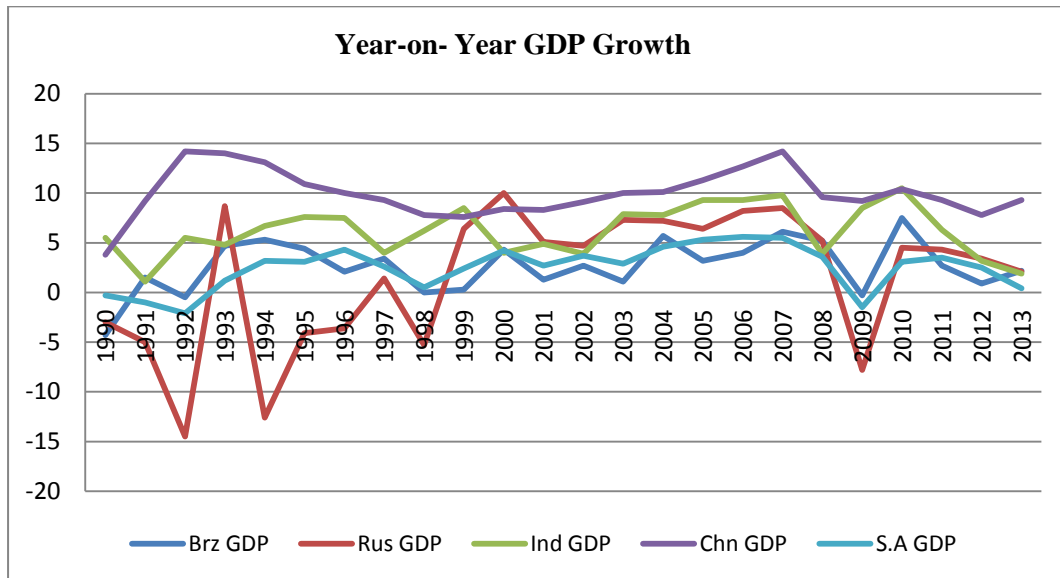


Figure 3.1 BRICS Year-On –Year-GDP Growth (Percentage)

Source: World Bank, 2015. Available from: <http://data.worldbank.org/indicator>. [20 October 2015]

Since inception, BRICS as a group accounted for 19.88 percent of the world GDP in nominal terms and 26.78 percent of the world GDP in PPP terms. Figure 3.2 maps current GDP in nominal terms in each of the BRICS economies over the period 1990-2012. The nominal GDP in US dollar terms increased manifold, with Brazil over four times, from US\$462 billion in 1990 to US\$2.253 trillion in 2012. India increased by five times, whereas China and South Africa increased by more than fourteen and three times respectively. The situation further improves if comparison is made based on PPP terms. China has emerged as the second-largest economy, followed by India in fourth position, Russia in sixth, Brazil in eighth and South Africa twenty sixth (Singh & Dube, 2013).

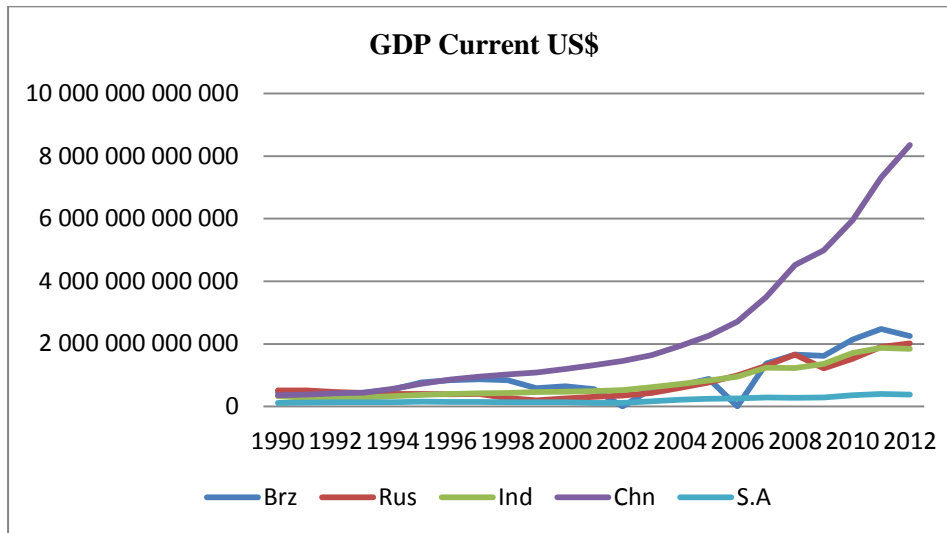


Figure 3.2 BRICS GDP (Current US\$)

Source: World Bank, 2015. Available from: <http://data.worldbank.org/indicator>. [20 October 2015]

In terms of per-capita income (figure 3.3), the BRICS economies experienced a trajectory trending pattern. Per-capita income for South Africa doubled from US\$3182.21 in 1990 to US\$7507.68 in 2012. Brazil and Russia experienced a three-fold increase, from US\$3086.922 and US\$3485.11 in 1990 to US\$11339.52 and US\$14037.03 in 2012 respectively. Robust year on year growth in Chinese and Indian economies translated into manifold increases in per capita income from US\$375.89 and US\$314.4306 in 1990 to US\$1489.235 and US\$6188.194 in 2012 respectively.

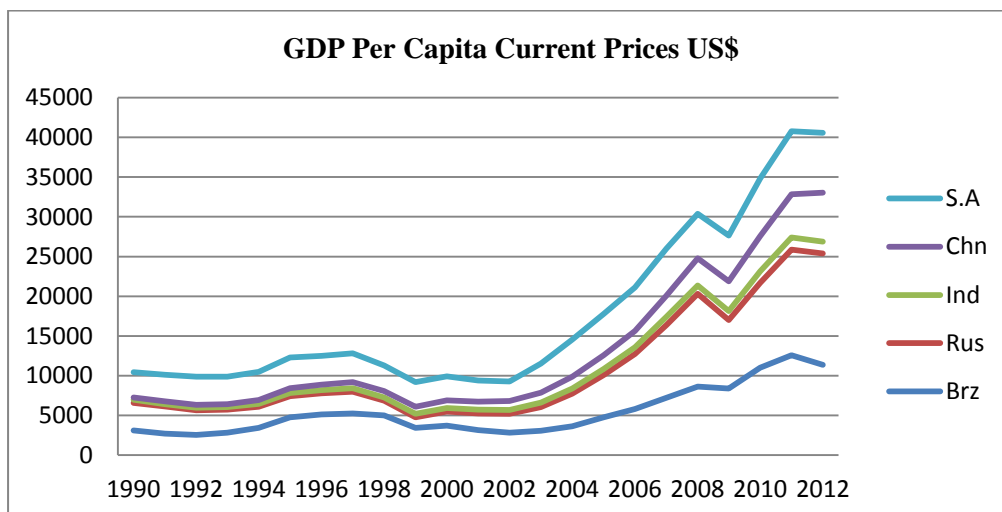


Figure 3.3 BRICS GDP Per Capita (Current US\$)

Source: World Bank, 2015. Available from: <http://data.worldbank.org/indicator>. [20 October 2015]

Sustained economic reforms, improved macroeconomic fundamentals and a buoyant macroeconomic environment contributed to the improved growth performance of the BRICS since inception (The BRICS Report, 2012). Table 3.2 provides a detailed analysis of the BRICS economic indicators with 2014 as the focal point.

Table 3.2 BRICS Economic Profiles

	GDP				Inflati on Rate GDP Deflat or (Δ p.a)	Intere st Rate	Gross Savin gs (% of GDP)	Inves tment (% of GDP)	Centr al GVT Debt (% of GDP)	Fisca l Balan ce (% of GDP)	Curre nt Acco unt balan ce (% of GDP)	FDI Net Inflo w (US\$ bill)	Forex Reser ves(US\$ bill)
	Nomi nal GDP (US\$ bill)	Grow th Rate p.a	Per Capit a (US\$)	PPP (US \$)									
Brazil	2346	3.2	1161 2	3263	6.9	23.5	15.8	20.6	64.9	-0.6	-4.43	63	359
Russia	1861	2.8	1273 5	3745	7.1	10.5	23.4	23.2	9.4	-0.5	3.1	20.9	419
India	2067	7.2	1630	7393	3	7.0	31.6	31.2	67	-3.9	-1.53	30.8	327
China	10360	8.5	7593	1803 0	0.9	4.7	49.5	48.6	22.4	-2.1	1.9	128	3 900
South Africa	349	2.2	6477	704	5.8	3.1	14.9	19.7	38.8	-3.8	-5.4	12.3	49

CIA, 2015; World Bank, 2015, Available from: <https://www.cia.gov/library/publications/the-world-factbook/geos/br.html> & <http://data.worldbank.org/indicator>. [24 November 2015].

China followed by India and Russia has the highest saving and investment rates amongst the BRICS nations. High savings rate were responsible for the reduction in contribution of net exports to GDP in the Chinese and Indian economies. Brazil and South Africa still have room to increase on investment rates. The investment rate for South Africa increased substantially over the BRICS inception as government and public corporations stepped up efforts on infrastructure investment. The overall investment was, however, constrained by high savings.

Foreign exchange reserves, a benchmark for measuring a country's financial strength, saw the BRICS contributing the equivalent of 42 percent of the global foreign exchange reserves in 2014. China contributed US\$3.9 trillion from US\$4.32 trillion realised from the total group. Regardless of losing 40 percent in value of the Russian Rouble to the US dollar, an interest rate hike of 10 percent and repurchases of the Rouble with forex reserves to install value, Russia's contribution of US\$419 billion was higher than most world economies. Forex reserves in India rose by more than US\$5 billion, a record level since 2011, due to investment in Indian equities by foreign investment firms. South Africa had the lowest proportion of forex reserves amongst the BRICS. The reserves were expected to dip amidst acute fall of the rand towards the later part of 2015.

Net private capital flows in the BRICS economies were buoyed by global and emerging domestic factors. These factors include excess liquidity, a low interest rate regime followed in the industrialized countries along with risk perception towards emerging economies and the urge for higher yields (The BRICS Report, 2012). Of the BRICS, only Brazil, China and South Africa recorded a surplus in their capital account. The situation was mixed in the current account as only China and Russia experienced a surplus. The trend accrued to the balance of trade figures amidst falling export demand.

In 2014, the BRICS accounted for US\$257 billion of FDI, which is about 23 percent of the global FDI flows. China was the largest recipient, overtaking the US as the world largest recipient of inward FDI. US rate fell to US\$ 86 billion during the same year (Jerin, 2015). The crisis in Russia over conflicts with Ukraine and the imposed western economic sanctions prompted a record fall of more than 90 percent of inward FDIs, as investor confidence was lost. However, China increased its position with the troubled nation, a sign of intra- BRICS cooperation.

Brazil and India had their modest share of about US\$63 billion and US\$30 billion respectively which was 10 percent less than that of the previous year. The same applied for South Africa with an almost 30 percent decline in inward FDIs to that recorded in 2013. Structural issues in ESKOM and the incidences of industrial action were the main factors responsible for the loss in investor confidence.

The BRICS economies have been successful in maintaining prudential macroeconomic stability. Interest rates were reduced to single digit levels; there were, however, concerns which still needed to be addressed. Inflation remained pegged above 5 percent in most of the BRICS economies, the

fiscal balance was in deficit for all the BRICS economies and, finally, all the BRICS had accrued debt in managing their economies. South Africa and Brazil had the highest rates averaging 38.8 percent and 64.4 percent respectively. The position was a reflection of lack in prudential mechanisms for managing public finances.

South Africa does not only have the smallest GDP in BRICS (at U\$475 billion in 2011), it is the only country that has seen very little growth in the size of its GDP. All the BRICS countries have proven to be able to grow their economies greatly and are becoming potentially large economies, but South Africa has not shown this potential. This then raises the concern of whether South Africa fits in the group. It raises questions of whether the country does deserve to be in BRICS. Based on the GDP figures and other indicators, the inclusion of South Africa in BRICS appears to have been based on a political move and not one based on economic facts and figures (SAGI, 2013).

A high savings rate allows for large investments to take place in an economy, thereby stimulating economic growth. Within BRICS, China has the highest saving and investment as a percentage of GDP. This explains its very large GDP. South Africa has had the lowest savings as percentage of GDP since 2003, at 16 percent and 15 percent in 2012. Although it has the lowest saving within BRICS, investment as percentage of GDP has been generally higher than that of Brazil. The share of savings to GDP in South Africa is expected to increase to 17 percent by 2017 and still remain the lowest within BRICS (SAGI, 2013).

Accelerated economic activity in the continent has also increased competition. Very large South African companies now have to compete against a new breed of African companies. According to SAGI(2013), companies like the Dangote conglomerate of sugar and cement and Econbank in financial services are not receiving much publicity in South Africa but their impact is increasingly felt in the continent and causing a declined in foreign direct investments.

The other negative side is of South Africa's unemployment rate which dramatically exceeds that of its fellow BRICS. On other indicators, however, South Africa does not fall outside the range of the others. Economic concerns for South Africa include the low levels of capital formation (but this is shared with Brazil); and the high current account deficit and low levels of foreign direct investment (common with India). On the positive side, South Africa's inflation is lower than the other BRICS; the economy is more open to the world than the other BRICS; levels of debt are low; and the stock market has outperformed that of the others.

Importantly, South Africa's economy is relatively well diversified and structurally mature in relation to the others, with the exception of Brazil. South Africa and Brazil have well developed tertiary economies while India is still strongly geared towards agriculture and low wage manufacturing; Russia is still largely dependent on oil and gas; and China is now a predominantly manufacturing economy.

South Africa also performs comparatively well in terms of "competitiveness" and "innovation". In recent rankings for competitiveness and innovation, South Africa ranks second in BRICS after China, although only marginally ahead of Russia, Brazil and India. South Africa's rankings are buoyed by the strength of its institutions, the quality of its regulatory environment, and its market and business sophistication. On the downside, South Africa has severe weaknesses in terms of the quality of its education, and the scale of investment in Research and Development (Harrison, 2014).

3.2.3 BRICS Trade Profiles

Trade has been on the forefront in boosting economic growth prospects of the BRICS. Trade liberalisation has been seen as a tool to foster such growth (Singh & Dube, 2013). There was a significant increase in BRICS' share of global trade from only 3 percent in 1990 to 19.3 percent of global exports and 16.4 percent of global imports of goods and services in 2010 (WTO, 2015).

With reference to WTO (2015) data from 2011-2014, all the BRICS countries enjoyed more than at least 5 percent change in merchandise exports and imports. South Africa topped the group, followed by China, and India. Brazil and Russia's changes were minimal citing the stringent import tariffs on the part of Brazil and economic sanctions in Russia.

Cumulative year-on year growth in merchandise trade made China the largest world exporter and second largest importer of merchandise goods with a world share of 12.3 percent and 10.3 percent respectively. The implication of an ending to the commodity super-cycle and engagement in global trade is cited. In contrast, the world share of BRICS was below 3 percent for each economy and beyond the top 10 in world ranking.

On merchandise trade balance, Brazil, Russia and China had surpluses in their balance of trade while Brazil, India and South Africa had deficits.

Table 3.3 provides a detailed analysis on BRICS trade profiles with reference to 2014 for merchandise trade and commercial services trade.

Table 3.3 BRICS Merchandise and Commercial Services Trade

	Merchandise Export				Merchandise Import				Comercial Services Export				Commercial Services Import			
	Tot (US\$ bill)	% Δ p.a	W/S hare	World Rank	Tot (US\$ bil)	% Δ p.a	W/S hare	World Rank	(Tot US\$ bill)	% Δ p.a	W/S hare	World Rank	Tot (US\$ bill)	% Δ p.a	W/S hare	World Rank
		11 - 14				11 - 14				11 - 14				11 - 14		
Brazil	225	3	1.2	25	239	6	1.3	22	37	7	0.9	32	73	10	1.8	17
Russia	498	6	2.7	11	308	6	1.6	17	64.9	10	1.3	22	119	13	2.2	11
India	322	9	1.7	19	463	7	2.5	12	156	13	6.3	8	147	14	2.0	8
China	2342	10	12.3	1	1959	9	10.3	2	233	11	4.0	5	382	18	7.8	2
South Africa	91	11	0.5	40	121	12	0.6	33	16	4	0.3	44	17	4	0.6	45

Source: WTO, 2015. Available from:

<http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=BR%2cIN%2cRU%2cZA%2cCN> .[04 November 2015]

All the BRICS economies recorded robust double digit growth in commercial services exports and imports. China, Russia and India occupied the top 15 world rankings in commercial services trade, while South Africa and Brazil still needed to improve on their positioning. With the exception of India, all other BRICS members had deficits in their commercial services balance of trade. However, the surplus in India could not offset a negative merchandise trade balance (WTO, 2015). Overall South Africa could not compare with the other BRICS in merchandise and service trade. Her global positioning averages 40 in all sectors whilst the other BRICS were positioned below 20. More so, total trade in both sectors from the least partner's trade was more than thrice to that of South Africa.

Figure 3.4 provides another detailed look by mapping the BRICS' merchandise and service trade balances from 1990-2011. The impact of global added value chains made China and the Soviet Union then Russia in 1993 record positive trade balances over the period 1990-2011. South Africa and Brazil's figures fluctuated below US\$20 billion. India had an outright trade deficit. Before ascension to WTO in 2001, China had sizable balances to other BRICS economies. From 2004 - 2011, China and Russia had sizable trade surpluses above US\$100 billion. This was astonishing on the part of Russia as membership to WTO was not yet in force. This leads to deeper argument of whether membership to WTO is necessarily a catalyst for trade. The other BRICS, India and South Africa had negative trade balances. India's deficit exceeded US\$50 billion while South Africa's balance fluctuated below US\$10 billion. The Brazil trade balance fluctuated at not less than US\$20 billion. From 2009 onwards, trade deficit exceeded US\$20 billion, an indication of over reliance on imports.

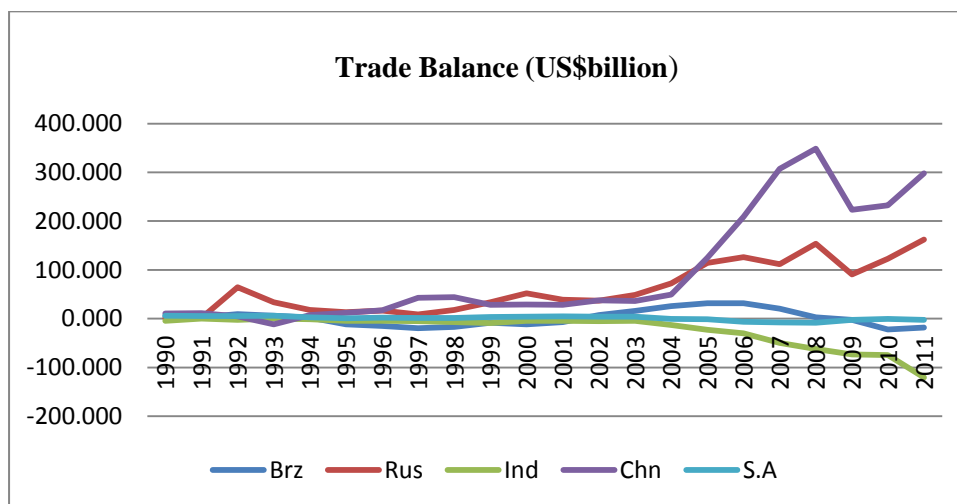


Figure 3.4 BRICS Trade Balances

Source: World Bank, 2015. Available from: <http://data.worldbank.org/indicator>. [20 October 2015].

Trade as a proportion of GDP showed an upward trending pattern from 1990-2011 (Figure 3.5). Yearly fluctuations were pronounced mostly in Russia. From 2005- 2011, the trade to GDP ratio was over 45 percent in all BRICS economies except Brazil. India experienced a substantial increase from as low as 20 percent in 1990 to over 50 percent in 2011. An increasing ratio of trade to GDP indicates how the importance of trade had impinged on the growth of the BRICS economies.

From 2011 to 2013, South Africa was the third largest BRICS exporter to Africa, after China and India, and was only the fourth largest importer from Africa, after China, India and Brazil (Harrison,

2014). South Africa is losing market share in agricultural goods to other BRICS countries in all countries in Africa except for Zimbabwe, while China is rapidly gaining market share relative to South Africa in exports of manufactured goods to Africa, with India also making inroads. In terms of the mining sector Chinese and Brazilian firms, in particular, are increasingly active on the continent and represent growing competition to South African firms which have held an historical dominance in parts of Africa (Harrison, 2014).

There are also challenges in terms of South Africa's direct trade relations with the other BRICS. There is concern in South Africa that "unfairly incentivized" imports from BRICS counterparts (especially China, India, and Brazil) may be having a negative impact on South Africa's already stressed manufacturing sector (Manufacturing Circle, 2014). South Africa's economy is more open than that of the other BRICS, and is highly vulnerable to import competition.

The other BRICS do, however, offer South Africa new market opportunities. There is an expansion of exports to the other BRICS. The contribution of the other BRICS is still relatively modest but is expanding, accounting for 16.7 per cent of the total value of South Africa's exports in 2013, sharply up from 6.2 per cent in 2005 (SAGI, 2013).

Within BRICS as a category, China is overwhelmingly dominant as an export destination, followed at a distance by India. One of the concerns is that trade with the other BRICS is reinforcing South Africa's role in the global economy as a commodity exporter. South Africa's export to the other BRICS is concentrated largely in iron and chromium ores and coal. The major exports in 2013 were: iron ore to China (R51 billion); chrome ore to China (R15 billion); coal to India (R15 billion); and steel to China (R10 billion) (DTI, 2014).

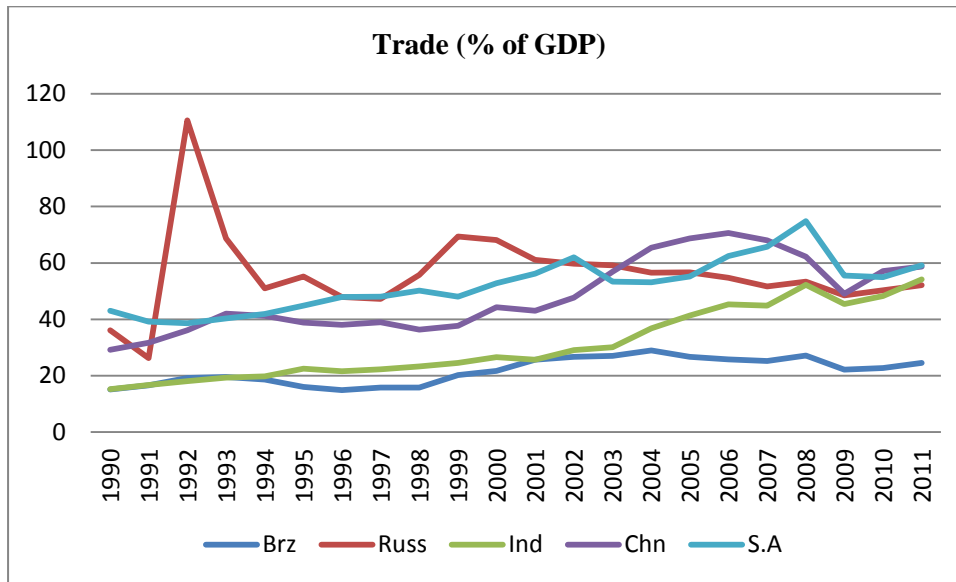


Figure 3.5 BRICS Trade as Percentage of GDP

Source: World Bank, 2015. Available from: <http://data.worldbank.org/indicator>. [20 October 2015]

3.2.4 BRICS' Key Markets

At country level, the United States dominated as the main export market for BRICS (figure 3.6). With emergence of interests from economies shunning their traditional trading blocs in favour of the BRICS, the U.S. share declined from 17.2 percent in 2001 to 14.2 percent in 2008, before marginally slipping further to 11 percent in 2012. Hong Kong (a Special Administrative Region of the People's Republic of China) was the second major BRICS export destination. Japan, the Netherlands and South Korea made up the remaining top five leading export destination for BRICS. Africa (excluding South Africa) boasted a substantial 16 percent of BRICS exports in 2012. The ratio was lower than 19 percent recorded in 2008, but similar to that of 2001. Africa's proportion was attributed to infrastructure development, as well as its resounding consumer market catalysed by a huge buying power (IDC, 2014).

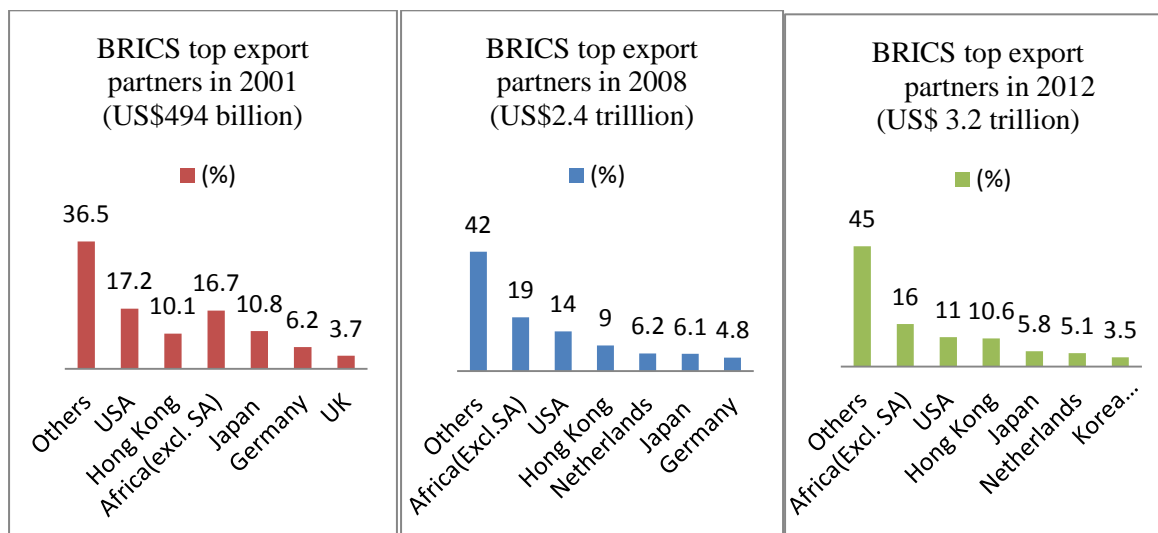


Figure 3.6 Key Markets for BRICS Exports

Source: IDC, 2014. Available from: <http://www.idc.co.za>. [20 March 2014]

At national level, Japan and USA remain the leading sources of BRICS imports. Republic of Korea and Germany followed the list. Despite the dominance of the leading sources of BRICS imports, their share dipped in 2008 and 2012. Intra-BRICS trading could have clouded the overall BRICS imports from individual economies. Africa’s contribution dwindled from 19 percent in 2008 to 15 percent in 2012. Crude petroleum and gases, refined and unrefined copper and iron ore and concentrates were the leading imported products from Africa. Figure 3.7 illustrates the key markets for BRICS imports.

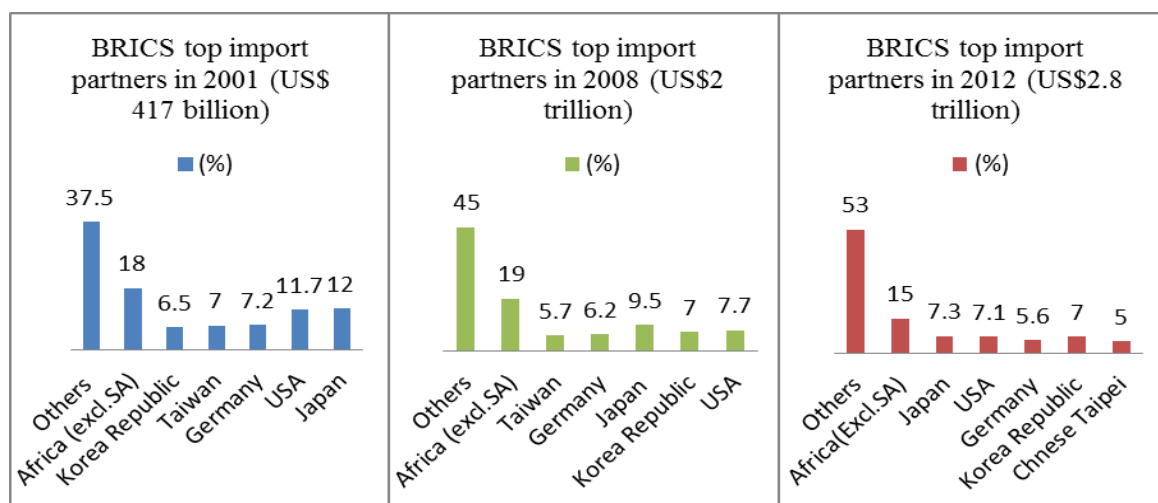


Figure 3.7 Key Markets for BRICS Imports

Source: IDC, 2014. Available from: <http://www.idc.co.za>. [20 March 2014]

3.2.5 Intra-BRICS Trade

Trends in intra-BRICS trade reflect an increasing focus of the group members fostering mechanisms to increase intra-trade. Figure 3.8 captures intra-BRICS trade by destination in 2013. China was the leading trade partner for other BRICS countries, with a total trade share ranging between 72 percent and 85 percent. India's share ranged within 7 percent to 26 percent. Only with China did Brazil record a double digit figure. With the exception of China, where its share was 85 percent, Russia had a smaller slice of intra-BRICS trade regardless of its ascension to the WTO in 2011. More so, barring trade with China and India, South Africa's share was the smallest in each of the other BRICS markets (WTO, 2015).

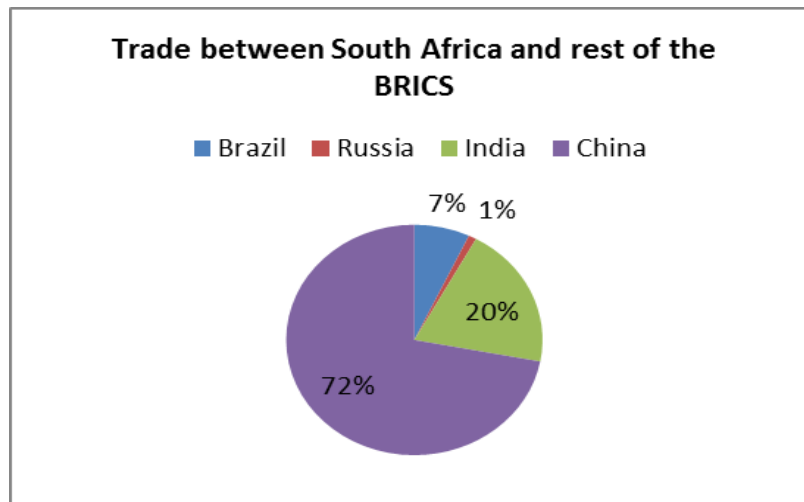
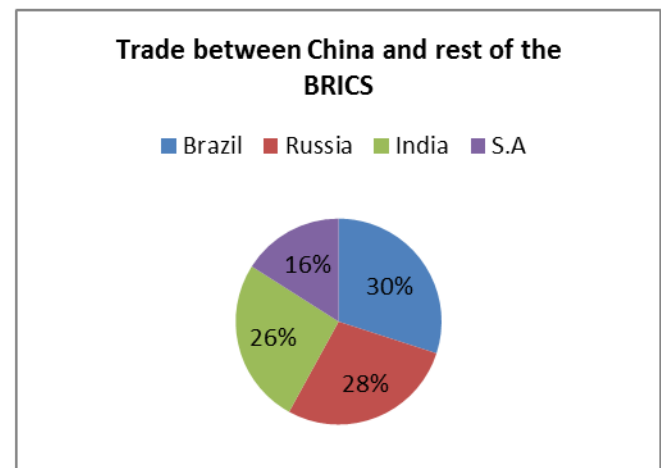
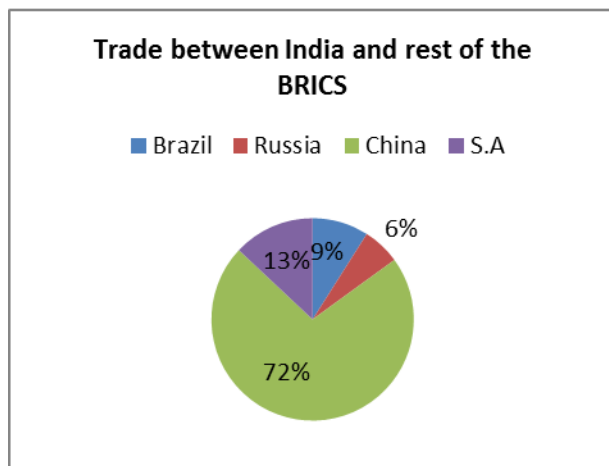
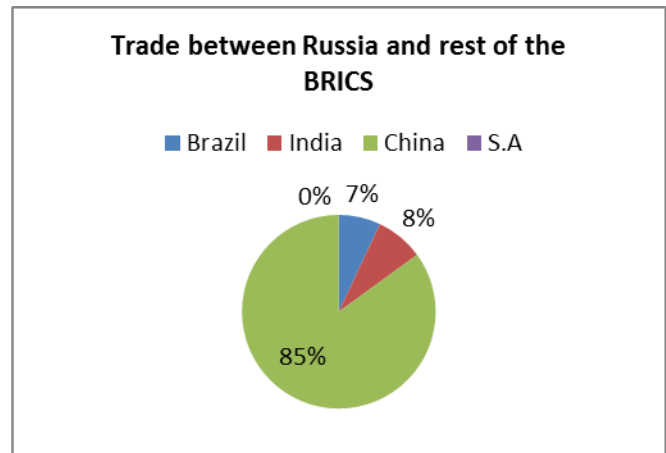
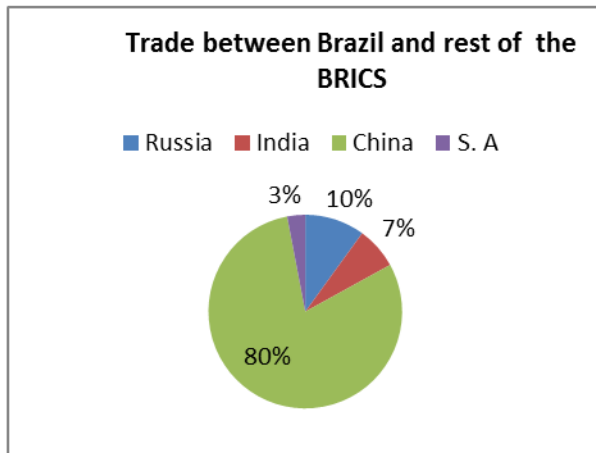


Figure 3.8 Intra-BRICS Trade (by Destination)

Source: IDC, 2014. Available from: www.idc.co.za [20 March 2014]

3.2.6 Intra-BRICS Trade in Value Added

Traditional trade flows as recorded by gross exports and imports of goods and services have suffered criticisms of recent years. The increasing international fragmentation of production in a world of global value chains (GVCs) leads to multiple counting of trade often responsible for misguided policy measures (OECD, 2013).

OECD, (2016) defines domestic value added in gross exports as the estimation of value added, by an economy, in producing goods and services for export.

The measure is a percentage share of value which can be broken in smaller components namely; compensation of employees; gross operating surplus; mixed income; and taxes on production less subsidies.

The OECD-WTO estimates of trade in value added (TiVA) can better interpret trade in a world of GVCs. Domestic value added in gross exports from the BRICS economies to other BRICS, Japan, the United States (US), United Kingdom (UK) and the rest of the world (ROW) was used for comparison purpose from 1995 to 2011.

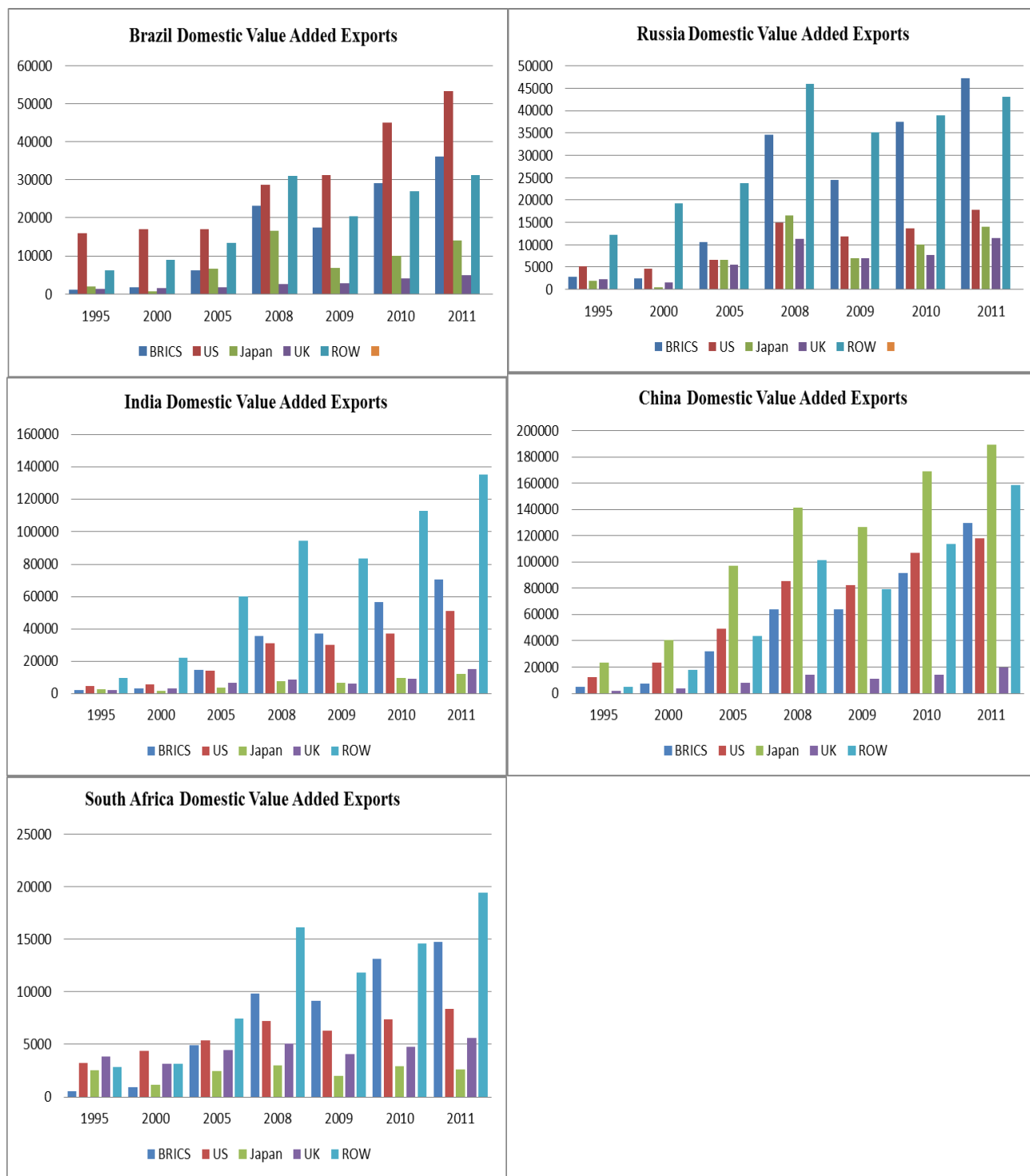


Figure 3.9 Total BRICS Exports in Value Added (US\$ Millions)

Source: OECD.Stat, 2016. Available from: <http://stats.oecd.org/Index.aspx?DataSetCode=TIVA201> [28 February 2016].

From 1995 to 2011, exports in value addition from the BRICS nations were concentrated in Japan, the US and UK. Brazil's major value added exports were concentrated in the US. The BRICS nations contributed the next major share followed by the ROW and Japan. Exports to the BRICS exceeded US\$36.046 billion in 2011 from about US\$1.104.47 billion in 1995. This was little to offset the US magnitude which spiralled to over US\$53 billion over the same period (OECD, 2016).

Russia value added exports to BRICS were equivalent to exports to the rest of the world. In 2011 the highest value added exports was recorded with BRICS for US\$47.428 billion. This was more than 100 percent for the value in 1995 and 2009 respectively.

India response to BRIC and BRICS trading was positive, with value added exports exceeding US\$70.478 billion in 2011 from US\$2.182 billion and US\$37.167 billion recorded in 1995 and 2009 respectively. India export more to the ROW and the US amongst other world economies crowding out the value added exports meant for the BRICS.

China maintained her position as a global trader, with value added exports exceeding US\$129.629 billion in 2011 from US\$ 4.955 billion and US\$64.064 billion recorded in 1995 and 2009 respectively. Value added exports increased gradually with the formalisation of the BRICS prompted by favourable trade policies amongst member countries (OECD, 2016).

South Africa value added exports remained lower than in other BRICS countries. Value added exports to Africa in ROW surpassed exports destined for the BRICS and the US which has been a dominant partner from 1995 to 2005. In 2011 value added exports to the ROW exceeded US\$19.403 billion compared to US\$14.784 billion and US\$8.413 billion exported to the BRICS and the US respectively (OECD, 2016).

3.2.7 BRICS Sectoral Analysis

BRICS Sectoral analysis is made subject to decomposition of output, employment and trade from 2010-2014 (table 3.4).

The services sector dominated the Brazilian economy with 71 percent of the country's GDP and 57.3 percent of employment from 2011-2014. The contribution to GDP was slightly up from 67 percent recorded in 2010 (WTO, 2015). Employment contribution fell by 4.7 percent. Transport and travelling services were the leading exports to the value of 13.8 percent and 17.1 percent respectively. Trade in services accounted for 17.5 percent of total exports and 27 percent of total imports. The industrial sector was equally important, with a contribution of 24.3 percent to GDP and 13.3 percent of labour-force. Contribution of the agricultural sector dipped due to diversification in trade. The sector's contribution to GDP and labour-force fell by 1.4 percent and 0.4 percent respectively. More so, the sector was highly protected as seen by 4 percent of imports recorded.

Russia was buoyed by the energy sector as the main driver of its economy. Industry, comprising of mining, energy production and construction accounted for over 80 percent of its export earnings and about 60 percent of its total imports in 2010. The sector employed over 25 percent of Russia's workforce and contributed at least 37 percent of its GDP. Russia's exports diversified in ascension to the WTO. From 2011-2014, Russia's export structure by product group was dominated by fuels and manufactured goods, measuring 72 percent and 16 percent of total exports respectively. The services sector emerged as the main contributor to GDP and the main employer for 60 percent of the country's workforce. Service exports contributed 12 percent of total exports and 27 percent of total imports. Agriculture comprised of 5 percent of GDP, and employed 10 percent of the country's workforce. Its share of total exports and imports was marginal at 5 percent and 13 percent respectively.

Agriculture dominated the economy of India, with an employment share of 49 percent of its total labour force. Contribution of the sector to GDP decreased from 19 percent of GDP in 2010 to 17 percent of GDP in 2011-2014. The contribution of agriculture to total exports was minimal as major production was geared towards the domestic market. The service sector showed increased importance, with 31 percent of the labour-force and a contribution of 53 percent to GDP. Diversification and expansion of the manufacturing base led to an increase in foreign trade statistics. Industry share in GDP and employment was 30 percent and 20 percent respectively, which was a 4 percentage increase in both categories from that recorded in 2010.

The Chinese industrial sector contributed at least half of the country's rapidly rising GDP from 2011-2014. Its industrial sector accounted for 89 percent of total exports and 82 percent of total imports. The services sector showed positive growth, with a contribution of 44.6 percent of GDP and labour force of 36.1 percent from 43 percent and 33 percent recorded in 2010 respectively. Service exports and imports ranged within 10 percent of total trade. Trade in agriculture contributed 10 percent of the country's GDP. The share was minimal as it was channeled directly to the domestic market as China's trade policy shifted to consumer led growth, impacting trade severely (WTO, 2015).

Even though South Africa's agriculture sector accounted for only 2.5 percent of GDP and 4 percent of labour force employed, South Africa was regarded as a major agricultural exporter, with an export value of over 14 percent of total exports (WTO, 2015). From 2011-2014, the industrial sector, with the domination of the mining industry, accounted for 29.5 percent of GDP, 18 percent of labour force, and at most 73 percent of imports and 77 percent of exports. The services sector was equally important, contributing 52.9 percent of GDP and 64.4 percent of labour force (WTO, 2015).

Table 3.4 BRICS Sectoral Analysis (Percentage)

	Agriculture Sector				Industrial Sector				Services Sector			
	GDP Com positi on	Labour Force Compos ition	X ÷ Sum X	M ÷ Sum M	GDP Comp ositio n	Labour Force Composi tion	X ÷ Sum X	M ÷ Sum M	GDP Comp osition	Labour Force Compos ition	Net Servic e Trade	M ÷ Sum M
Brazil	5.6	15.7	29	4	23.4	13.3	55	69	71	57.3	-46.6	27
Russia	4.2	9.7	6	13	35.8	27.8	82	59	63	58.5	-54.1	28
India	17	49	6	4	30	20	60	74	53	31	8.7	22
China	9.2	33.6	3	7	42.7	30.3	89	82	44.6	36.1	-149	14
South Africa	2.5	4	14	6	29.5	18	73	77	52.9	64.4	-0.17	19

**X represent Exports and M represent Imports*

Source: CIA, 2015; WTO, 2015. Available from: <https://www.cia.gov/library/publications/the-world-factbook/geos/sf.html>; & <http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?> [24 November 2015].

3.2.8 BRICS Trade Policies

South Africa's explicit negotiating objectives in the WTO are given as; enhancing market access to developed countries; elimination in industrial countries subsidies and support to agriculture; re-negotiation on rules that perpetuate imbalances in the international trade regime and ensuring the appropriate policy space for developing countries to pursue developmental objectives through meaningful implementation of the principle of special and differential treatment (Edwards & Lawrence, 2012).

During the Uruguay Round, South Africa participated as a developed country and was required to make more extensive cuts in its maximum (bound) tariff rates than other emerging economies (although tariff protection in many developing economies fell substantially through unilateral liberalisation). Tariff barriers on South African exports to developing countries far exceed those to developed countries. The 2008 average applied tariff imposed on South African exports to BRICs (excluding Russia which only joined the WTO in 2012) ranges from 8.4 percent in China to 12 percent in Brazil. In contrast, the average applied tariff rate by developed economies is substantially lower: 0.3 percent by EU countries, 1.7 percent by the US and 3.6 percent by Japan (Edwards & Lawrence, 2012).

On the other hand, the preference margins on average tariff rates applied by developed economies range from 3 percentage points (into EU) to 0.4 percentage points (into Japan). Reductions in developed economy barriers were susceptible to erode the preference margins. In contrast, South Africa faced negative preference margins into the BRICs as a consequence of the various regional trade agreements entered into by these economies (Edwards & Lawrence, 2012).

The BRICS formalisation saw a massive shift in BRICS trade policies, such that the share of BRICS in global trade to double over the period from 2011- 2014. Tariff rates were subsequently reduced to range within 10 percent of the average tariff rates (table 3.5)

Bound and applied rates were kept higher for agricultural commodities amidst food security concerns. Brazil and India were exceptions as higher average tariffs were imposed on non-agricultural commodities. Non-*advalorem* tariff rates were insignificant for Brazil while South Africa had a large proportion of duty free imports, an aspect responsible for her overall negative trade balances with the BRICS and most world economies.

Table 3.5 BRICS Tariff Profiles

	Tariff binding Coverage (%)	Simple Average Bound Rate (%)			Simple Average Applied Rate (%)			Range (Percentage)		Coefficient of variation (Applied Rate)	Non-ad valorem tariffs (% total tariff lines)	Duty free Imports – Agric & Non-Agric (%)
		Agric (AOA)	Non-Agri c	All	Agric (AOA)	Non-Agri c	All	Boun d Rate	Applie d Rate			
Brazil	100	35.4	30.8	31.4	10.2	14.1	13.5	0-55	0-35	0.6	0.0	36.5
Russia	100	11.2	7.1	7.6	11.2	8.9	8.4	0-278	0-278	0.2	9.8	44.3
India	74.4	113.5	34.5	48.5	33.4	10.2	13.5	0-300	0-150	1.3	4.9	49.1
China	100	15.7	9.2	10.0	15.2	8.6	9.6	0-65	0-65	0.7	0.4	51.8
South Africa	96.1	40.4	15.7	19.0	8.4	7.4	7.6	0-597	0-96	1.4	2.6	110

Source: WTO, 2015. Available from: <http://stat.wto.org/CountryProfile/WSDBCountryPFView.aspx?Language=E&Country=BR%2cIN%2cRU%2cZA%2cCN> [24 November 2015].

Apart from reduction in tariff rates, a large number of import restrictions and quotas have been dropped. However, licences remained the only important restraint for regulating imports in BRICS.

The BRICS have set up technical barriers (TBT) and sanitary and phytosanitary measures (SPS) amongst themselves. All BRICS have membership in international standard setting organizations such as Plant Protection Convention (PCC), Codex Alimentarius Commission (Codex) and International des Epizooties (OIE). Membership in such organizations ensures global harmonization and transparency in execution of standard guidelines and procedures for trade.

The BRICS have signed a lot of multilateral and bilateral mutual recognition agreements with several developing countries on standards conformity, assessment and accreditation procedures. One example is INMETRO (the standardisation body of Brazil), which has a memorandum of understanding with India and a cooperation agreement with Russia on quality management systems. Congruently, the standardisation body of India had a memorandum of understanding with South Africa (WTO, 2015).

On the same note of protectionists' agreements, the BRICS implemented usage of trade remedies to protect their local industries. Trade remedies comprise of anti-dumping action, countervailing duties measures and safeguard actions. China has been targeted for most anti-dumping duties, while India emerged as the frequent user of anti-dumping remedies. On the other hand Brazil made frequent use of safeguards and countervailing duties to protect its primary industry. In contrast, South Africa made few use of trade remedies, a situation resulting in her experiencing a negative trade balance with the other BRICS economies.

More so, in order to aid fair trading in the services sector, the BRICS made a commitment in 12 service sectors specified under GATS (General Trade in Services) of the WTO with an obligation of provision of market access and national treatment of service activities in relation to the terms and conditions specified in the agreement schedule (WTO, 2015).

The 12 service sectors are divided into specific sub-sectors in which the BRICS economies made specific commitments. Table 3.6 presents the specific commitment areas of the BRICS in each sectoral categorisation.

Table 3.6 BRICS Total Services Sectors with GATS Commitments

Country	Total (no.) Sectors	Sectoral Categorisation
Brazil	43	Business (13), communication (1), construction & related engineering (9), distribution (4), financial (9), tourism and travel related (2), transport (5).
Russia	122	Business (37), communication (8), construction & related engineering (5), distribution (4), education (6), environment (28), financial (2), health (1), tourism & travel related (5), recreational, cultural & sporting (2), transport (14).
India	37	Business (10), communication (11), construction & related engineering (1), financial (13), health (1), tourism & travel related (2)
China	93	Business (41), communication (3), construction & related engineering (5), educational (5), environment (8), financial (2), tourism & travel related (2), transport (15).
South Africa	91	Business (33), communication (7), construction & related engineering (15), distribution (7), environmental (3), financial (20), tourism & travel related (3), transportation (4).

Source: WTO, 2015 Available from: <http://i-tip.wto.org/services/SearchResultGats.aspx> [16 November 2015]

Amongst the BRICS, Russia, China and South Africa made a lot of specific commitments in line with GATS agreements, a situation healthy for world trade. Brazil and India did not commit much as required by GATS. The business and financial services sectors were most pronounced with more than 11 specific commitments respectively.

Intellectual property rights are also at the helm of intra-BRICS trading. All BRICS members are party to the World Intellectual Property Organisation, the Paris Convention for the Protection of Industrial Property, the Berne Convention for Protection of Literary and Artistic Works and WTO's TRIP agreement. Stringent measures have been adopted to enforce and monitor infringements and counterfeit goods.

Progressive trade policies have resulted in high volume of trade in the BRICS economies; however, intra-BRICS trade continues to be low. More so, the BRICS trade imbalance is a subject of scrutiny, with more imports skewed towards China, which is the leading partner amongst the bloc.

The BRICS have signed a number of bilateral and multilateral trade agreements (as a group). As a member of the South American Common Market (MERCOSOR), Brazil signed various preferential trade agreements with India in 2004 and with the Southern African Customs Union (SACU) in 2008, where South Africa is a member. Trade agreements negotiations were also launched between China and SACU, and India and SACU. In addition, India and China are members of the Asia Pacific Trade Agreement (APTA), a preferential trading arrangement for the Asia-Pacific region. India and Brazil are party to the agreement on Global System of Trade Preferences (GSTP), which seeks to promote trade amongst the G77 countries. China and Russia are members of the Asia Pacific Economic Co-operation (APEC) (WTO, 2015).

South Africa's emphasis on enhancing market access into developed country markets, for all developing countries in all products, was not necessarily in its interest. Analytically, the key issue was whether South African exports to developed countries compete more strongly with domestic producers in these markets (example, against US producers when selling in the US market) – in which case lower MFN tariffs *are* in its interest, or with other countries, (example, Brazilian producers selling in the US) in which case preferential access could be better. Through its FTAs with the EU and EFTA, the US African Growth and Opportunity Act preferences and the Generalised System of Preferences (GSP) (used to export to Japan) South Africa has preferential access into the developed economies. South Africa's preference margins on average tariff rates applied by developed economies range from 3 percentage points (into EU) to 0.4 percentage points (into Japan) in 2008 (WTO, 2015). Reduction in developed economy barriers was susceptible for eroding the preference margins. In contrast, South Africa faced negative preference margins into the BRICs as a consequence of the various regional trade agreements entered into by these economies (Edwards & Lawrence, 2012).

According to WTO (2015), South Africa has not been an active participant in the global trend towards FTAs after 2000. The co-operation agreements that have been signed with India, China and Brazil had a high symbolic and encouraging character emphasising desires to increase trade and investment rather than establishing systems based on binding rules and tariff preferences. The same applies to the India–Brazil–South Africa Forum (established in 2003) and the SACU Trade, Investment and Development Cooperation Agreement (in 2008) with the US that was the final outcome of the failed negotiations of a SACU–US FTA. South Africa did (as part of SACU) conclude a preferential trade agreement with MERCOSUR in 2008, and a similar agreement is in

prospect with India. In addition, there was a Comprehensive Strategic Partnership Agreement with China (Partnership for Growth and Development).

These agreements have been justified as useful but they did not give South Africa the same access benefits as those given to countries that have signed more comprehensive FTAs (Edwards & Lawrence, 2012).

Even with the BRICS formalisation in 2011, little tariff reforms were implemented, very low preference margins were granted on the products that made up a large share of South African exports. For example, no preferences were granted on the two most important products exported by South Africa (ferro-manganese and spark-ignition engines over 1 000 cc), yet these products faced tariff rates of between 6 percent and 18 percent (Edwards & Lawrence, 2012).

There was little evidence, therefore, that the partial trade agreements emphasised by the South African government would be effective in enhancing access into the BRICS economies. The SACU–MERCOSUR agreement *has* established a legal framework for negotiating future tariff reductions. However, unless the focus is on negotiating comprehensive trade agreements that match those signed by other developing countries, South African exporters will remain relatively disadvantaged in these markets.

Many argue that regional integration has at times conflicted with South Africa's national interests, with the country choosing to integrate into the world economy at the expense of regional partners. The EU/SA Trade Development and Cooperation Agreement (TDCA) agreement on developing a free-trade area between the two partners is one of the good examples. The grouping offers political leverage for South Africa, with some advocating that it should pursue alliances in key sectors. One of the key sectors in which South Africa can influence the agenda of the BRICS group is that of renewable energy.

According to Lawrence & Edwards, (2012), the justification for South Africa's defensive stance in the BRIC trade negotiations was for provision of maximum freedom for domestic industrial policy. This involves a detailed sector-by-sector approach which seeks to upgrade South Africa's industrial base and to encourage the production and export of more sophisticated value-added products, and achieving dynamic competitive advantages.

Although the approach above has the advantage of providing domestic policy space, it results in excessive complex tariff structure and places South Africa at a disadvantage when seeking market access for its exporters.

An alternative approach would be to simplify the tariff structure with much fewer tariff rates, but still maintain barriers in a few sectors. This will be so to preserve jobs and nurture infant industries. In addition, more emphasis would be given to offensive interests by seeking greater multilateral liberalisation with the BRIC economies or by negotiating more comprehensive bilateral agreements in which greater liberalisation is exchanged by granting preferential market access while still retaining some protection for sensitive sectors.

3.3 Bilateral Trade Relations in BRICS: A South African Perspective

Given that South Africa has the largest economy in Africa, its inclusion in BRICS has further boosted its geo-political significance. The South African economy constitutes a third of economic activity in sub-Saharan Africa, and 80 percent of economic activity in the Southern African Development Community (SADC) (Onyekwena et al, 2015). South Africa is also endowed with abundant mineral and natural resources, and has relatively well-developed financial, energy, and transport sectors, unlike most African countries. It is clearly a continental leader in terms of infrastructure, financial institutions, and outward investment.

According to Onyekwena et al (2015), the other BRICS countries also dominate their respective regions or continents, and thus their coalition, especially in terms of economic co-operation, can augment their influence in global affairs. South Africa's rich endowment of mineral and natural resources complements Brazil's specialisation in agriculture and raw materials, Russia's position as a major player in the commodity market, India's services-exporting economy, and China's recognition as the 'world's factory'. The BRICS countries also share similar economic challenges, particularly the task of raising the standards of living of their citizens. South Africa has strong ties with Europe as a result of its prolonged colonial history. Indeed, the European Union (EU) has been its major trading partner, with a Preferential Trade Agreement entrenched in the Trade Development and Cooperation Agreement. The EU remains a major trading partner with South Africa, but BRICS is rapidly catching up.

This section examines South Africa trade with its BRICS partners in considerable detail, thus enabling policy recommendations about optimising intra-BRICS trade. The first section provides a detailed overview of South Africa's trade policies. Following is a review on world trade with South Africa as the main partner. The third sub-section unearths bilateral trade relationship between South Africa and the BRICS. An analysis of leading products in SA-BRIC trade is provided in the fourth section. The fifth sub-section highlights SA-BRIC trade intensity and trade complementarity. The final sub-section concludes the analysis and provides policy recommendations.

3.3.1 South Africa Trade Policy

Trade policies adopted by South Africa were pinned by three interrelated strategies, that is, import substitution industrialisation, development of strategic industries in military equipment, oil and coal and the development of minerals related exports (Lewis, 2001 in Sandrey, Fundira, Vink, Jensen, Viljoen & Nyhodo, 2013).

Accession to WTO accelerated the pace of trade policy reform. Trade liberalisation and tariff reduction measures were key aspects in the WTO offer. Trade reform brought about by the reduction in average tariffs from 15 percent in 1996 to 7 percent in 2011 signalled the commitment of South Africa towards trade-related growth. Presently, South Africa has shifted its policies towards market-led support measures that are in line with WTO rules, so as to facilitate industrial restructuring, technological upgrading, investment and export promotion as well as small, medium and micro enterprises development (SMMEs) (Sandrey et al. 2013).

3.3.2 South Africa -World Trade

According to The Presidency (2014), the South African economy is one in which diversification has spanned its macro-economic environment. The country has adopted supply side policies to aid in distribution of commodities to international markets. Exports in South Africa are mostly in the agriculture and mining industries. Machinery, transport equipment and petroleum make up the largest segment of the country's imports (The Presidency, 2014).

Since the inception of democracy in 1994, South Africa has signed a total of 624 bilateral, political and economic agreements with many countries on the continent. The relations were centred mostly on trade (The Presidency, 2014). Changes in the South African export market made the implementation of bilateral agreements practically improbable. New markets emerged in China to

the measure of 12.9 percent share of non-gold merchandise exports in 2012, compared to 0.8 percent in 1994. The same happened to India–SA relations. India became the fifth largest export destination for South African exports, overtaking United Kingdom and Switzerland (The Presidency, 2014). African countries, especially from the Southern Africa Development Committee (SADC), have become an important destination of South African exports since 1994. Exports to the entire African continent increased by 7.6 percent, from 10 percent in 1994 to 17.6 percent in 2012. SADC countries claimed 12.9 percent of total Africa’s exports in 2012, up from 8.3 percent in 1994.

No major changes in export source and destination countries were recorded in 2014. The overall share of South Africa world exports of merchandise trade was 51 percent compared to 67 percent of world imports. Manufacturing, fuels, mining products and agricultural commodities dominated the economy’s total imports and exports of commodities. Share in world total service exports was 30 percent as compared to 36 percent of total service exports. Travel, transport and other commercial services dominated the economy’s total service imports and exports (World Bank, 2014).

South Africa’s World exports and imports decreased by 10.8 percent and 0.1 percent from December 2014 to February 2015. Major decline in trade was recorded in exports of mineral products, plastics & rubber, machinery & electronics and vehicles & transport equipment. A shift in world demand and limited global value chains amongst deteriorating economic conditions could have affected SA recent trade changes (SARS, 2015).

3.3.3 South Africa Trade Balance with the BRIC

Since 1990, South Africa has had trading relations with BRIC countries. The trading relations were, however, minimal with concentration on essential commodities and services (Gelb, 2014). In 1990 South Africa’s exports to BRIC totalled US\$111 million and imports totalled US\$328 million. By 1995, total trade had accelerated to US\$1.76 billion, but it then rose steadily in 2002, when it amounted to US\$2.3 billion which was slightly more than 4 percent of total trade. A steady incline of US\$5.4 billion was recorded between 2002 and 2007 against imports of US\$12.7 billion, thus posting a deficit of approximately US\$7 billion. Between 2007 and 2012, South Africa’s total trade with BRIC countries had increased to US\$36.1 billion (Gelb, 2014). Figure 3.10 reflects on SA’s trade balance with the BRIC from 2000 -2014 – in other words, whether trade favoured it or its trading partners.

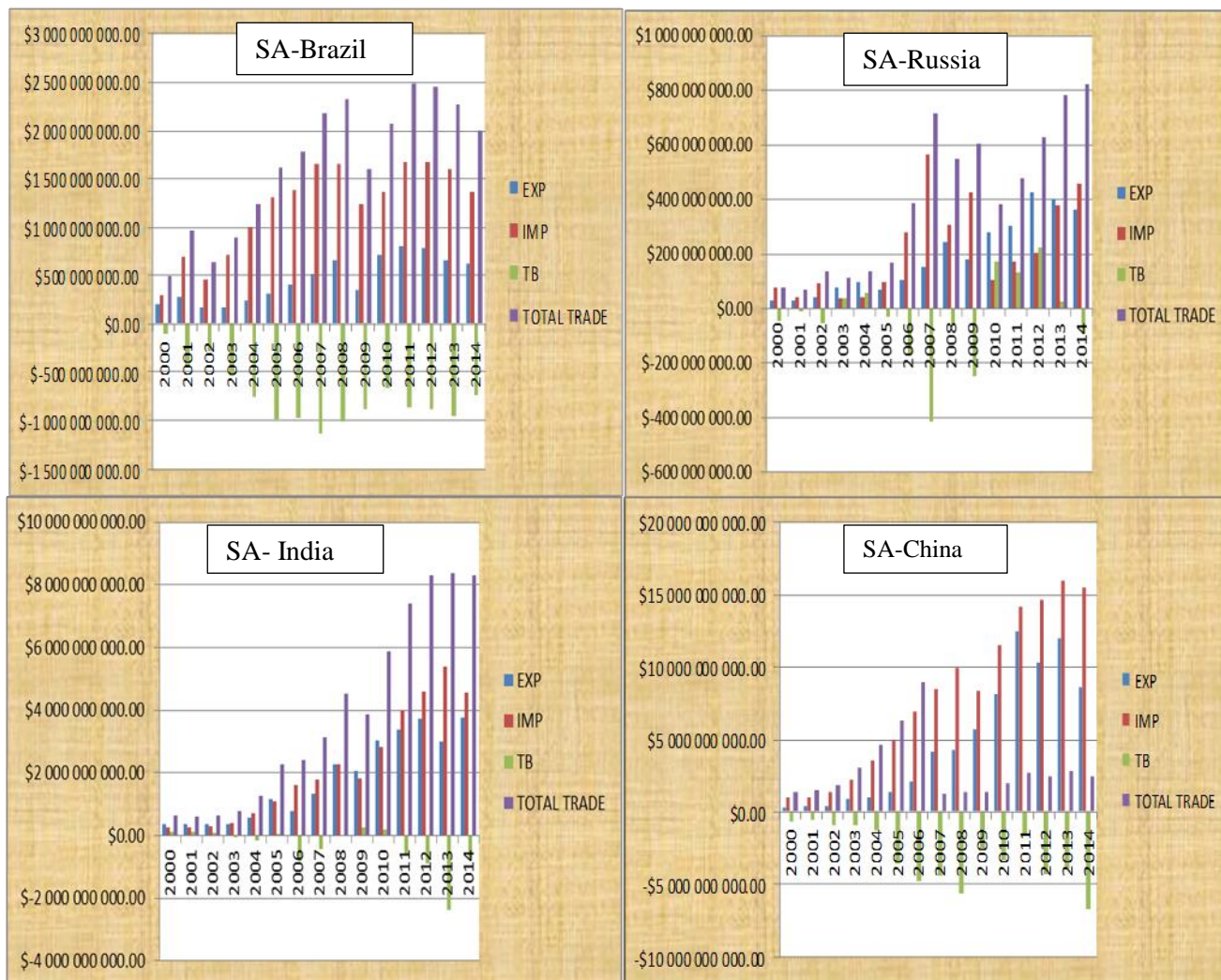


Figure 3.10 SA Trade Balance with the BRIC (US\$)

Source: UNComtrade, 2015. Available from: <http://comtrade.un.org/data/> [20March 2015]

SA recorded a trade deficit with BRIC as a whole for most of 2000–2009; however, it has recorded consistent surpluses in trade with India since 2000. Prior to BRICS inclusion, SA recorded trade deficits with China and Russia, changing dramatically to surpluses in 2010 after inclusion. Trade with Russia followed a similar trend, changing to a surplus after 2010, while trade with Brazil has been in deficit for most of the period from 2000 - 2012. According to Edwards & Lawrence (2012) in Onyekwena et al. (2014), rapid growth of emerging economies and the rise in demand for SA commodities were the most important events responsible for the shift in SA trade with most BRICS countries.

From 2012-2014, the trade balance between SA and the other BRICS countries emerged into a deficit. Russia recorded a surplus; save for 2014 when the effect of economic sanctions imposed by the EU had crippling effects on its economy. China and India's trade with SA increased significantly; however, exports from SA were too little to offset a negative trade balance. The trade deficit with Brazil widened over the same period, which was most probably due to unfavourable trade policies and high tariffs from the Brazilian perspective towards SA. As a result, SA preferred to trade with other Latin American countries where tariffs were lower (Onyekwena et al. 2014).

3.3.4 South Africa Trade Structure with the BRIC

Trade structure is referred to as the composition of exports and import commodities within a particular setting (ITC, 2015). The SA trade structure with the BRIC is assessed based on data from UNComtrade and the International Trade Centre. The assessment is made in four snapshot segments of 2001, 2007, 2011 and 2014 so as to monitor the gradual changes in composition, with the BRICS formalisation in mind.

The traditional trade theories of Hecksher Ohlin and David Ricardo explain the occurrence of international trade through comparative advantages necessitating the exchange of goods. This they termed inter-industry trade. This trading pattern was practiced within the SA-BRIC trade prior to formalisation as South Africa export raw material and natural resources to those countries while they export sophisticated goods and machinery and appliances in which they had comparative advantage to South Africa.

The new monopolistic trade theorists of Dix-Stiglitz, Rodrik-Rodriguez and Krugman provided a distinct pattern of gains in trade even with similar country characteristics and resource endowments. This type of trade is called intra-industry trade. South Africa and the EU enjoyed trade under such circumstances, which deteriorated with advent of the BRICS as South Africa shifted from the inter-industry basis towards the intra-industry basis as shown by data from trade map which reflected on SA importing the same types and related commodities it had comparative advantage. Issuances of re-exports also set in and value addition become a prerequisite in the quest of driving growth.

South Africa's exports to BRICS over the period 2001- 2014 were largely dominated by minerals and beneficial products. Overall share of iron ores and concentrates and coal related products to the BRICS rose from 24 percent in 2001 to 27 percent in 2007 and 48 percent in 2014, indicating a much greater degree of concentration (ITC, 2015). Prior to the formation of BRICS, SA exports were concentrated in the minerals sector to all the BRIC economies. A gradual change occurred

after the BRICS formation, which saw the composition of SA exports changing into semi-finished and finished products. Figure 3.11 presents South Africa’s key export categories to the BRIC economies.

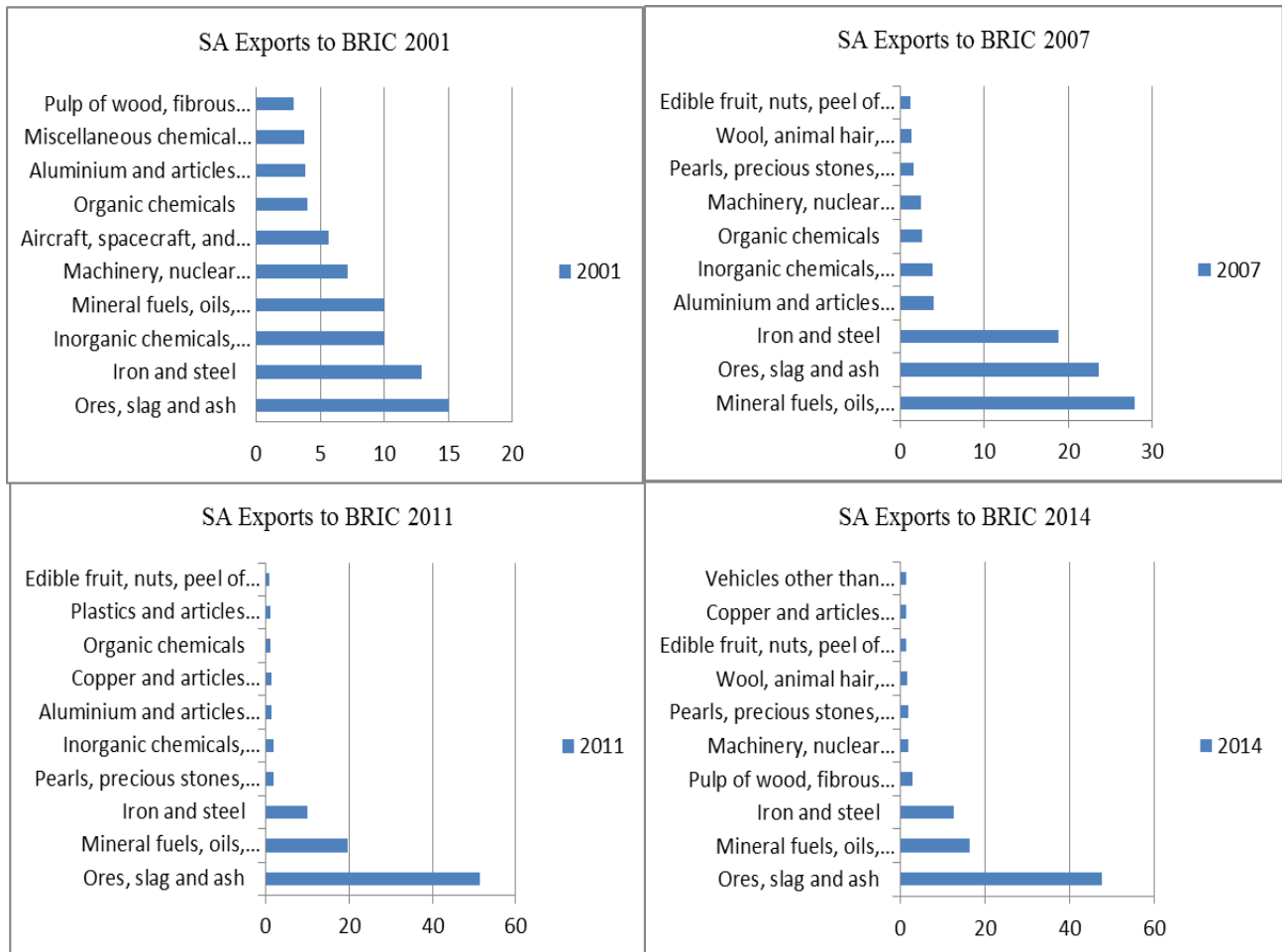


Figure 3.11 SA Key Export Categories to the BRIC (Percentage)

Source: ITC, 2015. Available from: http://www.trademap.org/tradestat/Product_SelCountry [20 March 2015].

From an individual country’s point of view, South Africa’s leading exports to other BRICS countries were in the form of raw materials, semi-finished products and fruits. Of these commodities, coal related products, iron ores and concentrates and ferroalloys dominated the top export list to Brazil, India and China. Fruits in varying varieties including grapes dominated the exports of South Africa to Russia. However, trucks, motor vehicles and manganese ores also found a mark on the leading exports (ITC, 2015).

Since 2001, imports from BRICS to South Africa were mostly finished products. Machinery, nuclear reactors and boilers, electrical and electronic equipment and mineral fuels, oils and distillation products were the most dominant imports. The overall share of machinery, nuclear reactors and boilers rose from 10.3 percent in 2001 to 18.3 percent in 2014. Electrical and electronic equipment rose by 8.2 percent from 9.9 percent in 2001 to 18.3 percent in 2014, a clear reflection on the intensity of imports in response to BRICS formalisation. Mineral oils, fuels and distillation products followed similar trending characteristics, with an overall increase of 5.9 percent of total imports from 2001 to 2014. South Africa also found itself importing some of the commodities in its export basket, a term Krugman (1979) termed ‘intra-industry trading’. Figure 3.12 presents South Africa’s key import categories from the BRIC economies.

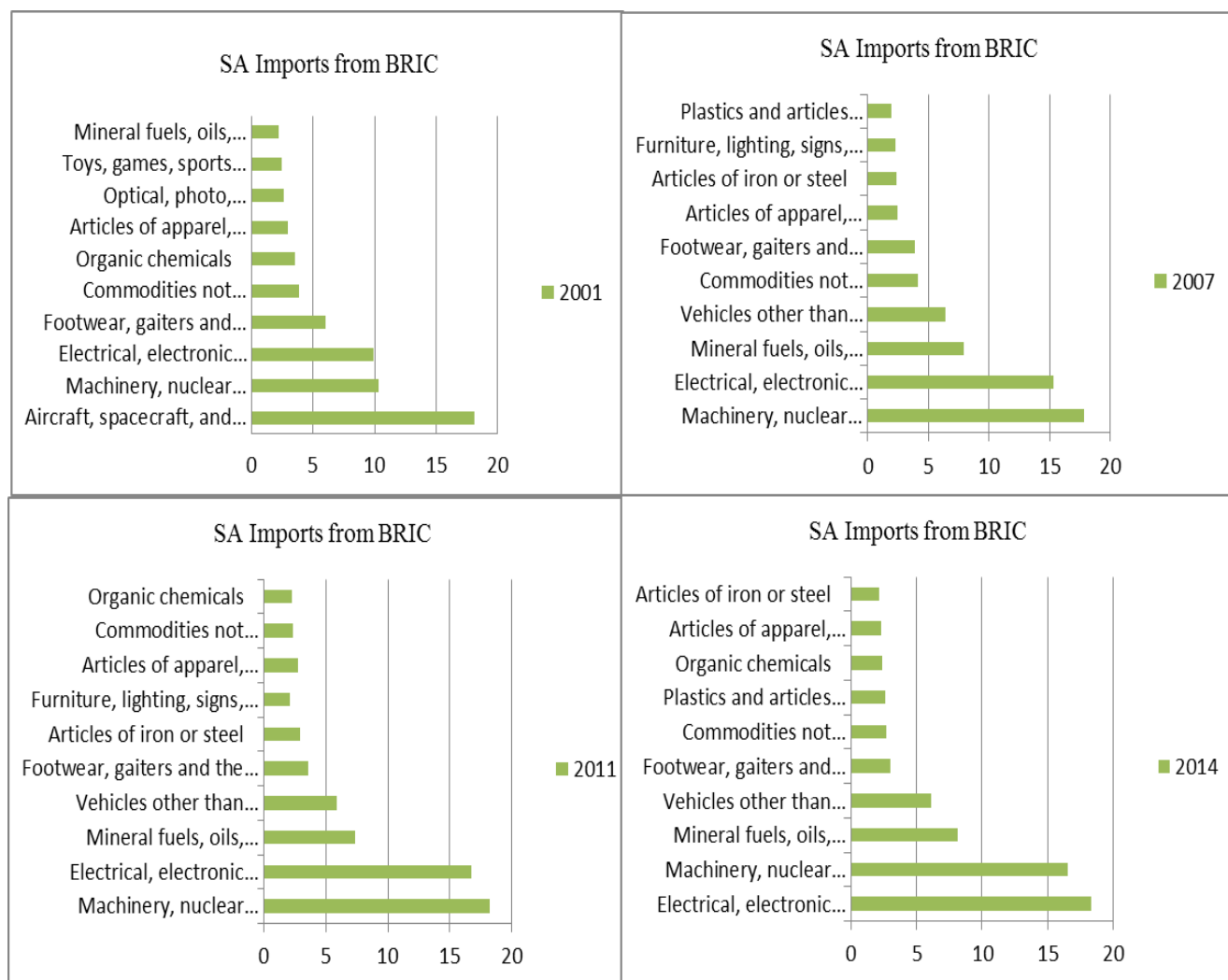


Figure 3.12 SA Key Import Categories from the BRIC (Percentage)

Source: ITC, 2015. Available from: http://www.trademap.org/tradestat/Product_SelCountry [20 March 2015].

From an individual country point of view, South Africa imports from Brazil were mainly household items, including meat and edible offal. Mineral fuels, oils and distillation products and agriculture commodities, including wheat and meslin and industrially manufactured commodities such as synthetic rubber and fertilizers formed major imports from Russia. Ferroalloys and coal, briquettes, ovoids and similar solid fuels manufactured from coal were also amongst the top imports. This was regardless of South Africa's position as net exporter of the products to China and India, a position validating the Hecksher-Ohlin's comparative advantage assumptions for trading nations (ITC, 2015).

Cars, diamonds, medicaments, petroleum oils and rice were the major imports from India to South Africa. The imports intensified with the formalisation of the BRICS, owing to relaxation of trade and import tariffs. Imports from China were more diversified than that of the other BRIC members. Electrical equipment, data processing machines, motor spare parts, televisions and footwear and clothing were amongst the top Chinese imports from 2001 -2011. The imports became more intense after 2011, and were skewed towards electric appliances for line telephony, automated data processing machines, printing machinery and footwear (ITC, 2015).

3.3.5 South Africa Trade Intensity with the BRIC

The World Bank (2014) defines trade intensity as the share of a country's exports going to a trading partner, relative to the share of world exports going to the same partner. Trade intensity index is used as a measuring tool and is calculated as follows;

$$EI_{AB} = \frac{X_{AB}}{X_A} / \frac{X_{WB}}{X_W} \quad (3.1)$$

Where X_{AB} equals SA exports to country B (a partnering country) X_A equals total SA exports, X_{WB} equals total world exports to country B, and X_W equals total world exports. The equation yields a figure from zero upwards. An index greater than one means that SA sells a larger proportion of its exports to country B than the rest of the world does, and the opposite is true.

Export intensity shows the relative importance of country B in terms of foreign demand for SA goods, as well as the importance of SA to country B as a source of imports. Figure 3.13 map the intensity of SA exports relative to BRIC from 1995 - 2014.

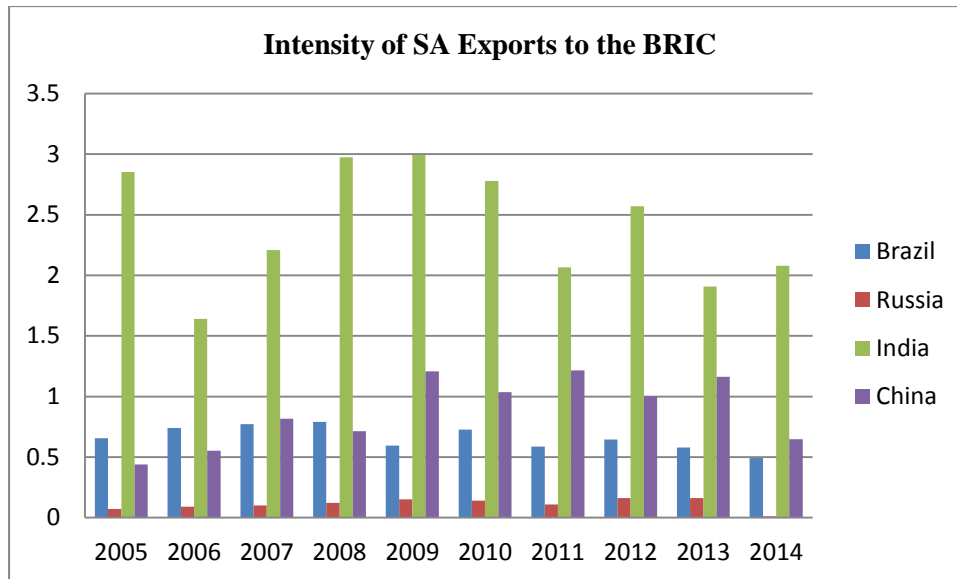


Figure 3.13 Intensity of SA Exports to the BRIC

Source: WITS, 2015. Available from: <http://wits.worldbank.org/>[13 November 2015]

South Africa boasts a significant proportion of exports to China and India respectively. India is the prominent partner with an index averaging 2.5 per cent over the period 2005-2014. China followed a similar trending with more exports from manganese minerals, ferroalloys and iron pyrites. The index averaged 1.2 percent since the institutionalisation of BRICS.

In contrast, the intensity of SA exports to Brazil and Russia did not show any trending pattern. Indeed, both countries accounted for less than 0.6 percent and 0.1 percent of SA exports over the review period. In the case of Brazil, high tariff rates were to blame for low SA export intensity with the country. Take for example in 2010, South Africa exported more than US\$28 million worth of transport equipment to Columbia, a Latin American country, retaliating against the 35 percent bound tariff rate on all SA automobile exports to Brazil.

The low intensity of SA exports to Russia was the result of ineffective trade policy on Russia's part, as it had to prioritise the organisation of trade missions. Machinery and transport equipment were the top Russian imports, with the equivalents of 40 percent of total Russian imports, yet they were ranked third in most SA exports to Russia (Volchkoval & Ryabtseva, 2013).

Figure 3.14 shows a comparison analysis of SA export intensity in relation to BRIC, EU & Central Asia and Sub-Saharan Africa.

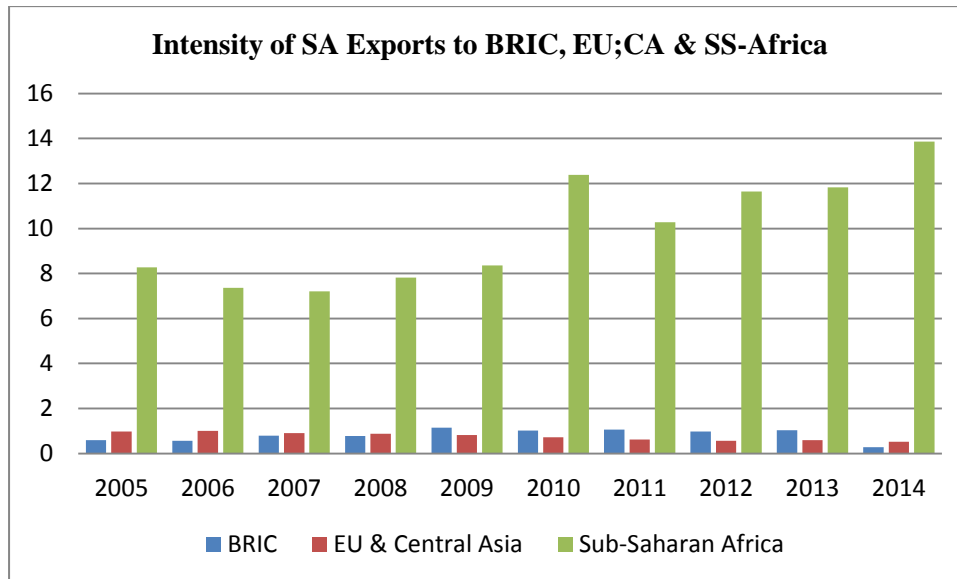


Figure 3.14 SA Export Intensity to BRIC, EU; CA & SS- Africa

Source: WITS, 2015. Available from: <http://wits.worldbank.org/>[13 November 2015]

The intensity of exports to Sub-Saharan Africa followed an upward trending since 2005. South Africa signed a lot of bilateral trade relations with the SS-Africa, amongst them the prominent SADC and SACCU trading agreements. This had a positive effect on SA export intensity averaging 11 percent for the rest of the period.

The EU & Central Asia and the BRIC did not see any significant intensity changes. The exports tend to dwindle towards the end of 2014 with both regions averaging 0.8 percent for the whole review period. Exports to BRIC were not intense as expected. The strong Rand, dependence on primary products and unfair trading practices by other members affected SA exports greatly.

Export intensity with the EU & Asia, followed similar repercussions, trade and investment treaties on BRICS formalisation and the crippling of the Zimbabwean economy caused a shift in exports concentration towards the Sub-Saharan region and the BRIC with better trading relations after formalisation.

Secondly, we shall look at import intensity, which is the share of a country's imports going to a trading partner, relative to the share of world imports for that country. SA import intensity with the BRICS is presented as follows:

$$MI_{AB} = \frac{Y_{AB}}{Y_A} / \frac{Y_{WB}}{Y_W} \quad (3.2)$$

Where, Y_{AB} equals SA imports by country B, Y_A equals total imports from SA, Y_{WB} equals total world imports by country B, and Y_W equals total world imports.

Figure 3.15 shows the intensities of imports from SA by other BRICS countries.

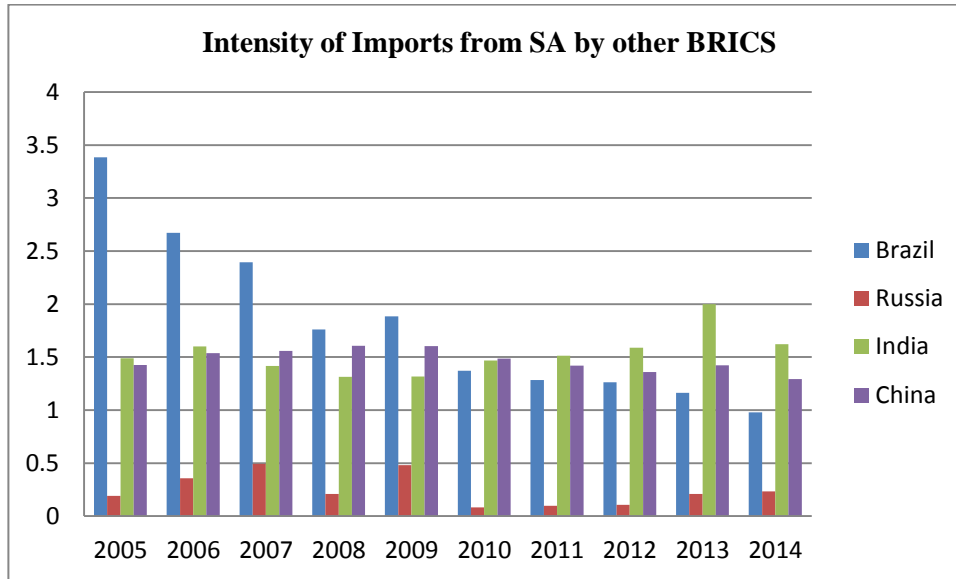


Figure 3.15 Import Intensity from SA by other BRICS countries

Source: WITS, 2015. Available from: <http://wits.worldbank.org/>[13 November 2015]

Brazil was the most dominant importer of SA products between 2005 and 2009, only to be surpassed by India and China in 2010. From 2010 onwards, the import intensity levelled amongst all BRICS partner countries. The intensity averaged 1.5 percent for India, 1.4 percent for China, 1.3 percent for Brazil and 0.3 percent for Russia. The growing demand for pharmaceutical products explained India’s dominance. Russia’s economy is dependent on commodity exports in oil and gas, and metals such as aluminium and steel. South Africa’s economy relies on commodity exports of mineral and metals, making the countries similar in nature. This has reduced imports of SA products from Russia as explained in the review period.

Figure 3.16 maps the intensity of SA imports from the BRIC, the EU & Central Asia and Sub-Saharan Africa.

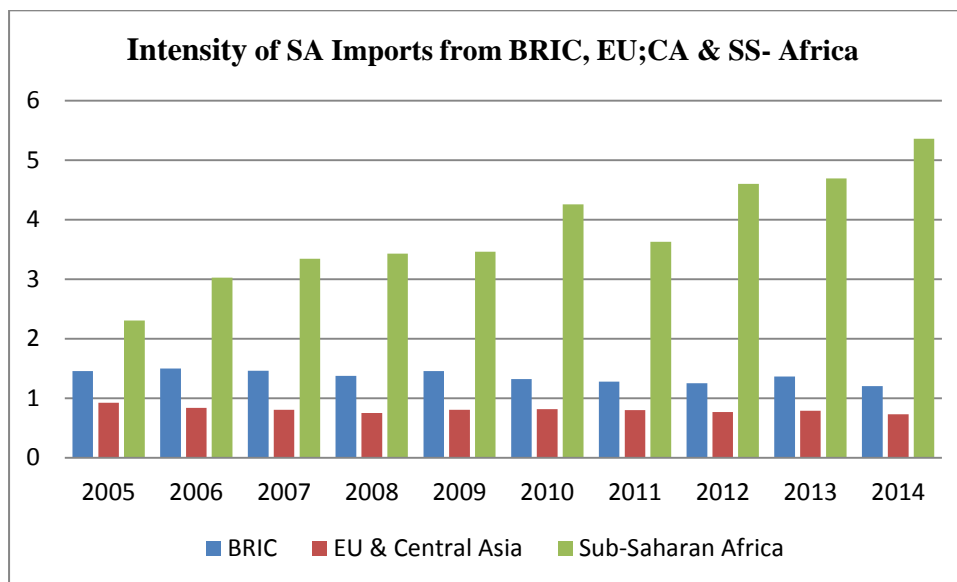


Figure 3.16 SA Import Intensity from BRIC, the EU; CA & SS- Africa

Source: WITS, 2015, Available from: <http://wits.worldbank.org/>[13 November 2015].

Imports from the SS-Africa were the most intense since 2005. From 2010 to 2014 the import intensity averaged 4.5 percent, with major imports in raw materials and fuels. Imports from the EU and Central Asia were dominated by chemicals, machinery and transport & equipment. The intensity maintained a 0.8 percent average since 2005. A rise in demand for capital goods in BRIC countries amidst increase in industrial production caused BRIC-SA import intensity to surpass the EU & Central Asia. The import intensity of the BRIC was more than 1.5 percent for most of the period. Major imports were concentrated in machinery & equipment, pharmaceuticals, chemicals and processed foods.

Even though SA imported more from the Sub-Saharan countries, imports from the BRIC performed quite well. Their distribution was qualitative in nature with a large bearing on value added products, the area SA has not explored well and the main reason for the negative trade balance with the BRIC.

3.3.6 South Africa Trade Complementarity with the BRIC

Trade complementarity measures the extent to which two countries are natural partners. This is in relation to the degree to which the sectoral composition of a country's exports correlates with the sectoral composition of imports from a trading partner (Onyekwena, et al. 2014).

Trade complementarity between South Africa and the other BRICS countries is calculated as follows:

$$EC_{AB} = 1 - 0.5 \sum_{K=1}^K | e_k^A - m_k^B | \quad (3.3)$$

Where e_k^A is sector k 's share of total South Africa's exports, and m_k^B is the sector's share in country B 's total imports. A perfect positive correlation between the two sectoral shares yields an index of 1, while a perfect negative correlation yields an index of 0. Figure 3.17 shows the trade complementarity between SA and the other BRICS countries as well as the EU.

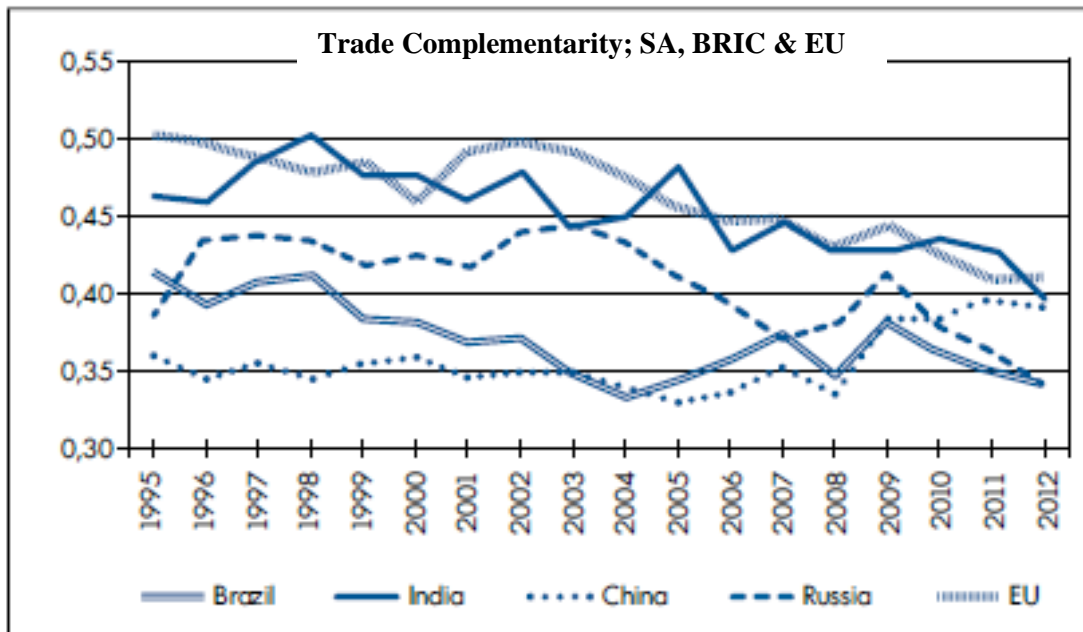


Figure 3.17 Trade Complementarity between SA, BRIC and the EU

Source: WITS, 2015, Available from: <http://wits.worldbank.org/>[13 November 2015].

The complementary index is highest in respect of the EU for most of the period under review, starting at 0.5 percent in 1995 and going to 0.42 percent in 2012. This made the EU a more natural trading partner than countries that trade with SA on an inter-industry basis. From 1995 onwards until the onset of the 2008 financial crisis, the indices decreased for all the other BRICS countries as

well as the EU. This was a reflection of gradual diversification of SA trading partners since the end of apartheid in 1994, and most likely a natural global phenomenon that the more trading partners a country has, the less likely it becomes a natural partner to any specific country (Onyekwena et al. 2014). The most intriguing scenario is that, while SA's natural trading patterns with the EU and other BRICS countries declined due to the global financial crisis in 2008, SA became more of a natural trading partner with China as reflected by an upward trend in China's index. SA exports in the form of primary products fitted perfectly into Chinese demand for imports than any of the other countries. More so, a diversified export structure to a mineral and resource dominated structure in the late 2000s made SA exports more appealing to China's imports (Onyekwena et al. 2014).

3.4 FDI Linkages in BRICS: A South African Perspective

Trade among the BRICS countries has shown progressive growth over the past decade. The overall figures exceeded US\$340 billion in 2014 quite fitting to countries regarded as recent economic superpowers (ITC, 2015). Intra- BRICS trade followed similar patterns with more intensity in various trade categories. In contrast, the BRICS investment story has not been as positive, though theoretically, the BRICS, as emerging economies have comparative advantage investing in each other over their Northern counterparts. Dunning (1973) ascribes foreign direct investment to ownership, location and internalisation (the OLI Model) which significantly shifts bargaining power towards emerging-economy multinational companies, by-passing some of the expected steps in foreign entry mode – exports, minority joint ventures, majority joint ventures, and mergers and acquisitions (M&As). Sun (2012) in SAIIA (2013) propose that emerging-economy MNCs are mostly motivated by industrial factor endowments, dynamic learning, value creation, strategic assets, and institutional facilitation.

According to SAIIA (2013), as the traditional sources of outward FDI slowed in reaction to the 2007–09 global financial crises, interest in the emerging economies' FDI trends intensified. Developing countries were affected only moderately by the economic slump (due in part to the one-year time lag). The BRIC grouping and South Africa, before it joined in 2011, were noticed for their regional economic leadership; contribution to global GDP; impressive trade performance; and for their notable inward FDI growth on average.

Overall, there is less clarity on specific detail of FDI flows among the five countries, and on how they can be encouraged. With respect to outward FDI, there seems to be little strategic policy

direction. The chapter outlines the existing outward investment motivations and destinations for each of the countries, and the historical sources of FDI for the BRICS. It provides a series of policy recommendations, which are aimed at enhancing FDI flows among the BRICS. The first sub-section discusses intra-BRICS FDI linkages. The second sub-section presents the geographical and sectoral composition of FDI flows from the BRICS. The third sub-section provides strategies for luring FDI to the BRICS economies. The fourth and fifth sub-sections present the FDI linkages between SA and the BRICS using stock data and firm-level data respectively

3.4.1 BRICS FDI Flows

FDI and trade are either substitutes or complements. FDI reduces trade if it's linked to domestic market access, and enhances trade if it is linked to the export market. Recent literature on FDI, technology and productivity has complemented the role of foreign firms via FDI on the productivity of domestic firms via learning by doing and external economies. The impact of FDI on the productivity of local firms is a function of the technology gap between the donor country and host country firms. If the gap is very high, absorption of technology by the host country firms becomes difficult. This leads to an argument that Intra-BRICS FDI will have a greater impact on productiveness than FDI from developed countries. To capacitate productivity and growth, FDI needs an enabling environment. This comes through institutional mechanisms, which have three components, namely Direct Tax treaties (DTTs), Bilateral Investment Treaties (BITs), TRIMS of the WTO and government policy towards FDI (Mathur & Dasgupta, 2013).

World comparison of the BRICS inward and outward investment flows from 2012-2014 showed a significant increase of over 40 percent in FDI exchanged between the BRICS and developed countries. About 43 percent were pronounced towards neighbouring countries. The remaining percentage was confined in the EU (UNCTAD, 2015).

Table 3.7 presents a detailed analysis of BRICS inward and outward FDI from 1995 to 2014.

Table 3.7 BRICS Inward & Outward FDIs (Percentage of GDP)

Economy	1995		2000		2007		2010		2012		2014	
	In-ward	Out-ward	In-ward	Out-ward	In-ward	Out-ward	In-ward	Out-ward	In-ward	Out-ward	In-ward	Out-ward
Brazil	1.3	0.3	2.3	0.2	1.8	0.3	3.9	0.9	3.2	0.3	4.1	0.1
Russia	0.6	0.2	0.2	0.3	2.8	2.1	3.3	3.9	2.5	2.4	1.2	3.0
India	0.6	0.0	0.3	0.0	1.3	0.8	2.0	1.1	1.3	0.5	1.7	0.5
China	11	0.6	2.9	0.1	4.2	1.0	8.5	5.1	2.9	1.4	2.8	6.2
South Africa	0.4	0.7	0.1	0.0	0.3	0.1	0.1	0.0	1.2	0.7	1.6	2.0

Source: World Bank, 2015. Available from: <http://data.worldbank.org/topic> [20 December 2015]

Brazil, India and South Africa were net importers of world FDIs from 1995 -2014 while Russia and China were net exporters. Net FDI inflow to the BRICS increased from US\$41 billion in 1995 to US\$109 billion in 2007. The increase was equivalent to 10 percent of inward FDIs as a percentage of growth. Opening of the BRICS economies as well as trade diversification caused a further increase of 19 percent in 2010. The trending could not live up to expectations due to various global issues affecting partnering countries. Only Brazil and South Africa had positive trending patterns from 2010 - 2014 thanks to the lucrative investment environment in South Africa and the easing of investment hiccups in Brazil.

Outward FDIs averaged 2.5 percent from 1995 -2007. FDI outflows from China were illegal until 2003 contributing to the low averages. 2010 figures were promising with China and Russia investing 9 percent of the overall 11 percent of the BRICS contribution. 2012 was not good for all the BRICS outward investments. China's share dipped to 1.4 percent, recovering in 2014 to post a record of 6.2 percent. China's share growth was due to investment in marginalised economies and devaluation of her currency. Russia and South Africa also recovered with 0.6 percent and 1.3 percent respectively. Both economies increased their shares in Sub-Saharan Africa investments. Brazil shares did not recover. Incidences of political and economic turmoil restricted further outward investments. India maintained its 2012 position citing similar challenges as that of Brazil; however, it could not withhold its main investments in pharmaceuticals and car manufacturing amongst other priority areas.

3.4.2 Sectoral Composition of FDI flows from BRICS

According to KPMG (2015), FDI inflows to BRICS were mainly from outside of the alliance. The same applies for FDI outflows. Transactions involving foreign outflow of capital from Brazil were dominated by the US, constituting half of the total share of outward investments. United Kingdom, France, Canada and China were also amongst the top destinations.

Russia's FDI outflows were mainly to the CIS countries, Western Europe and Central and Eastern Europe. India's FDI destination diverged over time; the concentration changed from Singapore, Thailand, Sri Lanka and Malaysia to the UK, the U.S, Bermuda and Mauritius.

Concentration of Chinese outward investment shifted from individual economies of Cayman Island, the U.S, Australia and British Virgin Islands towards Latin American and African countries.

South Africa's outward FDIs were concentrated in the U.S, UK and China, with services and natural resources sectors as major contributors.

Table 3.8 presents the main outward investments by the BRICS economies.

Table 3.8 Main Outward FDI Investments from BRICS

	SECTORS	OUTWARD FDI FIRMS
Brazil	Energy, mining, services	Vale; WEG; Petrobras; CVRD; Gerdau; Embraer; Votorantim; Camargo; Correa; Odebrecht
Russia	Oil, gas, metal, manufacturing & telecommunication	Evraz; Rosneft; Gazprom, VTV Aerospace; Sberbank; NLMK Steel; Vimpelcom; Norilsk Metals; Interrors Energy; Rusal Construction; AirBridge
India	Pharmaceuticals, agricultural inputs, software, IT & broadcasting	Tata Steel; Hindalco; Ispat Industry; Ranbaxy Laboratories; Matrix Laboratories; Tata Chemicals; Reliance; Tata Motors; Bharat Forge; Mahindra & Mahindra; Tata Tea; United Spirit; Suzlon Energy; Videocon International; Wipro Ltd; Sasken Communication Technologies Ltd; Videsh Sanchar Nigam Ltd; Reliance Infocomm; Bharti Airtel; Oil and Natural Gas Corporation; ONGC Videsh.
China	Trade & services, manufacturing, resource extraction (oil, gas minerals), Internet	Shanghai Electric Industrial, CNPC; Nanjing Automobile Group; Shanghai Baolong Industries; China Mini-Metals Corporation; Danyang Dare Technology Group; Brightoil Group; Suntech Power Holdings; Sinopec; Sichuan Century Shuaghong Display Device Co.Ltd; CNOOC; PetroChina; Changsha Zhonglian Heavy Industry Tech Development Co.Ltd; China Power Investment; Beijing Jingxi Heavy Industries; Sinochem
South Africa	Resource extraction, financial services	Sappi Limited; Sasol Limited; MTN group; Anglo Gold; Naspers Limited; Barloworld; Nampak Limited

Source: MandaPortal, 2015; KPMG, 2015; DGEFCFIN; 2015, Available from:

<http://www.mandaportal.com/Content/MA-Reports/Quarterly?page=2>, <https://home.kpmg.com>
& http://ec.europa.eu/economy_finance/db [20 December, 2015]

The sectoral distribution of FDI outflows from BRICS countries followed the pattern of most developing countries. Sectoral composition of Brazil was mainly from the information & technology sector, followed by the internet companies, the energy sector, food, beverage & tobacco sector and company services sector.

Russia's contribution shifted from resource based sectors like oil and gas exploration towards the manufacturing and telecommunication service sectors. Rosneft and Gazprom dominated all the sectors with mergers and acquisitions in various countries.

India's FDI outflows were mainly from the manufacturing sector, with flows mainly to fertilizer, pesticides & seeds, and drugs & pharmaceuticals. The services sector was also dominant, with information technology and business process outsourcing as major contributors.

FDIs from China were oriented towards resource extraction in oil, gas and minerals from the primary sector and IT, manufacturing and R&D in developing countries. The financial services and resources extraction sectors contributed most to South Africa's outward FDIs. Mergers and acquisitions by Naspers and Sasol in various economies contributed the largest share of outward investment by SA companies.

3.4.3 BRICS FDI Strategies

An FDI strategy outlines the course of action necessary to yield a collaborative system in public and private sectors towards mobilising foreign investments. According to Mathur and Dasgupta (2013), the BRICS FDI strategies are comprised of policy formulation, FDI promotion, investment facilitation and capacity building of special economic development zones. The public sector (PSCs), multinational companies (MNCs) and the small and medium enterprises (SMEs) are responsible for financing BRICS FDI flows. Inward FDIs to Brazil and Russia come from large MNCs and SMEs. Outward FDIs are mainly from PSCs. MNCs in information technology are responsible for India's outward FDIs. Inward FDIs are mainly from PSCs in the oil and gas industries and the SMEs in the entertainment and pharmaceutical industries. Chinese FDI investors comprise mainly of PSCs in resource and mineral exploration, MNCs in IT, manufacturing & Research and Development, and SMEs in textiles and small scale IT & manufacturing. South Africa's MNCs and SMEs play an important role in outward FDIs and are concentrated in gold & precious metals, sugar, paper, furniture, cellular phone services and plastic industries.

3.4.4 South Africa–BRICS FDI Links using Stock Data

Substantial disparities exist between FDI stocks in BRICS countries. Firstly, data collection methods differ within the BRICS countries. Secondly, price increase of equities due to asset revaluation distorts the official stock figures. Thirdly, none of the countries provide cross-calculations of each sector in the host and destination economies. This analysis will reference SARB stock data, making provision for official data from BRICS partner countries where necessary.

The official stock data on FDI relations between South Africa and China were more pronounced than with the other BRICS partners. SA-India relations were less significant.

3.4.4.1 South Africa –Brazil FDI Stock Links

Table 3.9 presents the official data for SA and Brazil from SARB and the Brazilian Central Bank (BCB).

Table 3.9 FDI stock, SA-Brazil (US\$Million)

Year	FDI stock into SA from Brazil		FDI stock from SA into Russia	
	SARB	BCB	SARB	BCB
2002	15	n/a	2	n/a
2007	31	n/a	5	n/a
2008	25	n/a	44	n/a
2009	27	n/a	84	n/a
2010	57	21	91	156
2011	77	15	569	379
2012	42	124	718	422

Source: SARB, 2014; BCB, 2014. Available from: <https://www.resbank.co.za/> & <http://www.bcb.gov.br/> [20 December 2015].

There was a gradual increase in FDI stock in SA from Brazil for the period of 2002- 2011. A positive response to the BRICS inception in 2011 caused a sharp incline in stocks to a record figure of US\$77 million before falling to US\$42 million in 2012. Contrasting data from BCB showed a sharp rise of stock from US\$15 million in 2011 to US\$124 million in 2012, citing the paying dividends from BRICS. FDI stocks from SA into Brazil spiralled by more than 100 percent from 2002 -2012. Exorbitant figures, exceeding US\$569 million (SARB) and US\$379 million (BCB), were recorded after 2010.

Naspers' investments dominated South African assets in Brazil. Naspers' share in Brazil included the 31 percent acquisition of Abril, a publishing company in 2006 for US\$421 million and 90 percent of Buscape, an internet company acquired for US\$341 million in 2009 as well as ComparanTime, an e-commerce group in 2008.

3.4.4.2 South Africa-Russia FDI Stock Links

A more pronounced contradiction existed between SARB and the Central Bank of Russia (CBR) data. SARB data is reliable in this context with proved transactions from various sources. The data reported that FDI stock in SA from Russia fluctuated within US\$1 billion from 2002 - 2010. An acute fall of more than 300 percent was experienced from 2011 onwards. The partial acquisition by Evraz of a 25 percent stake in Highveld Steel in 2006 was one of the largest Russian investments in South Africa. The stake doubled in 2007, before gradually easing in 2010.

Table 3.10 FDI Stock, SA-Russia (US\$ Million)

Year	FDI stock into SA from Russia		FDI stock from SA into Russia	
	SARB	CBR	SARB	CBR
2002	0	n/a	0	n/a
2004	1221	n/a	0	n/a
2005	1753	n/a	0	n/a
2007	0	n/a	0	n/a
2008	0	n/a	42	n/a
2009	730	34	22	15
2010	1064	35	67	12
2011	385	34	2482	8
2012	140	35	3434	9

Source: CDIS, 2014; SARB, 2014; CBR 2014; Available from: <http://data.imf.org/?sk=40313609-F037-48C1-84B1-E1F1CE54D6D5&sId=1390030109571>; <https://www.resbank.co.za/Publications/Detail> & <http://www.cbr.ru/eng/statistics/?Prtd=svs> [20 March 2015]

From the SARB point of view, SA stock in Russia followed an upward trending pattern. US\$2 480 billion and US\$3 430 billion of stock were invested in 2011 and 2012 respectively. Data from 2002 to 2007 is not reported; however, credible publications such as *Business Day Live* assisted in covering the gap. In 2006, the Renova group invested \$US250 million dollars in 2006 towards a ferroalloy plant construction and solar parks project. In 2007, Naspers purchased a 29 percent stake in Mail.ru, a Russian internet company for US\$165 million such that Naspers' stake was worth US\$2 billion by the end of 2010 before dropping by 24 percent to US\$1.6 billion by the end of 2011. The stock price returned to the 2010 level for a stock value of US\$2.1 billion in 2012. In

2013 Naspers purchased an 18.6 percent stake of portfolio investment in Avito of Russia for US\$50 million raising further projections of overall increase of SA stock in Russia.

3.4.4.3 South Africa-India FDI Stock Links

Variation between Indian and South African data comes from the fact that Indian data reflects cumulative flows rather than stocks *per se*. Cumulative flows refer to financing of investments with funds raised in the third economy rather than in the home economy. This may affect balance sheet data if debt liabilities are attributed to the affiliate rather than the foreign owner (Gelb, 2014). From the SARB standpoint, the share of South Africa's FDI stocks from India fluctuated within US\$200 million from 2009 to 2012 (table 3.11).

Table 3.11 FDI Stock, SA-India (US\$Million)

Year	FDI Stock into SA from India		FDI stock from SA into India	
	SARB	RBI & OTHERS	SARB	DIPP-INDIA
2002	18	22	1	n/a
2007	80	44	2	68
2008	86	140	41	75
2009	307	209	126	104
2010	378	217	160	110
2011	235	217	183	112
2012	220	180	203	120

Source: SARB, 2014, DIPP, 2014; RBI, 2014. Available from:

<https://www.resbank.co.za/Publications/QuarterlyBulletins/Pages/Quarterly-Bulletinaspx.> ;

http://dipp.nic.in/English/Publications/FDI_Statistics & <https://www.rbi.org.in/Scripts/Publications.aspx?>

[20 March 2015]

Additions to conflicting official data on Indian owned assets in South Africa included the investment by Tata, for the value of US\$1.6 billion between 1994 and 2009 and UB investments in food processing for US\$15 million in 1996. UB Investments also owned a stake in Mabula Game Lodge for US\$6 million. Mahindra (2003) and Apollo Tyres (2006) were the other Indian companies in SA with assets worth US\$88.5 million and US\$15 million respectively. In 2010, Indian assets were 0.3 percent of total foreign assets in South Africa, and South African assets in India were 0.17 percent of SA-owned assets abroad (SARB, 2014). DIPP reported that South Africa owned 0.1 percent of assets in India and 0.6 percent of India foreign assets were located in South Africa in 2010 (Gelb, 2014).

3.4.4.4 South Africa-China FDI Stock Links

There were substantial disparities between South African (SARB) and Chinese Ministry of Commerce (MOFCOM) FDI data. MOFCOM data is based on FDI projects and forex approvals while SARB data is based on companies' balance sheets collected by annual surveys and broken down by country of ownership.

Table 3.12 presents comparison of official data from SARB and MOFCOM.

Table 3.12 FDI Stock, SA-China (US\$Million)

Year	FDI into SA from China			FDI from China into SA	
	Stock SARB	Stock MOFCOM	Flow MOFCOM	Stock SARB	Flow MOFCOM
2000	109	n/a	n/a	0	n/a
2005	54	112	47	684	106
2007	70	702	454	4898	69
2008	2876	3049	4808	3126	26
2009	4604	2307	42	13744	440
2010	5616	4153	411	13992	463
2011	4369	4060	-14	12774	363
2012	5077	4775	-815	20284	327

Source: MOFCOM, 2014; SARB, 2014. Available from: <http://english.mofcom.gov.cn/article/statistic/> & <https://www.resbank.co.za/Publications/QuarterlyBulletins/Pages/Quarterly-Bulletin.aspx> [20 March 2015]

FDI relations between China and South Africa are of similar significance as their trading patterns. According to SARB (2014), for data ending in 2012, China was among the largest sources of inward foreign direct investment assets to South Africa, with 3.1 percent of total stock and the single largest destination of outward foreign direct investment from South Africa with a share of 18.1 percent of total asset stock from abroad.

In 2007, there were six Chinese mining companies in South Africa. Sinosteel had shares in two joint venture operations, ASA metals worth US\$380 million and Tubatse Chrome worth US\$230 million. Three other companies, Zijin, Minmetals and Jiaquan iron and steel had investments totalling US\$52.5 million. In 2008, Chinese assets in South Africa were dominated by the industrial and commercial bank of China (ICBC), a single investment firm holding 20 percent of shares in

Standard Bank of South Africa (SBSA) purchased in 2007 at a reported value of US\$5.5 billion. ICBC's stake rose to 85 percent by the end of 2012 (table 3.13).

Table 3.13 FDI stocks, SA-China (Naspers –ICBC share)

<i>Reporting Year</i>	<i>Tencent share price: US\$(Mill)</i>	<i>Naspers holding in Tencent: US\$mill</i>	<i>Naspers holding in Tencent: %SA FDI</i>	<i>Naspers holding in Tencent:%</i>	<i>SBSA share price: US\$</i>	<i>ICBC holding in SBSA: US\$mill</i>	<i>ICBC holding in SBSA:%</i>
2005	1.07	664	97.1	1.76	n/a	n/a	n/a
2007	7.18	4451	90.0	6.8	14.5	4411	n/a
2008	6.45	3999	119.6	8.1	8.8	2671	92.9
2009	21.76	13 493	98.2	18.6	13.8	4326	94.
2010	21.99	13 634	97.4	15.3	16.2	5156	91.8
2011	20.6	12 438	97.6	12.8	12.2	3891	89.1
2012	32.22	19 979	98.5	17.9	14.0	4509	88.8
2013	62.31	38 630	n/a	n/a	13.9	3983	n/a
2014	69.14	42 869	n/a	n/a	12.0	4270	n/a

Source: The Edge Institute FDI Database, 2015: Available from: <http://www.the-edge.org.za> [20 March, 2015]

The domination of FDI asset stock by a single investor is most likely when a specific bilateral relation involves a small number of investors all from developing economies (Gelb, 2014). In 2009, South African assets in China were dominated by a 34 percent stake of Naspers, a South African IT/media corporation in Tencent, which was a small Chinese instant messaging service when Naspers purchased its initial holding in 2001. Tencent listed on Hong Kong Stock Exchange in 2004 became China's largest IT and media company by the end of 2012. Tencent share price increased by 67 percent from 2005 to 2007. South Africa assets in China rose by 72 percent in 2007 with Naspers holding about 94 percent of the share. By the end of 2012, Naspers contributed about 98 percent of SA assets in China and 18 percent of South African foreign direct investment in all destination countries (Gelb, 2014).

3.5 South Africa-BRICS Bilateral FDI Links Using Firm Level Data

Firm level data, classified by the number of firms in a category, is used to complement official data on FDI stock. Primary focus will be on India and China, with subsequent detailed analysis on Brazil and Russia. Data is presented on the number of investing firms by sector, and in total, on year of entry and on mode of entry. The EDGE institute FDI database is used as the main data source. The database records public domain information from investing companies, media reports, and other sources on operations by foreign firms in SA, and SA firms abroad.

Table 3.14 draws on the number of firms involved in the South Africa-China and South Africa-India FDI links as well as their relationships.

Table 3.14 Sectoral Distribution of Firms, SA-China and SA-India

<i>Economic Sector</i>	<i>China in SA</i>	<i>India in SA</i>	<i>SA in China</i>	<i>SA in India</i>
Mining	14	7	22	6
Consumer goods	6	7	8	7
Materials processing	13	9	11	4
Electricals	10	3	0	0
Automobiles	7	6	0	0
Other machinery	6	3	11	0
Infrastructure & Construction	21	4	19	17
Consumer services	6	5	6	22
Finance & business services	14	8	17	17
Internet(IT & Media)	4	25	6	20
Pharmaceuticals	1	20	0	7
Conglomerates	0	2	0	0
Total	100	100	100	100
Number of Firms –end 2013	72	115	36	54
Number of Firms end-2010	45	93	32	47
Disinvestments	20	2	7	4
Reinvestments	15	25	n/a	n/a

Source: The EDGE Institute FDI Database, 2015. Available from: <http://www.the-edge.org.za> [24 March 2015].

At the end of 2013, there were 72 Chinese firms in South Africa, which is a 57 percent increase from 45 firms present by the end of 2010. Major investments were by ICBC's investments in Standard Bank SA worth over US\$5 billion and Hisense (US\$1 million). On sectoral distribution, the largest share of Chinese firms was in infrastructure and construction. In the mining industry, Chinese firms remained a small minority with only 10 mining firms from 56 foreign entrants to have entered the market since 2010. Materials and processing equally command the same proportion as mining. Market seeking firms in the building industry dominated the sector. Manufacturing sub-sectors (other than materials processing) contain 30 per cent of the remaining firms. Other than mining and material processing firms which are export oriented, Chinese firms in SA appear to have entered the country for market seeking motive rather than the usual natural resource seeking motive. Of the firms operating in South Africa, 37 were public sector companies (PSCs), 25 privately owned (Private) and 10 small medium enterprises (SMEs).

Regardless of lower asset stock to that of China (at the end of 2012) (table 3.12 & table 3.13), there were more Indian firms present in South Africa than those from China (table 3.15). A total of 115 firms from India invested in South Africa at the end of 2013, which was a 12 percent increase from 93 firms recorded at the end of 2010. The largest share to the equivalents of 25 percent and 20 percent respectively was dominated by business process outsourcing and the pharmaceuticals sectors. The manufacturing sector was second largest with at least 28 percent of the share. 15 percent of the firms were natural resources seeking and they comprised of mining and agro-materials processing industries. Finance and business services held 8 percent of the share. The remaining share was for market seeking firms.

Data on South African firms in China and India was distinct from the official data released from credible government sources. South African firms in China and India increased from 32 and 45 firms in 2010 to 36 and 54 firms in 2013 respectively. Congruent with inward investment, the Indian link was larger than that of China with about 13 percent of South African outward investors in India compared to 9 percent in China. Eight of South African firms in China were conglomerates domiciled abroad during the late 90s. The market seeking objective was the main motive for South African investors in both China and India. The sectoral distribution was skewed towards mining, infrastructure development and consumer and financial services. The strategic asset seeking motive was the other objective with eight pharmaceutical and IT/media service companies involved. From 2002 to 2010, there were 20 Chinese firms which entered South Africa but subsequently withdrew due to broader strategic reasons. Half of the disinvestments were from the fast moving consumer

goods manufacturing sector (FMCG) with operations established in the late 90s from assistance obtained from the Shanghai city authority. The other withdrawals included a single private owned bank, a mining company, two construction companies and three vehicle distribution operations. On the other hand, seven South African investors withdrew from China. Six of the companies were listed on the Johannesburg Stock Exchange, and the other was in the FMCG sector (Gelb, 2014).

The withdrawal rate in the South African-Indian link was less pronounced. Only two Indian firms from South Africa and four South African firms from India withdrew during the same period. A more cautious approach was taken by investors, opting to start with small investments, thus enabling firms to become familiar with the host market before commitment of significant resources.

Sectoral distribution of SA-Russia and SA-Brazil firms is shown in table 3.16.

Table 3.16 Sectoral Distribution of Firms, SA-Russia and SA-Brazil

<i>Economic Sector</i>	<i>Russia In SA</i>	<i>Brazil In SA</i>	<i>SA in Russia</i>	<i>SA in Brazil</i>
Mining	4	1	6	6
Consumer goods	0	0	0	2
Materials processing	2	0	3	3
Electrical/electronic machinery	0	0	0	0
Automobiles	0	1	0	0
Other machinery	1	1	1	0
Infrastructure & construction	2	1	1	3
Consumer services	0	0	2	0
Finance & business services	2	0	0	4
IT/media	0	0	2	5
Pharmaceuticals/healthcare	0	0	0	1
Conglomerates	1	0	0	1
Number of firms end-2013	12	4	15	25
Disinvestments	2	0	1	n/a
Reinvestments	1	1	n/a	n/a

Source: The EDGE Institute FDI database, 2015. Available from: <http://www.the-edge.org.za> [24 March 2015].

There were more outward investors from South Africa in Brazil and Russia than inward investors. This was contrasting to China and India's data. Evraz dominated the inward investments from Russia and Naspers from both countries. Half of the Russian firms were reported to have invested in South Africa after 2011. Firms in mining, materials and energy sectors made up the majority. The Renova group in manganese exploration and OJSC MMC Norilsk in nickel mining were the largest contributors. SAB-Miller, Monty, ALROSA and De Beers productively interacted in both countries. The electrical sector was shunned by investors from Brazil-Russia and South Africa. 13 of South African firms present in Russia, and 20 in Brazil were also present in another BRIC economy. 68 South African companies were operating in at least one BRIC country and 30 in at least two BRIC countries. From the 30, 18 also invested in the EU and the US (Gelb, 2014).

3.6 Chapter Summary

Trade, investment and market size are the prominent features that have positioned the BRICS in the global arena more than other usual trading blocs such as the European Union (Polodoo, 2012). The chapter has examined the extent to which this significance holds in terms of contribution to economic growth in the global economy. The Chapter first reviewed the extent to which there is unexplored potential for future engagement among the BRICS, either commercially or through collaborative ventures in various economic sectors. An analysis of trends in service output, exports and imports, FDIs, regulatory measures and trade liberalization clearly articulated the potential for deeper commercial and cooperative engagement among the BRICS. One of the factors often neglected in BRICS trade is the dominance of small scale enterprises in the exports of these countries. The role of government in promoting value addition is important, given the low resource base of these firms.

Fiscal difficulties in Brazil and economic sanctions in Russia may constrain BRICS growth. Growth in China may slow, especially if it confronts economic and political problems in re-orienting its economy from export and investment led growth to domestic consumption led growth. Instability in the Middle East has the potential to destabilise global growth through its impact on oil prices. Unexpectedly slow demand could depress commodity markets, which would slow the BRICS growth. Finally, in failure of the Doha Round, and unemployment rates remaining high in developed countries, the global trading system could also face new protectionist measures. The implications entailed by the risks to the future global trading environment point to the importance of a sustained diversification strategy.

The chapter also examined trade relations between South Africa and the other BRICS countries. Accession to World Trade Organisation, with key aspects of trade reform through trade liberalisation and tariff reduction, necessitated the increase in volume and intensity of trade between South Africa and the BRICS. An analysis of South Africa -World trade shows Africa as the main destination for SA exports while Asia was the main import source. The dynamism and intensity of SA trade was more pronounced with the country's admission to the BRICS. SA exports to other BRICS countries surpassed exports to the EU and America, which dominated SA trade for decades.

The traditional trade theories of Hecksher Ohlin and David Ricardo explain the occurrence of international trade through comparative advantages necessitating the exchange of goods. This they termed inter-industry trade. This trading pattern was practiced within the SA-BRIC trade prior to formalisation as South Africa export raw material and natural resources to those countries while they export sophisticated goods and machinery and appliances in which they had comparative advantage to South Africa.

The new monopolistic trade theorists of Dix-Stiglitz, Rodrik-Rodriguez and Krugman provided a distinct pattern of gains in trade even with similar country characteristics and resource endowments. This type of trade is called intra-industry trade. South Africa and the EU enjoyed trade under such circumstances, which deteriorated with advent of the BRICS as South Africa shifted from the inter-industry basis towards the intra-industry basis as shown by data from trade map which reflected on SA importing the same types and related commodities it had comparative advantage. Issuances of re-exports also set in and value addition become a prerequisite in the quest of driving growth.

South Africa's current trade strategy, however, does not position the economy to take full advantage of the features of the future global trading environment. South African tariff policies are heavily focused on domestic concerns and run the risk of placing South Africa at a disadvantage as its exporters seek access to the growing emerging economies. There is a need for alternative approaches that might assist in entering manufacturing export supply chains. In particular, the establishment of free duty-free export zones where exporters are able to compete in low-wage manufacturing industries. An improved regulatory regime on policies dealing with minerals and beneficiation is also required. This provides some caveats about the current government approach that emphasises the beneficiation of commodities.

Finally the chapter explored on bilateral trade linkages in BRICS to highlight on the level of investments made between South Africa and the BRIC nations. Formalisation of the BRICS saw a lot of mergers and acquisition most sectors of the South African economy. Mining and financial services sectors had large contribution alienating to South Africa's capabilities in those areas through the dominance of natural resources and sound financial systems. There is need to capitalise on the BRICS development institutions, especially the New BRICS Development Bank and the Contingent Reserve Arrangement as sources of financing infrastructural development necessary for luring foreign investments in value added sectors.

The next chapter discusses on the BRICS development institutions, with specific reference to the NDB and the CRA and attempt to show contributions towards global financial architecture and the BRICS infrastructure development

CHAPTER 4

THE RISE OF BRICS DEVELOPMENT INSTITUTIONS

4.1 Introduction

Dissatisfied with the main multilateral institutions (the IMF, WTO, UN and World Bank) towards the process of multilateral rule, governance and international community stability and development, BRICS countries, with the aid and success from India multilateral institutions and theoretical evidence from Latin American countries, developed the first BRICS institutions (at the 5th & 6th BRICS summits in 2013 & 2014) to allow some significant degree of reform and governance within the global system. The institutions included the BRICS New Development Bank (NDB), the Contingent Reserve Arrangement (CRA), the BRICS Business Council and the BRICS Think Tanks Council (Cattaneo, Biziwick & Fryer, 2015).

Although this has created deep concerns about intra-BRICS cooperation, critics have questioned whether these institutions will have substantial effect to foster genuinely inclusive and sustainable development. Einchengreen (2014) in Cattaneo et al (2015) criticised modalities of the CRA while the NDB has been questioned on ability to finance small and medium enterprises. This chapter explore more precisely the NDB and CRA. The first section discusses the rise of India's development and multilateral institutions. Following is a review on theoretical evidence from Latin American countries towards institutionalisation of BRICS. The third section provides overview of BRICS institutions with particular reference to the NDB and the CRA. Concluding remarks and policy recommendations are provided in the last section.

4.2 Rise of India's Development and Multilateral Institutions

From 1950 to 1980, massive ideological and political motivations provided insight into India's development co-operation (IDC). IDC was founded on the main principles of sustainable and inclusive growth, no conditionalities, mutual gains, demand driven support and the sharing of India's domestic development appearance (Singh & Mukamba, 2015).

From 1990, India transitioned from a mixed state economy towards a market-oriented economic approach. Its foreign policy became increasingly influenced by geo-economic and international political conditions; as such, India became vicarious towards greater participation of developing nations in a number of development forums such as the United Nations(UN), the World Trade

Organisation (WTO), the World Bank, the International Monetary Fund (IMF), prompting the development of other multilateral development institutions (Singh & Mukamba, 2015).

India has substantial experience in the operation and functioning of existing development institutions and multilateral institutions. In 1944, India was amongst the 44 signatories to the Bretton Wood agreement that paved way for the formation of the IMF. More so, India was a founding member of the International Finance Corporation formed in 1956 and the International Development Association initiated in 1960. India's relationship with these international institutions was of the North-South corporation prism, a situation where India request financial and non-financial resources at very minimal costs (Singh & Mukamba, 2015).

Presently, India has changed its positioning towards multilateral and regional development institutions from that of a borrower to that of a lender. Unlike some of its BRICS counterparts, India's national development finance is managed by development financial institutions (DFIs), which came about after nationalisation of the Reserve Bank of India in 1947. The DFIs are meant to finance the country's infrastructural needs and reduce the developmental gap that separated India from the world's developed economies. In 2015, there were more than ten national DFIs that performed regulatory, supervisory and financing roles within their sectors (Singh & Mukamba, 2015).

There has been a significant increase in domestic infrastructure spending by India's DFIs from 1990 to 2012. Regardless of a positive outcome, India still had a requirement of over US\$ 1 trillion in infrastructural investment to fill in its infrastructural deficit. India's DFIs, the NDB, CRA, as well as regional and multilateral institutions as envisaged in the World Bank strategy of inclusive growth and poverty reduction, are crucial in bridging the gap (Singh & Mukamba, 2015).

In line with Chandrasekhar (2014), from the 1950s to the 1980s, strong ideological and political motivations provided the impetus behind India's development co-operation. Six conceptual strengths underpins India's development co-operation. These strengths comprise of first; sustainable and inclusive growth, second; sharing India's domestic developmental experience, third; no conditionalities, fourth; demand-driven support, fifth; mutual gains; and finally its contribution to India's soft power. A transition from state led economy towards a market oriented approach from the 1990s onwards led to its foreign policy increasingly influenced by geo-economic considerations as well as aspirations to be heard in the international political atmosphere. India made several calls for reforms in the existing multilateral organisations particularly the World Bank and the

International Monetary Fund (IMF), prompting the establishment of the NDB and CRA where voices of emerging economies have greater representation and marks ability to carve their own policy space within the global systems independent of the World Bank and the IMF.

4.3 Theoretical Features in NDB and CRA Establishment: Case of Latin America

The core competency of Multilateral Development Banks (MDB) is to lend money to governments in developing countries and economies in transition. These funds, in turn, can be used to cover shortfalls in budgets or to allow governments to continue program development without having to increase their debts by borrowing from the international capital markets. As a result of providing this financial assistance, MDBs introduce their own policy agendas into the governments to which they lend money (Avalle, 2013).

In an effort to reform the international financial architecture particularly systems of the World and the International Monetary Fund (IMF), various regional, monetary and financial cooperation initiatives have taken centre stage since 2000. In the Latin American countries, regional economic integration eliminates policy autonomy, as well as implementation of sound macro-economic policies and prudential financial standards to cushion against financial fragility. The supporting role in infrastructure development and other government development projects is made by the regional and sub-regional banks (Sampaio, 2015).

The Inter-American Development Bank (IDB), developed in 1959 is the prominent MDB in Latin America. The IDB goal is of accelerating economic and social development in Latin America and the Caribbean. In carrying out its mission, the IDB mobilized financing for projects that represent a total investment of US\$263 billion to the Latin American countries. From 1961 to 2000 annual lending grew dramatically from US\$264 million to US\$5 billion.

Despite attempts to be as close as possible to their clients the IDB's disbursement ratio of approved loan commitments is extremely low compared to the World Bank and the Andean Development Corporation (CAF) (Avalle, 2013).

The support role is played by other regional monetary and financial institutions. Together with the multilateral development banks, regional, monetary and financial institutions function at three different levels. Grants of long term credit are classified in the first level. The second level deals

with short-term external financing. In this level issues on balance of payment constraints and currency mismatches are dealt with. More so, bond payments, repurchase and loan approvals are facilitated. The third level engages the exchange rate system and monetary unionisms, a stage the Latin American countries are yet to reach (Sampaio, 2015).

The focus of Latin America is within the first two levels of integration. In this spectrum, balance of payments support comes through the regional financial institutions comprising of the Reserve Fund of Latin America (LARF), the Local Currency Payment System (LCPS) and the Reciprocity Payment and Credit Agreement (RPCA). The region has been able to access long term credit from the Structural Convergence fund of MERCOSUR, the River Plate Basin development fund, the Latin American bank of Foreign Trade and the Brazilian national development bank (Sampaio, 2015).

Using the assessment from Seatzu, (2014), the Latin American regional multilateral organizations play a rapidly increasing role in the supply of development finance and technical assistance to the countries of the Latin American (LAC) region. Firstly, like reserve pooling institutions sub-regional multilateral organizations in general and international sub-regional banks in particular help countries of the region to mobilize financial resources for productive activities. Second, sub-regional multilateral development organizations help the LAC countries to increase their role and level of integration in international capital and financial markets while also strengthening their internal capital markets. For example they have improved their funding conditions and are now able to issue bonds in Latin American currencies. Jointly with global multilateral financial institutions, international sub-regional development banks support the LAC countries against financial fragility through liquidity support. Wealthier countries in the group, such as Brazil and Mexico have allocated and still continue to allocate resources to these organisations as does China in the NDB and CRA perspective. These multilateral organisations of the LAC provide positive platform and modelling framework in the NDB and CRA establishment. The drawback only lies in legal recognition to the international multilateral financial system.

4.4 BRICS National Development Banks and their Operations

In order to understand the effects of the NDB and CRA towards infrastructure development and financial assistance of the BRICS economies, one cannot forget to evaluate the role of the BRICS national development banks, especially their role in export and foreign direct investment promotion. This section will analyse the Brazilian National Development Bank (BNDES), the National

Development Bank of Russia (Vnesheconombank), Export–Import Bank of India, China Development Bank (CDB) and the Development Bank of Southern Africa (DBSA).

4.4.1 Brazilian National Development Bank (BNDES)

The BNDES aims to integrate Brazil with the Latin American countries. This mandate is achieved through provision of long term credit for financing investment projects, acquisition of equipment and assistance towards trade in goods and services. The FINAMEX, an export financing line was formed by the BNDES in 1990 to promote export of goods and services. The program became BNDES-exim in 1997 performing the role similar to export credit agencies in the provision of long term financing to high tech-industries and the small and emerging enterprises. The BNDES-exim provides credit shipment lines to local producers, foreign companies and other financial entities. In 2013 credit shipment lines to foreign entities accounted for 35 percent of US\$7.1 billion total disbursement to export financing (Sampaio, 2015).

In 2013, the BNDES grants were focussed mainly in financing exports to Latin America. Over 57 percent of loans were destined towards the region as compared to 34 percent in 2009. Venezuela had the largest share of 41.2 percent, followed by Cuba, 18.3 percent, Peru, 13.9 percent, Argentina, 10.9 percent and Ecuador 5.4 percent (Sampaio, 2015).

The BNDES is commendable due to greater dynamism of grants to finance exports to the Latin American countries as shown in the rising shares directed towards Cuba and Venezuela, and a decline in disbursements for exports to the United States (US) (Sampaio, 2015).

The expansion of the BNDES' grants to the Latin American countries was mostly due to market forces than the desire of the regional nations to integrate. From 2003 onwards, Brazil became more concerned with South-South and sub-regional collaborations. Through the South American Nations initiative of 2008, the BNDES became committed on funding regional projects (Sampaio, 2015).

The beneficiaries of BNDES grants are mostly economies with strong trade ties with Brazil. This is exactly the opposite of regional bank's functions' theory which postulates on the flow of development finance from developed countries to emerging countries (Sampaio, 2015).

The functions of the BNDES are market oriented due to their response in funding Brazilian exports and Brazilian entities interested in establishing new business ventures within the region. This therefore nullifies the hypothesis of the importance of Government policy towards integration.

The BNDES provides practical lessons for the establishment of the NDB; however, critics have questioned on the sustainability of the BNDES projects. In some situations, the funded projects fail to withhold indigenous rights or provide information asymmetry on active markets for citizen participation. To some extent, projects have negative environmental and social impacts and commercial benefits have overridden structural change and technological progress. Finally the nature of development promoted by BNDES reinforces regionalism (Sampaio, 2015).

Solutions to the problems above include elimination of regional asymmetries, integration into global value chains so as to overcome external vulnerability (Sampaio, 2015). Moreover the BNDES should give preference to loans with better economic length and cost conditions. Finally democratic governance of multilateral institutions should be applied towards regional integration in order to avoid the process being oriented towards a single country's foreign policy (Sampaio, 2015).

4.4.2 Russia Bank for Development and Foreign Affairs –Vnesheconombank (VEB)

The main function of the VEB is to promote the competitiveness of the Russian economy. To achieve the main objective, the bank diversify and stimulate economic activity towards infrastructure development, innovations, special economic zones, environmental protection, exports support and Small and Medium Enterprises (SMES) development (SELA, 2015).

Funding for VEB activities is raised from the Federal Budget, the National Wealth Fund and the Central Bank. Moreover these activities are governed by the Federal Law on Bank for Development (82-F7-2007) (SELA, 2015:19).

VED also funds foreign investment projects as such the VEB has partnership with the World Bank and other regional European banks, such as the Investment bank of Europe to fund overseas projects (VEB, 2015a).

The bank oversees the implementation of investment projects as well as export promotion through provision of export credits, leasing transactions, insurance and securities and guarantees amongst other offers (SELA, 2015).

The guidelines followed in investment project selection are mostly based on compliance with the bank's standards. The maximum repayment period for projects of more than 2 billion rubbles is 5 years. The minimum accepted share contribution is 1 billion rubbles (SELA, 2015).

The VEB has been commendable for financing long-term capital-intensive projects since 2007. These projects could not be financed by private commercial banks due to their complex requirements and the incapacities of the private commercial banks in provision of sufficient capital. In executing its mandate, the VEB heeded environmental concerns at the same time avoided loss making operations and gave preference to public-private partnerships (VEB, 2015b:5).

From 2010 to 2014 VEB increased support for Russian industrial exports by more than 80 percent, which is equivalent to 22.7 billion rubles (US\$409 million). Guarantees during the same period increased by more than 100 percent and reached 99.58 billion rubles (US\$1.53 billion) (VEB, 2014:46).

The VEB provides extensive export support to the Independent States of the commonwealth (CIS countries) Eastern Europe, Asia, Latin America as well as African states. The export support is concentrated in aircraft manufacture, nuclear enhanced projects, high- tech exports as well as construction of transport machinery (VEB, 2014:46).

The VEB has been successful in acquiring assets and funding investment projects abroad in the form of direct investment hence making the Russian economy competitive (VEB, 2015a).

While the VEB involves private investors to projects, at least 90 percent of VEB projects are funded from the bank's balances, with most of liabilities in the form of reserve bank deposits. In Capital and subsidies from the national government are used to finance projects of other entities that the VEB could not meet. In 2013 the Russian government disbursed subsidies worth 76 billion rubbles (US\$1.35 billion) (Morozkina, 2015).

The NDB could act in the capacity of an investment source and consultant to the Russian government and other development entities. These institutions perform duties which are not related to infrastructure development as such the NDB will act as the source for infrastructure development, particular the transport sector found lagging over the past years (Morozkina, 2015). More so, the NDB should collaborate with the Russian public-private sector partnership through additional policy on investment. The success of the Pulkovo airport project provides guidelines to follow. The Pulkovo airport project is a public-private partnership between the Russian government and the private sector carried out by the Northern Capital Gateway LLC Company in 2010. The project involved modernization of existing airport terminals and construction of new terminal, north boarding gallery and concomitant infrastructure (Morozkina, 2015).

4.4.3 Export -Import Bank of India (EXIMINDIA)

EXIMINDIA is a government- owned entity with objectives of aligning the country's foreign trade and direct investments with growth. To be more specific, the bank positions India as a manufacturing hub for value added exports and job creation (SELA, 2015:19). Funding of the bank projects is mostly related to export credit services and guarantees. However the bank also funds acquisition of capital equipment, and is involved in project consultancy. Between 2014 and 2015, the bank approved loans of 577 billion rupees (US\$10.6 billion) under various lending arrangements (EXMINDIA, 2015:15).

The bank also stands to support direct outward foreign investment through India project exporters in the form of funded support and project related guarantee facilities (EXIMIDIA, 2015:20). Examples of projects supported by EXIMINDIA in 2014 included the construction of a Petroleum refinery plant in Nigeria, the Qatar electricity supply system, and the Saudi Arabia airport construction (EXIMINDIA, 2015:19).

The Bank also extends credit to foreign entities, development banks. The credit is channelled towards importation of infrastructural equipment. In 2014 there were 194 lines of credit commitments valued at US\$11.7 billion ready for implementation in 63 countries (EXIMINDIA, 2015:21). In 2015, 17 lines of credit were granted to 13 African states and Cuba, Vietnam and the Fiji Islands amongst non-African states. They were meant to support electrification projects, rice self-sufficiency programmes, fertilizer and cement plant establishments and the upgrading of the sugar refinery industry (EXIMIDIA, 2015:21).

Finally, the Exim Bank acts as a guarantee for local companies in securing credit from international financial institutions. Moreover, the bank facilitates seminars with multilateral organisations for linking business opportunities (EXMINDIA, 2015:30).

Similar to other India's Development Financial Institutions, the Exim Bank has emerged as strong advocate in promoting trade and investment. The work of the bank is commendable as it does not sponsor development projects only in India, but also in other developing nations from Africa and the Middle East.

Regardless of such a positive outcome, India still had a requirement of over US\$ 1 trillion in infrastructural investment to fill in its infrastructural deficit (SELA, 2015:31). Existing development institutions as well as multilateral organisations failed to fill the gap as such the NDB and CRA would act as a financial leverage at the helm of stringent lending arrangements from private entities.

4.4.4 China Development Bank (CDB)

The CDB is a state owned entity with a mandate to provide medium and long- term loans for industry and infrastructure development. The sector also supports development of basic industry and other growing sectors. The CDB also funds grassroots investments and businesses and is involved in the provision of healthcare and education. Finally the CDB promotes China's outward investments and international business partnerships (CDB, 2015a:58). In addition, the CDB has established an international network of 707 overseas banks in 106 world markets. The offshore banks serve the purpose of internalizing the Chinese currency as well as improving the banks service capability. (CDB, 2015b:57)

On outward investments and international business partnerships, the CDB advanced major cross-border investment in Africa, Asia and the Latin American countries. The acquisition of Peru's La Bambas copper mine for US\$7.2 billion by Minmetals represent the largest cross-border acquisition by China until 2015 (SELA, 2015). The Bank also supported the construction of US\$473 million coal power plant in Indonesia and US\$45 million First Automobile Works (FAW) car assembly plant in South Africa (CDB, 2015b:58).

Finally, the CDB contributed to the formation of the Silk Road Fund through pooling up funds from the China-ASEAN bank and the Shanghai Interbank. The Silk Road Fund emanates from the NEW Silk Road Strategy, which aims at supporting major projects, including nuclear related companies and major foreign railway line investments (CDB, 2015b:57).

It can be ascertained that the CDB has strengthened its position in international cooperation, as it supported various initiatives in structural and socio-economic development projects in Africa, Latin America, Europe and Asia. The principles and objectives of the NDB are partly embedded in the CDB. Through its activities, the bank had forex loans worth over US\$200 billion in 2014, and off-shore balances of RMB 56.4 billion, giving basis for establishment of the CRA which is a capital balance to cushion against liquidity pressures (SELA, 2015:22).

Finally, lessons from internalization of the Renminbi should be followed by all BRICS nations to support their cross-border investments. Internalization of the Renminbi act as a leverage to further push economic reforms in China, just as the country did with entry to the World Trade Organisation (WTO) in 2001. More so, China has managed to break-away from the Unites States based monetary policy and hence control its own initiatives in the Asian Infrastructure Investment Bank (AIIB) and the BRICS New Development Bank. Finally, China became positioned correctly for the

liberalization of the international financial market often abused by the United States (US) and other western dominance.

4.4.5 The Development Bank of Southern Africa (DBSA)

The DBSA run by the South African government was formed with the objective of promoting sustainable development in the socio-economic sectors. This is made possible through financial and other investment support from the Program for Infrastructural Development in Africa (PIDA), the New Economic Partnership for Africa Development (NEPAD) and the Industrial Development Cooperation (IDC) (DBSA, 2015a).

The DBSA also provides access to infrastructure development solutions in Southern African Development Committee (SADC) and Sub-Saharan African states (SSA). Geographical dispensation to the rest of the continent came in 2013 as such the Bank can finance projects to the all African states (DBSA, 2015b:41).

In fulfilling its mandate for international financing the Bank disbursed more than US\$300 million in financial products services and products to the region as well as partners in the public and private sectors during the 2013/2014 fiscal year. Total approvals were US\$345 million in the same year with predominant commitment in the energy sector of the Democratic Republic of Congo (DRC), Ghana and Zambia (DBSA, 2015b:41).

Regarding disbursements to the whole region, infrastructure investment towards roads construction accounted for the majority of shares with equivalent of 43 percent in 2013/2014 followed by the energy sector (21 percent), the transport sector (19.1 percent), communications sector(9.3 percent) and the infrastructure fund comprising of 8.4 percent (DBSA, 2015b:42).

We can attest that the DBSA is a strong mechanism through regional integration of the African continent. However funds disbursed through the DBSA are little to instil significant infrastructure development within the region. Loans from the NDB will help expand the scope of DBSA disbursements in line with its 2015 objectives of broadening their product offering as well as targeting the expertise of other regional banks and lobbying to co-finance infrastructural projects (DBSA, 2015b:44).

4.5 The Structure and Operations of the BRICS New Development Bank

The NDB has a mandate to provide interest free loans to developing countries principally for sustainable infrastructural development projects in the BRICS economies (BRICS, 2013a, 2015).

The main function of the NDB is to utilize resources in support of infrastructural investments in priority projects. This comes in the form of equity participation, guarantees and cheap loans which pass through a transparent governance system. The initial start-up capital is US\$100 billion for all members (BRICS, 2013b).

The bank operates within internationally stipulated legal guidelines for all financial institutions. This obligation entails prudential financial contact and operation as with any other development institutions. Finally, the NDB offers technical assistance in implementing priority projects as well as administration of special funds to support the projects (BRICS, 2014a: paragraph 8).

All the members of NDB have equal voting power, with no provision for a veto. Contribution of each country should be consented by the majority and restricts the extent to which one member contributes (BRICS, 2014b: paragraph 8). Clarity is blurred in membership expansion issues, however the membership expansion must not reduce the BRICS' capital share of 55 per cent as it would lessen the power of the BRICS member states. The threshold is calculated from the US\$100 million initial capital contribution (Dixon, 2015).

For the first five years of operation (2014-2018) The NDB headquarters is located in Shanghai, China. The elected President is from India. The chairmanship is from Russia and Brazil with special classifications of board of governors and board of directors respectively. Finally, South Africa was chosen as the first regional centre. Rotations will follow in all areas within the stipulated time of 5 years (BRICS, 2014b: paragraph 12).

4.5.1 Institutional Design of the NDB

According to Zhu (2015), from the South–South cooperation existing within the BRICS, five principles have been prioritised in its mechanism design. The principles are fair governance, market based operation, non-interventionist approach, localisation and constructive supplement.

The setup for equal fund and discourse power amongst the BRICS demonstrates substantial international innovative capacity of the BRICS countries. The NDB shows the principle of fairness in its innovative governance structure. Its stock rights are equally distributed amongst the BRICS

membership. This means stock rights are not divided according to the BRICS countries gross domestic product in global GDP.

A market based operation model enables the bank to diversify sources of capital by including capital drawn from the market and other channels aside from the BRICS governments. It also enables the introduction of governance structures used in modern companies, and market based recruitment strategies to attract the best international talent (Zhu, 2015).

The non-intervention approach insists on respecting the rights of developing countries on the choice of their own policy space and development paths. It also safeguards against clauses operational in existing BRICS multilateral development banks, which have a negative bearing on the operational efficiency of the NDB. In addition, the NDB attaches loan terms with a non-intervention approach to borrowing countries. This enables proper implementation of economic policies and investment in sustainable and priority infrastructure projects.

The localisation principle enacts on equal communication and mutual learning through various organisations. The Human Sciences Research Council (HSRC) in South Africa has been given a mandate for sharing and communicating experiences on the BRICS aspects with the aim of achieving organic synthesis of fund and wisdom gathering. In addition, the NDB has proposed measures meant to strengthen co-operation with other regional development banks in an attempt to correct the mistakes of the World Bank, which neglected the development needs of developing countries.

The constructive supplement principle entails co-operation between the existing multilateral financial institutions and the NDB. The link stretches from adopting congruent prudential financial standards to constructive participation in co-financing critical and specific infrastructural projects.

4.5.2 Governance of the NDB and its effect on Established Financial Institutions

The NDB has been seen as a global alternative to the World Bank Group, controlled by emerging economies; however, it will constitute added value to the global value of multilateral development banks and additional national development banks if it innovates in procedures and objectives of its future lending (Reisen, 2013).

Experiences from each of the BRICS countries showed a possibility of free political conditions on development finance from the NDB. Growth in South-South cooperation looked to have taken a prominent stage, with much benefit to the developing nations discontented with interventionist governance of international multilateral institutions and regional development banks (Reisen, 2013).

Absence of coherent alternative development initiatives from BRICS's lower lending standards might expose projects dealing with environmental, social and economic impacts. On the other hand, absence of functional institutions poses a challenge to the sustainability of potential infrastructure projects (Schablitzki, 2014).

4.5.3 The NDB and South-South Cooperation

There has been a decline in support from developed countries and multilateral development banks in financing problems of developing countries (North-South co-operation) (Zhu, 2015). Under these circumstances, the rise of emerging economies and the new international economic system through South-South co-operation (financial support amongst developing countries) forms an important element of the BRICS' co-operation agenda (Zhu, 2015). South-South cooperation focuses on respect, reciprocal treatment, mutual gains, maximum results and joint development, which is contrasting with existing inequalities in the North-South economic relations. Through South-South cooperation, the status of developing countries has been uplifted, meaning they can receive financial, technological, managerial, marketing and other developmental support through a new international economic system based on investment, trade, finance and industrial transfers between emerging economies (Zhu, 2015).

The strategic role of the NDB follows the usage of new financing sources separate from developed nations. It has also ushered new financing fields in infrastructure development, which is contrasting with existing multi-lateral institutions and regional development banks which are largely devoted to multi-lateral development projects with less bearing on infrastructure development (Zhu, 2015).

The stringent lending conditions emanating from the North-South co-operation (International Monetary Fund (IMF) and World Bank helping developing countries) contributed to the politicisation and bureaucratisation of the multilateral institutions. South-South cooperation with advent of the NDB prompted a more equal and balanced development partnership amongst developing nations. Reduction in loan costs and lending conditions spearheaded a sound customer-oriented development finance service (Zhu, 2015).

According to Qobo and Soko (2015), the NDB induces structural transformation on the African continent as well as stimulating regional integration through financing infrastructure projects.

South Africa has the role of the African regional centre, as such support the program initiatives of Program for Infrastructural Development in Africa (PIDA) and New Economic Partnership for

Africa Development (NEPAD) amongst others. The Industrial Development Cooperation (IDC) and the Development bank of Southern Africa (DBSA) are used as leverage to support BRICS projects under the auspices of PIDA.

Funding provided by the IDC is in the form of loans, equity and quasi equity. From 2001 to 2010, IDC had funded more than 50 projects in over 15 African states approving loans to the tune of US\$1.98 billion (Qobo & Soko, 2015).

The primary purpose of DBSA is that of promoting sustainable economic development, institutional capacity building and human resources within the SADC region. By August 2015, DBSA regional project support on investment shortfalls covered all 15 SADC member states and most African nations (Qobo & Soko, 2015).

China and South Africa are the major trade and investment partners of Africa. Their membership in NDB processes and operations means there is a highly likelihood of African countries benefiting from major cross-border investments with proceedings from the NDB disbursements. Moreover through South–South cooperation Africa will get preferential treatment in loan disbursements to develop its marginalized infrastructure. This will ease the burden on the African Development Bank (ADB), the DBSA and the IDC which are inadequately funded.

4.6 The Structure and Operations of the Contingent Reserve Arrangement (CRA)

The CRA cushions against short-term balance of payments problems and provide equal benefit and stabilisation of the BRICS financial sector (BRICS, 2014c: article 1).

The BRICS countries made an initial contribution of US\$100 billion towards the CRA establishment. China contributed the largest share of about US\$40 billion, Brazil, Russia and India contributed equal proportions of US\$18 billion per individual. South Africa's contribution was the lowest at US\$5 billion (Cattaneo et al. 2015). The participating countries are entitled to own resources committed to them unless a member request assistance such that a currency swap is done (BRICS, 2014c: article 2)

The maximum access limits to the fund are determined by each country's relevant multipliers, in other words the maximum access limit is determined by each country's capacity to generate income. China's multiplier of 0.5 confine half of its total contribution, while Brazil, Russia and India are allowed to request all their contribution with a multiplier of 1 and South Africa can request two

times its commitment with a multiplier of 2. Approval of other members is required for amounts greater than 30 percent of the reserve (BRICS, 2014c: article 5).

CRA instruments are comprised of liquidity tools and precautionary tools. Both tools are meant to cushion against short term balance of payment requirements but with different degrees of response (2014c: article 4).

The CRA provides for operationalisation of currency swaps when one party request bailout support. Rates are based on the US dollar with reference to the spot market rate for repurchase calculations. Interest is paid based on the dollar quantity requested by a member, rather than the value of the member's currency. The maturity date for repurchase is six -months for un-linked drawings and at least twelve months for IMF linked drawings. Liquid drawings maybe renewed thrice on un-linked drawings and two times on drawings related to the IMF. Precautionary related drawings are non-renewable (BRICS, 2014c: article 12).

The rules and guidelines stipulated in the CRA treaty govern every member. The stipulations include compliance with the banking surveillance system and information disclosure as highlighted in the IMF treaty, as well as proscription of all accruals with other financial institutions of magnified lending (Cattaneo et al. 2015).

CRA governance is carried through the standing committee and the governing council. The governing council is highest in command and comprises of member representatives from the central bank governance. The council stipulates the adjustments in interest rates, prerequisites and conditions, drawings maturity period, changes to access limits and multipliers. The council is also allowed to change the scope of the CRA instruments and administer a strong surveillance system (Cattaneo et al. 2015).

The Standing Committee which is second in governance level has a mandate to approve the participating parties' requests. Its top brass is made up of representatives from each country as well as ordinary central bank delegates. A weighted voting system is used for decision making in support requests. Other decisions prominent decisions are made by consensus. In all levels of decision making of the standing committee, 5 percent of voting right is distributed equally among the participating countries, while the remaining 95 percent depends on the committed value to CRA by each participating country.

4.6.1 Lessons from the Operations of the Contingent Reserve Arrangement (CRA)

The CRA has been commended on the way it embraces the liberal ideals in the main multilateral processes, the ideals of free trade, financial development and financial globalisation. Critics accept the liberal ideas, but argue that the multilateral process has been abused by the traditional multilateral institutions such that the CRA in its present condition is unlikely able to correct (Cattaneo et al. 2015).

The CRA has been rendered to be likely ineffective. In an argument stemming from Cattaneo, et al (2015), similar processes from the agreement of the ASEAN+3 grouping from the year 2000 to 2010 was similar to the CRA in its present condition, and became ineffective in the 2008 crisis. Size, IMF linking and lack of rapid response in balance of payments difficulties were the major problems which affected the CMI.

Size and IMF linking has created doubts on the effectiveness of the CRA too. The drawing rights of South Africa to the equivalents of US\$10 billion and at least US\$2.8 billion unlinked to the IMF is inadequate to meet major balance of payment problems (Cattaneo et al. 2015). Thailand experienced the same situation in 1997, when it requested about US\$17 billion from IMF, with an economy's growth equivalent to only 40 per cent of the present SA growth. The IMF linking had to reconcile through a process of counterweighting. This could apply now, but it is highly unlikely that nations would consent to the IMF conditionalities due to disputes about voting shares, and resentment from past experiences (Cattaneo et al. 2015).

Against these criticisms, the CRA has drawn positive lessons from ASEAN+3 processes. It is highly likely that adjustments will be done in scope and operations to subvert problems faced by institutions of the same capacity.

4.7 BRICS Think Tanks Council

The establishment of the BRICS Think Tanks Council (BTTC) was endorsed in March 2013, Durban South Africa. BTTC was formed to create a platform for the exchange of ideas among researchers, academia and think tanks. The BTTC mostly presents policy recommendations and guidance to BRICS leadership for consideration.

The BTCC membership comprises of the Institute for Applied Economic Research (IPEA) Brazil, National Committee for BRICS Research (NRC BRICS) Russia, the Observer Research Foundation (ORF) India, China Centre for Contemporary World Studies (CCCWS), and the Human Sciences Research Council (HSRC) South Africa (SABTT, 2014).

The HSCR was given a task to oversee and finalise the drafting of a long term vision and strategy for BTTC in 2013/2014 Think Tank agenda, as well as shaping the strategic vision of South Africa and the African region around global financial, economic and governance issues. As such, the HSCR was obliged to collate comments from the five member countries into the next draft of the vision and strategy.

According to Cosser (2014), Think Tanks are well placed to shape the strategic vision for each individual BRICS country. To affirm the position and progress towards the agreed objectives, the BTCC approved a document entitled- '*Towards a Long Term Strategy for BRICS-Recommendations by the BRICS Think Tanks Council*' in 2014. In the document, the BTCC presented a diagnosis of the current situation, and proposed recommendations on the five pillars, namely: promoting cooperation for economic growth and development; peace and security; social justice, sustainable development and quality of life; political and economic governance; and sharing of knowledge and innovation. The BTCC in-depth expert opinion is commendable, and gives a clear outline on policy discourse on all issues affecting BRICS cooperation.

4.8 BRICS Business Council

The BRICS business council was formed in 2013 (Durban, South Africa), with the main objective of promoting and strengthening business, trade and investment ties amongst the BRICS economies (BBC, 2014). The BBC ensures regular dialogue between business communities and governments of the BRICS nations, at the same time identifying problems, bottlenecks and solutions, which necessitate greater economic, trade and investment ties amongst the BRICS partner countries.

The BBC comprises of five working groups meant to tackle issues of infrastructure, manufacturing, financial services, energy and green economy, and skills development. The main reason for the establishment of work groups was to facilitate interaction amongst businesses with a view to understanding the market opportunities and hence build synergies based on their respective competitive strength for the promotion of the manufacturing industry and job creation (BBC, 2014).

According to DIRCO (2014), the BRICS Business Council was progressive in establishing operational procedures, action plans and joint ventures in various areas of cooperation. Proposed areas of co-operation included agro-processing, value added manufacturing, medium and macro enterprises development, sustainable development, pharmaceutical and financial services, amongst others. Global growth points in Asia, Africa and Latin America were identified, and hence

cooperation, best practice exchanges and public-private partnership amongst BRICS business and governments was enhanced. Finally, promotion of high return partnerships between BRICS and Africa, in sectors such as agro-processing, beneficiation, infrastructure, energy and supporting skills development, was sustained.

4.9 Chapter Summary.

The establishment of BRICS institutions provided a valuable platform for BRICS to advance reforms in international financial and development architecture that favoured developing and emerging countries at large. The BRICS Think Tank and BRICS Business Council provided a platform for policy and decision making responsible for the establishment of the NDB and the CRA. These institutions are credible and their amendments and recommendations can be reckoned with for better functioning of the BRICS alliance.

The NDB is a valuable tool for implementation of regional and global strategies for sustainable development. However, the NDB might face challenges in the short run. Decisions taken regarding capital structure and governance arrangements may have unintended repercussions that could initially restrict the NDB's scale and effectiveness. Projections as reflected in Humfrey (2014) show a likely loan portfolio in the US\$40-65 billion range after ten years of operation, which is fairly modest in relation to existing Multi-lateral Development Banks (MDBs). The expected bond rating of the NDB is most probably going to restrict its financial flexibility and limit demand for its services to some emerging economies due to potentially high loan costs. Finally, lack of clear leadership on founding member equal shareholding may hinder expansion and flexibility.

The BRICS economies have pledged on providing at least US\$150 million for each partner in the short term, and raising the other US\$50 billion over the next six years, which is likely difficult as most of the BRICS economies are mired in cash constraints rising from various political and economic problems further agitated by a drastically overstated dollar dominance which can be reverted if exchange is transacted in local currencies.

Even though the BRICS are contributing more to growth as a system, sovereign-debt downgrades for some of its member states could result in higher borrowing costs on international markets. Slow growth makes lending to low-payback infrastructure projects risky.

The NDB will never surpass the Bretton Woods institutions, however it can make the global financial development and stabilisation multi-polar with the NDB acting as alternative to the IMF

and World Bank in lending mechanisms towards developing countries. It reduces the Bretton woods voting share discrepancies and softening conditionalities.

In April 2016, The NDB made progress by issuing the first round of loans to the BRICS nations for green energy worth US\$811 million. More so the Bank planned a 5 year interbank bond in Chinese Yuan worth US\$6.1 trillion. The bond is expected in the second quarter of 2016. In addition, the BRICS joined forces on IMF quota formula reform and finally the BRICS finance ministers discussed on launch of bank institute ratings agency.

The NDB proposed bond not only portrays Beijing's outsize importance to the global financial strategic processes but also how its involvement introduces uncertainties. The Chinese US\$6.1 trillion interbank bond market represent the bank's only viable debt-market funding option at the present moment and clarity is blurred on how China's currency policies may affect plans to serve the broader membership. Uncertainties are still prevalent on the rate of currency swaps between the Yuan and other BRICS currencies citing the recent downgrade in the Yuan's value. Even though, the market rate is always a solution to balance of payments and exchange problems between the member countries.

The recently launched AIIB (Asian Infrastructure Investment Bank) is a challenge to the NDB with contrasting pattern and lessons to follow as portrayed in China's membership and her vigorous leadership in setting an interim secretariat, appointing new staff and intensive lobbying to persuade other countries to join.

On the other hand, the present primary motive of the CRA on finding ways that cushion against balance of payment pressure and eliminate the IMF-linked drawings and requirements is difficult. A transparent surveillance system, research facility and modalities for a rapid crisis response should be developed to bypass competition from existing international financial institutions or rather eliminate possibilities of failure in the long run. The CRA membership must be increased and its scope reviewed.

Discussion from this chapter and other previous chapters provides evidence to reinforce empirical findings in succeeding chapters of methodology, test results and recommendations.

The next chapter presents the research methodology, model specification and estimation techniques.

CHAPTER 5

METHODOLOGY, MODEL SPECIFICATION AND ESTIMATION TECHNIQUES

5.1 Introduction

This chapter outlines the methodology applied to find the impact of trade in BRICS on South Africa's economic growth. The methodology combines two analytical models. Trade shocks are assessed using Autoregressive Distributed Lag (ARDL) modelling that incorporates the new endogenous growth model to test various economic growth determinants for South Africa. The resulting effects on growth for all BRICS countries are evaluated using the General Method of Moments (GMM) in a dynamic panel data set up. Theoretical underpinnings emanating from chapter two form the basis for this analytical framework. The first section specifies the model and how estimation was applied. This is followed by data specification, definition of variables and expected results in the third and fourth sections. Section five reviews the ARDL and panel data modelling approaches. Stationarity, cointegration and diagnostics tests are discussed as methods for testing the robustness of each modelling technique. Concluding remarks are provided in the last section.

5.2 Methodology

This research uses quantitative methods of analysis. In this regard an econometric modeling using ARDL and dynamic panel data analysis using GMM will be analysed.

5.2.1 Theoretical Model

The theoretical framework which underpins the methodology is based on the endogenous growth model by Romer (1993). The model is distinguished by the presence of technological spill-overs, in which economy-wide capital stock affects industry output at the industry level. This is in the presence of industrialization, resulting in economy-wide increasing returns to scale (Todaro & Smith, 2013). The model is formally presented as:

$$Y_i = AK_i^\alpha L_i^{1-\alpha} \bar{K}^\beta \quad (5.1)$$

Where:

Y_i = Aggregate production (total value of all goods produced in a year)

L = Labour

K = Capital

A = Factor productivity (aggregate)

α and β are coefficients representing output elasticity of labour and capital, and are determined by technology respectively (Todaro & Smith, 2013). Output elasticity measures the responsiveness of output to a change in levels of labour or capital production. A practical illustration of $\alpha = 0.25$, implies that a 1 percent increase in labour would lead to 0.25 percentage increase in output. If $\alpha + \beta = 1$, the production function has constant returns to scale. If L and K increase by 10 per cent, Y increases by 10 per cent. Thus $\alpha + \beta < 1$ implies decreasing returns to scale and $\alpha + \beta > 1$ implies increasing returns to scale (Todaro & Smith, 2013).

Assuming symmetry across industry, such that each industry will use the same level of capital and labour, an aggregate production function is produced, and is presented as follows:

$$Y_i = AK^{\alpha+\beta} L^{1-\alpha} \quad (5.2)$$

Romer (1993) asserts that, if it is assumed that the number of researchers producing knowledge is constant, the model will predict that all growth is due to technological progress. That is to say, the capital-labour (K/L) ratio, the stock of knowledge and output, all grow at a constant rate. Without technical progress, there will be no growth.

5.2.2 Empirical Model

The empirical model is drawn from the new endogenous growth model and will be modified by employing RGDP growth as the dependent variable, Average Trade balances of BRIC member countries ($\text{\textcircled{9}TB}$) and Average Foreign Direct Investment ($\text{\textcircled{9}FDI}$) of BRIC member countries in South Africa and of South Africa in BRIC member countries, private investment (INVE), Gross Domestic Capital Formation (GDGF), Real Exchange Rate (REXCH) and Real Interest Rate (RINT) which are entered as independent variables.

A functional model is expressed as follows:

$$\text{RGDP}_t = \beta_0 + \beta_1 \text{\textcircled{9}TB}_t + \beta_2 \text{\textcircled{9}FDI}_t + \beta_3 \text{INVE}_t + \beta_4 \text{GDGF}_t + \beta_5 \text{REXCH}_t + \beta_6 \text{RINT}_t + \beta_7 \text{DUM} + \mu t \quad (5.3)$$

Where:

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ and β_7 are coefficients to be estimated.

RGDP_t = Real Gross Domestic Product in year t

§TB_t = Average Trade Balance in year t, Brazil, Russia, India, China

§FDI_t = Average Foreign Direct Investments in year t, Brazil, Russia, India, China

INVE_t = Private Investment in year t

GDCF_t = Gross Domestic Capital Formation in year t

REXCH_t = Real Exchange Rate in year t

RINT_t = Real Interest Rate in year t

DUM= Dummy variable takes 1 (after South Africa officially joined BRIC) otherwise 0 (before South Africa officially joined BRIC)

In the ARDL framework, all variables are used. One of the strengths of the ARDL is ability to produce robust results even if the endogenous variable is related to the exogenous variables. We initially dropped INVE and GDCF for goodness of fit of the model, but the results were spurious, with exorbitant coefficients. Adoption of the variables retained robustness of the model.

In the GMM framework, the exogenous variables (INVE, GDCF and RINT) were excluded for robustness purposes, and the model produced robust estimates.

5.3 Definition of Variables

The factors influencing growth in the BRICS economies differ between countries and time and are as follows: the growth rate in previous year, trade volume (exports and imports) as a percentage of GDP to represent openness, which in our case is presented by average trade balances of South Africa in BRICS and the BRICS economies in South Africa, public and private GDFCF (Gross Domestic Fixed Capital Formation), exchange rate, the quantum of private investment represented by credit issued to the domestic private sector and average foreign direct investments between South Africa and the BRICS. These factors are considered to be the most important factors contributing to growth in the BRICS economies and they follow empirical evidences from Polodoo et al. (2012) and

Lo & Hiscock (2014) who used similar variables to test on growth in BRICS economies and South Africa. Growth effects of trade and FDIs are usually analysed on the basis of total trade or total FDIs, this has biases implementation of ideal trade FDI and growth policies. Usage of average trade balances and foreign direct investments between South Africa and the BRICS arrest the debate on South Africa inclusion in BRICS and provides clear guidelines on policy recommendations. The variables are expected to be positively related to growth

5.3.1 Real Gross Domestic Product

Gross Domestic Product (GDP) is the monetary value of goods and services produced in a country over a particular period of time. GDP is usually measured on a monthly basis, which translates to quarterly and annual figures. It accounts for market and non-market production activities. Non-market activities include government spending on education, defence and social security, amongst others. GDP figures are used to calculate real GDP (RGDP), which is the nominal adjustment of the current GDP to constant prices through a price deflator for comparison purposes. A positive growth in real GDP will translate into employment and capacity utilisation, which is healthy for a country's economy. Real exchange rate of the US dollar to each country's currency is the measure used to deflate each country's real GDP for comparison purposes. Data used in our studies was sourced from credible international institutions; as such purchasing power parity (PPP) measures were applied in tabulating the real GDP figures.

5.3.2 Trade Balance

Trade balance (TB), also known as the external balance, is the difference between a country's exports and imports. Total goods and services are included amongst the aggregates (World Bank, 2015). A country's trade balance is said to be in deficit if it imports more than it can export. According to economic theory, a trade deficit is self-correcting and as such does not pose much threat to the economy. The major worry is on the domestic currency which becomes domiciled in foreign accounts. A large increase in the selling of the domiciled host country's currency may drive the value of the currency low such that it becomes expensive to buy imports. The opposite is true for a trade surplus.

5.3.3 Foreign Direct Investment

Foreign direct investment (FDI) is defined as the sum of equity capital, reinvestment earnings and any other capital flows within and out of the reporting economy (World Bank, 2015). The 'direct' phrase from the statement resorts to cross-border investment from a resident of one country into

another country with a strong influence on the management of the latter country's enterprises. Ownership has to exceed 10 percent of ordinary shares of voting to classify the investment as direct.

5.3.4 Domestic Credit to Private Sector

Domestic credit to private sector (INVE) refers to financial resources provided to the private sector by financial institutions with an entitlement for claim repayment (World Bank, 2015). These resources include loans, purchase of non-equity securities, trade credits and various accounts receivables. The World Bank (2015) classified financial corporations as monetary authorities, deposit money banks, and any other institutions that accept transferable deposits at the same time as incurring liabilities as time and savings deposits. Finance and leasing companies, insurance organisations, foreign exchange corporations and pension funds are included in such analysis.

5.3.5 Gross Domestic Capital Formation

Gross Domestic Capital Formation (GDCF) is a measure of the net increase in fixed capital investment. The World Bank (2015) included land improvements, plant, machinery and equipment purchases and infrastructure development (road, schools, commercial buildings, etc) amongst some of the measured aggregates. GDCF is a component of the expenditure method of GDP as such countries with higher economic growth spend more on fixed investment in order to accelerate their growth. Investment increases economic growth and also future productive capacity.

5.3.6 Real Effective Exchange Rate

Real effective exchange rate (REXCH) is defined as the adjusted nominal effective exchange rate deflated through an index of costs. Nominal effective exchange rate is the value of a country's currency in relation to a weighted average of several countries' currencies. A strong currency is detrimental to growth as it intends to suffocate domestic demand.

5.3.7 Real Interest Rate

Real Interest Rate (RINT) is defined as the lending rate offered by financial institutions to different entities under varying conditions depending on the country. The interest rate is termed '*real interest rate*' because it is adjusted for inflation via the GDP deflator. To achieve this objective, the central bank sets the level of lending (repo rate), thereby influencing the rate banks and financial institutions pass to their customers for business and personal loans, mortgages and savings. An increase in interest rate has negative effects on investment and growth. At the same time a decrease in interest rate might deter growth if the borrowed funds are wrongly channelled towards non-productive activities.

5.4 A Priori Expectation

Table 5.1 Expected Signs

Variable	Expected sign (+/-)	Explanation
Average Trade Balances of BRIC countries	+	Average trade balances of the BRIC countries are expected to impact positively on economic growth in South Africa (Field et al. 2005).
Foreign Direct Investments to and from BRIC countries	+	Average net foreign direct investments are expected to be positively related to GDP (Field et al. 2005).
Private Investment	+	An increase in private investment in the economy leads to increase in economic growth (Field et al. 2005).
Gross Domestic Capital Formation	+	An increase in infrastructure investment is expected to be positively related to economic growth (Mohr & Fourie, 2008).
Real Exchange Rates	+/-	An increase in exchange rate may either lead to increased economic growth or a decline (Field, Appleyard & Cobb, 2005).
Dummy Variable	+	Dummy variable takes 1 (after inclusion of South Africa to BRIC countries and 0 otherwise. The dummy variable is expected to be positively related to GDP

Source: Expected estimates drawn from empirical literature

5.5 Data Sources

The study utilise two estimation techniques, as such the first technique (Autoregressive lag) employs time series quarterly data for the period 1990-2014. The alternative technique (General Method of Moments) utilises annual data from 1990-2014. In both the Autoregressive and General Method of Moments models, data on \%FDI was obtained from the South African Reserve Bank (2015); Coordinated Direct Investment Surveys (2015) and KPMG (2015). Data on \%TB was obtained from

UNComTrade (2015); International Trade Centre (2015) and World Integrated Trade Solutions (2015). Data on GDCF, INVE and RINT used in the Autoregressive modelling was obtained from South Africa Reserve Bank (2015), while REXCH used in both the Autoregressive and the General Method of Moments was obtained from World Bank (2015).

5.6 Estimation Techniques

According to Doan (2010), many econometric methods have been proposed to test long-run equilibrium cointegration amongst time series variables. Prominent works by Engel & Granger (1987), Phillips & Hansen (1990) and Johansen (1991) are most recognised amongst recent 20th century research. This study employed the Autoregressive Distributed Lag (ARDL) modelling developed by Pesaran & Pesaran (1997) and Pesaran, Shin & Smith (2001) to conduct a simultaneous analysis of the short-run and long-run dynamics between trade in BRICS economies and South Africa's growth.

Dynamic panel data analysis using GMM is utilised as an alternative technique to test on the effect of trade in BRICS on SA growth. The technique is diverse as it intends to evaluate the contribution of trade and FDIs from SA to the BRIC economies' growth.

5.6.1 Autoregressive Distributed Lag (ARDL) Modelling

Several methods are available for conducting the cointegration test. The most commonly used methods include the Engle-Granger (1987) test and the maximum likelihood based Johansen (1991; 1995) and Johansen- Juselius (1990) tests. Due to lower power and other serious problems associated with these test methods, the OLS based ARDL has approach to cointegration has been preferable in recent years (Pesaran & Shin, 1999).

The model carries the following form:

$$Y_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 X_{t-1} + v_t \quad (5.4)$$

Where, Y_t is the dependent variable, Y_t is the explanatory variable and X_{t-1} is the stochastic explanatory variable distributed independently of the disturbance term v_t .

The dependent variable Y_t represent SA growth and is regressed against ϑTB_t (Average trade balances of SA with BRIC), ϑFDI_t (Average Foreign Investments of SA with BRIC), $INVE_t$ (Credit extended to the domestic private sector) $GDCF_t$ (Gross Domestic Capital Formation), $REXCH_t$

(Real Exchange Rate) and $RINT_t$ (Real Interest Rate). t is time variant and will include an innovative outlier to demarcate periods after BRICS membership.

The main advantage of ARDL modelling lies in its flexibility that it can be applied when the variables are of different order of integration (Pesaran & Pesaran 1997). This was so with our variables which were integrated of different order of integration.

Another advantage of this approach is that the model takes sufficient numbers of lags to capture the data generating process in a general-to specific modelling framework (Laurenceson & Chai, 2003). Moreover, a dynamic error correction model can be derived from ARDL through a simple linear transformation (Banerjee et al. 1993). The error correction model integrates the short-run dynamics with the long-run equilibrium without losing information. It is also argued that using the ARDL approach avoids problems resulting from non-stationary time series data.

The variables considered in this study are a mix of I(0) and I(1) series. The cointegration test methods based on Johansen (1991; 1995) and the Johansen-Juselius (1990) require that all variables be of equal degree of integration, for example I(1). Therefore, these methods of cointegration are not appropriate and cannot be employed. Hence, we adopt the ARDL modelling approach for cointegration analysis in this study.

5.6.1.1 Break Point Unit Root Test

Many macroeconomic time series data incorporates the nonsensical correlation error in their econometrics methodology. Differencing is therefore necessary to stabilize the time series data. Data spuriously correlated is termed 'non-stationary'. Non-stationary data is used only in modelling the long run equilibrium, defined as the stationary linear combination of that particular time series. Each deviation from the equilibrium is then corrected in the next period (Engel & Granger, 1987 in Hamuda, Sulikova, Gazda & Horvath, 2013). Preliminary unit root testing using the ADF breakpoint test is carried on the data series to identify variables integrated of the order 1(2) which is a violation of the ARDL assumptions. Breakpoint tests take into consideration structural breaks that might exist in our data series. Structural changes occur due to policy changes, economic crises and policy changes amongst other factors. The null hypothesis of structural stability is tested against the alternative hypothesis of one time structural break. If structural changes are not allowed in specification tests, there might be erroneous non-rejection of the null hypothesis. Two types of structural break exist in literature, namely the Additive Outlier (AO) and the Innovative Outlier

(IO). The AO method allows instant application of structural changes while the IO allows changes to take place gradually. The gradual changes reportedly affect the slope and intercept of the trend function (Leybourne & Newbold, 2003).

The study used the IO approach for its unit root testing.

5.6.1.2 ARDL Cointegration Approach

Following the empirical literature, the standard log-linear functional specification of the long-run relationship for the growth equation and nesting theoretical approaches introduced in the second section is expressed as follows:

$$RGDP_t = \beta_0 + \beta_1 \theta TB_t + \beta_2 \theta FDI_t + \beta_3 INVE_t + \beta_4 GDCF_t + \beta_5 REXCH_t + \beta_6 RINT_t + \beta_7 DUM + \mu t \quad (5.5)$$

Where DUM denotes a dummy variable, u , an error term and t time index.

To investigate the presence of the long-run relationship, a bounds test based on the Wald or F statistic, as proposed by Pesaran (2001) was used.

5.6.1.2.1 The Bounds Test

The bounds test approach to cointegration is performed in three steps. In the first step, the bounds test is computed based on the Unrestricted Error Correction Model (UECM) from the ARDL equation 5.5, using the Ordinary Least Squares (OLS) technique.

The unrestricted Error Correction Model (UECM) is presented as follows:

$$\begin{aligned} \Delta RGDP_t = & \beta_0 + \sum_{i=0}^P \beta_1 \Delta \theta TB_{t-i} + \sum_{i=0}^P \beta_2 \Delta \theta FDI_{t-i} + \sum_{i=0}^P \beta_3 \Delta INVE_{t-i} + \sum_{i=0}^P \beta_4 \Delta GDCF_{t-i} \\ & + \sum_{i=0}^P \beta_5 \Delta REXCH_{t-i} + \sum_{i=0}^P \beta_6 \Delta RINT_{t-i} + \beta_7 \theta TB_{t-1} + \beta_8 \theta FDI_{t-1} + \beta_9 INVE_{t-1} + \beta_{10} GDCF_{t-1} + \\ & \beta_{11} REXCH_{t-1} + \beta_{12} DUM_{t-1} + \mu t \end{aligned} \quad (5.6)$$

Where, $\Delta \ln$ is the first difference of logarithms for the respective variables.

In the second step, the null hypothesis of non-cointegrating relationship ($H_0: \delta_1 = \delta_2 = \delta_3 \dots = \delta_8 = 0$) is tested by performing a joint significance test on the lagged level variables. The asymptotic distribution of the F-statistic is standard under the alternative hypothesis of cointegrating relation between the examined variables, irrespective of whether they are purely I(0) or I(1).

Two sets of critical values, upper bound and lower bound were tabulated by Narayan (2004). The upper bound critical values are called the I(1) series and the lower bound critical values are called the I(0) series. Under the conventional used level of significance, if the F-statistic from the Wald test falls outside the critical bound, a conclusive inference can be made without considering the order of integration of the explanatory variables. In other words, if the F-statistic falls between the upper and lower bounds, no conclusive inference can be made and if the F-statistic is higher than the critical bound, the null hypothesis of no-cointegration is rejected (Hamuda et al. 2013).

The third step is to estimate the coefficients of the long-run cointegrating relationship and the corresponding Error Correction Model (ECM).

The long-term ARDL equilibrium relation (q1, q2, and q3.....q7) is given as,

$$RGDP_t = a_0 + \sum_{i=1}^{q1} a_1 RGDP_{t-i} + \sum_{i=0}^{q2} a_2 \theta TB_{t-i} + \sum_{i=0}^{q3} a_3 \theta FDI_{t-i} + \sum_{i=0}^{q4} a_4 INVE_{t-i} + \sum_{i=0}^{q5} a_5 GDCF_{t-i} + \sum_{i=0}^{q6} a_6 REXCH_{t-i} + \sum_{i=0}^{q7} a_7 RINT_{t-i} + dDUM + \epsilon_t \quad (5.7)$$

Where, ϵ_t is the gap error term used more frequently between $\ln(RGDP_t)$ and its equilibrium level to be filled the next period (Hamuda et al. 2013).

The resulting model is presented as,

$$RGDP_t = c_0 + \sum_{i=1}^q c_1 RGDP_{t-i} + \sum_{i=0}^q c_2 \theta TB_{t-i} + \sum_{i=0}^q c_3 \theta FDI_{t-i} + \sum_{i=0}^q c_4 INVE_{t-i} + \sum_{i=0}^q c_5 \ln GDCF_{t-i} + \sum_{i=0}^q c_6 REXCH_{t-i} + \sum_{i=0}^q c_7 RINT_{t-i} + c_8 \epsilon_{t-1} + \mu t \quad (5.8)$$

The resulting estimated coefficient is expected to be negative, and is interpreted as the speed of adjustment for the explained variable towards equilibrium. The appropriate lag structure of the ECM is determined by three model selection criteria, namely Akaike Information Criteria (AIC), Schwarz Bayesian Criteria (SBC) and the Adjusted LR Test.

5.6.1.3 Diagnostic Tests

Diagnostics and stability tests are conducted on the ARDL model to ascertain the goodness of fit. The diagnostic test reviews the serial correlation, functional form, normality and heteroscedasticity associated with the model. The stability test reviews whether the inverse roots of the characteristic equation associated with our model lies strictly inside the unit circle (Giles, 2013).

5.6.1.3.1 Residual Diagnostics

5.6.1.3.1.1 Correlogram Q Statistic

The Q statistic is a test statistic for the null hypothesis that there is no autocorrelation in the lagged variables of the order k , and is represented as follows:

$$Q_{LB} = T(T + 2) \sum_{j=1}^k r_j^2 / T - J \quad (5.9)$$

Where, T is the number of observations and r_j is the j -th autocorrelation. The series is interpreted based on the ARIMA or without the ARIMA estimation. If the series is not based on ARIMA, Q is asymptotically distributed as chi squared with degrees of freedom equal to the number of autocorrelations (EViews 8, 11). In the latter case, the appropriate degrees of freedom should be adjusted to represent the number of autocorrelations less the number of AR and MA previously estimated.

Choice of order length is often a major challenge with the Q test. A smaller lag might not detect serial correlation at higher order lags. Too large a lag will lessen the power of the test since the significance at one lag may be neutralised by insignificant correlations at other lags. Advanced modelling software, such as Eviews 9, automatically chooses the order length to avoid problems of misspecifications.

5.6.1.3.1.2 Breusch-Godfrey Serial Correlation LM Test

The test is an alternative to the Q statistic for testing serial correlation in large samples. The test is used to test for the presence of ARMA errors and lagged dependent variables. The test hypothesises that there is no serial correlation up to order p against the alternative ARMA(r, q) errors where the number of lag terms $p = \max(r, q)$. The alternative includes both AR(p) and MA(p) error processes so as to give the test maximum strength against a variety of alternative correlation structures (Eviews 9, 11).

The test statistic for the lag order p is based on the auxiliary regression for the residuals ($e = y - X\beta$) from the equation:

$$y_t = X_t\beta + \varepsilon_t; \quad (5.10)$$

Where β are the estimated coefficients and ε are the errors, and is presented as:

$$e_t = X_t \gamma (\sum_{s=1}^p (\alpha_s e_{t-s}) + v_t \quad (5.11)$$

Equation 5.11 is the test regression of residuals on the original regressors X and order p of lagged residuals. The F statistic, which is an omitted variable test for joint significance of lagged residuals and the Obs*R-squared statistic, which is the Breusch-Godfrey LM test statistic, are computable from the test regression.

The B-G LM statistic is asymptotically distributed as chi-squared (p) and is tabulated as the number of observations times R^2 from the test regression and is computable with least squares or two stage least squares.

5.6.1.3.2 Stability Diagnostic Tests

5.6.1.3.2.1 Cusum Test

The Cusum test draws from the cumulative sum of recursive residuals and plots the cumulative sum together with the 5 percent critical lines. If the cumulative sum goes outside the demarcation between two critical red lines, the parameter is regarded as unstable.

The Cusum test statistic is presented as:

$$w_t = \sum_{r=k+1}^t (w_r / s) \quad (5.12)$$

Where, w is the recursive residual of the parameter $t = k+1, \dots, T$, and s is the standard deviation of the recursive residuals w_t . Under a constant β vector, $E(W_t) = 0$. Under a varying β vector, W_t diverge from the mean, the significance of which is assessed at 5 percent level within a distance varying with t .

The following lines are used to connect the 5 percent significance lines:

$$[k, \pm 0.948(T-k)^{1/2}] \quad \text{and} \quad [T, \pm 3 * 0.948(T-k)^{1/2}] \quad (5.13)$$

Movement of W_t outside the critical lines indicates coefficient instability.

5.6.1.3.2.2 Cusum Squares Test

The Cusum of squares test is used to test for variance or parameter stability. The test draws from the CUSUM test and is based on the test statistic;

$$S_t = (\sum_{r=0}^n w^2 r) / S_t = (\sum_{r=0}^n w^2 r) \quad (5.14)$$

Under the hypothesis of parameter constancy, S_t is expected to have the following value:

$$E(S_t) = (t-k)/(T-k) \quad (5.15)$$

The value goes from zero at $t=k$ to unity at $t=T$. The significance of the departure of S from its expected value is made subject to a pair of parallel straight lines around the expected value (Brown, Durbin & Evans, 1975, in *Eviews* 9, 11).

5.6.2 Panel Data Regression Modelling

The panel data modelling technique is used to test on the impact of trade with South Africa on BRICS economies growth.

In modelling South Africa growth, \%TB and \%FDI are used to present the average trade balance of all the BRIC countries with South Africa.

For the rest of the BRIC, \%TB and \%FDI represent the average trade balance and average FDIs of South Africa and each BRIC counterpart, respectively.

The trade balance and real effective exchange rate as specified in model 5.5 are used as explanatory variables in each individual BRICS growth model. GDGF , INVE and RINT were removed to improve the robustness of the model.

The panel regression models address the goals of the paper by testing multiple time points on BRIC economies and allow tests of dynamic hypothesis, which is a statement about a change in one variable, more so they allow simulation on long term effects of trade and foreign direct investments between South Africa and the BRICS. Finally they enable simulations on Causality to check whether our independent variables Cause growth bi-directionally or uni-directionally (Gujarati, 2004).

According to Maddala (1994), Panel data is sets of information on the same individual over respective periods of time. Panel data is most appropriate for empirical analysis of cross section and time series data. This enhances data quality and sorting out of economic effects that cannot be distinct with cross-section or time series data. More so, with panel data, there are more numbers of data points that generate additional degrees of freedom which improve the efficiency of the econometric estimates. Baltagi (1995) suggest that the use of panel data is useful in studying the dynamics of adjustment. It is also useful in studying the economic time frame necessary to adjust to economic policy changes.

Panel data as shown in Baltagi, (2001) & Gujarati, (2004) is used to provide a model of the following form:

$$Y_{it} = \alpha + X_{it}^i \beta + \mu_{it} \quad (5.16)$$

Where, i represent the countries, and t time

The model is based on decomposing the error term (μ_{it}) to its components in terms of its individual and time effects. When the error term is decomposed, an error component model is obtained. The model is presented as follows:

$$\mu_{it} = \mu_i + \lambda_t + \vartheta_{it} \quad (5.17)$$

Where, μ_i and λ_t are individual and time effects.

It is assumed that μ_i, λ_t and $\vartheta_{it} \sim N(0, \sigma^2)$ are independent and identically distributed (Mercan et al. 2013). This simply means the average of error terms is zero, and normally distributed over a stationary variance.

The panel data model in equation 5.17 is modified by employing ϑ_{TB} (Average trade balances to and from BRIC countries), expected to positively related with growth (Field, 2005), ϑ_{FDI} (Average Foreign Direct Investments to and from BRIC countries) also expected to be positively related with growth and real effective exchange expected to be either positive or negative (Field, 2005).

5.6.2.1 Panel Data Estimation Models

Three models have existed in empirical literature for the analysis of panel data. These models are the constant coefficient model, fixed effects model and random effects model (Gujarati, 2004). The constant coefficient model assumes that all coefficients, (both slopes and intercepts) are constant with the error terms. The constant intercept assumption means all countries are the same, with no significant country specific and temporary effects. The constant coefficient model has been commended for the ease of parameter testing. However, by ignoring country and/or time specific effects, the model is bound to heterogeneity specification (Hsiao, 1986, in Doan, 2010).

The fixed effects and random effects modelling are most appropriate for handling heterogeneity effects among countries.

In contrast to the coefficient model, the fixed effects model presented in equation 5.18 assumes that country specific intercepts a_j that relates to different countries may not be constant or vary with time.

$$Y_{jt} = \alpha_1 D_{j1} + \dots + \alpha_n D_{jn} + \beta_i X_{jt} + \varepsilon_{jt} \quad (5.18)$$

Dummy variables are used in the model for controlling effects of omitted variables specific to individual countries. The intercept α_n shows the omitted variables for every specific country, and is used to induce unobserved heterogeneity in the model. The intercept and independent variables are allowed to be correlated. X_{jt} represent the observed parts of the heterogeneity. The rest of omitted variables are contained in the error term (ε_{jt}) (Doan, 2010). OLS or GLS can be used as estimation techniques for the model.

The fixed effects model has been criticised on the dummy variable trap. More so, the model is susceptible to weak statistical inference, as a result of too much cross section and time series data (Pindyck & Rubinfeld, 1998, in Doan, 2010).

According to Pindyck & Rubinfeld (1998) in Doan (2010), the random effects model is more efficient in the estimation process than the coefficient and fixed effect models. In contrast to the fixed effects model where a dummy variable is used as a differentiating component for each country's intercept, the random effects model shows the intercept as a result of a draw from some distribution. The intercept contains only the mean effect from the random cross-section and time-series effects. More so, the random effects model does not sacrifice on the number of degrees of freedom, a weakness of the fixed effect model for statistical inferences. Equation 5.20 shows the random coefficient model:

$$Y_{jt} = c + \beta_i X_{jt} + \varepsilon_{jt} \quad (5.19)$$

ε_{jt} is the error term, comprising of the terms a_j and v_j ($\varepsilon_{jt} = a_j + v_j$). Where, a_j is cross country error, and v_j is time series error.

The random deviations about the mean are components of the error term. These components are not allowed to be correlated with the independent variables (Doan, 2010).

The question facing the researcher is of choosing the appropriate model, whether to treat the effects (a_j) as random or fixed. Hsiao (1986) in Doan (2010) suggested the usefulness of either of the models should the time series be long. For short data sets, it is essential to choose the correct model, so as to make best use of the small amount of information (Doan, 2010). In order to choose the best model, one has to test for misspecification of the random effects model, where (a) is assumed to be random and uncorrelated with the independent variable (Hsiao, 1986, in Doan, 2010).

Hausman test is conducted to test on the hypothesis $H_0: a = 0$ and $H_1: a \neq 0$.

If (a) is uncorrelated with the independent variables, the null hypothesis holds and the random effects model should be applied. Similarly a fixed effects model holds for the alternative hypothesis.

5.6.2.2 Dynamic Panel using the GMM Estimator

The main advantage of this estimator is that it does not require any external instrument to deal with endogeneity. Within the GMM approach, one may choose the first-differenced estimator, which considers regression equations in first-differences instrumented by lagged levels of explanatory variables. Taking first-differences eliminates country-specific fixed-effects, thus solving the problem of the potential omission of time invariant country specific factors that may influence growth. Nevertheless, the first-differenced GMM estimator (Arellano & Bond, 1991) is not suitable when time series are persistent and the number of time series observations is small, like in the case of empirical growth models where data has to be averaged in order to avoid modelling cyclical dynamics (Bond et al., 2001). Under these conditions, lagged levels of explanatory variables tend to be weak instruments for subsequent first-differences, thus producing biased estimates. Therefore, Arellano & Bover (1995) and Blundell & Bond (1998) suggested on retaining the System-GMM approach, which combines - into one system - regression equations in first-differences and in levels, where instruments used for level equations are lagged first differences of the series

The GMM variations are estimated using the following growth regression:

$$y_{it} - y_{it-1} = \alpha y_{it-1} + \beta' X_{it} + n_t + \mu_i + \varepsilon_{it} \quad (5.20)$$

Where, n_t represent the period-specific effects that controls for global shocks affecting the growth performance of the BRICS countries, and μ_i represent the unobserved country-specific effects, that is the growth determinants peculiar to the country and likely correlated with the exogenous variables.

Period specific intercepts are included in the GMM estimator, as a way of controlling unobserved time effects. Country effects are handled through differencing and instrumentation of the dynamic model specification. The method also takes care of the endogeneity problem by assuming the weakly exogeneity of the explanatory variables, hence establishing the following moment equations:

$$E [y_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t=3 \dots T; \quad (5.21)$$

$$E [X_{i,t-s} \cdot (\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t=3 \dots T; \quad (5.22)$$

The use of instruments accounts for the likely endogeneity of the explanatory variables, such that the new error term $\epsilon_{i,t} - \epsilon_{i,t-1}$ will be correlated with the lagged dependent variable $y_{i,t-2}$.

The GMM difference estimator has been praised for outperforming other simpler panel data estimators. Criticism has been directed at previous levels explanatory variables which are weak instruments for equation (5.24), meant to control for country specific effects, and are persistent over time.

$$y_{it} - y_{it-1} = \alpha (y_{it-1} - y_{it-2}) + \beta'(X_{it} - X_{it-1}) + (\epsilon_{it} - \epsilon_{it-1}) \quad (5.23)$$

Arellano & Bond (1991) and Arellano & Bover (1995) specification tests are carried out on the model, to determine the consistency of the GMM estimators. Arellano & Bond's (1991) tests are used to check for correlation; while the Sargan test (1958) validates the instruments by analysing the sample analogue of the moment conditions used in the estimation process. Availability of both tests depends on the software used. The model is supported if we fail to reject the null hypothesis in both tests (Calderon & Fuentes, 2005).

In modelling South Africa growth, θTB and θFDI are used to present the average trade balance of all the BRIC countries with South Africa.

For the rest of the BRIC, θTB and θFDI represent the average trade balance and average FDIs of South Africa and each BRIC counterpart, respectively.

The trade balance and real effective exchange rate as specified in model 5.3 are used as explanatory variables in each individual BRICS growth model. $GDCF$, $INVE$ and $RINT$ were removed for failing the diagnostic checks.

The adjusted BRICS' growth model is presented as follows:

$$RGDPi_t = \beta_0 + \beta_1 \theta TBi_t + \beta_2 \theta FDIi_t + \beta_3 REXChi_t + \beta_9 DUM + \mu_t \quad (5.24)$$

The model above is firstly tested in its series through the panel unit root test. Following is the identification of individual and time effects. An endogeneity test is performed to determine the relationship between individual effects and explanatory variables. If a variable is found to be closely related with another variable, that variable is regarded as endogenous. The endogeneity test is followed by model estimation. The GMM estimator over dynamic panel data is used as the estimation technique.

Our growth analysis is based on cross country and time series observations for BRICS countries using average data from 1990-2014, except for initial GDP per capita and real exchange rate which take the first observation within each period over the period. We used the GMM estimator for dynamic panel analysis, proposed by Blundell and Bond (1998), which explains unobserved country and time-effects and accounts for possible endogenous regressors. More so the GMM estimator can allow data to be entered without passing the stationarity tests. Estimating the model by Ordinary Least Squares (OLS) or within group estimations would potentially lead to biased results, thus, we used the System-GMM estimator developed for dynamic panel data models (Arellano & Bover, 1995; Blundell & Bond, 1998).

The Arellano–Bond serial correlation test was used for detecting non-constant error variance and serial autocorrelation in the model. In cases where the estimation software does not provide for both tests, White’s robust standard errors correction was applied in all models (Doan, 2010).

5.6.2.3 Dynamic Panel Unit Root Tests

Panel unit root tests draw from the normal unit root testing for time series data. In the testing, an analysis of the asymptotic behaviour of the time-series T and the cross-sectional dimension N is made. The convergence of N and T towards infinity determines the asymptotic behaviour of estimators and tests used for non-stationary panels. According to Baltagi (2005) in Kunst, Nell & Zimmerman (2011), asymptotic behaviour can be corrected in three ways, namely the diagonal path limits, joint limits and the sequential limits. The diagonal path limits allows a monotonic increase diagonally between N and T towards infinity. Joint limits allow N and T to move towards infinity congruently. Lastly, the sequential limit allows N and T to move together towards infinity, but N is allowed to grow starting at a certain intermediate level, termed the sequential limit

A plethora of panel unit root tests have evolved in literature. The prominent tests used in recent econometric packages include the Breitung (2000), Hadri (2000), Levin, Lin & Chu (2002), Maddala & Wu (1999), Choi (2001), IM, Pesaran & Shin (IPS) (2003) and Taylor ve Sarno (1998). This study utilised the GMM moments over dynamic panel data analysis, as such the LLC (2002) and the IPS (2003) tests are used in line with our model specification and sampling size.

The Levin, Lin & Chu (LLC) test is derived from the sequential limit theory and hypotheses that each time series is stationary against the null hypothesis that each series contains a unit root. The tests are run over ADF estimates in a pooled regression analysis. The statistic is most significant when T lies between 5 and 250 and N is between 10 and 250. The test has been criticised for

assuming that all cross sections have a unit root, which is restrictive. More so, the test statistic critically depends on the assumption of cross-sectional independence. Finally, inference power can be lost if the test is applied on smaller samples.

Unlike the LLC test, the Im, Pesaran & Shin (IPS) test is non-restrictive, allowing the heterogeneity of coefficients. The null hypotheses assume that all individuals follow a unit root process. The alternative hypothesis allows some of the individuals to have unit roots. The test requires a range of zero to infinity for its sample size and is based on averaging individual unit root tests. An asymptotical distribution $N(0, 1)$ is obtained on a properly standardized t statistic. LLC and IPS tests can be used concurrently but the IPS is preferable. However, if deterministic trends are included in the regression analysis, both tests become insignificant.

5.6.2.4 Diagnostic Tests

5.6.2.4.1 Hausman Endogeneity Test for Correlated Effects

It is necessary to check if linear models can adequately characterise the panel data. The Hausman (1978) test is the most popular specification test for our model. The test checks on whether the unobserved effect α_i is either random or fixed. In other words, the test checks on whether common effects α_i is correlated with the regressors X_{it} under the maintained assumption of a linear functional notation.

The Hausman test statistic transforms the differences between parameter estimates obtained from random effects and fixed effects estimates which becomes asymptotically distributed χ^2 under the null hypothesis of no endogeneity:

$$H_0: \text{Cov} [x_{it}, \alpha_i] = 0, \quad t=1, \dots, T \quad (5.25)$$

Where, T is the sample size and the degrees of freedom are the number of regressors estimable with the fixed effects.

In line with our model specification, the Hausman test hypothesis is presented as follows:

$$H_0: \text{Cov} [\mu_i, \chi_{it}] = 0 \quad (5.26)$$

$$H_1: \text{Cov} [\mu_i, \chi_{it}] \neq 0 \quad (5.27)$$

H_0 resembles absence of the endogeneity problem, where μ_i are individual effects and χ_{it} are explanatory variables from our estimation equation (5.20).

If the probability value obtained from the analysis is less than 5 percent, H0 is rejected, the endogeneity problem holds and hence the fixed effects model will be used. The alternative hypothesis holds for the random effects model. Hausman test is effective, non-deviated and consistent such that the results are plausible and complementary to other tests decisions (Green, 2003 in Mercan et al. 2013).

5.6.2.4.2 Arellano-Bond Serial Correlation Test

Arellano-Bond (1991) developed moment conditions for dynamic panel data analysis using lagged-levels of the dependent variable and first differences of the disturbances of the predetermined variables. The test draws from Anderson and Hsaio (1981), who first proposed using instrument variables as a solution to correlation between the idiosyncratic error and the dependent variable.

$$y_{it} = X_{it} \beta + p y_{it-1} + \alpha + \mu_{it} \dots \dots \dots t=1, \dots T; i=1, \dots, N \quad (5.28)$$

Equation 5.29 showed a scenario where one lag of the dependent variable is correlated with the regressor (y_{it-1}). First differencing is performed on the equation to eliminate the fixed effect. The resulting equation (5.29) is applied for the GMM estimator in equation 5.24.

$$\Delta y_{it} = \Delta X_{it} \beta + p \Delta y_{it-1} + \alpha + \Delta \mu_{it} \dots \dots \dots t=1 \dots T; i=1, N \quad (5.29)$$

The equation can be rewritten as:

$$\Delta y = \Delta R \pi + \Delta \mu \quad (5.30)$$

$$\pi_{EGMM} = [\Delta R' Z (Z' \Omega Z)^{-1} Z' \Delta R]' \Delta R' Z (Z' \Omega Z)^{-1} Z' y \quad (5.31)$$

Where, Z is the instrument matrix ΔR

Ω matrix is calculated using either residual vectors or variance of error terms of both one-step-bond and two-step bond estimation, consistent and asymptotically efficient with heteroscedasticity (Wikipedia, 2015).

5.7. Chapter Summary

The chapter discussed the methodology, variable analysis and the estimation techniques in the quest of investigating the effect of trade in BRICS on South Africa's growth. The ARDL and panel data frameworks were presented as estimation methods employed in the study. Diagnostic tests will be carried on each of the models for robustness. The contents of this chapter provide a basis for the actual estimations of the study, as portrayed in the succeeding chapter six.

CHAPTER 6

ESTIMATIONS AND ANALYSIS OF RESULTS

6.1 Introduction

This chapter provides an overview of the estimated results and relevant findings by providing an analysis of the empirical findings. The chapter comprises of two major sections. The first section presents results of the ARDL model. The second section presents results of the dynamic panel model. Stationarity, estimation and diagnostic results are provided for each model. Appendix A provides a summary of the estimation results iterations where necessary. The last section concludes the chapter.

6.2 Autoregressive Lag Distributed Model

Quarterly data from 1990Q1 -2014Q4 was used to determine the effect of trade in BRICS on South Africa's growth. Average Trade Balances between SA and BRIC (ϑ TB) and Average Foreign Direct Investment Flows between SA and BRIC (ϑ FDI), Private Investment (INVE), Gross Domestic Capital Formation (GDGF), Real Effective Exchange Rate (REXCH) and Real Interest Rate (RINT) were used as regressors in the growth equation (RGDP). Eviews 9 was provided as the estimation software.

6.2.1 ARDL Unit Root Test

A necessary preliminary step before conducting ARDL cointegration analysis is the pre-testing of integration order of variables. This is so as to avoid inclusion of 1(2) variables.

Graphical presentations of the data showed clear structural breaks in the series after South Africa was admitted into BRICS in 2011. A dummy variable, BREAK, with the value one for these observations and zero everywhere else, was added to carter for such changes. ADF-MAX Breakpoint unit root test developed by Leybourne (1995) was utilised to provide robust statistics towards structural breaks in the series. An additive outlier break type over the SC criterion in trend and intercept was considered for blue estimates.

Table 6.1 presents the ADF Breakpoint unit root test results.

Table 6.1 ADF Breakpoint Unit root Test Results

ADF Test		ADF Test	
Levels		First Differences	
Variable	T- statistic	Variable	T-Statistic
RGDP	-3.73605	RGDP	-5.728376***
9TB	-14.06801*	9TB	-11.55290*
9FDI	-6.480697*	9FDI	-3.82428*
INVE	-3.950387	INVE	-10.527274***
GDCF	-1.564763	GDCF	-8.730420***
REXCH	-4.056315	REXCH	-10.4482***
RINT	-2.627242	RINT	-11.51351***

***, **, * denotes significance at 1%, 5% and 10% levels.

Source: Own Table drawn from Eviews 9 iterations

The null hypothesis is that the series are non stationary against the alternative of stationarity or absence of unit root. The critical values are based on MacKinnon (1996).

9TB and 9FDI are stationary at both levels and first differences 1(1). RGDP, INVE, GDCF, REXCH and RINT are non-stationary at levels 1(0), and become stationary after first differences 1(1). The inclusion of both 1(0) and 1(1) variables is necessary for application of the bounds test.

6.2.2 ARDL Model Specification

The Schwarz criterion (SC) was used as the basis for determining the lag orders for the regressors. The maximum number of lags for the regressors and the independent variable were set at 8. This means a consideration of 425128 models was made for our model choice. The BREAK dummy variable, an intercept and linear trend were entered as fixed regressors as such lagging is not possible.

Results of the model test using Akaike info Criterion (AIC) at 8 lags chose ARDL model (3, 6,3,6,0,2,0) as the most appropriate for our regression analysis. Appendix A (8a) and Figure 6.1 presents the model test results and the model selection graphics respectively.

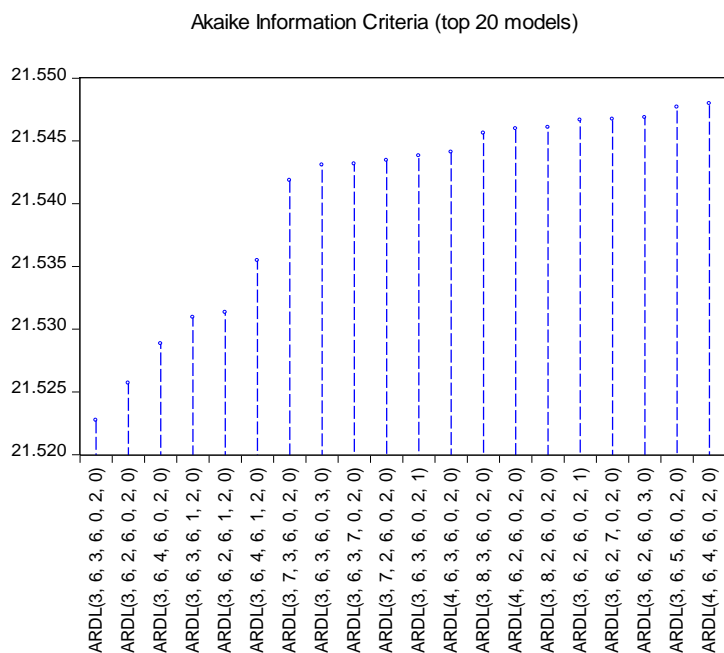


Figure 6.1 ARDL Model Selection

Source: Eviews 9 Iterations

6.2.3 Residual Diagnostic Tests

6.2.3.1 Correlogram Q Statistics

One of the assumptions of the ARDL model is for the serial independence of the parameter estimates. If the lagged values of the dependent variables appear as regressors in the model (serial correlation), parameter estimates would be inconsistent. The correlogram Q statistics probability test presented in 8b (Appendix A) showed no evidence of autocorrelation or partial correlation in the model's residuals.

6.2.3.2 Breusch-Godfrey Serial Correlation LM Test

The Breusch-Godfrey serial correlation LM test was used to validate some of the modelling assumptions inherent in regression analysis. The test follows to identify instances where lagged values of the dependent variables were used as independent variables. The test draws from the Lagrange Multiplier (LM) and the Durbin-Watson test which is, however, less powerful as it tends to focus on non-stochastic and first order regression errors for Autoregressive models.

The serial independence null hypothesis is that there was no serial correlation of any order. Table 6.2 presents an analysis of the Breusch-Godfrey serial correlation LM test.

Table 6.2 Breusch-Godfrey Serial Correlation LM Test Results

F-statistic	0.878703	Prob. F(2,64)	0.4203
Obs*R-squared	2.512207	Prob. Chi-Square(2)	0.2848

Source: Own Table Drawn from Eviews 9 Iterations

The Chi-Square probability value of 0.2848 is not statistically significant at 5 percent level, meaning we do not reject the null hypothesis.

6.2.4 Stability Diagnostic Tests

6.2.4.1 Cusum & CusumsQ Tests

Pesaran & Pesaran (2001) suggested the need to empirically investigate the stability of the model’s estimated coefficients. In this, he proposed the cumulative sum of recursive residuals (Cusum) and the cumulative sum of squares of recursive residuals (CusumsQ) to analyse the stability of the short- and long run dynamic model’s coefficients.

The model is said to be stable if the Cusum and CusumsQ lines are within two red lines mapped at 5 percent level of significance. Figure 6.2 reports on the Cusum and CusumsQ test results.

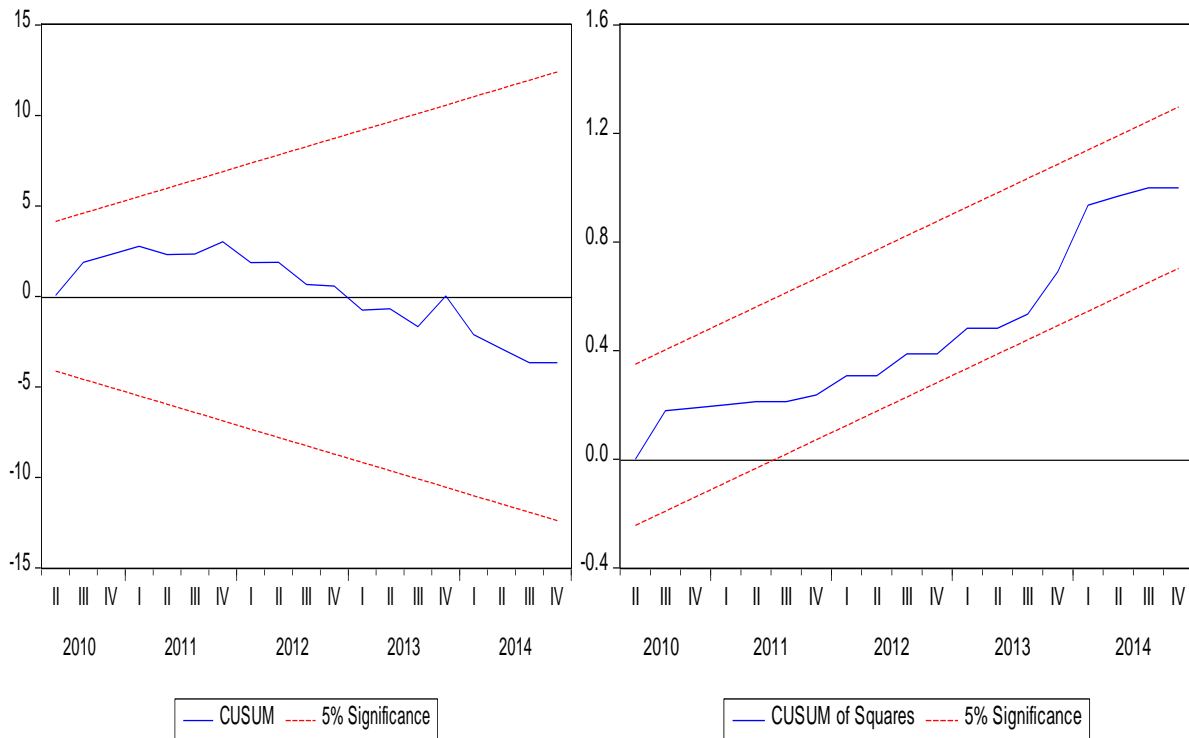


Figure 6.2 Cusum & CusumsQ Test Results

Source: Eviews 9 Iterations

Plots of CUSUM and CUSUMSQ results are within the recommended limit. This is an indication of the stability of the short-run and long-run coefficients of the model.

6.2.5 Coefficient Diagnostics

6.2.5.1 The Bounds Test

The Bounds testing approach proposed by Pesaran et al. (2001) draws from the F and t -statistics in mapping the level of relationship between the dependent variable and a set of regressors in a univariate equilibrium correction set-up. The asymptotic distribution of the F and t -statistics is non-rationalised under the null hypothesis of no level cointegration regardless of whether the regressors are stationary $I(0)$ or differenced $I(1)$.

Two sets of asymptotic critical values (Pesaran et al. 2001: 294) classify the regressors strictly as $I(0)$, jointly cointegrated or $I(1)$. Table 6.3 maps the ARDL bounds test results.

Table 6.3 ARDL Bounds Test Results

Test Statistic	Value	k
F-statistic	3.986530**	6

Critical Value Bounds	I0 Bound	I1 Bound
10%	1.99	2.94
5%	2.27	3.28
1%	2.88	3.99

Source: Own Table drawn from Eviews 9 Iterations

With reference to Pesaran et al (2001:294) the intercept and trend F statistic of 3.986530 is greater than the upper bound value of 3.28 at percent significant level. The results imply the presence of long run cointegration relationship amongst our regressors.

6.2.6 ARDL Cointegrating and Long-Run Form

The ARDL approach is a statistically significant cointegration approach in dynamic time series analysis for small samples. The model includes one or more lagged values of the regressor amongst its explanatory variables. The model is dynamic in nature as it portrays the time path of the dependent variable in relation to its past values (Pesaran & Pesaran, 2001).

The ARDL is preferable to other single equation cointegration procedures due to a number of reasons. Firstly, it allows simultaneous estimation of short and long run parameters of the model to

avoid problems posed by non-stationary time series data. Secondly, there is no need for prior determination of the order of integration amongst the variables. Finally, the model can easily detect the speed of adjustment towards equilibrium for the test variables (Pesaran & Pesaran, 2001).

Cointegration is defined as the level relationship between the regressor and the regress-ants. The bounds test was used to test the validity of a long run equilibrium relationship between the variables. The bounds test results were positive and significant, which is an indication of a long run relationship between the dependent variable RGDP and the independent variables (Δ TB, Δ FDI, INVE, GDCF, REXCH and RINT).

6.2.6.1 Short-Run Cointegration Form

The ECM coefficient shows how slowly/quickly it is for a variable to return to equilibrium.

The short-run coefficient estimates obtained from the ECM version of the ARDL model are reported in Table 6.4

Table 6.4 Estimated Short-run Error Correction Model

ECM-ARDL: Dependent Variable ΔRGDP			
Regressor	Coefficient	T-Statistic	P- Value
Δ TB	0.020770	-4.266675	0.0006
Δ FDI	-0.015608	-2.747027	0.0470
Δ INVE	0.329465	2.400823	0.0192
Δ GDCF	0.202179	1.260544	0.2119
Δ REXCH	647.7466	2.493255	0.0152
Δ RINT	396.6731	0.659123	0.5121
BREAK	-2.254464	-1.859323	0.0074
ECM _{t-1}	0.01134	6.364226	0.0000

Source: Own table Drawn from E views 9 Iterations

The narrowing of the Δ TB by 1 percent increases growth by 0.02 percent. The relationship is positive, explaining the positive outcome from trade in BRICS.

Δ FDI have done little to offset the little growth effect inflicted by Δ TB. A 1 percentage increase in Δ FDI reduces growth by 0.01 percent, which is almost insignificant. This supports literature on the low levels of FDI SA received from BRICS and resounding less beneficial impact it could impose on growth

A positive relationship exists between INVE and RGDP. One percentage increase in INVE increases growth by 0.33 percent.

An appreciation in the exchange rate (REXCH) has positive implications on growth with an insignificant coefficient. The appreciation in exchange rate as a result of improved competitiveness is sustainable and cannot lower growth.

RINT and GDCF results were insignificant.

6.2.6.2 Long-Run Cointegration Form

Bannerjee, Dolado & Mestre (1998) provided guidelines to follow in interpreting long run coefficients. If the error correction term coefficient (ECT) is positive, there is no stable long term relationship amongst the variables. The ECT in our model was positive and statistically significant giving us the decision to accept Bannerjee, et al.'s (1998) hypothesis and as such conclude that there is no long-run stable relationship in our model. Validation of this conclusion was made by looking at the p values of the regressors' coefficients. The p values were insignificant at all levels.

These results entail that the structure and dynamics of trade and FDIs in BRICS is not pronounced to inflict any significant growth in the long term for South Africa. The situation could further deteriorate with less input from Russia due to political sanctions and the recent upheavals in the Brazilian economic and political structure amongst other factors.

6.3 Dynamic Panel Data Analysis

Annual data from 1990 -2014 was used to determine the effect of BRIC-SA trade on growth of BRICS economies. Average Trade Balances between SA and BRIC (θ TB) and Average Foreign Direct Investment Flows between SA and BRIC (θ FDI), Private Investment (INVE) and Real Effective Exchange Rate (REXCH) were used as regressors in the growth equation (RGDP). Eviews 8 was provided as the estimation software.

6.3.1 Dynamic Panel Unit Root Test

Mercan, Gocer, Bulut, & Dam (2013) classified panel unit root tests as first generation or second generation. First generation tests are known as homogeneous while the second generation are heterogeneous. Classification of the panel unit root tests allows solving the problem of whether the cross sections building the panel are independent or not. Breitung (2000), Hadri (2000), and Levin, Lin & Chu (LLC) (2002) are based on the homogeneous model hypothesis while Maddala & Wu (1999), Choi (2001) and IM, Pesaran & Shin (2003) are based on the homogenous model hypothesis.

The study employed the IPS and LLC panel unit root tests. The LLC are estimated as ‘common root’, an indication that the tests are estimated assuming a common Autoregressive (AR) structure for all of the series. IPS follows individual root testing to allow for different AR coefficients in each series. The tests follow the notion that if the probability value is less than 0.05, H0 is rejected. Panel test results are shown in table 6.5.

Table 6.5 Dynamic Panel Unit Root Test Results

IPS			LLC	
Variable	Levels	1 st Difference	Levels	1 st Difference
RGDP	-3.71860***	-10.1415***	-3.26220***	-9.31020***
9TB	-2.61175**	-8.46966***	-1.20353	-2.53710**
9FDI	-4.72510***	-13.0348***	-5.89166***	-14.2599***
REXCH	1.03447	-6.14713***	0.66782	-6.68962***

***, **, * denotes significance at 1%, 5% and 10% levels

Source: Own Table Computed from Eviews 8 Iterations

At level values for series intercept were used. The LLC results show the presence of a unit root for 9TB, INVE and REXCH and as they fail to reject the null hypothesis. IPS results are non-stationary at level save for 9FDI and REXCH. The non-stationary variables become stationary after first differences. Results from the dynamic panel unit root analysis are necessary for panel classification.

6.3.2 Hausman Endogeneity Test for Correlated Random Effects

The key assumption of the random effects modelling is that the random effects are uncorrelated with the explanatory variables. The Hausman test was used to compare the fixed and random effects coefficient estimates, and provide evidence on the modelling to follow (Eviews 9 11:786). Summary of Hausman test results are shown in table 6.6.

Table 6.6 Hausman Test Results

Test Summary	Chi-Sq Statistic	Chi-Sq. d.f	Probability
Cross-section random	0.000000	5	1.0000

Source: Own table with Eviews 8 iterations

The statistic provides strong evidence against the null hypothesis that there is no misspecification. This portrays absence of endogeneity in the model, a condition necessary for random effects modelling analysis.

6.3.3 Dynamic Panel Data Analysis using GMM

A dynamic panel data analysis technique using GMM was utilised in order to investigate the effect of trade with South Africa on growth in BRICS economies. The panel results are shown in table 6.7 below.

Table 6.7 Dynamic Panel Estimates

Dependent Variable ΔRGDP_{t-1}				
Regressor	Coefficient	Std.Error	t-Statistic	Probability
Δ9TB	0.284577	0.113454	2.5088307	0.0135
Δ9FDI	0.286352	0.117237	2.442600	0.0161
ΔREXCH	0.008838	0.015665	0.645650	0.5737
DUMMY	-1.754027	0.844980	-2.075821	0.0401

Source: Own table drawn from Eviews 8 Iterations

Coefficients of both variables are positive, an indication of a positive relationship with economic growth. A percentage increase in 9TFDI will result in a 0.29 percent increase in growth, an indication of the effectiveness of FDI policy within the BRICS member countries. Trade was not spared in contribution towards BRICS's economies growth. A 1 percent increase in 9TB will result in 0.28 percentage increase in growth. Growth effects of real effective exchange rate (REXCH) were insignificant.

6.3.4 Arellano-Bond Serial Correlation Test

Models estimated by GMM allow the computation of the first and second order serial correlation statistics proposed by Arellano & Bond (1991) as one the methods for testing serial correlation. The test follows two separate statistics, namely first order correlation and second order correlation statistics. If the innovations are *i.id*, the first order statistic will be significant. The alternative hypothesis holds for the second order statistic. A positive auto-correlation coefficient accompanies the later (Eviews 8 11: 788).

Table 6.8 presents a summary of the Arellano-Bond serial correlation test results.

Table 6.8 Arellano-Bond Serial Correlation Test Results

Test Order	m-Statistic	rho	SE(rho)	Probability
AR(1)	-2.374995	-1273.069428	536.030469	0.0175
AR(2)	-0.307458	-57.509856	187.049205	0.7585

Source: Own table with Eviews 8 iterations

Results of the Arellano-Bond serial correlation test show that the first order statistic is statistically significant, while the second order statistic is not. This is the correct outcome if the model error terms are uncorrelated in levels (Arellano & Bond, 1991, in Eviews 8 11).

6.3.5 Granger Causality Test

Seth (2007) defines Granger causality as the statistical concept of causality that is based on prediction. According to the theory, if a signal B_1 "Granger-causes" a signal B_2 , then past values of B_1 should contain information that helps predict B_2 above and beyond the information contained in past values of B_2 alone.

The Pairwise Granger causality tests results are reported from Appendix 8c(1) and 8c(2)

Appendix 8c (1) shows the pairwise Granger Causality tests on trade effect with BRICS on South Africa's growth. The analysis is done on each of the BRIC economies and as a group. The individual economic analysis accepts the null hypothesis of no Causality at 5 percent level of significance for all the BRIC economies trade ($\text{\textcircled{9}}\text{TB}$) and foreign investments ($\text{\textcircled{9}}\text{FDI}$) with South Africa. This implies that trade and foreign investments of each of the BRIC economies with South Africa does not affect South Africa's growth.

Performing the same Granger Causality tests from the combined BRIC countries trade and direct foreign investments with South Africa reports that SA-GDP Granger Causes $\text{\textcircled{9}}\text{FDI}$ at 5 percent level with a coefficient of 0.0010 percent. On the other hand SA-RGDP does not Granger Cause $\text{\textcircled{9}}\text{TB}$ and REXCH as the coefficients were insignificant. Finally no Granger Causality exists between $\text{\textcircled{9}}\text{TB}$, $\text{\textcircled{9}}\text{FDI}$ and REXCH on SA-RGDP as all variables fail to reject the null hypothesis. Results of the findings imply that trade and foreign direct investments between South Africa and the BRICS do not lead to South Africa's growth. The results are in line with the ARDL results and confirm similar test results by Sridharan et al (2009) who find that growth leads to FDI bi-directionally on SA growth. Trade and FDI with other BRIC un-directionally caused growth.

Appendix 8c (2) reports on the Granger Causality test the impact of BRIC economies growth as a result of trade and foreign direct investments from South Africa.

With the exception of Δ FDI which Granger Causes REXCH at 0.006 percent significant level, all other results accepted the null hypothesis and confirms an un-directional relationship with growth. Δ TB, Δ FDI and REXCH do not Granger Cause RGDP as the probability values are greater than 5 percent. On the other hand we reject the null hypothesis that RGDP Granger Cause Δ FDI and cannot Granger Cause Δ TB, and REXCH. The Granger causality results are similar to Naude & Rossouw (2011) who recorded inconclusive effect of trade linkages on economic performance of the BRICS.

These results imply that Average trade balances of BRIC trade with South Africa and Average foreign direct investment balances of South Africa and the BRIC does not affect South Africa's economic growth and BRICS economies growth respectively.

6.4 Discussion of Findings

The chapter analysed the effect of trade in BRICS on South Africa's growth and the effect of trade with South Africa on BRICS countries' growth. The chapter was divided into two major sections in which the research questions mentioned above were addressed. The ARDL results were reported in the first section while the dynamic panel results using the GMM were reported in section two. Preliminary checks were conducted on both models to check for stationarity of variables. The AO breakpoint unit root test was conducted on the ARDL model to eliminate structural bias from the series. Panel LLC and IPS tests were conducted on the dynamic panel model for classification purposes. The unit root tests were plausible for all our models estimations.

In the ARDL framework, the bounds test provided positive results towards cointegration. However, after considering the Error Correction Term and insignificance of regressing coefficients, I concluded that a long run relationship between RGDP and the growth regressors was absent. Save for the Δ TFDI and RINT and GDGF, all short-run coefficients of the regressants were positive. The contribution of Δ TB was minimal to instil significant growth linkages. Results from the ARDL framework were similar to those of Bhatia & Kishor (2015) who utilised on Vector Autoregressive modelling to analyse the linkages of foreign portfolio investments and stock market indices in BRICS nations. Results of the study showed that it is difficult for the BRICS to sustain growth without steady inflow of foreign capital, foreign portfolio investment or foreign institutional investors. China and Russia are controlled economies as such foreign investment is retarded. South

Africa, India and Brazil are democracies which have been gradually adopting policies of structural and financial reforms as such their foreign investments are increasing. South Africa's trade deficit with BRICS had negative effects on growth. A strong rand, economic woes of Russia and the political upheavals in Brazil were to blame. Diagnostic test were significant to support the results obtained from the model.

The contribution of private investment (INVE) towards growth remained very low amongst the BRICS economies. The implication was positive, with an unconvincing contribution for South Africa. Priority loans and interest rates should be reconsidered to resuscitate the contribution of the private sector towards growth.

While a number of macroeconomic studies report on positive growth effects of foreign capital (FDI), these studies did not fully control for country-specific effects, endogeneity and use of lagged dependent variables in their growth regression analysis. The GMM was used as a statistical tool to resolve such claims. After controlling for all the effects, the GMM test results were found to be significant hence affirming the macro-economic position. BRIC's trade with South Africa (GTB) was significant to explain growth.

The results were congruent to explain ARDL results which showed very little contribution of trade, negative contribution of foreign investments and insignificant long run relationship with growth. The ARDL results tested on SA growth implications while the GMM results analysed on BRICS economies growth. Findings to the GMM study were reinforced by Prabhakar, Azam, Bakhtyar & Ibrahim (2015), who examined trade and investment patterns in the BRICS with a view to locate development effects in assertion to regional integration in a Panel data analytical framework. Results of the study showed a sustainable relationship between trade, foreign direct investment and growth. Policymakers should remove obstacles to FDI inflows and improve the respective absorptive capacities in order to reap maximize positive growth effects.

From 1990 to 2014, trade related growth of China and India exceeded that of Russia, South Africa and Brazil respectively. The explanation for China's case consists in the early process of the gradual reforms that is the introduction of the policy of "openness" in 1978 and WTO accession in 2001. The Global financial crisis of 2008 caused her trade with developing countries to fall, recovering

later due to trade liberalisation policies. End of the commodities cycle in 2013-2014 and the realignment of trade policy towards consumer oriented growth in 2014.

BRICS states are increasingly dependent on foreign trade. From the perspective of the experts of the WITS (2015) shows that in descending order of export dependence may be mentioned China, South Africa, Russia, India and finally, Brazil. Regarding imports, the situation looks like this: South Africa, China, India, Russia and Brazil. As a consequence, the large commercial dependence leads to an irrational domestic production, consumption and foreign trade structure, affecting GDP because of trade volatility (case of South Africa) (Prabhakar et al, 2015).

Results from the Granger Causality tests showed that ΔTB , ΔFDI and $REXCH$ do not Granger Cause $RGDP$ as the probability values were greater than 5 percent. On the other hand the null hypothesis that $RGDP$ Granger Cause ΔFDI and cannot Granger Cause ΔTB , and $REXCH$ was rejected.

These results imply that Average trade balances of BRIC trade with South Africa and Average foreign direct investment balances of South Africa and the BRIC does not affect South Africa's economic growth and BRIC economies growth respectively.

The results reinforce estimations from the ARDL model which showed absence of a long run relationship between the test variables and growth.

In the GMM category, the findings are in line with Chengxiang & Shen (1999); Kowalski et al (2009) and Polodoo et al (2012). The coefficient for the interaction between BRICS average trade balances and foreign direct investments with South Africa show that the impact of trade and foreign direct investment on economic growth depends on previous years' income or development in the BRICS economies. The effect is however not sustainable for all the BRICS economies because they are mostly resource based.

Growth effects of real effective exchange rate ($REXCH$) were insignificant. Strict trade and exchange controls amongst BRICS economies prior to formalisation could have contributed to insignificant p value. China maintained strict exchange controls in the 1970s to the late 1990s while Brazil trade policies were to blame for little intra-BRICS trade even after formalisation as detailed in chapter three of the study. The insignificant, $REXCH$, and the positive coefficient representing the BRICS currencies value against the dollar supports literature by Wilson & Purushotaman (2003) that currencies tend to appreciate when improved productivity in the economies enable the countries to

converge on purchasing power parity exchange rates. From 2010 onwards the BRICS economies income was increasing, prompting their currencies to move towards the purchasing power parity (Polodoo et al, 2012).

The inconclusiveness of the Granger Causality results on the impact of trade with South Africa on BRIC economies growth are in line with Naude & Rossouw (2011) and confirm the lower GMM coefficients of at least 0.30 percent recorded on each of the variables' impact on BRIC' growth.

The reliability of these results entails that compelling conclusions on the effect of trade in BRICS on South Africa's economic growth can be deduced and applicable policies can be formulated.

CHAPTER 7

CONCLUSIONS AND POLICY RECOMMENDATIONS

7.1 Summary of the Main Findings

The aim of this study was to explore the effects of BRICS trade relations on South Africa's economic growth. In doing so chapter two provided the theoretical foundation and empirical evidence of the study. Growth theories which include the Harrod-Domar growth model, neo-classical growth theory and the new endogenous growth theory were reviewed in the chapter. The new endogenous growth theory was found to be compatible with the present day world in terms of human capital and technological development, thus formulating the basis for the empirical evidence. A debate on aid effectiveness by Sachs and Easterly on aid reinforced growth theories. FDI theories of Dunning, Hymer and Blonigen were also discussed. The theories were developed in their relations with growth through the resource seeking, market seeking and efficiency seeking motives. The chapter also reviewed traditional and new trade theories of growth. New trade theories were recommended based on their dynamism as they intend to look at various demand factors, market structures, externalities and economies of scale. The Dix-Stiglitz and Rodriguez- Rodrik models developed the modern day dynamism of trade through the monopolistic perspectives of intra-industry trade. Studies from developed countries, developing countries and South Africa reinforced the theoretical framework.

Chapter three discussed country, economic and trade profiles of the BRICS economies in order to highlight the potential for collaboration within the alliance. The chapter comprised of three sections. The first section reviewed the formalisation and evolution of the BRICS. Following was an in depth analysis of BRICS's country, economic and trade profiles. A subjective view was presented on trade attributes, pointing out policies, flows and compositions within the member countries. Despite the differences in country size and factor endowments, trade between BRICS has been highly complementary. Brazil, Russia and South Africa emerged strong in the commodity and natural resources sectors, while China and India were exporters of finished products. The beneficial effects of trade were skewed towards China and India. Brazil's trade policies were to blame for their low intra-BRICS trade.

The preceding section discussed on bilateral trade relations between South Africa and the BRICS economies. The first part discussed trade policies implemented in South Africa since the

advent of independence. Following was a review of South Africa's world trade positioning. Bilateral trade relations with BRICS and the leading commodity imports and exports were also discussed. Finally, an in-depth trade intensity and complementarity analysis was done in relation to South Africa, BRICS, the European Union and the rest of the world. An examination of policies, value, structure, intensity and complementarity of trade highlighted the increased dynamism of intra-BRICS trade, starting in 2010. Accession to the World Trade Organisation (WTO), with key aspects of trade reform through trade liberalisation and tariff reduction, necessitated the increase in volume and intensity of trade between South Africa and the BRICS. The overall structure of South Africa trade with BRICS switched from trade in primary products to trade in semi-finished and finished products, an indication of consciousness on global value addition. Apart from BRICS, South Africa has cordial trading relations with the European Union and Sub-Saharan Africa.

The third section unearthed the FDI linkages between South Africa and the BRICS. The chapter began with a review of BRICS's FDI flows. Following was a geographical and sectoral composition of FDI flows from BRICS, and strategies for luring FDI to the host country. FDI links with South Africa in BRICS formed the focal point of the chapter. Official data published from the member countries' government sources mapped FDI stocks within South Africa's bilateral links, and showed considerable inconsistencies and gaps within the data. Firm level data complemented data on stock level by focusing on number and type of investments within each link. A clear examination of bilateral FDI links between South Africa and BRICS using both firm-level data and stock data identified a significant relationship between South Africa's FDIs and the BRIC. A remarkable number of new entries and reinvesting companies were cited after 2010, an indication of rising BRICS significance in recent years. Outward investments were concentrated in sectors where the home economy had well developed capabilities. Financial services and pharmaceuticals were complementary in supporting capability development and internationalisation of firms for both the host and destination economies. A contrasting pattern was spelt out between Chinese and Indian investors when entering South Africa. Indian firms were more cautious and risk averse than Chinese firms. Brazilian investors totally shunned the South African market while Russian investors, though minimal, had equal representation in all sectors.

Chapter four provided an in-depth analysis into the BRICS's new development institutions. The first section discussed the rise of India's development and multilateral institutions under the auspice of the BRICS development institutions. The second section provided theoretical evidence from Latin American countries towards institutionalisation of the BRICS. The third section provided a comprehensive assessment of the NDB and its role in South to South cooperation. Following was a review of the CRA, BRICS business council and the BRICS-Think Tank. The establishment of BRICS institutions provided a valuable platform for BRICS to advance reforms in international financial and development architecture. The BRICS Think Tank and BRICS Business Council provided a platform for policy and decision making responsible for the establishment of the NDB and the CRA. The NDB acted a valuable instrument for implementation of national, regional and global strategies for sustainable development; however, evidence suggests that in the short run the NDB may experience greater difficulties in achieving meaningful scale. The CRA was recommended on the way it embraces the liberal ideals in the main multilateral processes, the ideals of free trade, financial development and financial globalisation. Critics accepted the liberal ideas, but argued that the multilateral process has been abused by the established powers, and the CRA in its current form is unlikely able to redress the dominance.

Chapter five presented the modelling and estimation techniques to test the impact of trade in BRICS on South Africa's economic growth. The methodology combined two analytical models. Trade shocks were assessed using Autoregressive Distributed Lag (ARDL) modelling that incorporated the new endogenous growth model to test various economic growth determinants for South Africa. The resulting effects on growth for all BRICS countries were evaluated using the General Method of Moments (GMM) in a dynamic panel data setup. Theoretical underpinnings emanating from chapter two formed the basis for the analytical framework. The first section specified the model and how estimation was applied. This was followed by data specification, definition of variables and expected results in the third and fourth sections. Section five discussed the ARDL and panel data modelling approaches. Stationarity, cointegration and diagnostics tests were discussed as methods for testing the robustness of each of the modelling techniques.

Chapter six provided an overview of the estimated results and relevant findings by providing an analysis of the empirical findings. The chapter was comprised of two major sections. The first

section presented results of the ARDL model. The second section presented results of the dynamic panel model using GMM. Stationarity, estimation and diagnostic results were provided for each model. Graphical analysis and the unit root tests showed that all the series were non-stationary in level but became stationary after the first difference. Therefore the series were integrated of the same order 1(1). The last section presented findings on Granger Causality tests conducted on panel data to determine the relationship between trade and foreign investments with the BRIC on South Africa and BRIC economies growth.

In the ARDL framework, the bounds test provided positive results towards cointegration. However, after considering the ECT sign and insignificance of regressing coefficients, we concluded that the long-run relationship between RGDP and the growth regressors was absent. Save for Δ FDI which was negative and RINT and GDCF which were insignificant, the short-run cointegration form for all the regressors carried positive signs towards growth. Though positive, Δ TB contribution was very minimal to instil any significant effect on growth. Negative trade balance from a strong rand, non-conducive FDI enabling environment, economic woes of Russia and the political connotations of Brazil were to blame for the anomalies. Diagnostic test results were significant to support the results obtained from the model.

The GMM results were significant for Δ TB and Δ FDI. The BRICS efforts to lure foreign capital investments and trading with South Africa had little but positive implications on growth of their economies. The results were contrary to ARDL estimates but confirming the ARDL results. Diagnostic checks reinforced the robustness of the model.

The Granger Causality tests showed absence of bi-directional relationship between trade and foreign investments with the BRIC on South Africa's economic growth and on the BRIC economies growth. The findings reinforced the ARDL and GMM results which showed absence of long-run cointegration relationship between trade and foreign investments on South Africa's growth and limited contribution of South Africa's trade and foreign investments with BRIC on BRICS economies growth respectively.

7.2 Policy Implications and Recommendations

The findings imply that trade and FDIs from BRIC do not have a reliable impact on economic growth in South Africa. The conclusions were made with analysis of the ARDL short-run and long-run results, the dynamic panel GMM estimates and the simple Granger Causality tests.

The results from the findings imply that the policies and incentives implemented by the government could have had little impact on attracting foreign direct investments and promoting trade that could enhance a significant impact on economic growth.

Patterns of trade and foreign investment occur due to differing synergies amongst the BRICS countries. Firstly, BRICS countries compete with each other in third markets. Secondly, members carry similar economic models. The natural resources sector dominates their productive capacity; as such FDIs and trade with other countries in other sectors is the solution for sustainable growth. Thirdly, lack of research and development and innovation capacity have called for trade and FDIs with Japan, US and the EU. Finally, differences in currency and exchange rate caused positive trade balances to be skewed towards countries with weaker currencies while large FDI inflows were skewed towards countries with strong currencies. These differences will continue for the foreseeable future as member countries intend to trade and invest with outside partners where benefit is comparatively sustainable.

Lessons from the European Union in using the Euro as a regional currency could be adopted in the BRICS. This single currency adoption mechanism could go a long way in alleviating trade balance problems brought about by differences in exchange rates.

In line with recommendations from Edwards & Lawrence, 2012, research and development towards innovative capacities and value addition to South Africa products could go a long way in improving South Africa trade balances with the BRICS.

South Africa's trade policy has been too relaxed to allow imports and subsequently dumping from BRICS member countries. Policy should be revisited towards protecting the local industry as the repercussions have been felt in industry unemployment. Specific tariffs and duty might be necessary to control influx of competing foreign products. At the same time controls should be relaxed on scarce commodities and all areas where research and development, global value addition and innovation capacities are undertaken *ceteris paribus*.

The BRICS new development bank and institutions of lending appear as stable sources for infrastructure development and capacity utilisation. Local investors should be educated on how to obtain such funding and also adapt production models from developed countries like Japan where value addition is most pronounced for developing nations' discourse. Government must also utilise the funding for the establishment of global value adding industries. This should be done in a cost-benefit-analysis approach and stringent monitoring mechanisms to counter against corruptible embezzlement of funds that have crippled major South African industries.

Incentives to lure foreign direct investment are often complex in their design as such they cause distortionary effects within the economy. The appropriate fiscal policy would be of a non-discriminatory simple tax with low rates alike to BRIC and domestic investors. More, so the tax rate should be similar to that charged by the BRIC. Lowering corporate tax rates, ensuring property rights, relaxation of exchange control regulations and lowering real wages serve as policy measures meant to increase intra-BRICS FDIs. The implications would be an increase in inward FDI, which will then excel into economic growth.

7.3 Limitations of the Study and Areas for Further Research

The study used average FDIs to compute data used in the model. This phenomenon does not distinguish the effect of each sectors' contribution to economic growth. This has an implication for implementing policies meant to attract the right kind of FDI that South Africa needs.

Computer general equilibrium methodology would provide an alternative tool to show the contribution of trade in individual sectors on South Africa's growth.

Future research should address the effect of sectoral trade and FDIs on South Africa's growth using the CGE modelling technique and an econometric assessment should be conducted to identify the contribution of NDB loans towards BRICS and South Africa's growth.

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Appendix A

8(a) ARDL Results

Model Test Results

Dependent Variable: RGDP				
Method: ARDL				
Date: 12/13/15 Time: 14:47				
Sample (adjusted): 1991Q3 2014Q4				
Included observations: 94 after adjustments				
Maximum dependent lags: 8 (Automatic selection)				
Model selection method: Akaike info criterion (AIC)				
Dynamic regressors (8 lags, automatic): INVE GDCF REXCH RINT TTB TFDI				
Fixed regressors: BREAK C				
Number of models evaluated: 4251528				
Selected Model: ARDL(3, 6, 3, 6, 0, 2, 0)				
Note: final equation sample is larger than selection sample				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	1.399518	0.104825	13.35095	0.0000
RGDP(-2)	-0.098612	0.181836	-0.542310	0.5894
RGDP(-3)	-0.289570	0.125587	-2.305729	0.0243
INVE	0.007550	0.009637	0.783387	0.4362
INVE(-1)	-0.110746	0.147578	-0.750424	0.4557
INVE(-2)	0.268706	0.156663	1.715179	0.0910
INVE(-3)	0.095997	0.153521	0.625304	0.5339
INVE(-4)	0.260427	0.160336	1.624258	0.1091
INVE(-5)	-0.124282	0.150479	-0.825905	0.4118
INVE(-6)	0.329465	0.137230	2.400823	0.0192
GDCF	-0.210150	0.167037	-1.258105	0.2128
GDCF(-1)	-0.282537	0.257930	-1.095402	0.2773
GDCF(-2)	0.092268	0.265984	0.346894	0.7298
GDCF(-3)	0.202179	0.160390	1.260544	0.2119
REXCH	-414.9369	229.5880	-1.807311	0.0753
REXCH(-1)	332.0112	297.5214	1.115924	0.2685
REXCH(-2)	-81.88735	296.5199	-0.276161	0.7833
REXCH(-3)	657.1841	296.7016	2.214966	0.0302
REXCH(-4)	-464.0608	291.3527	-1.592780	0.1160
REXCH(-5)	-251.9855	299.6234	-0.841007	0.4034
REXCH(-6)	647.7466	259.7996	2.493255	0.0152
RINT	396.6731	601.8193	0.659123	0.5121
TTB	-0.009215	0.005686	-1.620510	0.1099
TTB(-1)	-0.016749	0.005948	-2.816065	0.0064
TTB(-2)	0.020425	0.005676	3.598509	0.0006
TFDI	-0.015608	0.007712	-2.023902	0.0470
BREAK	-27414.49	9184.972	-2.984711	0.0040
C	-23339.10	62069.71	-0.376014	0.7081
R-squared	0.999688	Mean dependent var	2229408.	
Adjusted R-squared	0.999561	S.D. dependent var	478630.5	
S.E. of regression	10032.06	Akaike info criterion	21.50706	
Sum squared resid	6.64E+09	Schwarz criterion	22.26464	
Log likelihood	-982.8320	Hannan-Quinn criter.	21.81307	
F-statistic	7837.975	Durbin-Watson stat	2.070096	
Prob(F-statistic)	0.000000			
*Note: p-values and any subsequent tests do not account for model selection.				

Correlation Test -Correlogram of Residuals

Date: 12/13/15 Time: 16:19

Sample: 1990Q1 2014Q4

Included observations: 94

Q-statistic probabilities adjusted for 3 dynamic regressors

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob...
		1 -0.03...	-0.03...	0.1214	0.728
		2 -0.08...	-0.09...	0.8970	0.639
		3 -0.02...	-0.02...	0.9375	0.816
		4 -0.05...	-0.06...	1.1834	0.881
		5 0.007	-0.00...	1.1878	0.946
		6 0.041	0.031	1.3641	0.968
		7 -0.02...	-0.02...	1.4456	0.984
		8 -0.13...	-0.13...	3.4381	0.904
		9 0.108	0.096	4.6749	0.862
		1... -0.17...	-0.19...	7.7950	0.649
		1... 0.059	0.063	8.1701	0.698
		1... 0.133	0.095	10.106	0.607
		1... 0.028	0.051	10.193	0.678
		1... -0.10...	-0.09...	11.411	0.654
		1... -0.10...	-0.11...	12.709	0.625
		1... 0.004	-0.01...	12.711	0.694
		1... -0.00...	-0.00...	12.711	0.755
		1... 0.084	0.009	13.549	0.758
		1... -0.12...	-0.08...	15.328	0.702
		2... -0.05...	-0.05...	15.642	0.739
		2... 0.050	0.042	15.954	0.772
		2... -0.01...	-0.02...	15.968	0.817
		2... 0.010	-0.00...	15.980	0.856
		2... 0.103	0.073	17.338	0.834
		2... -0.01...	-0.04...	17.375	0.868
		2... -0.10...	-0.06...	18.877	0.842
		2... -0.08...	-0.11...	19.791	0.839
		2... 0.071	0.101	20.486	0.846
		2... -0.04...	-0.12...	20.782	0.867
		3... -0.01...	-0.06...	20.807	0.894
		3... 0.042	0.075	21.060	0.910
		3... -0.05...	-0.02...	21.522	0.920
		3... -0.03...	-0.09...	21.730	0.933
		3... -0.02...	-0.07...	21.796	0.948
		3... -0.00...	-0.03...	21.797	0.960
		3... 0.011	-0.00...	21.815	0.970

*Probabilities may not be valid for this equation specification.

8 (b) Dynamic Panel Result

Dependent Variable: RGDP

Method: Panel Generalized Method of Moments

Date: 03/28/16 Time: 07:21

Sample (adjusted): 1991 2014

Periods included: 24

Cross-sections included: 5

Total panel (balanced) observations: 120

White cross-section instrument weighting matrix

Instrument specification: RGDP C RGDP(-1) TTB TFDI REXCH

DUMMY

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.514151	1.383219	3.263511	0.0014
TTB	0.284577	0.113454	2.508307	0.0135
TFDI	0.286362	0.117237	2.442600	0.0161
REXCH	0.008838	0.015665	0.564196	0.5737
DUMMY	-1.754027	0.844980	-2.075821	0.0401
R-squared	0.064117	Mean dependent var		4.764333
Adjusted R-squared	0.031564	S.D. dependent var		4.755651
S.E. of regression	4.679995	Sum squared resid		2518.770
Durbin-Watson stat	1.075227	J-statistic		11.83808
Instrument rank	7	Prob(J-statistic)		0.002688

8(c) Pairwise Granger Causality Test

8(c)1 Trade with Individual BRIC Economies on SA Growth

Pairwise Granger Causality Tests

Date: 04/11/16 Time: 10:48

Sample: 1990 2014

Lags: 2

Null Hypothesis:	Obs	F-Statistic
RUS TB does not Granger Cause SA GDP	23	0.45374
SA GDP does not Granger Cause RUS TB		0.55089
RUS_SA_FDI does not Granger Cause SA GDP	23	1.21915
SA GDP does not Granger Cause RUS FDI		0.46192
IND TB does not Granger Cause SA_GDP	23	0.76455
SA GDP does not Granger Cause IND TB		0.23934
IND_FDI does not Granger Cause SA_GDP	23	0.22958
SA GDP does not Granger Cause IND FDI		1.80757
CHIN_TB does not Granger Cause SA GDP	23	0.57180
SA GDP does not Granger Cause CHIN TB		1.44235
CHN_FDI does not Granger Cause SA GDP	23	0.16438
SA GDP does not Granger Cause CHN FDI		0.14081
BRZ TB does not Granger Cause SA GDP	23	0.60627
SA GDP does not Granger Cause BRZ TB		0.06884
BRZ_FDI does not Granger Cause SA GDP	23	0.66021
SA_GDP does not Granger Cause BRZ_FDI		0.12025

Trade with all BRIC on SA Growth

Pairwise Granger Causality Tests

Date: 04/10/16 Time: 19:45

Sample: 1990 2014

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TFDI does not Granger Cause TTB	23	0.57565	0.5724
TTB does not Granger Cause TFDI		0.97281	0.3970
RGDP does not Granger Cause TTB	23	1.13085	0.3446
TTB does not Granger Cause RGDP		1.15639	0.3369
REXCH does not Granger Cause TTB	23	0.05654	0.9452
TTB does not Granger Cause REXCH		0.98507	0.3927
RGDP does not Granger Cause TFDI	23	10.2979	0.0010
TFDI does not Granger Cause RGDP		0.25131	0.7805
REXCH does not Granger Cause TFDI	23	0.64048	0.5386
TFDI does not Granger Cause REXCH		1.01221	0.3832
REXCH does not Granger Cause RGDP	23	0.65791	0.5299
RGDP does not Granger Cause REXCH		1.39126	0.2743

8c (2) Trade with South Africa on BRIC Economies growth

Date: 03/22/16 Time: 21:13

Sample: 1990 2014

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TFDI does not Granger Cause RGDP	115	0.31752	0.7286
RGDP does not Granger Cause TFDI		2.80878	0.0646
TTB does not Granger Cause RGDP	115	0.48810	0.6151
RGDP does not Granger Cause TTB		1.34036	0.2660
REXCH does not Granger Cause RGDP	115	0.77550	0.4630
RGDP does not Granger Cause REXCH		2.20399	0.1152
TTB does not Granger Cause TFDI	115	2.08307	0.1294
TFDI does not Granger Cause TTB		0.38205	0.6834
REXCH does not Granger Cause TFDI	115	0.34705	0.7075
TFDI does not Granger Cause REXCH		5.26257	0.0066
REXCH does not Granger Cause TTB	115	0.55115	0.5779

8(d) Data Used in Modelling
ARDL Modelling 1990Q1-2014Q4

Date	RGDP	INVE	GDCF	REXCH	RINT	θTB BRIC	φFDI BRIC	BREAK
1990/01	1633382	4504	238752	104.64	21.1	-79010	31085	0
1990/02	1632035	2777	233572	103.5	21.12	-54898	110527	0
1990/03	1630663	3674	227376	102.06	21.11	-26129	46888	0
1990/04	1632176	4857	221486	106.16	21.02	-62333	20833	0
1991/01	1619194	3309	217077	106.55	20.23	-380222	335277	0
1991/02	1615540	4259	215421	107.89	20.2	-147148	164030	0
1991/03	1614913	4810	211702	108	20.25	-84256	46030	0
1991/04	1612135	2967	208926	108.69	20.25	-172222	60833	0
1992/01	1600838	3031	205693	108.29	19.25	-106906	852778	0
1992/02	1591019	2847	204969	109.87	18.25	-82624	106088	0
1992/03	1572599	5506	200049	109.64	17.25	-93466	55855	0
1992/04	1559236	6397	197542	111.62	17.25	-74314	33558	0
1993/01	1573050	5303	196468	111.27	16.25	-81635	139186	0
1993/02	1590304	5249	198474	108.47	16.25	16395	105855	0
1993/03	1613196	6846	201821	107.35	15.25	-67725	42946	0
1993/04	1625148	6650	207005	109.63	15.25	-8843	977808	0
1994/01	1622832	7319	209074	111.52	15.25	14451	830364	0
1994/02	1640438	7512	213646	105.92	15.25	-788	200580	0
1994/03	1658888	10586	219527	105.44	16.25	-26876	158641	0
1994/04	1686577	11372	227810	106.84	16.25	-23921	106086	0
1995/01	1692669	11464	233056	107.1	17.5	25361	233580	0
1995/02	1700185	9831	242214	101.36	18.5	-69092	143483	0
1995/03	1707524	12625	243393	106.64	18.5	-3496	10780	0
1995/04	1714263	13896	244412	108.14	18.5	8006	22932	0
1996/01	1738318	14230	253381	110.31	19.5	-7656	218085	0
1996/02	1770877	13487	261413	97.74	19.5	-43147	120273	0
1996/03	1790973	12814	266185	93.68	20.25	-20295	168385	0
1996/04	1807959	13511	268852	94.42	20.25	-59763	114071	0
1997/01	1813153	14728	274639	97.75	20.25	-95712	158086	0
1997/02	1824244	14012	277140	107.49	20.25	-78909	118096	0
1997/03	1828055	14045	278334	105.92	19.25	-132319	197808	0
1997/04	1830815	15600	280000	103.56	19.25	-126926	58114	0
1998/01	1833129	17573	286210	104.49	18.25	-80527	130856	0
1998/02	1835721	17442	286001	102.55	25.5	-165893	158031	0
1998/03	1831698	18853	293196	85.36	23.1	-119345	165585	0
1998/04	1833468	20345	297607	88.21	22.2	15894	183113	0
1999/01	1850328	21916	276586	86.09	19.1	-89359	180363	0

1999/02	1865054	24841	265572	88.58	16.5	-4218	163 055	0
1999/03	1885423	23491	264225	89.01	15.5	-64839	133 599	0
1999/04	1906156	23461	268297	90.58	14.5	-75698	235 586	0
2000/01	1927597	26047	272115	91.44	14.5	-182346	205 308	0
2000/02	1945333	30756	276014	89.26	14.5	-175895	183 086	0
2000/03	1964599	38359	281046	89.36	14.5	-21207	165 308	0
2000/04	1981313	26221	287048	84.18	14.5	-133107	148 581	0
2001/01	1994180	25285	287815	81.57	14.5	-92378	158 086	0
2001/02	2004149	29852	287092	83.1	13.5	-129474	60 309	0
2001/03	2009472	50018	287061	82.87	13.2	-96069	47 582	0
2001/04	2024922	45186	286057	63.11	14.1	-55668	203 081	0
2002/01	2051198	34507	290229	65.59	15.2	-114111	18 508	0
2002/02	2076037	36626	292527	70.31	16.2	-109665	1 107	0
2002/03	2093066	31446	298925	70.95	17.2	-134922	82 233	0
2002/04	2107049	81057	306437	82.35	17.1	-187650	33 039	0
2003/01	2126547	102757	311520	81.94	17.2	-144664	85 308	0
2003/02	2136932	72147	322397	91.69	14.5	-175283	10 555	0
2003/03	2148528	84510	332473	94.1	11.5	-143761	78 177	0
2003/04	2160922	68852	343360	97.86	11.5	-219651	43 586	0
2004/01	2193636	51956	353674	89.88	11.5	-116848	58 385	0
2004/02	2224290	55841	360668	97.18	11.1	-29739	120 634	0
2004/03	2260660	79289	375645	97.96	11.2	-191999	16 538	0
2004/04	2284801	68941	388418	102.26	11.2	-149306	232 530	0
2005/01	2308029	68730	392814	101.57	10.5	-79010	133 037	0
2005/02	2349448	77759	403360	99.52	10.5	-62333	77 593	0
2005/03	2381486	81493	403360	98.03	10.5	-17222	67 734	0
2005/04	2397433	80419	415474	102.27	10.5	-74314	45 586	0
2006/01	2439551	88369	429140	104.76	10.5	-81635	38 597	0
2006/02	2474200	87450	438994	104.3	10.5	-8843	73 086	0
2006/03	2508372	85789	451850	93.03	10.5	-23921	3 279	0
2006/04	2543057	77098	467348	92.7	10.5	8006	18 086	0
2007/01	2584351	83878	481864	91.71	10.5	-7656	6 058	0
2007/02	2605530	83999	510060	91.63	10.5	-59763	8 613	0
2007/03	2636065	96949	520181	90.88	10.5	-126926	9 559	0
2007/04	2673414	90698	526153	92.84	10.5	-89359	53 098	0
2008/01	2684648	79330	536830	89.84	10.5	-75698	43 086	0
2008/02	2717424	87178	559722	78.22	10.5	-133107	35 585	0
2008/03	2723918	103252	577411	89.91	11.2	-55668	18 558	0
2008/04	2708410	106306	619509	77.68	11.2	-114111	10 579	0
2009/01	2666281	124730	604986	78.36	11.5	-187650	60 864	0
2009/02	2657131	117719	576222	87.29	11.5	-219651	118 208	0

2009/03	2663293	113025	554497	91.71	12.11	-149306	163 364	0
2009/04	2681051	108722	538820	94.88	12.12	-133107	195 871	0
2010/01	2712661	113439	534409	95.62	12.5	-798004	208 103	1
2010/02	2729279	127688	531277	99.21	12.5	-629566	468 633	1
2010/03	2759874	140584	529522	101.87	12.5	-1739448	418 085	1
2010/04	2790218	118246	527893	104.37	12.5	-750576	623 196	1
2011/01	2815899	124811	529032	101.44	12.5	-808190	133 113	1
2011/02	2830810	137132	546966	101.27	13.5	-87552	105 863	1
2011/03	2838222	126442	554191	97.18	14.5	-236825	78 355	1
2011/04	2860213	129863	561096	90.11	14.5	79261	30 855	1
2012/01	2872040	126112	576699	91.82	15.1	-71208	118 085	1
2012/02	2898241	147016	571867	92.91	15.5	-555800	232 808	1
2012/03	2906902	135521	573675	92.01	15.2	-118041	335 579	1
2012/04	2919809	133396	583000	87.71	15.1	147821	70 586	1
2013/01	2929698	143536	591122	85.74	13.2	-741684	70 585	1
2013/02	2956391	140254	604300	85.64	10.5	-628297	93 086	1
2013/03	2965232	138642	618634	79.74	10.5	-1104789	133 033	1
2013/04	3002235	155678	633083	77.79	10.5	-462049	55 335	1
2014/01	2990658	153401	640491	74.71	10.2	-901479	60 308	1
2014/02	2994639	154386	625295	79.44	10.1	-1482438	678 303	1
2014/03	3010499	166024	616715	78.82	9.1	-1735245	536 330	1
2014/04	3041336	1592024	620442	74.34	9.1	-1179517	783 554	1

Dynamic Panel Data Using GMM 1990-2014

COUNTRY	CROSSID	DATEID	GDP	REXCH	9TB	9FDI	DUMMY
BRAZIL	1	1990	-4.3	100.3	-0.5	-0.2	0
BRAZIL	1	1991	1.5	84.4	-0.3	-0.2	0
BRAZIL	1	1992	-0.5	74.2	0.2	-0.5	0
BRAZIL	1	1993	4.7	78.1	0.2	-0.2	0
BRAZIL	1	1994	5.3	81.4	0.1	-0.5	0
BRAZIL	1	1995	4.4	89	-0.1	-0.6	1
BRAZIL	1	1996	2.1	93.9	0	-0.1	0
BRAZIL	1	1997	3.4	96.4	0.1	-1	0
BRAZIL	1	1998	0.12	93.6	0.2	-4	0
BRAZIL	1	1999	0.3	62.2	0.7	-5	0
BRAZIL	1	2000	4.3	67	1.6	-5.2	0
BRAZIL	1	2001	1.3	56.8	0.4	-4	0
BRAZIL	1	2002	2.7	58.6	0.3	1.2	0
BRAZIL	1	2003	1.1	55.4	0.5	0.2	0
BRAZIL	1	2004	5.7	58.1	0.8	-3	0
BRAZIL	1	2005	3.2	70.9	1	1.2	0
BRAZIL	1	2006	4	79.2	1	-0.9	0
BRAZIL	1	2007	6.1	85.1	1.1	2.6	0
BRAZIL	1	2008	5.2	88.8	1	-1.9	0
BRAZIL	1	2009	-0.3	88.2	0.8	-0.6	0
BRAZIL	1	2010	7.5	100	0.6	-0.3	1
BRAZIL	1	2011	2.7	103.5	0.8	-0.4	1
BRAZIL	1	2012	0.9	93.1	0.9	0.7	1
BRAZIL	1	2013	2.7	87.9	1	0.4	1
BRAZIL	1	2014	0.1	87	0.7	-1.3	1
RUSSIA	2	1990	3.8	99.1	-0.7	-1	0
RUSSIA	2	1991	9.2	87	-0.4	1.2	0
RUSSIA	2	1992	14.2	83.5	0.2	0.2	0
RUSSIA	2	1993	14	88.9	-0.6	-6.2	1
RUSSIA	2	1994	13.1	69.6	-0.4	2.6	0
RUSSIA	2	1995	10.9	77.6	-0.6	0.6	0
RUSSIA	2	1996	10	85.3	0.2	4.8	0
RUSSIA	2	1997	9.3	91.8	-0.1	4.8	0
RUSSIA	2	1998	7.8	96.7	1.8	-4	0
RUSSIA	2	1999	7.6	91.2	1.3	3.8	0
RUSSIA	2	2000	8.4	91.4	0.7	3.5	0
RUSSIA	2	2001	8.3	95.4	0.6	-3.6	0
RUSSIA	2	2002	9.1	93.2	0.9	0.1	0
RUSSIA	2	2003	10	87.1	0.9	0.3	0

RUSSIA	2	2004	10.1	84.7	1.3	-0.2	0
RUSSIA	2	2005	11.3	84.3	3.6	0.6	0
RUSSIA	2	2006	12.7	85.6	4.7	1	0
RUSSIA	2	2007	14.2	88.9	4.4	4.8	0
RUSSIA	2	2008	9.6	97.1	5.5	0.3	0
RUSSIA	2	2009	9.2	100.4	2.7	9.1	0
RUSSIA	2	2010	10.4	100	3.4	8.4	1
RUSSIA	2	2011	9.3	102.7	1.7	8.4	1
RUSSIA	2	2012	7.8	108.4	4.3	15.2	1
RUSSIA	2	2013	7.7	115.2	3.9	5.4	1
RUSSIA	2	2014	7.4	119	6.8	2.4	1
INDIA	3	1990	5.5	45.5	0.1	0.1	0
INDIA	3	1991	1.1	45.3	0.1	0.1	0
INDIA	3	1992	5.5	44.1	0.2	0.3	0
INDIA	3	1993	4.8	44.1	-0.2	0.1	0
INDIA	3	1994	6.7	52.8	0.23	0	0
INDIA	3	1995	7.6	59.7	0.1	0.5	1
INDIA	3	1996	7.5	73.4	0.2	-0.5	0
INDIA	3	1997	4	78.3	0.2	-1	0
INDIA	3	1998	6.2	69	0.1	0.1	0
INDIA	3	1999	8.5	47.1	-0.8	-1.2	0
INDIA	3	2000	4	52	-1.2	0.2	0
INDIA	3	2001	4.9	62.3	-1.2	-0.2	0
INDIA	3	2002	3.9	65.1	-0.1	0.2	0
INDIA	3	2003	7.9	67.3	0.3	0.3	0
INDIA	3	2004	7.8	72.5	1.4	-0.3	0
INDIA	3	2005	9.3	79.4	-0.1	0.4	0
INDIA	3	2006	9.3	87.3	8.3	-0.1	0
INDIA	3	2007	9.8	92.1	4.3	0.8	0
INDIA	3	2008	3.9	98.3	-0.1	0.5	0
INDIA	3	2009	8.5	91.7	-2.6	1.2	0
INDIA	3	2010	10.5	100	-1.9	2.2	1
INDIA	3	2011	6.3	104.9	6.4	0.5	1
INDIA	3	2012	3.2	106.5	8.7	0.2	1
INDIA	3	2013	6.9	108.4	23.8	1	1
INDIA	3	2014	7.9	99.2	0.1	0.8	1
CHINA	4	1990	-3	52.3	0.2	-0.1	0
CHINA	4	1991	-5	48.2	0.11	-0.1	0
CHINA	4	1992	-14.5	52.3	0.1	-0.3	0
CHINA	4	1993	8.7	45.4	-0.1	-0.3	0
CHINA	4	1994	-12.6	52.8	-0.1	-0.2	0

CHINA	4	1995	-4.1	59.7	-0.4	-0.5	0
CHINA	4	1996	-3.6	73.4	0.2	-0.6	0
CHINA	4	1997	1.4	78.3	0.1	-1.2	0
CHINA	4	1998	-5.3	69	-0.1	-1	1
CHINA	4	1999	6.4	47.2	0.2	-0.8	0
CHINA	4	2000	10	52	0.1	-1	0
CHINA	4	2001	5.1	62.3	0.22	-0.8	1
CHINA	4	2002	4.7	65.1	0.1	-1	0
CHINA	4	2003	7.3	67.3	0.22	-2	0
CHINA	4	2004	7.2	72.5	-0.1	1.2	0
CHINA	4	2005	6.4	79.4	2.8	1.8	0
CHINA	4	2006	8.2	87.3	0.2	0.6	0
CHINA	4	2007	8.5	92.1	0.4	0	0
CHINA	4	2008	5.2	98.3	0.1	-0.4	1
CHINA	4	2009	-7.8	91.7	0.3	0.8	0
CHINA	4	2010	4.5	100	-1.7	-1	1
CHINA	4	2011	4.3	104.9	-1.3	-2.1	1
CHINA	4	2012	3.4	106.5	-2.3	-3.2	1
CHINA	4	2013	1.3	108.4	0	0.6	1
CHINA	4	2014	0.6	99.2	-0.1	-1.2	1
SA	5	1990	-0.3	114.7	0	0.35	0
SA	5	1991	-1	119.4	0.2	0.4	0
SA	5	1992	-2.1	123.3	-0.2	0.9	0
SA	5	1993	1.2	121.1	0.2	1.8	0
SA	5	1994	3.2	115.9	0.1	1.8	1
SA	5	1995	3.1	112.7	0.3	1.7	0
SA	5	1996	4.3	103.7	-0.1	1.9	0
SA	5	1997	2.6	109.5	0	2	0
SA	5	1998	0.5	100.6	-0.5	2.3	1
SA	5	1999	2.4	95.1	0	2.7	0
SA	5	2000	4.2	92.1	-0.3	2.6	0
SA	5	2001	2.7	81.3	0.1	2.2	0
SA	5	2002	3.7	69.5	-0.3	2.3	0
SA	5	2003	2.9	90.2	-0.4	1.3	0
SA	5	2004	4.6	97.5	-0.9	2.3	0
SA	5	2005	5.3	98.9	-1.9	1.2	0
SA	5	2006	5.6	94.9	-3.6	0.7	0
SA	5	2007	5.5	89.3	-2.6	1.2	0
SA	5	2008	3.6	79.4	-1.7	0.6	0
SA	5	2009	-1.5	86.6	-3.6	2.5	0
SA	5	2010	3.1	100	-0.1	7.6	1

SA	5	2011	3.5	97.9	-1.9	1.5	1
SA	5	2012	2.5	92.6	-2.9	3.2	1
SA	5	2013	1.9	82.8	-7.2	1.7	1
SA	5	2014	3.5	77.6	-1.9	1.4	1